

sought first. For Divinity says, "Seek ye first the kingdom of God, and all these things shall be added unto you ¹²⁵"; and philosophy says something like it, "Seek ye first the good things of the mind, and the rest will either be supplied or their loss will not be felt". And although the human foundation is sometimes built upon the sand, as we see in Marcus Brutus, when he brake forth into that speech at his death,—

Te colui, Virtus, ut rem; ast tu nomen inane es ¹²⁶:

yet the same foundation, laid by the hand of heaven, is ever laid upon the rock. Here then I conclude the doctrine concerning advancement in life, and with it the general doctrine concerning negotiation.

CHAPTER III.

The Divisions of the Doctrine concerning Empire or Government are omitted;—An Introduction only is made to two Deficients; namely, the Doctrine concerning the Extension of the Bounds of Empire, and the Doctrine concerning Universal Justice, or the Fountains of Law.

I now come to the Art of Empire or Civil Government, which includes Economics, as a state includes a family. On this subject, as I before said, I have imposed silence on myself, though perhaps I might not be entirely unqualified to handle such topics with some skill and profit, as being one who has had the benefit of long experience, and who by your Majesty's most gracious favour, without any merit of his own, has risen through so many gradations of office and honour to the highest dignity in the realm and borne the same for four whole years; and, what is more, being one who has been accustomed for eighteen successive years to the commands and conversation of your Majesty (whereby a very stock might be turned into a statesman), and who also, besides other arts, has spent much time in the study of laws and histories. All which I report to posterity, not through any vain boasting, but because I think that it is of no little importance to the dignity of literature, that a man naturally fitted rather for literature than for anything else, and borne by some destiny against the inclination of his genius into the business of active life, should have risen to such high and honourable civil appointments under so wise a king. But if my leisure time shall hereafter produce anything concerning political knowledge, the work will perchance be either abortive or posthumous. In the mean time, now that all the sciences are ranged as it were in their proper seats, lest so eminent a seat should be left entirely vacant, I have determined to mark as deficient only two parts of Civil Knowledge, which do not belong to the secrets of Empire, but have a wider and more common nature; and according to my custom I will set down examples thereof.

The Arts of Government contain three political duties; first, "the preservation," secondly, "the happiness and prosperity," and thirdly, "the extension," of empire. Of these the two former have in a great measure been excellently handled, but nothing has been said on the last. I will therefore set it down among the deficient, and according to custom, propose an example thereof, calling it "*the Statesman in Armour*," or the "*Doctrine concerning the Extension of the Bounds of Empire*".

¹²⁵ St. Matth. vi. 33.

¹²⁶ Virtue I worshipped, and as real, sought,

But found her empty, and a thing of nought—

which, according to Dio Cassius, xlvii., was the dying exclamation of Brutus. From the way in which the lines are introduced by Dio Cassius, they appear to be a fragment of a speech of Hercules in some lost tragedy. The first line and the first portion of the second (which, in effect, is all that is here translated) occur not only in Dio Cassius, but also in Plutarch, *De Superstitione*, where, however, no reference is made to Brutus. Most editions of Dio Cassius are accompanied by a Latin translation. In the earlier ones of those which I have seen, the words in question are given in prose, and in the later in iambic verse.

*Example of a Summary Treatise touching the Extension of Empire.*¹

THE speech of Themistocles if applied to himself was certainly haughty and arrogant, but if generally applied to others it seems to contain both a wise observation and a severe censure. Desired at a feast to touch a lute, he said, "he could not fiddle, but yet he could make a small town a great city"². Now these words, transferred to a political meaning, excellently describe and distinguish two very different abilities in those that deal in business of state. For if a true survey be taken of the councillors, senators, and other public statesmen who have ever been, there will be found some, though very few, who can make a small city or kingdom great, and yet cannot fiddle; and on the other hand, there will be found many very cunning on the lute or lyre (that is, in the follies of courts), who yet are so far from having the power to make a small state great, that they appear rather to be naturally gifted to bring a great and flourishing state to ruin and decay. And certainly those degenerate arts and shifts, whereby many councillors and ministers often gain both favour with their masters and estimation with the people, deserve no other name than a certain knack of fiddling; being things rather pleasing for the time, and graceful to themselves only, than advantageous to the weal and advancement of the state, whereof they are ministers. There will no doubt be found other councillors and ministers, of no mean character, equal to their business, and able to govern the state well, so as to preserve it from manifest precipices and inconveniences, who nevertheless are far removed from the ability to raise and amplify an empire in power, means, and fortune.

But be the workmen what they may be, let us consider the work itself; that is, what is the true greatness of kingdoms and states, and how it can be obtained. It is a subject indeed fit for princes to have ever in their hands and carefully to consider; to the end that neither by over-measuring their forces they may engage in vain enterprises beyond their power; nor on the other hand by undervaluing them they may demean themselves to timid and pusillanimous counsels.

The greatness of an empire as regards its size and territory falls under measure; as regard its revenue under computation. The number of the population may be taken by a census; the number and greatness of cities and towns by maps and surveys. But yet there is nothing among civil affairs more subject to error than the forming a true and right valuation of the power and forces of an empire. The kingdom of heaven is likened not to an acorn or any larger nut, but to a grain of mustard seed³; which is the smallest of all seeds, but yet has within itself a certain property and spirit hastily to get up and spread. So there are some kingdoms and states very great in extent of territory, and yet not apt to enlarge or command; and some that have but a small dimension of stem, and yet are apt to be the foundations of great monarchies.

Walled towns, stored arsenals and armouries, goodly races of horse, chariots of war, elephants, ordnance, artillery, and the like; all this is but a sheep in a lion's skin, except the breed and disposition of the people be stout and warlike. Nay, number itself in armies is not much advantage where the people are of weak courage; for, as Virgil says, it never troubles the wolf how many the sheep be⁴. The army of the Persians in the plains of Arbela was such a vast sea of people, that it somewhat alarmed the commanders in Alexander's army; who came to him therefore and wished him to set upon them by night; but he answered, He would not pilfer the victory: and the defeat was easy⁵. When Tigranes the Armenian, being encamped upon a hill with four hundred thousand men, discovered the army of the Romans being not above fourteen thousand marching towards him, he made himself merry with it, and said, "Yonder men are too many for an embassy, and too few for a fight"⁶. But before the sun set, he found them enough to give him the chase with infinite slaughter. Many are the examples of the great

¹ This Latin treatise on the Extension of Empire is nearly an exact translation of the Essay on the True Greatness of Kingdoms. I have therefore retained the original English with very few alterations.

² Plut. in Them. 2.

³ St. Matth. xiii. 31.

⁴ Virg. Ecl. vii. 52.

⁵ Plut. in Alex. c. 31.

⁶ Plutarch in Lucull. 27. and Appian, *Bell. Mithrid.* c. 85.

odds between number and courage ; so that it may be set down as a sure and tried rule, that the principal point of greatness in any state is that the people itself be by race and disposition warlike. Neither is money the sinews of war, as it is tri- vially said, where the sinews of men's arms in base and effeminate people are fail- ing. For Solon said well to Cræsus, when in ostentation he showed him his gold, " Sir, if any other come that has better iron than you, he will be master of all this gold ?". Therefore let any prince or state think soberly of his forces, except his militia of natives be of good and valiant soldiers. And let princes, on the other side, who have subjects of martial disposition, know their own strength, unless they be otherwise wanting unto themselves. As for mercenary forces (which is the usual help in this case), all examples show that whatsoever state or prince rests upon them, he may spread his feathers for a time, but he will mew them soon after.

The blessing of Judah and Issachar will never meet ; that the same people or nation should be both the lion's whelp, and the ass between burdens⁸. Neither will it be that a people over-laid with taxes should ever become valiant and mar- tial. It is true that taxes levied by consent of the state do abate men's courage less ; as it has been seen notably in the excises of the Low Countries⁹ ; and, in some degree, in the subsidies of England. For you must note, that we speak now of the heart and not of the purse. So that although the same tribute and tax, laid by consent or by imposing, be all one to the purse, yet it works differently upon the courage. So that you may conclude that no people over-charged with tribute is fit for empire.

Let states that aim at greatness take heed that their nobility and gentlemen do not multiply too fast ; for that makes the common subject grow to be a peasant and base swain, driven out of heart, and in effect but the gentlemen's labourer. Even as you may see in coppice woods ; if you leave your staddles too thick, you will never have clean under-wood, but shrubs and bushes. So in countries, if the gentlemen be too many, the commons will be base ; and you will bring it to that, that scarce one man in an hundred will be fit for an helmet ; especially as to the infantry, which is the nerve of an army : and so there will be great population and little strength. This which I speak of has been nowhere better seen than by com- paring of England and France ; whereof England, though far less in territory and population, has been nevertheless an overmatch ; and for this reason, that the yeomen and lower classes of England make good soldiers, which the peasants of France do not. And herein the device of King Henry the Seventh (whereof I have spoken largely in the history of his life) was profound and admirable : in making farms and houses of husbandry of a standard ; that is, maintained with such a proportion of land attached inseparably to them, as may allow a subject to live in convenient plenty and no servile condition ; and to keep the plough in the hands of the owners, or at least the tenants, and not mere hirelings. And thus indeed you shall attain to Virgil's character which he gives to ancient Italy :

Terra potens armis, atque ubere glebæ¹⁰.

⁷ Cf. Lucian's *Charon*.

⁸ Gen. xlix. 9. 14.

⁹ The excise, or accise (from *accisse*) was originally in the Low Countries a municipal tax ; it seems to have arisen from a privilege granted by Charles V. in 1536 to certain towns, of imposing duties on wine, beer, and woollen and silken stuffs. See *Histoire Générale des Provinces-Unies*, i. 236. That the inhabitants of these countries were from an early time jealous of the administration of public money appears from the fol- lowing passage from *Meteranus* : " Status Belgici, Italico et Gallico gravatai bello, novennalem exactionem Regi consentiunt : harum autem pecuniarum administra- tionem et præsidiorum atque turmarum publice merentium satisfactionem suo officio reservant : quæ res multis sibi id arrogantibus non parum displicuit : hinc Regis subditorumque mutua alienatio et offensio orta, cum Regi esset persuasum, hoc modo suæ majestati summopere derogari ".—*Hist. Belg. Meter.* in anno 1554.

¹⁰ Virg. *Æn.* i. 531 :—

Hesperia called, a land divinely blessed,
Of strength in arms and fruitful soil possessed.

Neither is that state, (which, for anything I know, is almost peculiar to England, and hardly to be found anywhere else, except it be perhaps in Poland,) to be passed over; I mean the state of free servants and attendants upon noblemen and gentlemen, who are no ways inferior to the yeomanry as infantry. And therefore out of all question, the splendour and magnificence and great retinues and hospitality of noblemen and gentlemen received into custom conduce much unto martial greatness; whereas, contrariwise, the close and reserved living of noblemen and gentlemen causes a penury of military forces.

By all means it is to be looked to, that the trunk of Nebuchadnezzar's tree of monarchy¹¹ be great enough to bear the branches and the boughs; that is, that the natural subjects of the crown or state bear a sufficient proportion to the stranger subjects that they govern. Therefore all states that are liberal of naturalization towards strangers are fit for empire. For to think that an handful of people can, with the greatest courage and policy in the world, embrace too large extent of dominion, it may hold for a time, but it will fail suddenly. The Spartans were a difficult and jealous people in point of naturalization; whereby, while they kept their compass, they stood firm; but when they did spread, and their boughs were become too great for their stem, they became a windfall upon the sudden. Never was any state in this point so open to receive strangers into their body as were the Romans; therefore it sorted with them accordingly, for they grew to the greatest monarchy. Their manner was to grant naturalization, which they called the right of citizenship, and to grant it in the highest degree, that is, not only the right of commerce, the right of marriage, the right of inheritance; but also, the right of voting, and the right of bearing office; and this not to single persons alone, but likewise to whole families; yea, to cities, and sometimes to nations. Add to this their custom of plantation of colonies, whereby the Roman plant was removed into the soil of other nations: and putting both constitutions together, you will say that it was not the Romans that spread upon the world, but it was the world that spread upon the Romans: and that was the surer way of greatness. I have marvelled sometimes at Spain, how they clasp and contain so large dominions with so few natural Spaniards; but sure the whole compass of Spain is a very great body of a tree, far above Rome and Sparta at the first. And besides, though they have not had that usage to naturalize liberally yet they have that which is next to it; that is, to employ, almost indifferently, all nations in their militia of ordinary soldiers; yea, and sometimes in their highest commands¹². Nay, it seems at this instant they are sensible of this want of natives and desire to remedy it; as appears by the pragmatical sanction published in this year¹³.

¹¹ Daniel, c. iv.

¹² E.g. Bourbon, Prosper, Colonna, Pescara, Egmont, Castaldo, Parma, Piccolomini, Spinola. Of these, however, one or two might almost be called Spaniards; and it must be remembered that the dominions of Charles V. and his successors extended beyond the natural limits of the Spanish monarchy.

¹³ In 1618, the Cortes, among other projects of reformation, petitioned the king not to grant any licences for monastic foundations.

The excessive multiplication of religious houses had attracted the attention of the government long before; and the opinions of a number of ecclesiastics were taken on the subject, in 1603, but nothing further seems to have been done. Subsequently, however, to the representation of the Cortes, the state of the kingdoms belonging to the crown of Castile was referred by the king to the council of Castile; and their report, which is given at full length in Davila's *Life of Philip the Third* (see chap. 86), is known as the *Gran Consulta de 1619*. The distress and depopulation of the parts of Spain to which it refers are stated in very strong language, the causes assigned being mainly excessive and oppressive taxation, the increase of luxury, and the non-residence of the rich on their estates. To relieve the revenue, the revocation of royal grants, when any fair reason could be found for doing so, is recommended. Sumptuary laws are also proposed, and some regulations tending to the relief of the agricultural class. The king is also advised to be cautious in granting licenses to religious houses. Ortiz states expressly that no measures were taken to carry out the recommendation of the council during the reign

It is certain that sedentary and within-door arts, and delicate manufactures (that require rather the finger than the arm), have in their nature a contrariety to a military disposition. And generally all warlike people are a little idle, and love danger better than work; neither must they be too much broken of it, if they shall be preserved in vigour. Therefore it was great advantage in the ancient states of Sparta, Athens, Rome, and others, that they had the use of slaves who commonly dispatched those manufactures. But that is abolished in greatest part by the Christian law. That which comes nearest to it is to leave those arts chiefly to strangers, who for that purpose are to be invited or at least easily received, and to contain the principal bulk of the vulgar natives within those three kinds; tillers of the ground, free servants, and handicraftsmen of strong and manly arts, as smiths, masons, carpenters, and the like; not reckoning professed soldiers.

But above all, for empire and greatness, it is of most importance that a nation profess arms as their principal honour, study, and occupation. For the things which we have formerly spoken of are but qualifications for the use of arms; and what is qualification without intention and act? Romulus after his death (as they report or feign), sent an injunction to the Romans, that above all they should attend to arms, and then they should prove the greatest empire of the world¹⁴. The fabric of the state of Sparta was wholly and carefully (though not wisely) framed and composed to that scope and end to make the people warriors. The Persians and Macedonians had it for a flash. The Britons, Gauls, Germans, Goths, Saxons, Normans, and others, had it for a time. The Turks have it at this day, (being not a little stimulated thereto by their law,) though in great declination. Of Chris-

of Philip the Third; a statement which seems to be fully confirmed by the silence of so copious and seemingly so painstaking an annalist as Gonzalez Davila. The assertion to be found in some French and English books, that the king made a decree in virtue of which those who introduced agricultural improvements on their estates were ennobled, is in itself exceedingly improbable, and has perhaps no other foundation than the imagination of some French economist who may have been misled by the circumstance that in the Cortes of 1618 something was done with respect to proofs of nobility. I speak, however, without having seen Navarrete's *Conservacion della Monarquia*. Soon after the accession of Philip the Fourth a royal decree or *Pragmatica* was published which attempted to carry out some of the recommendations of the council, and which gave certain privileges to persons who married, and further immunities to those who had six children. For some account of its provisions, see Cespedes' *History of the first Six Years of Philip the Fourth* (published at Lisbon in 1631, and reprinted in Spain in 1634), book 3, cc. 17, 18. Cespedes does not precisely fix the date of the decree, but it was plainly issued some time in the summer of 1622, and is no doubt that to which Bacon refers. The date assigned by Desormeaux, namely, the 10th of February 1624, is manifestly wrong; the sumptuary part of the enactment was suspended on the occasion of the visit of Prince Charles in 1623. See Mead's Letters to Stuteville, in *Ellis's Letters*.

It is a historical commonplace to assert that the depopulation of Spain was caused by the expulsion of the Moriscos, but this alone could not have produced so permanent an effect. The energies of the country were exhausted by excessive and unequal taxation; and the increase of the number of religious houses, especially of those belonging to the Mendicant Orders, aggravated the evil. Ranke has justly remarked that Spain must always have been a thinly peopled country; and he might have added, a country in which there seems always to have been a tendency to become depopulated. Thus in a passage of the *Siete Partidas*, quoted in the *Gran Consulta*, it is said to be part of the duty of the king to see that the population of places does not fall off. Even the word *despoblado* suggests a different idea from that which is expressed by weald or wilderness. It may be well to remark that there seems no reason to doubt that the population of Spain is much greater now than it was in the sixteenth century, although for a considerable time there must have been a decrease. Cassmany, in an interesting essay on the subject, has shown how much exaggeration there is in the statements made by Spanish writers of the sixteenth and seventeenth centuries, as to the population and manufacturing industry of the country in earlier times. According to him the population reached its minimum about 1700.

¹⁴ Livy, i. 16.

tian Europe they that still have it are in effect only the Spaniards. But it is so plain that every man profits most in that to which he most attends, that it needs not to be stood upon. It is enough to point at it; that no nation, which does not directly profess arms and devote themselves to the practice thereof, may look to have any special greatness fall into their mouths. And on the other side it is a most certain oracle of time, that those states that continue long in that profession (as the Romans and Turks principally have done), do wonders in extension of empire: and those that have professed arms but for an age have notwithstanding commonly attained that greatness in that age which maintained them long after, when their profession and exercise of arms has grown to decay.

Incident to this point is for a state to have those laws or customs which may reach forth unto them just occasions or at least pretexts for making war. For there is that justice imprinted in the nature of men, that they enter not upon wars (whereof so many calamities do ensue), but upon some weighty, at the least specious, grounds and quarrels. The Turk has at hand for the cause of war the propagation of his law or sect; a quarrel that he may always command. The Romans, though they esteemed the extending the limits of their empire to be great honour to their generals when it was done, yet they never rested upon that alone to begin a war. First therefore, let nations that pretend to greatness have this, that they be quickly sensible of wrongs, either upon borderers, merchants, or public ministers; and that they sit not too long upon a provocation. Secondly, let them be prompt and ready to give aids and succours to their confederates and allies, as it ever was with the Romans, insomuch, as if the confederate had leagues defensive with divers other states, and upon invasion offered did implore their aids severally, yet the Romans would ever be the foremost and leave it to none other to have the honour. As for the wars which were anciently made on the behalf of a kind of party or tacit conformity of estate, I do not see how they may be well justified; as when the Romans made a war for the liberty of Greece; or when the Lacedemonians and Athenians made wars, to set up or pull down democracies and oligarchies; or when wars were made by commonwealths and princes, under the pretence of justice or protection, to deliver the subjects of others from tyranny and oppression, and the like. Let it suffice for the present, that no estate expect to be great that is not awake upon any just occasion of arming.

No body can be healthful without exercise, neither natural body nor politic; and certainly to a kingdom or estate a just and honourable war is the true exercise. A civil war indeed is like the heat of a fever; but a foreign war is like the heat of exercise, and serves most of all to keep the body in health. For in a slothful peace both courage will effeminate and manners corrupt. But howsoever it be for happiness, without all question for greatness, it makes to be still for the most part in arms; and the strength of a veteran army (though it be doubtless a costly business), always on foot, is that which commonly gives the law, or at least the reputation amongst all neighbour states, as may be well seen in Spain; which has had, in one part or other, a veteran army almost continually, now by the space of six-score years¹⁵.

To be master of the sea, is an abridgment of a monarchy¹⁶, Cicero writing to Atticus of Pompey's preparation against Caesar, says, "Pompey's counsel is plainly that of Themistocles, for he thinks that whoever is master of the sea is master of the empire¹⁷". And without doubt Pompey had tired out and reduced Caesar, if upon vain confidence he had not left that way. We see the great effects of battles by sea from many instances. The battle of Actium decided the empire of the world. The battle of Lepanto arrested the greatness of the Turk¹⁸. There be certainly many examples where sea-fights have put an end to the war; but

¹⁵ Commencing, that is, with the wars in Italy which arose out of the invasion of that country by Charles VIII.

¹⁶ [Orig. "Maris dominium monarchiæ quædam epitome est." The sense is obscure. See the same passage in essays, p. 773.—Ed.] ¹⁷ Cic. Ep. ad Att. x. 8.

¹⁸ Orig. *Pugna ad Insulas Cursolares*. The *Insulæ Cursolares* or *Kurzolari* islands are the ancient Echinades. The naval engagement generally, though perhaps incorrectly, called the Battle of Lepanto, took place off these islands in 1571. The Turkish fleet was defeated with great loss. It was on this occasion that Cervantes lost his hand.

this is when princes or states have risked their whole fortune upon the battles. But thus much is certain, that he that commands the sea is at great liberty, and may take as much and as little of the war as he will; whereas those that be strongest by land are many times nevertheless in great straits. Surely at this day with us of Europe the advantage of strength at sea (which is one of the principal dowries of this kingdom of Great Britain) is great; both because most of the kingdoms of Europe are not merely inland, but girt with the sea most part of their compass; and because the wealth and treasures of both Indies seem in great part but an accessory to the command of the sea.

The wars of latter ages seem to be made in the dark, in respect of the glory and honour which reflected upon men from the wars in ancient time. There be now for martial encouragement some degrees and orders of chivalry, which nevertheless are conferred promiscuously upon soldiers and no soldiers; and some remembrance perhaps upon the escutcheon, and some hospitals, for maimed soldiers, and such like things. But in ancient times, the trophies erected upon the place of the victory, the funeral laudatives and monuments for those that died in the wars, the crowns and garlands personal, the style of emperor, which the great kings of the world afterwards borrowed, the triumphs of the generals upon their return, the great donatives and largesses to the soldiers upon the disbanding of the armies, these, I say, and such like dazzling honours, were things able to inflame all men's courage and excite even the coldest breast; but above all, that of the triumph among the Romans was not a pageant or gaudery but one of the wisest and noblest institutions that ever was. For it contained three things, honour to the general, riches to the treasury out of the spoils, and donatives to the army. But that honour perhaps were not fit for monarchies, except it be in the person of the monarch himself or his sons; as it came to pass in the times of the Roman emperors, who did appropriate the actual triumphs to themselves and their sons for such wars as they achieved in person, and left only for wars achieved by subjects some triumphal garments and ensigns to the general.

To conclude: no man can, by taking thought, as the Scripture saith, "add one cubit to his stature"¹⁹ in this little model of a man's body; but in the great frame of kingdoms and commonwealths it is in the power of princes or states to add amplitude and greatness to their kingdoms. For by wisely introducing such ordinances, constitutions, and customs, as we have now touched, and others like them, they may sow greatness to their posterity and succession. But these counsels are commonly not observed, but left to take their chance.

Such then are the thoughts that now occur to me touching the extension of empire. But what avails this consideration, seeing that the Roman is supposed to have been the last of earthly monarchies? Yet because the extension of empire was set down as the last of the three political duties, I could not have passed it by altogether without deviating from my proposed course. There remains now the other of the two deficiencies which I mentioned; namely, the treatise of Universal Justice, or the Fountains of Equity.

All who have written concerning laws have written either as philosophers or lawyers. The philosophers lay down many precepts fair in argument, but not applicable to use: the lawyers, being subject and addicted to the positive rules either of the laws of their own country or else of the Roman or Pontifical, have no freedom of opinion, but as it were talk in bonds. But surely the consideration of this properly belongs to statesmen, who best understand the condition of civil society, welfare of the people, natural equity, customs of nations, and different forms of government; and who may therefore determine laws by the rules and principles both of natural equity and policy. Wherefore let it be my present object to go to the fountains of justice and public expediency, and endeavour with reference to the several provinces of law to exhibit a character and idea of justice, in general comparison with which the laws of particular states and kingdoms may be tested and amended. I will now therefore according to my custom set forth an example thereof in one of its heads.

¹⁹ St. Matth. vi. 27; St. Luke, xii. 25.

Example of a Treatise on Universal Justice or the Fountains of Equity, by Aphorisms: one Title of it.

PREFACE.

APHORISM I.

IN Civil Society, either law or force prevails. But there is a kind of force which pretends law, and a kind of law which savours of force rather than equity. Whence there are three fountains of injustice; namely, mere force, a malicious ensnarement under colour of law, and harshness of the law itself.

APHORISM 2.

The ground on which private right rests is this. He who commits an injury, receives either pleasure or profit from the act, but incurs danger from the precedent. For others do not share in the particular pleasure or profit, but look upon the precedent as concerning themselves. And hence they readily agree to protect themselves by laws, that the course of injury may not come round to them in turn. But if through the state of the times, and a communion of guilt, it happen that those whom a law protects are not so numerous or so powerful as those whom it endangers, a party is made to overthrow the law; and this is often the case²⁰.

²⁰ The doctrine of this aphorism resembles that of Hobbes, inasmuch as there is no recognition of the principle that moral ideas lie at the root of civil rights. All the evidence of which the nature of the subject admits tends to show that society has always been held together, not by fear, but by notions more or less perfectly developed of the distinction between right and wrong; and to assert that in the absence of any such notions selfish fear could serve as the "*firmamentum juris privati*," is at best to assert that which never has been proved and never can be.

Of course it is not meant to deny that fear is the principle by means of which the moral force of society becomes efficient in the repression of crime.

[That a notion of the distinction between right and wrong in general lies at the bottom of all our notions of individual rights and wrongs; that when we think of one man as doing an *injury* to another, we think of him as doing something not only in its effect hurtful, but in its nature unjust; I do not think Bacon would have denied. That in the absence of any such notion the interest which all men have in protection from injury would lead them to concur in the measures necessary to secure protection to each, he would not, I think, have affirmed. But such questions did not enter into the practical problem with which he had to deal; which was this: Given our common notions of right and wrong, *jus* and *injuria*, with all their constituent elements, what is the principle by which they are made to bear upon the protection of individuals? To this he answers: It is the interest which each individual has in being himself protected. That the personal interest would be insufficient without the sanction of the "moral idea" to stimulate and support it, is probably true; for we see that actions the most dangerous to society, if committed by madmen, and therefore not objects of moral disapprobation, are exempted from punishment; the necessity of self-defence requiring only that measures be taken to prevent the recurrence of them, and the sense of justice refusing to sanction any further severity. But that the "moral idea," unassisted by the sense of personal interest, could be still less relied upon as a "*firmamentum privati juris*," seems to me still more certain; for we see that the penalties exacted or denounced by the laws, though proportioned with tolerable accuracy to the danger of the offence, bear no proportion at all to the moral disapprobation of which it is the object. Actions which are morally wrong in the highest degree, if they be such as every man may protect himself against, are not punished at all. Actions which the moral sense scarcely condemns, if such that the general permission of them would entail a general insecurity of property, are punished with great severity. And the truth seems to be, that to make an action seem a fit object of punishment, there must be *something* morally offensive in it, but that the nature and amount of punishment varies according to the interest of society in preventing it, and the difficulty of effecting that end. Men are not content with less severity than they think necessary for their protection, nor do they feel justified in using more.—J. S.]

APHORISM 3.

Private right depends upon the protection of public right. For the law protects the people, and magistrates protect the laws; but the authority of the magistrates depends on the sovereign power of the government, the structure of the constitution, and the fundamental laws. Wherefore, if this part of the constitution be sound and healthy, the laws will be of good effect, but if not, there will be little security in them.

APHORISM 4.

It is not however the only object of public law, to be attached as the guardian of private right, to protect it from violation and prevent injuries; but it extends also to religion, arms, discipline, ornaments, wealth, and in a word, to everything that regards the well-being of a state.

APHORISM 5.

The end and scope which laws should have in view, and to which they should direct their decrees and sanctions, is no other than the happiness of the citizens. And this will be effected, if the people be rightly trained in piety and religion, sound in morality, protected by arms against foreign enemies, guarded by the shield of the laws against civil discords and private injuries, obedient to the government and the magistrates, and rich and flourishing in forces and wealth. And for all these objects laws are the sinews and instruments.

APHORISM 6.

This end the best laws attain, but many pass wide it. For there is a strange and extreme difference in laws; some being excellent, some moderately good, and others entirely vicious. I will therefore set down, according to the best of my judgment, what may be called certain "laws of laws," whereby we may derive information as to the good or ill set down and determined in every law.

APHORISM 7.

But before I proceed to the actual body of particular laws, I will take a brief survey of the virtues and dignities of laws in general. That law may be set down as good, which is certain in meaning, just in precept, convenient in execution, agreeable to the form of government, and productive of virtue in those that live under it.

TITLE I.

Of the Primary Dignity of Laws, that they be certain.

APHORISM 8.

Certainty is so essential to law, that law cannot even be just without it. "For if the trumpet give an uncertain sound, who shall prepare himself to the battle²¹?" So if the law give an uncertain sound, who shall prepare to obey it? It ought therefore to warn before it strikes. It is well said also, "That that is the best law which leaves least to the discretion of the judge²²"; and this comes from the certainty of it.

APHORISM 9.

Uncertainty of laws is of two kinds; the one, where no law is prescribed; the other, where the law is ambiguous and obscure. We must therefore speak first of cases omitted by the law, that in these also we may find some rule of certainty.

Of Cases omitted by the Law.

APHORISM 10.

The narrow compass of human wisdom cannot take in all the cases which time may discover; whence new and omitted cases often present themselves. For

²¹ 1 Corinth. xiv. 8.

²² Arist. *Rhet.* i. 1.

these, the remedy or supplement is threefold ; namely, by reference to similar cases, by employment of examples which have not yet grown into law, and by jurisdictions empowered to decide according to the arbitration of a good man and sound discretion, whether they be Prætorian or Censorian Courts.

Of reference to Similar Cases, and the Extensions of Laws.

APHORISM 11.

In omitted cases, the rule of law is to be drawn from cases similar to them, but with caution and judgment ; wherein the following rules are to be observed : Let reason be esteemed prolific, and custom barren. Custom must not make cases. Whatever therefore is received contrary to the reason of a law, or even where its reason is obscure, must not be drawn into consequence ²³.

APHORISM 12.

Great public good draws omitted cases to itself. Wherefore when any law notoriously and to an extraordinary degree respects and procures the good of the people, let its interpretation be wide and comprehensive.

APHORISM 13.

It is harsh to torture laws, in order that laws may torture men. We would not therefore that penal, much less capital laws be extended to new offences. If however the offence be old and taken cognizance of by the laws, but the prosecution thereof fall upon a new case, unprovided for by the laws, we ought by all means to depart from the decrees of law rather than leave offences unpunished.

APHORISM 14.

In statutes which directly repeal the common law (especially in matters of frequent occurrence and long standing), we approve not the proceeding by similarity to cases omitted. For when the state has long been without the entire law, and that too in expressed cases, there is little danger in allowing the cases omitted to wait for a remedy from a new statute.

APHORISM 15.

Statutes which have a manifest relation to the time when they were made, and spring out of a temporary emergency of state, when the state of the times is altered, should have all their due, if they retain their authority in the cases proper to them ; for it would be proposterous to wrest them to omitted cases.

APHORISM 16.

Consequence does not draw consequence, but the extension should stop within the next cases ; otherwise there will be a gradual lapse into dissimilar cases, and sharpness of wit will have greater power than authority of law.

APHORISM 17.

When laws and statutes are concise in style, extend freely ; when they enumerate particular cases, more cautiously. For as exception corroborates the application of law in cases not excepted, so enumeration invalidates it in cases not enumerated.

APHORISM 18.

An explanatory statute stops the streams of the statute which it explains, and neither of them admits of extension afterwards. For the judge must not make a super-extension, when the law has once begun an extension.

APHORISM 19.

Formality of words and acts admits not of an extension to similar cases. For formality loses its character when it passes from custom to discretion ; and the introduction of new things destroys the majesty of the old.

²³ Paulus, *Digest.* 141. ff. De Div. Reg. Jur.

APHORISM 20.

The extension of the law to posthumous cases, which had no existence at the time of the passing of the law, is easy. For where a case could not be expressed, as having no existence, a case omitted is taken for a case expressed, if there be the same reason for it.

Enough then on the extensions of laws in cases omitted. I will now speak of the employment of examples.

On Examples, and their Use ²⁴.

APHORISM 21.

I now come to speak of examples, from which justice is to be derived when the law is deficient. Of custom, which is a kind of law, and of examples which by frequent use have passed into custom as a tacit law, I will speak in their place. But here I will speak of such examples as happen seldom and at distant intervals, and have not yet acquired the force of law; to show when, and with what caution, the rule of justice may be sought from them where the law is deficient.

APHORISM 22.

Examples are to be sought from good and moderate times, not from such as are tyrannical, factious, or dissolute. For those belonging to such times are spurious in their origin, and rather injurious than instructive.

APHORISM 23.

Of examples the latest are to be accounted the safest. For why should not that which has been lately done without any subsequent inconvenience be done again? But yet they have less authority; and if it happen that a reform be needed, modern examples savour more of their own age than of right reason.

APHORISM 24.

Ancient examples are to be received cautiously, and with proper selection. For the lapse of time makes many alterations, so that what in respect of time appears ancient is, by reason of the confusion which it makes and its inconformity to the present state of things, really new. Wherefore the best examples are those of the middle time, or else such a time as is most in conformity with the present age; and this is sometimes to be found in a more remote age rather than in that immediately preceding.

APHORISM 25.

Keep within, or rather on this side, of the limits of the example, and on no account go beyond them. For where there is no rule of law, everything should be

²⁴ It is to be observed, that the principle on which the English courts have proceeded—namely, that a decision on a point not previously decided on is to be accepted merely as a declaration of an already existing law virtually contained in the unwritten corpus juris entitled the Common Law—has had the effect of giving nearly equal weight to all cases decided by a competent tribunal. On the other hand, we find in the history of French jurisprudence that great uncertainty has existed as to the degree of authority to which a "res judicata" was entitled; the principle that "res judicata pro veritate accipitur" extending only to the parties between whom the actual decision was had. Thus it is related that De Thou was in the habit of saying, when it was mentioned that in a case similar to the one before him a decree had been given in favour of the plaintiff or defendant, "C'est bon pour lui"; implying that it was not of authority in any other case. The Parliament of Paris was for a long time in the habit of distinguishing the decisions to the principle of which it intended to give force of law from other decisions by a more solemn form of delivering judgment; thereby in effect claiming what our courts have never claimed, namely, a power of making new law. A collection has been published of these quasi-legislative decisions, with the title of "Arrêts rendus en robe rouge". It is evident that the practice of the Parliament of Paris, which was probably followed by other of the French Parliaments, escapes from some of the inconveniences of the English theory.

looked on with suspicion ; and therefore, as in obscure cases, be very careful how you proceed.

APHORISM 26.

Beware of fragments, and epitomes of examples, and look carefully into the whole of the examples with all the process thereof. For if it be unreasonable to judge of part of a law, without examining the whole²⁵ ; much more ought this to have weight in examples, the use whereof is doubtful, if they do not exactly correspond.

APHORISM 27.

It is of great importance through what hands examples have passed, and by whom they have been sanctioned. For if they have only passed among clerks and secretaries, in the ordinary course of the court, without the manifest knowledge of the higher officers ; or among the teacher of all errors, the people ; they are to be condemned and held of little account. But if they have passed under the eyes of senators, judges, or the principal courts, in such a manner that they must needs have been strengthened by at least the tacit approval of the judges, they are entitled to more authority.

APHORISM 28.

Examples, which even though they have been little used have been published, yet having been well debated and ventilated in discourse and discussion, deserve more authority ; but those which have lain as it were buried in desks and archives and have openly passed into oblivion, deserve less. For examples like waters are most wholesome in a running stream.

APHORISM 29.

Examples which have reference to laws should not be sought from historians, but from public acts and the more careful traditions. For it is a misfortune even of the best historians, that they do not dwell sufficiently upon laws and judicial acts ; or if by chance they use some diligence therein, yet they differ greatly from the authentic reporters.

APHORISM 30.

An example, which the same or the succeeding age has upon the recurrence of the case rejected, should not be readily re-admitted. For the fact that it was once adopted does not tell so much in its favour, as the subsequent abandonment tells against it.

APHORISM 31.

Examples are to be used for advice, not for rules and orders. Wherefore let them be so employed as to turn the authority of the past to the use of the present.

Enough then of instruction from examples where the law is deficient. I must now speak of the Courts Prætorian and Censorian.

*On Courts Prætorian and Censorian*²⁶

APHORISM 32.

Let there be courts and jurisdictions to determine, by the judgment and discre-

²⁵ Celsus, *Digest*, i. 3, 24.

²⁶ M. Bouillet remarks that every one who has commented on this tract of Bacon's has condemned the institution of these Courts. M. Dupin is evidently much perplexed by them. "Hic mera utopia proponitur" is the commencement of his note on the thirty second aphorism. Doubtless it is odd that in inquiring how the law may be made certain Bacon should have introduced two Courts, of which the distinguishing character is the absence of any kind of certainty. But to every one who is acquainted with the history of English law, it is manifest that Bacon's intention was to give an idealised description of the Court of Star-Chamber, and of the equity jurisdiction of the Court of Chancery. Of the two institutions which he thus indirectly praises it is not necessary to say much. The Court of Star-Chamber, though of use in particular cases, was un-

tion of a conscientious man, when the rule of the law is deficient. For the law (as has been before said) cannot provide for all cases, but is adapted to meet such as

questionably on the whole an instrument of injustice and oppression; while, on the other hand, if equity had continued to be as indefinite as the jurisdiction of the "*curia prætoris*," it would soon have become a more intolerable evil than any which it could have been applied to relieve.

[The apparent inconsistency of introducing these discretionary tribunals into a scheme specially designed to make the operation of the law *certain*, admits in my opinion of a satisfactory explanation. The uncertainty of the law is injurious in two ways. On the one hand, it may lead me to expect that if I observe certain prescribed conditions, my liberty will not be interfered with; and when I think I have observed them, it may, by some arbitrary or unexpected interpretation, take me up and send me to prison. On the other hand, it may lead me to expect protection against particular kinds of injury or (failing protection) redress; and, from some defect in its provisions, it may fail to prevent the injury or to afford the redress. The first kind of uncertainty resides in the interpretation, the second in the framing, of the law; and against *both* it is necessary, as far as may be, to provide. The *perfect* remedy is a code of laws so framed as to provide expressly for every possible case, coupled with a rule of interpretation which leaves no discretion whatever to the judge. But this is for Utopia. No lawgiver can perfectly foresee either the conditions of cases or the effect of words. Laws will therefore pass occasionally, which, if strictly construed, will punish the man whom they were intended to protect, and protect the man whom they were intended to punish. To correct such errors, a discretion must be allowed somewhere in the administration of the law; and the question is, where? According to Bacon's scheme, the necessary discretion is to be confided, not to the ordinary tribunals, but to others specially constituted for the purpose, and acting under restrictions and regulations specially framed to prevent them from abusing it; lest in correcting one kind of uncertainty, uncertainties of another kind be introduced. What these restrictions and regulations should be, the rest of the section is occupied in explaining.

Now, to supply the defects of the law by the exercise of this kind of discretion was the proper function of the Star-Chamber and the Court of Chancery; and I see no occasion to seek further for Bacon's motive in introducing "an idealised description" of those Courts,—or, I should rather say, a description of two Courts constituted as, in a perfect administrative system, the Star-Chamber and the Court of Chancery ought to be.

With regard to the character of the actual Star-Chamber, we are not to forget that Bacon was not the only eminent jurist who approved of it. Sir Edward Coke, in the fourth book of his *Institutes*, which was written in his old age, when he was regarded as the great champion of the people against the Crown, speaks of it in terms as favourable as ever Bacon did. "It is the most honourable Court" (he says)—"our parliament excepted—that is in the Christian world, both in respect of the Judges of the Court, and of their honourable proceeding according to their just jurisdiction, and the ancient and just orders of the Court." And I cannot help thinking that modern constitutional writers have judged of it too hastily from the accidental and exceptional circumstances which led to its abolition. It was an instrument of *government*. When the government was oppressive and unjust, it was an instrument of oppression and injustice. So, also, at many periods of our history have the Courts of Common Law been. But if we would know whether a Court constituted like the Star-Chamber had any necessary tendency to become an instrument of oppression, we must consider it in connexion with the rest of the constitution. Was it in any special manner under the command of the Crown? Certainly not: it was under the command of the Crown so far only and so long only as the whole powers of government were under the command of the Crown. So far and so long as the King could appoint his own ministers and maintain them and carry on the government with them in spite of the House of Commons, so far and so long he could exercise an effectual control over the proceedings of a Court constituted like the Star-Chamber; no farther and no longer. The body of the Court was composed of the chief officers of the government; less than eight did not make a quorum; their proceedings were public; each member gave his own sentence with the reasons; the majority decided; the decree was solemnly recorded. As soon as the theory of a responsible ministry was recognised, and the impossibility of carrying on the government without money

generally occur. And time, according to the ancient saying, is the wisest of all things²⁷, and daily creates and invents new cases.

APHORISM 33.

Fresh cases happen both in criminal causes, which require punishment, and in civil causes, which require relief. The courts which take cognizance of the former I call Censorian, those which respect the latter, Prætorian.

APHORISM 34.

Let the Censorian Courts have power and jurisdiction, not only to punish new offences, but also to increase the punishments appointed by law for old ones, where the cases are heinous and enormous, provided they are not capital. For an enormous crime has somewhat of the nature of a new one.

APHORISM 35.

In like manner let the Prætorian Courts have power both to abate the rigor of the law and to supply its defects. For if relief is due to a person whom the law has neglected, much more is it due to one whom it has wounded.

APHORISM 36.

Let these Prætorian and Censorian Courts entirely confine themselves to monstrous and extraordinary cases, and not encroach upon the ordinary jurisdictions, lest they rather tend to supplant than to supply the law.

APHORISM 37.

Let these jurisdictions reside only in the supreme courts, and not be shared by the lower; for the power of supplying, extending, and moderating laws, differs little from that of making them.

APHORISM 38.

Let not these courts be entrusted to the charge of one man, but let them consist of many. And let not the decrees go forth in silence, but let the judges give the reasons of their decision, and that openly and in full court; so that what is free in point of power may yet be restrained by regard to character and reputation.

APHORISM 39.

Let there be no authority to shed blood; nor let sentence be pronounced in any court upon capital cases, except according to a known and certain law. God himself denounced death before he inflicted it. Nor should a man be deprived of his life, who did not first know that he was risking it.

APHORISM 40.

In the Censorian Courts, let there be opportunity for three verdicts; that the judges may not be obliged to acquit or condemn, but be at liberty to declare the fact "not proven". And besides the penalty, let there be power also to inflict a note or mark; such I mean as shall not extend to actual punishment, but may end either in admonition only, or in a light disgrace; punishing the offender as it were with a blush.

voted by the House of Commons gave the people an effective check upon the Crown, they would have had a check equally effective upon the proceedings of a court of justice so constituted. Any abuse of its authority would have led to a change of ministry, and to the transfer of that authority to other hands.

With regard to the Court of Chancery, it is less easy to say how it would have worked had its jurisdiction been exercised according to the conditions here prescribed for the *Curia Prætoriae*; one of which is, that it was not to be confided to a single man. "*Curia illa*" (i.e. *Curia Censoria et Prætoria*, see Aph. 36) "*uni viro ne committantur, sed ex pluribus constant.*" And in speculating upon the evil which it might have become, with powers so indefinite, we must not forget how great an evil it has actually become, in consequence of the rules by which its discretion has been defined and limited. The nearest approach to *certainty* attained by the existing system appears to be the certainty of damage to both parties.—*J. S.*]

²⁷ Xen. *Hellen.* iii. 3, 2.

APHORISM 41.

In Censorian Courts, let the commencements and middle acts of all great crimes and offences be punished, even though the end be not consummated²⁸. And let this be even the principal use of these courts; for it is as well the part of severity to punish the commencements of crimes, as of mercy to prevent their completion, by punishing the intermediate acts.

APHORISM 42.

Especial care must be taken, in Prætorian Courts, not to afford relief in such cases as the law has not so much omitted, as depised for their unimportance, or for their odious nature judged unworthy of redress.

APHORISM 43.

It is of the greatest importance to the certainty of laws (of which I am now treating), that Prætorian Courts be not allowed to swell and overflow, so as, under colour of mitigating the rigour of the law, to break its strength and relax its sinews, by drawing everything to be a matter of discretion.

APHORISM 44.

Let not the Prætorian Courts have authority, under any pretext of equity, to decree against an express statute. For in that case the judge would pass into the legislator, and everything would be at discretion.

APHORISM 45.

Some hold that the jurisdiction which decrees according to equity and conscience, and that which proceeds according to strict justice, ought to be deputed to the same courts; but others would have them kept separate. I am clearly for keeping them separate. For if there be a mixture of jurisdictions, the distinction of cases will not be retained, but discretion will in the end supersede the law.

APHORISM 46.

The Prætor's Table at Rome, wherein he set down and published the rules by which he meant to judge, was not established without good reason. And after this example, judges in the Prætorian Courts ought, as far as possible, to propose certain rules for themselves, and set them up where they can be seen by the people. For as that is the best law which leaves the least to the discretion of the judge, so he is the best judge who leaves the least to himself.

But I will treat more fully of these courts when I come to speak of judgments; for here I have only noticed of them in passing, in what way they remedy and supply the omissions of law.

Of the Retrospective Aspect of Laws.

APHORISM 47.

There is likewise another kind of supplement to omitted cases; namely, when one law follows and amends another, and draws the omitted cases along with it. And this is done by those laws and statutes which are called retrospective. But laws of this kind must be used seldom, and with great caution; for we approve not of a Janus in laws.

APHORISM 48.

He who evades and narrows the words or meaning of a law by fraud and cavil deserves to be himself ensnared by a subsequent law. And therefore in cases of fraud and captious evasion it is just that laws should be retrospective, and be of assistance one to the other; that a man who plots to deceive and upset the present laws may at least feel apprehensions from future ones.

²⁸ Of the Star-Chamber Bacon has said in his *History of Henry VII.*, that it took cognizance of "forces, frauds, crimes various, of stellationate, and the incursions of middle acts towards crimes, capital or heinous, not actually committed or perpetrated".

APHORISM 49.

Laws which strengthen and confirm the real intentions of acts and instruments against the defects of forms and usages very properly include past actions. For the principal inconvenience of a retrospective law is that it creates disturbance ; but confirmatory laws of this sort tend rather to peace and the settlement of past transactions. We must however take care not to call in question matters already adjudged.

APHORISM 50.

It must be observed that not those only are to be considered retrospective laws which invalidate acts passed ; but those likewise which prohibit and restrain future acts as necessarily connected with the past. Thus a law which should prohibit certain artisans from henceforth selling their wares seems only to bear upon the future, yet it operates on the past ; for such persons have not now the power to seek their living in another way.

APHORISM 51.

Every declaratory law, though it does not mention the past, yet by the very force of the declaration must needs apply to past transactions. For the interpretation does not date from the time of the declaration, but is made as it were contemporary with the law itself. And therefore enact no declaratory laws, except in cases where they may be justly retrospective.

And here I end that part which treats of Uncertainty of laws where no law exists. I must now speak of that other part, where some law is extant, but confused and obscure.

Of Obscurity of Laws.

APHORISM 52.

Obscurity of laws arises from four sources ; either from an excessive accumulation of laws, especially if they be mixed with such as are obsolete ; or from an ambiguity or want of clearness and distinctness in the drawing of them ; or from negligent and ill-ordered methods of interpreting law ; or lastly, from a contradiction and inconsistency of judgments.

Of Excessive Accumulation of Laws.

APHORISM 53.

The prophet says, " He shall rain snares upon them ²⁹". But there are no worse snares than legal snares, especially in penal laws ; if being infinite in number, and useless through the lapse of time, instead of being as a lantern to the feet they are as nets in the path.

APHORISM 54.

There are two ways in use of making a new statute. The one confirms and strengthens former statutes on the same subject, and then makes a few additions and alterations. The other repeals and cancels all former enactments, and substitutes an entirely new and uniform law. The last method is the best. For by the former the enactments become confused and complicated, and though indeed the immediate object is effected, yet the body of laws is in the meantime corrupted. But in the latter, though greater care is required in deliberating about the law itself, and former acts must be carefully searched and canvassed before it pass ; yet it is the best course for securing harmony in times to come.

APHORISM 55.

The Athenians had a custom of appointing six men to examine every year the contradictory titles of their laws (which they called *Antinomies*) and to report to the people such as could not be reconciled, that a definite resolution might be passed concerning them. After their example let the legislators of every state

²⁹ Psalm xi. 6.

every three or five years, or as often as it appears good, review their Antinomies. And let these be first examined and drawn up by commissioners appointed for the purpose, and then laid before the Parliament, that the matter may be settled and established by vote.

APHORISM 56.

But let there not be too great an eagerness and anxiety to reconcile or salve (as they term it) these contradictory titles by fine and far-fetched distinctions. For this is a web of the wit; which, whatever appearance of modesty and reverence it may bear, must yet be regarded as prejudicial, seeing that it makes the whole body of laws ill-assorted and incoherent. It is therefore far better to let the worse titles drop, and leave the best to stand alone.

APHORISM 57.

It should also be a part of the office of the Commissioners to propose that obsolete laws and such as have fallen into disuse should be repealed, as well as antinomies. For since an express statute is not regularly abolished by disuse, it comes to pass that through the contempt of obsolete laws the authority of the rest is somewhat impaired. And from this ensues a torment like that of Mezentius, whereby the living laws are stifled in the embraces of the dead. And above all things a gangrene in our laws is to be avoided.

APHORISM 58.

But in the meantime let the Prætorian Courts have power to decree against laws and statutes which are obsolete, and have not lately passed. For though it has been well said, "that no one should be wiser than the laws³⁰," yet this must be understood of waking and not of sleeping laws. Not so however with more recent statutes, which are found to be injurious to public justice. The power of giving relief in this case should be left not to the judge, but to kings, councils, and the supreme authorities of the state, who should be empowered to suspend the execution of them by Acts or Proclamations, till the re-assembling of Parliament or of that body which has the power of repealing them; lest in the meantime the welfare of the community be endangered³¹.

³⁰ Bacon refers perhaps to D'Argentré's maxim, "Stulta videtur sapientia quæ lege vult sapientior videri". In the passage from which these words are taken, he is condemning the presumption of judges who depart from the text on the pretence of equity. D'Argentré died in 1590. Cf. Arist. *Rhet.* i. 15, 12; and Thucyd. iii. 37.

³¹ Here, as in the description of the Curia Censoria and Prætoria, reference is made to what actually existed in England in Bacon's time. In the concluding part of this aphorism he sanctions the doctrine that an act of Parliament may provisionally at least be suspended or set aside by an Order in Council. This doctrine was undoubtedly commonly maintained in Bacon's time, but it was nevertheless even then protested against.

[When the rights of the people were not sufficiently secured against the powers of the Crown, and therefore to weaken those powers was a patriotic object, such doctrines were naturally protested against. For when the Crown could successfully and safely abuse the powers it had, the evil could only be remedied or mitigated by taking them away. And it was doubtless by restricting its authority in matters like this that the people were in fact enabled to win the game, and exact sufficient securities for themselves. But we must remember that throughout this treatise Bacon assumes the existence of a government otherwise well constituted. And I am much inclined to think that these securities being once attained, and the House of Commons having in fact a veto upon all the proceedings of the Crown, such an authority might be intrusted to the government both safely and beneficially. Bacon was not considering what powers could be exercised constitutionally, i.e. according to law and precedent, by the English government, but generally what powers it was good for a people that the governing authority should have.—J. S.]

Of New Digests of Laws ³².

APHORISM 59.

But if the laws by accumulation have grown so voluminous, or become so confused, that it is expedient to remodel them entirely and reduce them to a sound and manageable body, let it by all means be done; and let it be considered a heroic work; and let the authors thereof be justly and deservedly reckoned among legislators and reformers of law.

APHORISM 60.

This kind of expurgation and new digest of laws is effected by five processes. First, let obsolete laws, which Justinian calls old fables ³³, be omitted. Secondly, let the most approved antinomies be received, and the rest abolished. Thirdly, let *Homoionomies*, or laws which are of the same import, and nothing else but reiterations of the same thing, be erased, and let the one which is the most perfect among them be retained in place of all the rest. Fourthly, let such laws as determine nothing, but only propose questions, and leave them undecided, be dismissed in like manner. Lastly, let those laws which are found to be wordy and too prolix be more compressed and abridged.

APHORISM 61.

It will be very useful in a new digest of laws to digest and arrange separately on the one side all the laws received as Common Law, the existence whereof is as it were from time immemorial; and on the other side the statutes which have from time to time been superadded. For in many points, in passing judgment, the interpretation and administration of the Common Law are not the same as the Statute Law. And this was the plan followed by Trebonianus in the Digest and Code ³⁴.

APHORISM 62.

But in this regeneration and reconstruction of the laws, by all means retain the words and text of the old laws and law-books, though it be necessary to extract them by scraps and fragments: and afterwards connect them together in proper order. For although this might perhaps be done more conveniently, and, if you look to right reason, more correctly also by a new text than by patching up the old; yet in laws we ought not so much to look to style and drawing up as to authority, and its patron, antiquity. Otherwise the work would appear rather a matter of scholarship and method than a body of commanding laws.

³² This section, and especially the 64th Aphorism, is spoken of with great commendation by perhaps the highest authority on such subjects. See Savigny "On the Vocation of our Time to Legislation," 3d edition, p. 20.

³³ Institut. Proœm. § 3. The great bulk of Justinian's *Institutiones* are merely a reproduction of those of Gaius.

³⁴ The Digest consists of Excerpta from the works of a great number of jurists, so arranged as to form a connected view of the whole of the Roman law. The Codex is a collection of imperial ordinances, most of which relate to particular cases, but are nevertheless of general authority, while others are in form as well as in effect legislative enactments.

The Digest cannot be regarded as a Corpus of customary law: we find in every portion of it continual references to every source of law,—to leges, plebiscita, edicta, senatus consulta, and imperial rescripts and constitutions, as well as to jus civile, in the narrow sense in which the phrase is equivalent to immemorial custom. It is scarcely necessary to mention that Tribonianus was Justinian's chief instrument in the compilation of the *Digest*, *Codex*, and the *Institutes*. The first of these three works is the greatest in extent and importance. It was drawn up by a commission of seventeen persons, of which Tribonianus was the head, as he was likewise of the smaller commissions by which the other two were compiled. By the *Codex* I mean the *Codex Repetitæ Prælectionis*: Tribonianus was not at the head of the commission by which the original *Codex* was drawn up, and it has been conjectured that his dissatisfaction at this circumstance occasioned the revision.

APHORISM 63.

It will be expedient in this new digest of laws that the old volumes do not altogether perish and pass into oblivion; but that they be preserved at least in libraries, though the ordinary and promiscuous use of them be prohibited. For in important cases it will not be amiss to examine and consider the successive changes which have taken place in past laws. And surely it is a reverent thing to intermingle antiquity with things present. But this new body of laws ought to be regularly confirmed by the legislative power of the state; lest under pretence of digesting old laws, new laws be secretly imposed.

APHORISM 64.

It were desirable that this instauration of the laws should be undertaken in such times as are superior in learning and experience to those more ancient times whose works and acts they revise. But the reverse of this happened in the work of Justinian. For it is an unfortunate circumstance, when by the taste and judgment of a less wise and less learned generation the works of the ancients are mutilated and reconstructed. But that is often necessary which is not best.

So much then for obscurity of laws arising from an excessive and confused accumulation thereof. I now come to speak of the ambiguous and obscure drawing up of them.

Of the Confused and Obscure Drawing up of Laws.

APHORISM 65.

Obscure drawing up of laws arises either from their loquacity and verbosity or on the other hand from an excess of conciseness, or from the preamble of the law being at variance with the body.

APHORISM 66.

I must now speak of the obscurity of laws which arises from their being ill drawn up. The loquacity and prolixity used in the drawing up of laws I do not approve. For it does not at all secure its intention and purpose; but rather the reverse. For while it tries to enumerate and express every particular case in apposite and appropriate words, expecting greater certainty thereby; it does in fact raise a number of questions about words; so that, by reason of the noise and strife of words, the interpretation which proceeds according to the meaning of the law (which is the juster and sounder kind of interpretation) is rendered more difficult.

APHORISM 67.

Not that I therefore approve of a too concise and affected brevity, as being the style of majesty and command, especially in these times; lest by chance the law should become like a Lesbian rule³⁵. We must therefore aim at a mean, and look out for a well-defined generality of words; which though it does not attempt to express all the cases comprehended, yet excludes with sufficient clearness the cases not comprehended.

APHORISM 68.

In ordinary laws and proclamations of state however, in which lawyers are not generally consulted, but every man trusts to his own judgment, everything should be more fully explained, and pointed out, as it were with the finger, to the capacity of the people.

³⁵ "Lesbia regula dicitur quoties præpostere, non ad rationem factum, sed ratio ad factum accommodatur."—*Erasm. Adag.* i. 93.

Bacon's meaning is, that if the law be too concisely stated it may be bent by the interpretations which its excessive brevity will render necessary, so as to operate in a way which the legislator did not contemplate. This will more clearly appear to be his meaning from the passage in the *Nicomachean Ethics*, v. c. 10, to which Erasmus refers. In building with irregularly shaped stones, flexible rules might be found of use, and it would appear that the Lesbians were in the habit of employing them.

APHORISM 69.

Nor should I at all approve of the preambles of laws, which were formerly deemed impertinent, and which represent laws disputing and not commanding, if we could endure the ancient manners³¹. But as times now are, these preambles are necessarily used in most cases, not so much to explain the law, as to persuade Parliament to pass it, and also to satisfy the people. But avoid preambles as much as possible, and let the law commence with the enactment.

APHORISM 70.

Though the intention and purport of a law may sometimes be well gathered from the prefaces and preambles, yet the latitude or extension thereof should by no means be sought from thence. For the preamble often selects a few of the most plausible and specious points by way of example, even when the law contains many things besides. Or on the other hand, the law sometimes makes many restrictions and limitations, the reasons whereof need not be inserted in the preamble. Wherefore the extent and latitude of a law is to be taken from the body thereof; for the preamble often either exceeds or falls short of it.

APHORISM 71.

There is one very faulty method of drawing up laws. And this is, when the case at which the law aims is fully set forth in the preamble; and then from the force of the word "such" or some like relative, the body of the law is reflected back upon the preamble, which is thereby inserted and incorporated into the law, and renders it both more obscure and less safe. For the same care is not usually employed in weighing and examining the words of the preamble which is bestowed on the body of the law itself.

But this part of the uncertainty of laws, arising from their being ill drawn up, I will treat of more fully, when I come afterwards to the interpretation of laws. And so much for the obscure drawing up of laws; I must now speak of the methods of expounding law.

Of the Methods of Expounding Law, and Removing Ambiguities.

APHORISM 72.

There are five methods of expounding law, and removing ambiguities: namely, by reports of judgments; by authentic writers; by auxiliary books; by prelections; or by the answers and decrees of learned men. All these if properly instituted will be of great service against the obscurity of laws.

Of the Reporting of Judgments.

APHORISM 73.

Above all things, let the Judgments delivered in the Supreme and Principal Courts on important cases, especially if they be doubtful and contain some difficulty or novelty, be diligently and accurately taken down. For judgments are the anchors of laws, as laws are of the state.

APHORISM 74.

Let this be the method of taking down judgments and committing them to writing. Record the cases precisely, the judgments themselves word for word; add the reasons which the judges allege for their judgments; do not mix up the authority of cases brought forward as examples with the principal case; and omit the perorations of counsel, unless they contain something very remarkable.

APHORISM 75.

Let the reporters be taken from the most learned counsel, and receive a liberal salary from the state. But let not the judges themselves meddle with the reports; lest from being too fond of their opinions, and relying on their own authority, they exceed the province of a reporter.

³⁰ "Jubeat," says Seneca, speaking of law, "non disputet. Nihil videtur mihi ineptius quam lex cum prologo."—*Ep.* 95.

APHORISM 76.

Let these judgments be digested in chronological order, and not by method and titles. For such writings are a kind of history or narrative of the laws. And not only the acts themselves, but the times also when they passed, give light to a wise judge.

Of Authentic Writers.

APHORISM 77.

Let the body of law be composed only of the laws that constitute the Common Law, of the constitutional laws or statutes, and of reported judgments. Besides these, let no others be deemed authentic, or at least let them be sparingly accepted.

APHORISM 78.

Nothing contributes so much to the certainty of laws (whereof I am now treating), as to keep the authentic writings within moderate bounds, and to get rid of the enormous multitude of authors and doctors of laws. For by them the meaning of laws is distracted, the judge is perplexed, the proceedings are made endless, and the advocate himself, as he cannot peruse and master so many books, takes refuge in abridgment. Perhaps some one good commentary, and a few classic authors, or rather some few selections from some few of them, may be received as authentic. Let the rest however be kept for use in libraries, that the judges or counsel may inspect them if necessary; but let them not be allowed to be pleaded in court, or to pass into authorities.

Of Auxiliary Books.

APHORISM 79.

The science and practice of the law should not be deprived of auxiliary books, but rather well furnished with them. These are of six kinds; namely, Institutes: On Terms of Law: On Rules of Law: Antiquities of Laws: Summaries, and Forms of Pleading.

APHORISM 80.

Students and novices are to be educated and trained by Institutes to take in more readily and profoundly the higher parts of the law. Let these Institutes be arranged in a clear and perspicuous order. Let them run through the whole private law, not omitting some things, and dwelling too long on others; but giving a slight sketch of all; so that when the student comes to peruse the body of law he may find nothing entirely new, or of which he has not had a slight notion beforehand. But touch not the public law in these institutes, but let that be drawn from the fountains themselves.

APHORISM 81.

Construct a commentary on legal terms; but let it not enter too curiously or laboriously into an explanation of their full sense. For the object is not so much to look for exact definitions of the words, as for explanations to make the way easier in reading law books. And let not this treatise be digested in the order of the alphabet, but leave that to an index; and let the words which relate to the same thing be arranged together, that the one may serve to explain the other.

APHORISM 82.

A good and careful treatise on the different rules of law conduces as much as anything to the certainty thereof; and it deserves to be entrusted to the ablest and wisest lawyers. For I am not content with the works of this kind which are now extant. The collection should consist not only of the common and well known rules, but of others likewise more subtle and abstruse, which may be gathered from the harmony of laws and decided cases; such as are sometimes found in the best tables of contents; and are in fact the general dictates of reason, which run through the different matters of law, and act as its ballast.

APHORISM 83.

But let not every decree or position of law be taken for a rule ; as is commonly done, ignorantly enough. For if this were admitted there would be as many rules as laws ; for law is nothing else than a commanding rule. But let those be considered rules which are inherent in the very form of justice ; and whereby it comes that for the most part nearly the same rules are found in the civil laws of different states ; except perhaps that they may sometimes vary with reference to the forms of constitutions.

APHORISM 84.

After a rule has been stated in a concise and solid form of words, let examples, and such decisions of cases as are most clear, be added for the explanation ; distinctions and exceptions for the limitation ; and kindred cases for the amplification of the rule.

APHORISM 85.

It is a sound precept not to take the law from the rules, but to make the rule from the existing law³⁷. For the proof is not to be sought from the words of the rule, as if it were the text of law. The rule, like the magnetic needle, points at the law, but does not settle it.

APHORISM 86.

Besides the body of law, it will be of service likewise to take a survey of the antiquities thereof ; of which though the authority has perished, yet the reverence still remains. And by antiquities of laws, I understand those writings on laws and judgments, whether published or unpublished, which preceded the body of law ; for these should not be lost. Wherefore select the most useful of them, (for many will be found to be frivolous and unprofitable) and collect them into one volume ; that old fables, as Trebonianus calls them, may not be mixed up with the actual laws.

APHORISM 87.

It is of great importance to practice, that the whole law should be arranged in order under titles and heads ; to which reference may be made at once, when occasion shall require, as to a store-house provided for present wants. Summaries of this kind both reduce to order what is dispersed in the law, and abridge what is diffuse and prolix. But we must take care that while they make men ready in practice, they do not make them idlers in the science itself ; for their business is to facilitate the recollection of the law, not to teach it. But these summaries are by all means to be constructed with great care, accuracy, and judgment, lest they cheat the laws.

APHORISM 88.

Collect the different forms of pleading of every sort. For this is both a help to practice ; and besides, these forms disclose the oracles and mysteries of laws. For many things lie concealed in the laws, which in these forms of pleading are more fully and clearly revealed ; the one being as the fist, the other as the open hand.

Of Answers and Opinions.

APHORISM 89.

Some means should be devised for solving and clearing away the particular doubts which from time to time arise. For it is hard that they who desire to secure themselves from error should not be able to find a guide ; but that their actions must themselves run the risk, there being no means of knowing the law before the thing is done.

APHORISM 90.

I do not approve that the answers of learned men³⁸, whether advocates or doctors of law, given to those who ask their advice on a point of law, should have

³⁷ Paulus, Digest, *De diversis regulis antiqui juris*, i. 1.

³⁸ Orig. *Responsa Prudentum*. By the Roman Jurists the *Responsa prudentum* are

such authority that the judge should not be allowed to depart from their opinions. Let the laws be taken from sworn judges.

APHORISM 91.

I do not approve that men should make trial of judgments under feigned persons and causes, for the purpose of ascertaining what the rule of law will be³⁹. For this lowers the majesty of the laws and is a kind of prevarication. Besides, it is unseemly for judicial proceedings to borrow anything from the stage.

APHORISM 92.

Therefore, let judgments, as well as answers and opinions, proceed from the judges alone; the former in questions on pending suits, the latter on difficult points of law. And let not these opinions, whether on public or private matters, be demanded from the judges themselves, (for that were to turn the judge into an advocate); but from the king or state. Let the king or state refer them to the judges. Let the judges thus authorised hear the pleadings of the advocates, whether selected by the parties themselves, or (if necessary) appointed by the judges themselves, and the arguments on both sides; and after deliberating on the case let them deliver and declare the law. Let these opinions be recorded and published among judgments, and be of equal authority with them⁴⁰.

reckoned among the *Fontes Juris*, but there are few points in the history of Roman law on which it is more difficult to form a satisfactory opinion. We have no satisfactory information either as to the form in which these *Responsa* were given, or as to the degree of authority with which they were invested. The common opinion is, that they received absolute force of law in virtue of an ordinance of Augustus, and that more precise regulations with respect to cases in which a diversity of opinion existed were made by Hadrian. The connexion between them and the law of citations of Honorius and Valentinian is also a matter of much obscurity. See Böcking's *Pandekten*, i. p. 36. Walter, *Gesch. d. R. Rechts*, § 409 and 421. Hug, *Gesch. d. R. Rechts*, § 313 and 385.

³⁹ Lord Ellenborough refused to try a case in which a bet had been made on a point of law. He asked, it is said, to see the record, and threw it down "with much indignation". Tradition adds that he threw it at the head of the plaintiff's attorney. Until lately, when it was found necessary in proceedings in equity to have the decision of a jury on a question of fact, recourse was had to the machinery of a feigned issue; that is, an action was brought on an imaginary wager as to the truth or falsehood of an agreed-upon statement of facts. Possibly in Bacon's time a similar course may have been adopted in order to obtain the opinion of the judges on points of law. In modern times the practice has been in accordance with what he a little further on recommends; the point of law being referred to the judges directly, who, after hearing counsel, certify their opinion of it to the Chancellor.

⁴⁰ Bacon refers to the practice of extra-judicial consultations as it existed in his own time. It does not, I believe, appear that it was ever the practice for private persons to obtain through the intervention of the Privy Council authoritative decisions on legal questions, but it is well known that the Court occasionally obtained "*præjudicia*" from the judges on points in which it was itself interested. The effect of this practice in promoting judicial servility is well seen in the case of ship-money; the extra-judicial decision of the judges in favour of its legality being unanimous, whereas when the case came on in the exchequer chamber, it was affirmed to be legal by a bare majority of seven against five.

[I cannot think that Bacon alludes to extra-judicial consultations of this kind; which were conducted in a different way from those he recommends, and resorted to for a different purpose. The object of the Government in asking the judges' opinions on the case privately before commencing a prosecution, was to ascertain that the case was a good one, and so avoid the scandal and disrepute which then attended the failure of a Crown prosecution. The object of the proceeding which Bacon here advocates, is to provide a means of settling any disputed point of law, without either waiting for a real cause in which it may be involved, or getting up a fictitious one; and the manner of it is to be public and formal. The case is to be regularly argued and the judgment formally recorded.—*J. S.*]

Of Prelections.

APHORISM 93.

Let the lectures and exercises of those who study and labour at the law be so ordered and instituted, as rather to set legal questions and controversies at rest, than to raise and excite them. For at present they are nothing but schools and institutions for multiplying altercations and controversies on points of law, as if for the display of wit. And this evil is also an old one. For it was likewise the pride of antiquity, as by sects and factions, to keep alive a number of questions of law, rather than to settle them⁴¹. Let this however be provided against.

Of Inconsistency of Judgments.

APHORISM 94.

Inconsistency of judgments arises either from an immature and hasty decision, or from the rivalry of Courts, or from a bad and ignorant reporting of judgments, or from too great facility being given for their reversal. Care therefore should be taken that judgments proceed after mature deliberation; that courts preserve mutual respect for one another; that judgments be faithfully and wisely reported; and that the way to a repeal of judgments be narrow, rocky, and as it were paved with flint stones.

APHORISM 95.

If judgment be given on any case in a principal court, and a similar case occur in any other, do not proceed to pass judgment till a consultation has been held in some general assembly of the judges. For if it be that previous decisions must be rescinded, at least let them be interred with honour.

APHORISM 96.

That Courts should fence and dispute about jurisdiction is natural to humanity; the rather because of a foolish doctrine, that it is the part of a good and active judge to extend the jurisdiction of his Court; which stimulates the disease and applies a spur where a bit is needed. But that through this spirit of contention courts should freely rescind each other's judgments (judgments having nothing to do with the question of jurisdiction) is an intolerable evil, that should by all means be put down by kings or senates or governments. For it is a most pernicious example, that Courts, whose business it is to keep the subjects at peace, should be at war with one another.

APHORISM 97.

Let not the way to a repeal of judgments by appeals, writs of error, new trials, and the like, be much too easy and open. Some hold that a suit should be withdrawn to a higher court, as quite a new cause, the previous judgment being completely laid aside and suspended. Others are of opinion that the judgment itself should remain in full force, whilst only its execution should be deferred. I do not like either of these ways; unless the courts wherein judgment has been delivered be of a low and inferior character; but I would rather let both the judgment stand, and the execution proceed, the defendant only giving security for costs and damages if the judgments be reversed.

⁴¹ Our knowledge of the history of the two sects or schools of jurists which existed during what is called the middle period of Roman jurisprudence is still imperfect, though less so than before the discovery of the *Institutes* of Gaius. It appears probable that the importance of the differences of opinion between them has been exaggerated, and that the sects themselves had died out before the time of Justinian. The two schools respectively regarded Ateius Capito and Anstitius Labeo as their head or founder; but the followers of the former were called Sabinians or Cassians; the other school being that of the Proculeians; all these names being derived from those of certain eminent followers of the two jurists just mentioned. Gaius, the author of the *Institutes*, belonged to the former school, which is said to have been distinguished from the other by a closer adherence to the letter of the law. Probably the best writer on the subject is Dirksen.

This Title then touching Certainty of Laws shall stand as a model of the rest of the Digest which I have in mind.

But here I have concluded Civil Knowledge (as far as I have thought right to handle it), and together with it Human Philosophy, and, with Human Philosophy, Philosophy in General. At length therefore having arrived at some pause, and looking back into those things which I have passed through, this treatise of mine seems to me not unlike those sounds and preludes which musicians make while they are tuning their instruments, and which produce indeed a harsh and displeasing sound to the ear, but tend to make the music sweeter afterwards. And thus have I intended to employ myself in tuning the harp of the muses and reducing it to perfect harmony, that hereafter the strings may be touched by a better hand or a better quill. And surely, when I set before me the condition of these times, in which learning seems to have now made her third visitation to men; and when at the same time I attentively behold with what helps and assistances she is provided; as the vivacity and sublimity of the many wits of this age; the noble monuments of ancient writers, which shine like so many lights before us; the art of printing, which brings books within reach of men of all fortunes; the opened bosom of the ocean, and the world travelled over in every part, whereby multitudes of experiments unknown to the ancients have been disclosed, and an immense mass added to Natural History; the leisure time which the greatest wits in the kingdoms and states of Europe everywhere have at their disposal, not being so much employed in civil business as were the Greeks in respect of their popular governments, and the Romans in respect of the greatness of their monarchy; the peace which Britain, Spain, Italy, France too at last, and many other countries now enjoy; the consumption and exhaustion of all that can be thought or said on religious questions, which have so long diverted many men's minds from the study of other arts; the excellence and perfection of your Majesty's learning, which calls whole flocks of wits around you, as birds round a phoenix; and lastly, the inseparable property of time, ever more and more to disclose Truth; I cannot, I say, when I reflect on these things but be raised to this hope, that this third period will far surpass the Greek and Roman in learning; if only men will wisely and honestly know their own strength and their own weakness; and take from one another the light of invention and not the fire of contradiction; and esteem the inquisition of truth as a noble enterprise, and not a pleasure or an ornament; and employ wealth and magnificence on things of worth and excellence, not on things vulgar and of popular estimation. As for my labours, if any man shall please himself or others in the reprehension of them, they shall make at all events that ancient and patient request, "Strike, but hear"⁴². Let men reprehend them as much as they please, if only they observe and weigh what is said. For the appeal is lawful, though perhaps it may not be necessary, from the first cogitations of men to their second, and from the present age to posterity. Now let us come to that learning which the two former periods have not been so blessed as to know, namely, *Sacred and Inspired Divinity*, the most noble Sabbath and port of all men's labours and peregrinations.

whose work was published in 1525. The distinction between the character of the doctrines of the two schools is not very strongly marked.

⁴² Plut. in Themist. c. 11.

Book IX.

CHAPTER I.

The Divisions of Inspired Divinity are omitted—Introduction only is made to three Deficients ; namely, the Doctrine concerning the Legitimate Use of the Human Reason in Divine Subjects ; the Doctrine concerning the Degrees of Unity in the Kingdom of God ; and the Emanations of the Scriptures.

SEEING now, most excellent king, that my little bark, such as it is, has sailed round the whole circumference of the old and new world of sciences (with what success and fortune it is for posterity to decide), what remains but that having at length finished my course I should pay my vows ? But there still remains Sacred or Inspired Divinity ; whereof however if I proceed to treat I shall step out of the bark of human reason, and enter into the ship of the church ; which is only able by the Divine compass rightly to direct its course. Neither will the stars of philosophy, which have hitherto so nobly shone upon us, any longer supply their light. So that on this subject also it will be as well to keep silence. I will accordingly omit the proper divisions thereof, contributing however a few remarks upon it, according to my slender ability, by way of paying my vows. And I am the more inclined to do this, because in the body of Theology I find no region or district entirely desert and uncultivated ; such has been the diligence of man in sowing wheat or tares.

I will propose therefore three Appendices of Theology, which treat, not of the matter concerning which theology gives or shall give information, but only of the manner in which the information is imparted. I will not however, as in other like cases, either introduce examples or give precepts. That I will leave to theologians ; for these, as I have said, are only in the place of vows.

The prerogative of God comprehends the whole man, extending to the reason as well as to the will ; that man may deny himself entirely, and draw near unto God. Wherefore as we are bound to obey the divine law though we find a reluctance in our will, so are we to believe His word though we find a reluctance in our reason. For if we believe only that which is agreeable to our sense, we give consent to the matter and not to the author, which is no more than we would do to a suspected witness. But that faith which was accounted to Abraham for righteousness was of such a nature that Sarah laughed at it, who therein was an image of natural reason. The more discordant therefore and incredible the Divine mystery is, the more honour is shown to God in believing it, and the nobler is the victory of faith. Nay, even sinners, the more they are oppressed in their conscience, trusting nevertheless to be saved through the mercy of God, the more do they honour Him ; for all despair is a kind of reproach towards God. Howbeit, if we will truly consider it, it is more worthy to believe, than to know as we now know. For in knowledge man's mind suffers from sense, which is the reflection of things material, but in faith the spirit suffers from spirit, which is a worthier agent. Otherwise it is in the state of man glorified, for then faith shall cease, and we shall know even as we are known.

Wherefore we conclude that Sacred Theology ought to be derived from the word and oracles of God, and not from the light of nature, or the dictates of reason. For it is written, "The heavens declare the glory of God"¹, but it is nowhere written, "The heavens declare the will of God" ; but of that it is said, "To the law and to the testimony ; if men do not according to this word," etc.². And this holds not only in those great mysteries which concern the Deity, the

¹ Psalm xix. 1.

² Isaiah, viii. 20.

Creation, and the Redemption ; but it pertains likewise to a more perfect interpretation of the moral law, " Love your enemies " ; " do good to them that hate you ", and so on ; " that ye may be the children of your father who is in heaven, that sendeth rain upon the just and the unjust ³". To which words this applause may well be applied, " that they do not sound human ⁴" ; since it is a voice beyond the light of nature. Again, we see the heathen poets, especially when they discourse of the passions, often expostulate with laws and moral doctrines (which yet are far more easy and indulgent than the divine laws), as if they were contradictory and malignant to the liberty of nature ; " What nature grants the envious laws deny ⁵". So said Dandamis the Indian to Alexander's messengers, " That he had heard somewhat of the name of Pythagoras and some other wise men of Greece, and that he held them for excellent men ; but that they had a fault, which was that they had too great reverence and veneration for a kind of phantom, which they called law and manners ⁶". Wherefore it must be confessed that a great part of the moral law is higher than the light of nature can aspire to. Nevertheless what is said, that man has by the light and law of nature some notions of virtue and vice, justice and injustice, good and evil, is most true. For we must observe that the light of nature is used in two several senses ; the one, as far as it springs from sense, induction, reason, argument, according to the laws of heaven and earth ; the other, as far as it flashes upon the spirit of man by an inward instinct, according to the law of conscience ; which is a spark and relic of his primitive and original purity. And in this latter sense chiefly does the soul partake of some light to behold and discern the perfection of the moral law, a light however not altogether clear, but such as suffices rather to reprove the vice in some measure, than to give full information of the duty. So then religion, whether considered with regard to morals or mysteries, depends on revelation from God.

The use notwithstanding of reason in spiritual things is manifold and very general. For it is not for nothing that the Apostle called religion, " Our reasonable service of God ⁷". If we review the types and ceremonies of the old law we see that they were full of reason and signification, differing widely from the ceremonies of idolatry and magic, which were like surds and non-significants, mostly without meaning, and not even suggestive of anything. But especially the Christian faith, as in all things, so in this is pre-eminent ; holding the golden mean touching the use of reason and discussion (the child of reason) between the law of the heathen and the law of Mahomet, which embrace the two extremes. For the religion of the heathen had no constant belief or confession ; and the religion of Mahomet on the other side interdicts argument altogether ; so that the one has the very face of vague and manifold error, the other of crafty and cautious imposture ; whereas the holy Christian faith both admits and rejects the use of reason and disputation, but according to just limitations.

The use of human reason in matters of religion is of two sorts ; the former in the explanation of the mystery, the latter in the inferences derived from it. With regard to the explanation of the mysteries, we see that God vouchsafes to descend to the weakness of our apprehension, by so expressing his mysteries that they may be most sensible to us ; and by grafting his revelations upon the notions and conceptions of our reason ; and by applying his inspirations to open

³ St. Matt. v. 44, 45.

⁴ Virg. *Æn.* i. 328 : Nec vox hominum sonat.

⁵ Ovid, *Melam.* x. 330 :—

Et quod natura remittit,

Invida jura negant.

⁶ Cf. Plut. in Alex. c. 65 ; and Strabo, i. xv The name of the person of whom this story is told by Plutarch is Dandamis, but wherever Bacon has mentioned it, he spells it as in the text. Dandamis is also mentioned by Arrian, who, however, does not relate this anecdote. We find the same story in Strabo ; but the name of the Indian is with him not Dandamis, but Mandanis. In the *Temporis Partus Masculus*, Bacon speaks of these remarks of Dandamis as one of the exceptions to his general assertion of the worthlessness of the speculations of the philosophers of antiquity.

⁷ Romans, xii. 1.

our understanding, as the form of the key to the ward of the lock. But here we ought by no means to be wanting to ourselves; for as God uses the help of our reason to illuminate us, so should we likewise turn it every way, that we may be more capable of receiving and understanding His mysteries; provided only that the mind be enlarged, according to its capacity, to the grandeur of the mysteries, and not the mysteries contracted to the narrowness of the mind.

But with regard to inferences, we should know that there is allowed us a use of reason and argument (in regard to mysteries) secondary and respective, though not original and absolute. For after the articles and principles of religion have been set in their true place, so as to be completely exempted from the examination of reason, it is then permitted us to derive and deduce inferences from them according to their analogy. In nature indeed this holds not. For both the principles themselves are examinable, though not by a syllogism, yet by induction; and besides, these same principles have no discordance with reason, so that the first and middle propositions are derived from the same fountain. It is otherwise in religion, where the first propositions are not only self-existent and self-supporting; but likewise unamenable to that reason which deduces consequent propositions. Nor yet does this hold in religion alone, but also in other sciences both of a greater and smaller nature; namely, wherein the primary propositions are arbitrary and not positive; for in these also there can be no use of absolute reason. For we see in games, as chess or the like, that the first rules and laws are merely positive, and at will; and that they must be received as they are, and not disputed; but how to play a skilful and winning game is scientific and rational. So in human laws there are many maxims, as they call them, which are mere Placets of Law, depending on authority rather than upon reason, and therefore not to be disputed. But what is most just, not absolutely but relatively (that is, according to these maxims), that is a matter of reason, and opens a wide field for disputation. Such therefore is that secondary reason which has place in Divinity, which is grounded upon the Placets of God.

But as the use of the human reason in things divine is of two kinds, so likewise in the use there are two kinds of excess; the one when it inquires too curiously into the manner of the mystery; the other when the same authority is attached to inferences as to principles. For he may appear to be the disciple of Nicodemus who persists in asking, "How can a man be born when he is old?"⁸ And he can be nowise considered the disciple of Paul who does not sometimes insert in his doctrines, "I, not the Lord"; or again, "According to my counsel"⁹; which style is generally suited to inferences. Wherefore it appears to me that it would be of especial use and benefit, if a temperate and careful treatise were instituted, which, as a kind of divine logic, should lay down proper precepts touching the use of human reason in theology. For it would act as an opiate, not only to lull to sleep the vanity of curious speculations, wherewith sometimes the schools labour, but also in some degree to assuage the fury of controversies, wherewith the church is troubled. Such a treatise I reckon among the things deficient; and call it *Sophron*, or *The Legitimate Use of Human Reason in Divine Subjects*.

It is of extreme importance to the peace of the Church, that the Christian covenant ordained by our Saviour be properly and clearly explained in those two heads, which appear somewhat discordant; whereof the one lays down, "He that is not with us is against us;" and the other, "He that is not against us is with us."¹⁰ From this it is evident that there are some articles, wherein if a man dissent he is placed beyond the pale of the covenant; but that there are others in which he may dissent, and yet remain within it. For the bonds of the Christian Communion are set down, "one Lord, one Faith, one Baptism, etc."¹¹,

⁸ St. John, iii. 4. 10.

⁹ 1 Corinth. vii. 10.

¹⁰ The two passages Bacon refers to are St. Luke, xi. 23. (or St. Mat. xii. 30.), and St. Luke, ix. 50. But the former he has not quoted accurately. The words of our version are, "He that is not with me is against me"; while the passage in the ninth chapter is, "He that is not against us is for us".

¹¹ Ephes. iv. 5. Compare *St. August. Ep. ad Casulan. de jejuniis priscorum*. He

not one Ceremony, one Opinion. So we see the coat of our Saviour was without seam, but the garment of the church was of divers colours. The chaff should be separated from the corn in the ear, but the tares should not be pulled up from the corn in the field. Moses, when he saw the Egyptian fighting with the Israelite, did not say, "Why strive ye?" but drew his sword and slew the Egyptian¹². But when he saw the two Israelites fighting, though it were not possible for both to be in the right, yet he addresses them thus, "Ye are brethren, why strive ye?"

And therefore on these considerations it appears a thing of great use and importance, well to define what and of what latitude those points are, which disincorporate men from the Church of God, and excommunicate them from the communion of the faithful. And if any one think that this has already been done, let him think again and again, and say whether it has been done with sincerity and moderation. Meanwhile if a man talks of peace, he is very like to get the answer of Jehu to the message, ("Is it peace, Jehu?") "What hast thou to do with peace? turn thee behind me¹³"; for it is not peace but party that most men care for. Nevertheless I have thought right to set down among the deficiencies a treatise on the degrees of Unity in the kingdom of God, being as a wholesome and profitable undertaking.

Since the Holy Scriptures are the principal sources of information in theology, we must especially look to their interpretation. And I am not now speaking of the authority of interpreting them, which rests in the consent of the church; but of the manner thereof; which is of two sorts; methodical and free. For this divine water, which excels so much that of Jacob's well, is drawn forth and employed much in the same manner as natural water is out of wells and fountains. For it is either first forced up into cisterns, whence it may be conveniently fetched and derived by pipes for use; or else it is poured into buckets and vessels to be used as it is wanted. The former method has in the end produced to us the scholastical divinity; whereby divinity has been reduced into an art, as into a cistern, and the streams of doctrines and positions have been derived and conveyed from thence to water every part. But in the free way of interpreting Scripture, there occur two excesses. The one presupposes such perfection in Scripture, that all philosophy likewise should be derived from its sources; as if all other philosophy were something profane and heathen. This distemper has principally grown up in the school of Paracelsus and some others; but the beginnings thereof came from the Rabbis and Cabalists¹⁴. But these men do not gain their object; and instead of giving honour to the Scriptures as they suppose they rather embase and pollute them. For to seek the materiate heaven and earth in the word of God, (whereof it is said, "Heaven and earth shall pass away, but my word shall not pass away¹⁵"), is rashly to seek for temporary things amongst eternal; and as to seek divinity in philosophy is to seek the living among the dead, so to seek philosophy in divinity is to seek the dead among the living. The other method of interpretation which I set down as an excess, appears at the first glance sober and modest, yet in reality it both dishonours the Scriptures themselves, and is very injurious to the Church. This is (in a word), when the divinely-inspired Scriptures are explained in the same way as human writings. But we ought to remember that there are two things which are known to God the author of the Scriptures, but unknown to man; namely, the secrets of the heart, and the successions of time. And therefore as the dictates of Scripture are written to the hearts of men, and comprehend the vicissitudes of all ages; with an eternal and certain foreknowledge of all heresies, contradictions, and differing and changing estates of the Church, as well in general as of the individual

has elsewhere said, "Desuper texta tunica, quid significat nisi unitatem?" See his *Exp. in Evan. Joan.* in c. 3. and other passages. Compare St. Jerome, *Pro Libris adversus Jovin. Apolog.*, where the many-coloured coat of Joseph is expressly mentioned, as well as the passage in the Psalms to which St. Augustine refers.

¹² Exod. ii. 12.

¹³ 2 Kings, ix. 19.

¹⁴ In support of this statement see Tennemann's History of Philosophy.

¹⁵ St. Mark, xiii. 31.

elect, they are not to be interpreted only according to the latitude and obvious sense of the place ; or with respect to the occasion whereon the words were uttered ; or in precise context with the words before or after ; or in contemplation of the principal scope of the passage ; but we must consider them to have in themselves, not only totally or collectively, but distributively also in clauses and words, infinite springs and streams of doctrines, to water every part of the Church and the souls of the faithful. For it has been well observed that the answers of our Saviour to many of the questions which were propounded to Him do not appear to the point, but as it were impertinent thereto. The reason whereof is twofold ; the one, that knowing the thoughts of his questioners not as we men do by their words, but immediately and of himself, he answered their thoughts and not their words ; the other, that He did not speak only to the persons then present, but to us also now living, and to men of every age and nation to whom the Gospel was to be preached. And this also holds good in other passages of Scripture.

Having made then these prefatory remarks, I come to that treatise which I pronounce deficient. There are found indeed among theological writings too many books of controversies, a great mass of that theology which I have termed Positive, commonplaces, special tracts, cases of conscience, sermons and homilies, and many prolix commentaries upon the Scriptures. But what we want is a concise, sound, and judicious collection of annotations and observations on particular texts of Scripture ; neither dilated into commonplaces, nor chasing after controversies, nor reduced into method of art, but entirely unconnected and natural. It is indeed a thing sometimes found in the more learned sermons, which for the most part do not last ; but not yet introduced into books, which may be handed down to posterity. But certainly, as wines which flow gently from the first treading of the grape are sweeter than those which are squeezed out by the wine-press ; because these last have some taste of the stones and skin of the grape ; so those doctrines are very sweet and healthy, which flow from a gentle pressure of the Scriptures, and are not wrested to controversies or commonplaces. Such a treatise then I will denominate *the Emanations of the Scriptures*.

Now therefore have I made as it were a small globe of the intellectual world, as faithfully as I could ; with a note and description of those parts which I find either not constantly occupied, or not well cultivated by the labour and industry of man. Wherein, if I have in any point receded from the opinion of the ancients, let it be understood that I have done so not from a desire of innovation or mere change, but of change for the better. For I could not be true and constant to myself or the argument I handle, if I had not determined to add as much as I could to the inventions of others ; being however no less willing that my own inventions should be surpassed by posterity. But how fair I am in this matter may appear from this ; that I have propounded my opinions everywhere naked and unarmed, without seeking to prejudice the liberty of men's judgments by disputes and confutations. For in anything which is well set down, I am in good hope that if the first reading move a scruple or objection, the second reading will of itself make an answer. And in those things wherein it has been my lot to err, I am sure I have not prejudiced the truth by litigious arguments ; which commonly have this effect, that they add authority to error, and diminish the authority of that which is well invented ; for question is an honour to falsehood, but it is a repulse to honour. Meanwhile I am reminded of the sarcastic reply of Themistocles to the ambassador, who coming from a small town used great words, " Friend, (said he) your words require a city ¹⁶". And certainly it may be objected to me with truth, that my words require an age ; a whole age perhaps to prove them, and many ages to perfect them. But yet as even the greatest things are owing to their beginnings, it will be enough for me to have sown a seed for posterity and the Immortal God ; whose Majesty I humbly implore through His Son and our Saviour, that He will vouchsafe favourably to accept these and the like offerings of the human intellect, seasoned with religion as with salt, and sacrificed to His Glory.

¹⁶ Lysander, not Themistocles. Cf. Plut. *Lac. Apophthegmata*.

APPENDIX

[The following Notes on some old treatises on the art of writing in cipher are referred to by Mr. Ellis, at p. 527, note 16.—J. S.]

THE earliest writer, I believe, on ciphers, except Trithemius whom he quotes, is John Baptist Porta, whose work *De occultis literarum notis* was reprinted in Strasburg in 1606. The first edition was published when Porta was a young man. The species of ciphers which Bacon mentions are described in this work. What he calls the *ciphra simplex* is doubtless that in which each letter is replaced by another in accordance with a secret alphabet. (Porta, ii. c. 5.) The manner of modifying this by introducing non-significants and by other contrivances is described in the following chapter. The *wheel cipher* is described in chapters 7, 8, 9. It is that in which the ordinary alphabet and a secret one are written respectively on the rim of two concentric disks, so that each letter of the first corresponds in each position of the second (which is movable) to a letter of the secret alphabet. Thus in each position of the movable disk we have a distinct cipher, and in using the instrument this disk is made to turn through a given angle after each letter has been written. The *ciphra clavis* is described by Porta, book ii. 15, 16. It is a cipher of position; that is, one in which the difficulty is obtained not by replacing the ordinary alphabet by a new one, but by deranging the order in which the letters of a sentence or paragraph succeed each other. This is done according to a certain form of words or series of numbers which constitute the key. The *cipher of words* was given by Trithemius and in another form by Porta, ii. 19 (and in a different shape, v. 16). It is a cipher which is meant to escape suspicion. Each letter of the alphabet corresponds to a variety of words arranged in columns. Any word of the first column followed by any of the second, and that followed by any of the third, etc., will make, with the help of a non-significant word occasionally introduced, a perfectly complete sense; and by the time the last alphabet has been used a letter on some indifferent subject has been written. Only sixty alphabets are given by Porta, and therefore the secret communication can consist only of sixty letters. It is worth remarking that when Porta wrote it was usual to put the sign of the cross at the head of an ordinary epistle. The first of his alphabets corresponds not to a series of words but to two and twenty different modifications of the figure of a cross, and his second alphabet similarly corresponds to two and twenty different modifications of the introductory flourish. His sixtieth alphabet is of the same kind. We see here perhaps whence Bacon derived his idea of giving significance to seemingly accidental modifications of the characters of ordinary writing.

The idea of a *biliteral alphabet*, which Bacon seems to claim as his own, is employed, though in a different manner, by Porta. His method is in effect this. He reduces the alphabet to sixteen letters, and then takes the eight different arrangements *aaa, aba, etc.*, to represent them; each arrangement representing two letters indifferently: the ambiguity arising from hence he seems to disregard. In this manner he reduces any given word or sentence to a succession of *a's* and *b's*. At this point his method, of which he has given several modifications, departs wholly from Bacon's. Let us suppose the biliteral series to commence with *aababb*. A word of two syllables and beginning with *A* indicates that two *a's* commence the series; any monosyllable will serve to show that one *b* follows, another that it is succeeded by one *a*, and then any dissyllable will stand for *bb*. Thus *Amo te mi fili* or *Amat qui non sapit* will represent the biliteral arrangement *aababb*, and so on on a larger scale. Porta's method is therefore not, like Bacon's,

a method *scribendi omnia per omnia*, but only *omnia per nulla*. Still the analogy of the two methods is to be remarked; both aim at concealing that there is any but the obvious meaning, and both depend essentially on representing all letters by combinations of two only. See the *De oc. Lit. Signis*. v. c. 3.

The *Polygraphia* of Trithemius (dedicated to Maximilian in 1508¹) consists of six books. The first four contain extensive tables constituting four different *ciphra verborum*; the first and second of which are significant, and relate, the former to the second person of the Trinity, and the latter to the Blessed Virgin. The fifth and sixth books are of less importance. *Trithemius*, written in the cipher of the second book, becomes "Charitatem pudicissimæ Virginis Mariæ productricis coexistentis verbi, robustissimi commilitonis mei dilectissimi devotissime benedicamus; vivificatrix omnium," etc.

Traicté des Chiffres, ou secrètes manières d'escrire, par Blaise de Vigenère, Bourbonnois. (Paris, 1587.)

This work is described by the author as what he had saved of his work "*Du Secrétaire*," written in Italy in 1567 and 68. The two first books were stolen at Turin in 1569. The third is the foundation of the present work. (v. f. 285. verso.) He says he had revealed nothing of its contents.

The two authors whom he chiefly mentions are Trithemius and Porta; that is, modern authors; for there is a great deal said of the Cabala. The key ciphers of which Porta speaks he ascribes to a certain Belasio, who employed it as early as 1549: Porta's book not being published until 1563, "auquel il a inseré ce chiffre sans faire mention dont il le tenoit." Porta's book, he goes on to say, was not *en vente* until 1568. The invention was ascribed to Belasio by the grand vicar of St. Peter at Rome, who had great skill in deciphering (f. 35. rect. and 37. verso).

At f. 199. Vigenère gives an account of ciphers in which letters are represented by combinations of other letters,—which Porta had already done, but which he varies in a number of ways.

f. 200. A table where the twenty-three letters of the alphabet, and four other characters, are represented by combinations of *abc*. D (e. gr.)=*aaa*, S=*bac* etc.)

f. 201. A smaller table where an alphabet of twenty-one letters is similarly represented.

f. 202. An alphabet of twenty letters represented by binary combinations of five letters, *a=ED*, etc.

f. 202. goes on to what Bacon speaks of, a cipher within a cipher. You write in a common cipher with an alphabet of eighteen letters; the cipher being such that the five vowels are used as nulls; then by the last cipher these five vowels are made significant, and give the hidden sense. He seems to speak of this as his own.

After mentioning a cipher described by Cardan, he goes on, f. 205, to Porta's ciphers by transposition, etc.

At f. 240. he shows how characters may be multiplied by different ways of writing them; which Porta had not done.

f. 241. An alphabet and \mathcal{C} , each character written in four ways.

f. 241, verso, An application of these variations.

f. 242. He remarks that a great variety of uses may be made of this idea, and gives some.

f. 244. He goes on "De ce même retranchement et de la variété de figure, part une autre invention encore d'un chiffre carré à double entente, le plus exquis de tous ceux qui ayent esté decouvers jusqu'à icy," &c. You write with twelve letters only, as in the subjoined table, in which however I have not followed his way of diversifying.

¹ The edition of 1600 is that I use.

	P	C	T	E	I	L	M	N	A	R	S	V
E)	a ₁	a ₂	a ₃	b ₁	b ₂	b ₃	c ₁	c ₂	c ₃	d ₁	d ₂	d ₃
P)												
V)												
C)	e ₁	e ₂	e ₃	f ₁	f ₂	f ₃	g ₁	g ₂	g ₃	h ₁	h ₂	h ₃
T)												
L)	i ₁	i ₂	i ₃	k ₁	k ₂	k ₃	l ₁	l ₂	l ₃	m ₁	m ₂	m ₃
I)												
M)	n ₁	n ₂	n ₃	o ₁	o ₂	o ₃	p ₁	p ₂	p ₃	q ₁	q ₂	q ₃
A)												
N)	r ₁	r ₂	r ₃	s ₁	s ₂	s ₃	t ₁	t ₂	t ₃	u ₁	u ₂	u ₃
R)												
S)	x ₁	x ₂	x ₃	y ₁	y ₂	y ₃	z ₁	z ₂	z ₃	æ ₁	æ ₂	æ ₃

In this table, Z, for instance, represents 1st M, and 2nd R or S; to distinguish whether R or S, he has recourse to a supplementary contrivance by nulls.

f. 242. v. He refers to table at 200., and says the three letters *abc*, (which there represent I) may be replaced by a single character; for this table represents in another column letters by dots. Thus T is; D ...; or if we will we may put *o*'s for dots; so that D=*o o o* and T=*oo ooo o*; and the spaces may be filled up by a slightly varied *o*. Thus D=*ooooo*, T=*oooooooo*, and thus the whole cipher will apparently consist of *o*'s.

The transition from this to Bacon's cipher is so easy that the credit given to him must be reduced.

ON PRINCIPLES AND ORIGINS ACCORDING TO THE FABLES OF CUPID AND COELUM, ETC.

[TRANSLATION OF *DE PRINCIPIIS ATQUE ORIGINIBUS, ETC.*]

PREFACE.

BY ROBERT LESLIE ELLIS.

THE following tract is one of those which were published by Gruter. It seems to be of later date than many of the others, as it contains several phrases and turns of expression which occur also in the *Novum Organum*.

Bacon's design was to give a philosophical exposition of two myths; namely that of the primeval Eros or Cupid, and that of Uranos or Cœlum. Only the first however is discussed in the fragment which we now have, and even that is left incomplete.

The philosophy of Democritus appeared to Bacon to be nearly in accordance with the hidden meaning of these fables; but we are not well able to judge of his reasons for thinking so, as the only system spoken of in detail is that of Telesius.

Touching the origin of Eros, Bacon remarks that no mention is made anywhere of his progenitors. In this he is supported by the authority of Plato, or rather by that of one of the interlocutors in the *Symposium*, who affirms that no one, whether poet or not, has spoken of the parents of Eros; but that Hesiod in the order of his theogony places Gaia and Eros next after primeval Chaos¹. It seems in truth probable that the fables which make Eros the son of Zeus and Aphrodite are of later origin. From the *Symposium* Bacon may also have derived the recognition of an elder and a younger Eros, of whom the former was allied to the heavenly Aphrodite, and the latter to Aphrodite Pandemos². But it is more probable that his account of the distinction between them comes from some later writer.

Hesiod, to whom the first speaker in the *Symposium* refers, though he places Eros and Gaia next to Chaos, says nothing of Eros as the progenitor of the universe. His existence is recognised, but nothing is said of his offspring. In this the theogony of Hesiod differs essentially from that which is contained in the Orphic poems, and shows I think signs of greater antiquity. To recognise as a deity an abstract feeling of love or desire, is in itself to recede in some measure from the simplicity of the old world: we find no such recognition in Homer; and the transition from him to Hesiod is doubtless a transition from an earlier way of thinking to a later. But even in Hesiod Eros is not the producing principle of the universe, nor is his share in its production explained. On the other hand in the Orphic poems, Phanes, whom we are entitled to identify with Eros, is the progenitor of gods and men, the light and life of the universe. He comes forth from Chaos, uniting in his own essence the poles of the mysterious antithesis on which all organic production depends. From him all other things derive their existence. There seems clearly more of a philosopheme in this than in the simpler statements of Hesiod.

¹ *Sympos.* p. 178.; and see Valcknaer's *Diatribes*, to whom Stallbaum refers. On the other hand Pausanias mentions as an early myth that Eros was the son of Ilithyia. See Pausan. *Bœot.* ix. 27.

² *Sympos.* p. 180, and see also p. 195.

The identification of Eros with Phanes or Ericapeus rests on a passage in the *Argonautics* in which it is said that he was called Phanes by the men of later time because he was manifested before all other beings; *πρῶτος γὰρ ἐφάνθη*³. It is confirmed by the authority of Proclus.

Phanes, in the common form of the Orphic theogony, comes out of the egg into which Chaos had formed itself⁴. But I am not aware that any one except Aristophanes makes Night lay the egg from which Eros afterwards emerges⁵; and it seems that this is only a playful modification of the common myth, not unsuitable to the chorus of birds by whom it is introduced⁶. It does not appear necessary to suppose, as Cudworth seemingly does, that Aristophanes had in some unexplained way become acquainted with a peculiar form of "the old atheistic cabala"⁷.

The most remarkable passage in which Eros (not Phanes) is spoken of as the producer of all things, is in the *Argonautics* :—

πρῶτα μὲν ἀρχαίου χάος μεγαλήφατον ὕμνον,
ὡς ἐπάμειψε φύσεις, ὡς τ' οὐραῆς ἐς πέρας ἦλθεν,
γῆς τ' εὐρυστέρνου γένεσιν, πυθμένας τε θαλάσσης,
πρεσβυτάτων τε καὶ αὐτοτελή πολύμητιν Ἔρωτα,
δσάα τ' ἐφύσεν ἅπαντα, τὰ δ' ἔκριθεν ἄλλοι ἀπ' ἄλλο⁸.

Nothing is said here, or elsewhere I believe, of his having mingled with Uranos in the engendering of the universe; and I am inclined to think that when Bacon says, "Ipse cum Cælo mistus, et deos et res universos progenuit," we ought to substitute Chao for Cælo⁹. For the passage in Aristophanes goes on to say that in wide Tartarus Eros and Chaos mingled in love and produced first the race of birds and then gods and men.

Of Phanes nothing of this kind is mentioned, except his intercourse with Night¹⁰; so that Bacon's statement does not seem to be in any way justified.

It would be endless to cite passages in which the attributes of Eros are described, nor is it necessary to do so.

The form in which Bacon connects the myth of the primeval Eros with philosophy is far less artificial and unreal than most of the interpretations which he has given in the *Wisdom of the Ancients*. Chaos represents uninformed matter; Eros matter actually existing, and possessed of the law or principle by which it is energised; the first principle, in short, which is the cause of all phenomena. The parents of Eros are unknown; that is to say, it is in vain to seek to carry our inquiries beyond the fact of the existence of matter possessed of such and such primitive qualities. On what do those primary qualities ultimately depend? On the "lex summa essentiaæ atque natura . . . vis scilicet primis particulis a Deo indita, ex cujus multiplicatione omnis rerum varietas emergat et confietur". Whether this highest law can ever be discovered is by Bacon left here as elsewhere doubtful; but he does not forbid men to seek for it. But what he utterly condemns is the attempt to make philosophy rise above the theory of matter. We must ever remember that Eros has no progenitors, "ne forte intellectus ad inania deflectat"—that we turn not aside to transcendental fancies; for in these the mind can make no real progress, and "dum ad ulteriora tendit ad proximiora recidit". We must of necessity take as the starting point of our

³ Orph. *Argon.* 14. In the preceding line, Eros is made, according to Gesner's reading, the son of Night. But for *υλα* there is another reading, *πατέρα*.

⁴ See Lobeck, *Aglaoph.* i. 474.

⁵ This seems to be confirmed by the half ludicrous epithet *ὑπνέμων*.
⁵ Aves, 650.

⁶ See Cudworth, *Intellect. Syst.*

⁷ Argonaut. 423. In the third line *πυθμένας* is admitted to be corrupt. I would venture to suggest *πολιὰς*, making *θαλάσσης* the genitive case after *γένεσιν*.

⁹ This conjecture is confirmed by the corresponding passage in the *De Sap. Vet.*, where for *cum cælo mistus* we have *ex chao*.—J. S.

¹⁰ Lobeck, i. 501. It is to this intercourse that the line quoted by Proclus refers :—
Αὐτὸς ἐῆς γὰρ παιδὸς ἀφελετο κούριον ἄνθος.

philosophy, matter possessed of its primitive qualities; and this principle is in accordance with the wisdom of those by whom the myth of Eros was constructed. And certainly, Bacon goes on to say, "that despoiled and merely passive matter is a figment of the human mind"; a statement which refers to the Aristotelian doctrine in which the primitive *ύλη* is not conceived of as a thing actually existing, but as that which first receives existence through the *ειδος*, wherewith it is united. Of this doctrine Bacon asserts that it is altogether trifling: "For that which primarily exists must no less exist than that which thence derives its existence", that is to say, matter must in itself exist actually and not potentially. And the same conclusion follows from the Scriptures, "wherein it is not said that God created hyle, but that he created heaven and earth".

This application of Scripture certainly does not deserve the indignation which De Maistre, perhaps in honest ignorance, has poured out upon it¹¹. "He asserts the eternity of matter," is De Maistre's commentary on the passage in which it occurs. Beyond doubt he denies that hyle was created, but he also denies that it exists; treating it as the mere figment of the Aristotelian philosophy.

But although De Maistre's remark is only a fair specimen of his whole work, in which ignorance and passion are so mixed together that it is hard to say how much is to be ascribed to the one and how much to the other, yet it cannot be denied that Bacon does not appear to have understood Aristotle. So far from putting at the origin of things that which is potential, and educing the actual from it, Aristotle asserts that any system which does this is untenable; and it is curious that he refers particularly to the theogonists, *οἱ ἐκ νυκτὸς γεννῶντες*, who engender realities out of night¹². For night and chaos may not unfitly be taken to represent uninformed matter¹³. The doctrine of Aristotle being in this as in other matters followed by the schoolmen, it was a question with them how the words "and the earth was without form", which come immediately after the declaration that in the beginning God created the heaven and the earth, ought to be understood. For to create the earth is to give it actual existence; how then can it be without form? To this the most satisfactory answer was that the words without form do not imply the absence of substantial form, failing which the earth could have no actual existence, but simply mean that as yet the earth was unadorned and in disorder; a solution in which we see how far they were from supposing that according to Aristotle the first created thing ought to be uninformed matter. They insist on the contrary that the Scripture cannot mean that any created thing can be mere matter: "non enim datur ens actu sine actu".

Aristotle, as I have said, condemns the theogonists in whose system Night is a producing principle,—a remark in which he may refer either to Hesiod or to the Orphic writers, but which probably relates to the former only. In the reason of this condemnation Bacon agrees with him, and yet takes into the myth which he proposes to explain, Aristophanes's fancy that the egg from which Eros came forth was laid by Night. His reason for doing so is that this part of the fable appears to him to relate not to essence but to cognition, that is to the method whereby we may arrive at a knowledge of Eros, or of the fundamental properties of matter. For conclusions obtained by means of affirmatives are, so to speak, brought forth by Light: whereas those which are obtained by negatives and exclusions are the offspring of Night and Darkness. Therefore the egg is laid by Night, seeing that the knowledge of Eros, though it is assuredly attainable, can yet only be attained by exclusions and negatives; that is, to express the same opinion in the language of the *Novum Organum*, the knowledge of Forms necessarily depends on the *Exclusiva*. That this method of exclusions must of necessity be ultimately successful is intimated by the myth itself; for the incubation of primeval egg is not eternal. In due time the egg is hatched and Eros is made manifest. If it be asked what analogy there is between darkness and the method of exclusions, Bacon's answer is satisfactory,—that darkness is as ignorance, and that in employing the method of exclusions we are all along ignorant of that

¹¹ Examen de la Philosophie de Bacon, ii. p. 143.

¹² Arist. *Metaph.* xii. 6.

¹³ See Brandis's Schol. in Aristot. p. 803, and for the remarks of Alexander Aphrodisiensis, Lobeck, *Aglaoph.* i. 488.

which at any stage of the process still remains unexcluded. It may again be asked why the method of exclusions is the only one whereby Eros may be disclosed,—a question to which Bacon suggests an answer by saying that Democritus did excellently well in teaching that atoms are devoid of all sensible qualities. Bacon's opinion seems therefore to be, that any method but a negative one would necessarily fail, because that which is sought bears no analogy to any of the sensible objects by which we are surrounded. The parable, he says, maintains throughout the principles of heterogeneity and exclusion: meaning by heterogeneity a strongly marked antithesis between the fundamental qualities of matter and the sensible qualities of which we are directly cognisant. In accordance with this he censures Democritus for departing from this principle in giving his atoms the downward motion of gravity and the impulsive motion (*motus plagæ*) which belong to ordinary bodies. Not only are atoms and bodies different as touching their qualities, but also in their motions.

In these views, which however do not show either that the method of exclusions is the only one which can succeed or that it will always do so, there is much which deserves attention. They show that Bacon had obtained a deep insight into the principles of the atomic theory. The earlier developments of this theory have always been encumbered by its being thought necessary, in order to explain phenomena, to ascribe to the atoms properties which in reality belong only to the bodies which they compose; that is, by its being thought necessary to break through Bacon's principle of heterogeneity. Thus the atoms have been supposed of definite sizes and figures, thereby resembling other and larger bodies, and to be perfectly hard and unyielding. When freed from these subsidiary hypotheses, the atomic theory becomes a theory of forces only, and of whatever ulterior developments it may be capable, these can only be introduced when it has assumed this form. The speculations of Boscovich do not mark the farthest point to which the atomic theory may be carried, but they were nevertheless an essential step in advance, and altogether in accordance with what Bacon has here said, though in an obscure and somewhat abrupt manner. "We do well," remarks Leibnitz, "to think highly of Verulam, for his hard sayings have a deep meaning in them:" a judgment which may not improbably have had a particular reference to the views now spoken of. For Leibnitz's own monadism is in effect only an abstract atomic theory¹⁴: more abstract doubtless than any thing which Bacon had conceived of, but yet a system which might have been derived from that of Democritus by insisting on and developing Bacon's principle of heterogeneity. And again, in a different point of view, it seems not unlikely that Leibnitz perceived an analogy between his own doctrine and that of Bacon. In the earlier part of his philosophical life, Leibnitz was disposed to agree with the opinion common among the reformers of philosophy, that what Aristotle had said of matter, of form and of mutation, was to be explained by means of magnitude, figure, and motion. This opinion he ascribes to all the reformers of the seventeenth century, mentioning by name Bacon and several others¹⁵. Thirty years afterwards, in giving some account of the history of his opinions, he says that he came to perceive, "que la seule considération d'une masse étendue ne suffisoit pas, et qu'il falloit employer encore la notion de la force, qui est très-intelligible, quoiqu'elle soit du ressort de la Métaphysique"¹⁶. In introducing this notion of force, he conceived that he was rehabilitating the Aristotelian or scholastic philosophy, seeing "que les formes des Anciens ou Entelechies ne sont autre chose que les forces"¹⁷. These primitive forces¹⁸ being the constituent forms of substances, he supposed them, with one exception (founded on dogmatic grounds), to have been created at the beginning of the world. The "lex a Deo lata" at the creation "reliquit aliquod sui expressum in rebus vestigium", namely an efficacy, or form, or force by virtue of which and in accordance with the divine precept all phenomena had been engendered¹⁹.

¹⁴ The monad, Leibnitz himself remarks, is a metaphysical point, or formal atom.

¹⁵ Epist. ad Thomas. p. 48 of Erdmann's edition of Leibnitz's Phil. Works.

¹⁶ *Système nouveau*, p. 124, Erdmann.

¹⁷ Lettre à Bouvet, p. 146, Erdmann.

¹⁸ *Forces primitives*, v. *Syst. Nouv.*

¹⁹ See his *De ipsâ Naturâ*, p. 156.

If we compare these expressions, which contain the fundamental idea of Leibnitz's philosophy, with those which have already been quoted from the following tract, we shall I think perceive more than an accidental analogy between them. Leibnitz speaks of the primitive forces impressed by the divine word on created things, "ex quâ series phenomenorum ad primi jussus præscriptum conquireretur,"—and Bacon of the "lex summa essentialis et naturalis, vis scilicet primis particulis a Deo indita, ex cujus multiplicatione omnis rerum varietas emergat et conflatur". It does not seem improbable that Leibnitz, who in the letter to Thomasius classes Bacon, so far as relates to the present subject, with Gassendi and Descartes, came afterwards to find in Bacon's language hints of the deeper view which he had himself been led to adopt, and which constitutes the point of separation between his system and the Cartesian. This supposition would at least be in accordance with the emphatic manner in which he has contrasted the physical theories of Descartes and Bacon, taking the former as a type of acuteness and the latter of profundity, and asserting that compared with Bacon, Descartes seems to creep along the ground²⁰.

It may not be out of place here to remark that there are other traces of Bacon's influence on Leibnitz. In Erdmann's edition of his philosophical works, we find several fragmentary papers which Leibnitz wrote under the name of Gulielmus Pacidius. The title of one of these is "Gulielmi Pacidii Plus Ultra, sive initia et specimina scientiæ generalis de instauratione et augmentis scientiarum ac de perficiendâ mente rerumque inventionem ad publicam felicitatem". Plus Ultra was the motto to Bacon's device of a ship sailing through the Pillars of Hercules, and the remainder of the title is both in tone and language clearly Baconian. The work itself was to have concluded with an exhortation "ad viros dignitate doctrinâque egregios de humanâ felicitate exiguo tempore, si velimus modo, in immensum augendâ²¹".

Another of these fragments contains some account of himself, or rather of Wilhelmus Pacidius, in which he mentions it as one of the happy incidents of his youth, that when he had perceived the defects of the scholastic philosophy the writings of several of the reformers came into his hands—among which he gives the first place to the "consilia magni viri Francisci Baconi Angliæ Cancellarii de augmentis Scientiarum²²".

To return to the fable of Cupid. After interpreting the statement that all things come from Eros to mean that all phenomena must be referred to the fundamental and originally inherent properties of matter as the first ground of their production, Bacon goes on to say that next to the error of these who make formless matter an original principle, is the error of ascribing secondary qualities to primitive matter. This he expresses by saying that though Eros is endued with personality, he is nevertheless naked, "ita personatus²³ ut sit tamen nudus". Those who have committed the error of clothing him have either merely covered him with a veil, or have dressed him up in a tunic, or lastly have wrapped him round with a cloak.

These three errors are respectively the errors of those who have sought to explain everything by the transformations of one element, as air or fire,—of those who assume a plurality of elements,—and of those who assume an infinity of first principles (the homœomeria of Anaxagoras), each possessed of specific properties.

Contrasted with these errors is the doctrine that there is one first material principle, "idque fixum et invariabile," and that all phenomena are to be explained "per hujusmodi principii . . . magnitudines figuras et positiones,"—a statement which includes along with the old atomic theory every such hypothesis as the Cartesian. By those only who hold this opinion is Eros rightly displayed; they show him as he really is, "nativus et exutus".

In the interval between writing this tract and the *Novum Organum* Bacon's

²⁰ *Leibnitiana*, vol. vi. p. 303, ed. Genev. 1768.—J. S.

²¹ Leibnitz, ed. Erd. p. 89.

²² Leibnitz, ed. Erd. p. 91.

²³ The meaning of *personatus* appears from the phrase Bacon previously uses: "Cupidinis est persona quedam".

opinions seem to have undergone some change, as he has there condemned the atomists for asserting the existence of "materia non fluxa"; an obscure phrase, but which appears irreconcilable with the expression which I have just quoted—"fixum et invariabile".

However this may be, Bacon next proceeds to enumerate the different forms of doctrine into which the doctrine of a single element has been subdivided. The first principle or primitive matter has been asserted to be water, or air, or fire. Something is then said of the opinions of Thales, of Anaximenes, and of Heraclitus, and they are collectively commended for having given Eros but a single garment, that is, for having ascribed to primitive matter only a single form, substantially homogeneous with any of the forms of secondary existences.

The Anaxagorean doctrine of an infinity of elements is then set aside as belonging to the interpretation of the fable of Cœlum, and thus Bacon comes to the doctrine of two opposing principles, with which the remainder of the tract is taken up. Parmenides, he observes, among the ancients, and Telesius in modern times, have made fire and earth, or heaven and earth, the two first principles.

In connecting together Telesius and Parmenides Bacon overlooked an essential point of difference. For the system of Telesius is merely physical, it deals only with phenomena, and seeks for no higher grounds of truth than the evidence of the senses. Parmenides, on the other hand, recognized the antithesis of τὸ ὄν and τὸ φαινόμενον, of that which exists and that which is apparent. His doctrine is ontological rather than physical, and he does not admit that phenomena have any connexion with real or essential truth. He seeks for a deeper insight into things than any which a mere "Welt-anschauung," a mere contemplation of the universe, could be made to furnish. The hypothesis which he framed to explain the phenomena by which we are surrounded, is with him a hypothesis merely; and though, like Telesius's, this hypothesis refers every phenomenon to the antagonism of heat and cold, yet it has a character of its own, inasmuch as in a way not distinctly conceivable it also serves to represent the metaphysical antithesis of τὸ ὄν and τὸ μὴ ὄν.

It is however to be remembered that with the ontological aspect of the philosophy of Parmenides Bacon has here no concern.

The fundamental notion of Telesius's system was doubtless suggested both to him and to Parmenides²⁴, by certain obvious phenomena, and especially by the growth, decay, and reproduction of plants and animals. But it is essentially derived from the delight which the mind takes in every form of antithetic dualism, and especially in the idea of the reciprocal action of opposing forces. It comes from the same source as the love and strife of Empedocles, and as the good and evil principles of the Persian theology.

By the help of this notion, namely that heat and cold are the constituent principles of the universe, Telesius attempts to give general explanations of all phenomena, leaving it to others to study them in detail. The largeness of his plan and the grave eloquence with which it is set forth won for him some celebrity, notwithstanding the extreme obscurity of his style and the vagueness of his whole doctrine.

The academy of Cosenza (it was at Cosenza that Telesius was born) adopted his views, and both there and elsewhere men were for some time to be found who called themselves Telesiani. Spiriti, in his *Scrittori Cosentini*, gives a list of the disciples of Telesius; it contains however no name of much note, except that of Campanella, and the fame of Campanella rests much more on his moral and political speculations than on his defence of Telesius. Giordano Bruno and Patricius cannot be called disciples of Telesius, though the writings of both bear traces of his influence²⁵. Among real students of nature it was not to be ex-

²⁴ The same notion is ascribed also to Hippo of Rhegium, and to others of the Greek philosophers. See Ps. Orig. [Hippolytus, i. 14] *Philos.* (16), as to Hippo.

²⁵ The influence of Telesius on Bruno is not, I think, mentioned by historians of philosophy, yet there is no doubt of its existence. In the following passage the fundamental principle of Telesius is plainly assumed, mingled with ideas derived from Copernicus. "Così vien distinto l'universo in fuoco et acqua, che sono soggetti di doi primi principii

pected that so indefinite a system as that of Telesius could find much acceptance, and accordingly it is but seldom mentioned by scientific writers. Grassi, in the *Libra Astronomica*²⁶, seems to reproach Galileo with having taken some notion about comets from Cardan and Telesius; remarking that their philosophy was sterile and unfruitful, and that they had left to posterity "libros non liberos". To this Galileo answers that as for what Cardan and Telesius might have said on the matter he had never read it, and it would seem as if he means to disclaim all knowledge of their writings. Though he protests against the argumentum ex consensu which Grassi brings against them, yet it is plain that he does so only to confute his opponent, and not because he thought them worthy of a greater fame than they had received. Even among the large class of men who are content to acquiesce in general views and are not careful to inquire whether these views are accurate or ill-defined, Telesius's popularity could not last long. For he had left nothing for his followers to do. All that could be said in favour of his fundamental idea he had said himself, and any attempt to develop it further could only show how insecure a foundation it was built on. His works are however not undeserving of attention, even apart from the influence which they had on the opinions of Bacon. They show much of the peculiar character of mind which distinguishes southern from northern Italy, and which is yet more conspicuous in the writings of Campanella and of Vico: grave and melancholy earnestness,—a fondness for symbol and metaphor, and for wide-reaching but dreamy theories.

The first two books of his principal work, the *De Rerum Naturâ*, were published at Rome in 1565. The complete work was not published until 1586, only two years before his death²⁷. In 1590 a number of tracts, some of which had appeared in his lifetime, were published by Antonius Persius, one of his chief disciples, with a dedication to Patricius, which seems to claim him as at least half an adherent to the Telesian philosophy²⁸. For some account of Telesius's minor works I may refer to Spiriti's *Scrittori Cosentini*, or to what Salsi has said of them in Ginguené's *Histoire Littéraire de l'Italie*²⁹.

Of Lotter's work, *De Vita et Scriptis B. Telesii*, Leipsic, 1733, I much regret that I only know what is said of it in the *Acta Eruditorum* for that year. It appears to contain much information not easily to be found elsewhere.

The view which Bacon gives of the doctrines of Telesius seems to have been much used and trusted by the historians of philosophy³⁰,—a natural result of the involved and obscure style in which they were originally propounded. Whether it is altogether an accurate representation of these doctrines may at least be doubted: it seems as if Bacon, in some matters of detail, mingles with what he finds in Telesius some further developments of his own. Perhaps he is in some measure influenced by his jural habits of thought, and tries in all fairness and equity to put a favourable construction on that on which he sits in judgment³¹.

formali et attivi, freddo et caldo. Que' corpi che spirano il caldo, son le sole, che per se stesso son lucenti et caldi; que' corpi che spirano il freddo son le terre".—*Cena di Cenere*, p. 174 of Wagner's edition.

²⁶ Published in 1618, with the pseudonym of Lotario Sarsi. It is incorporated in the new edition of Galileo's works, iv. p. 61.

²⁷ It was reprinted in 1588, along with the *Contemplationes* of Mocenicus and the *Questiones Peripateticæ* of Cæsalpinus. The volume containing these three works is entitled "Tractationum Philosophicarum tomus unus", and is apparently not easily met with. It is this edition that I have been in the habit of using.

²⁸ This dedication is prefixed to the tract "De Mari".

²⁹ The account of Telesius in Ginguené was written by Salsi. See Ginguené, vii. p. 500.

³⁰ See what Brucker says of Morhof and Sosellus, *Hist. Crit. Phil.* iv. 453.

³¹ Bacon's own language suggests this impression. "Nos enim," he declares, "in omnium inventis summâ cum fide et tanquam faventes versamur." And that he does not conceive himself bound to minute accuracy in reproducing the opinions of the philosophers of whom he speaks, appears from several expressions: "Hujusmodi quædam de diversitate calorum a Telesio dicuntur;" "Hæc, aut iis meliora, cogitabant illi," etc.

However this may be, I have certainly found it difficult to support all his statements by quotations from his author, and in some cases have noticed at least apparent discrepancies.

The tract ends abruptly with the discussion of the system of Telesius. A similar discussion of the atomic theory would have been of far greater interest, for Bacon's own opinions are much more closely connected with those of Democritus than with Telesius's, from whom he derived only isolated doctrines. The most important of these doctrines is that of the duality of the soul, of which and of its relation to the orthodox opinion I have elsewhere had occasion to speak³².

³² See General Preface, p. 29.—J. S.

ON PRINCIPLES AND ORIGINS ACCORD- ING TO THE FABLES OF CUPID AND CÆLUM : ETC.

THE stories told by the ancients concerning Cupid, or Love, cannot all apply to the same person ; and indeed they themselves make mention of two Cupids, very widely differing from one another ; one being said to be the oldest, the other the youngest of the gods. It is of the elder that I am now going to speak. They say then that this Love was the most ancient of all the gods, and therefore of all things else, except Chaos, which they hold to be coeval with him. He is without any parent of his own ; but himself united with Chaos¹ begat the gods and all things. By some however it is reported that he came of an egg² that was laid by Nox. Various attributes are assigned to him ; as that he is always an infant, blind, naked, winged, and an archer. But his principal and peculiar power is exercised in uniting bodies ; the keys likewise of the air, earth and sea were entrusted to him. Another younger Cupid, the son of Venus, is also spoken of, to whom the attributes of the elder are transferred, and many added of his own.

This fable, with the following one respecting Cælum, seems to set forth in the small compass of a parable a doctrine concerning the principles of things and the origins of the world, not differing in much from the philosophy which Democritus held, excepting that it appears to be somewhat more severe, sober, and pure. For the speculations of that philosopher, acute and diligent as he was, could not rest nor keep within bounds, nor put a sufficient check and control over themselves. And even the opinions which are veiled in the parable, though somewhat more correct, are yet no better than such as proceed from the intellect left to itself and not resting constantly on experience and advancing step by step ; a fault to which I suppose the primitive ages were likewise subject. It must be understood however, in the first place, that the things here brought forward are drawn and concluded from the authority of human reason alone, according to the belief of the sense, whose expiring and failing oracles are deservedly rejected since a better and more certain light has been shed upon us from divine revelation. This Chaos then, which was contemporary with Cupid, signified the rude mass or congregation of matter. But matter itself, and the force and nature thereof, the principles of things in short, were shadowed in Cupid himself. He is introduced without a parent, that is to say, without a cause ; for the cause is as the parent of the effect ; and it is a familiar and almost continual figure of speech to denote cause and effect as parent and child. Now of this primary matter and the proper

¹ *Cælo* in the original. For the grounds of the correction, see Preface, p. 640.—J. S.

² Kellgren, *De Ovo mundano* (Helsingfors, 1849), has collected the passages on the egg cosmogony in the Institutes of Menu, the Puranas, and certain Commentaries. He remarks that, so far as he is aware, no trace of the mythus occurs in the Vedas. It follows that he did not perceive any reference to it in the 129th hymn of the 10th book of the Rig Veda, with which he was certainly acquainted, as he has quoted a portion of Colebrook's translation of it. In this translation it is difficult to recognise even the germ of the mythus, but in that which has since been given by Max Müller it seems more easy to do so. It would be interesting to ascertain how far the mythus was developed at the time at which the older portions of the Rig Veda were composed. The subject may be said to have a natural interest at Helsingfors, as the egg cosmogony exists among the Finns. For the hymn referred to see Colebrook's *Miscellaneous Essays*, i. p. 34, and Müller's Addenda to Bunsen's *Hippolytus*, p. 140.

virtue and action thereof there can be no cause in nature (for we always except God), for nothing was before it. Therefore there was no efficient cause of it, nor anything more original in nature; consequently neither genus nor form. Wherefore whatsoever this matter and its power and operation be, it is a thing positive and inexplicable, and must be taken absolutely as it is found, and not to be judged by any previous conception. For if the manner could be known, yet it cannot be known by cause, seeing that next to God it is the cause of causes, itself only without a cause. For there is a true and certain limit of causes in nature; and it is as unskilful and superficial a part to require or imagine a cause when we come to the ultimate force and positive law of nature, as not to look for a cause in things subordinate. And hence Cupid is represented by the ancient sages in the parable as without a parent, that is to say, without a cause,—an observation of no small significance; nay, I know not whether it be not the greatest thing of all. For nothing has corrupted philosophy so much as this seeking after the parents of Cupid; that is, that philosophers have not taken the principles of things as they are found in nature, and accepted them as a positive doctrine, resting on the faith of experience; but they have rather deduced them from the laws of disputation, the petty conclusions of logic and mathematics, common motions, and such wanderings of the mind beyond the limits of nature. Therefore a philosopher should be continually reminding himself that Cupid has no parents, lest his understanding turn aside to unrealities; because the human mind runs off in these universal conceptions, abuses both itself and the nature of things, and, struggling towards that which is far off, falls back on that which is close at hand. For since the mind, by reason of its narrowness, is commonly most moved by things of familiar occurrence and which may enter and strike it directly and at once, it comes to pass that when it has advanced to those things which are most universal in experience, and yet cannot be content to rest in them that then, as if striving after things still more original, it turns to those by which itself has been most affected or ensnared, and fancies these to be more causative and demonstrative than those universals themselves.

It has been said then that the primitive essence, force and desire of things has no cause. How it proceeded, having no cause, is now to be considered. Now the manner is itself also very obscure; and of this we are warned by the parable, where Cupid is elegantly feigned to come of an egg which was laid by Nox. Certainly the divine philosopher declares that "God hath made everything beautiful in its season, also he hath given the world to their disputes; yet so that man cannot find out the work that God worketh from the beginning to the end"³. For the summary law of being and nature, which penetrates and runs through the vicissitudes of things (the same which is described in the phrase, "the work which God worketh from the beginning to the end"), that is, the force implanted by God in these first particles, from the multiplication whereof all the variety of things proceeds and is made up, is a thing which the thoughts of man may offer at but can hardly take in. Now that point concerning the egg of Nox bears a most apt reference to the demonstrations by which this Cupid is brought to light. For things concluded by affirmatives may be considered as the offspring of light; whereas those concluded by negatives and exclusions are extorted and edged as it were out of darkness and night. Now this Cupid is truly an egg hatched by Nox; for all the knowledge of him which is to be had proceeds by exclusions and negatives: and proof made by exclusion is a kind of ignorance, and as it were night, with regard to the thing included. Whence Democritus excellently affirmed that atoms or seeds, and the virtue thereof, were unlike anything that could fall under the senses; but distinguished them as being of a perfectly dark and hidden nature; saying of themselves, "that they resembled neither fire nor anything else that could be felt or touched"⁴; and of their

³ Eccles. iii. 11.

⁴ Lucret. i. 688:—

Neque sunt igni simulata, neque ulli
Præterea rei quæ corpora mittere possit
Sensibus, et nostros adjectu tangere tactus.

virtue, "that in the generation of things the first beginnings must needs have a dark and hidden nature, lest something should rise up to resist and oppose them⁵". Atoms therefore are neither like sparks of fire, nor drops of water, nor bubbles or air, nor grains of dust, nor particles of spirit or ether. Neither is their power and form heavy or light, hot or cold, dense or rare, hard or soft, such as those qualities appear in greater bodies; since these and others of the kind are results of composition and combination. And in like manner the natural motion of the atom is not that motion of descent which is called natural, nor the one contrary to it (that of percussion), nor the motion of expansion and contraction, nor the motion of impulse and connection, nor the motion or rotation of the celestial bodies, nor any of the other motions of large bodies simply. Notwithstanding in the body of the atom are the elements of all bodies, and in the motion and virtue of the atom are the beginnings of all motions and virtues. But yet on this point, namely, the motion of the atom compared with the motion of larger bodies, the philosophy of the parable seems to differ from that of Democritus. For Democritus is found to be not only at variance with the parable, but inconsistent and almost in contradiction with himself in that which he says further on this point. For he should have attributed to the atom a heterogeneous motion, as well as a heterogeneous body and a heterogeneous virtue; whereas, out of the motions of the larger bodies, he has selected two motions; namely the descent of heavy things and the ascent of light (which latter he explained as the effect of force or percussion of the heavier driving the less heavy upwards), and ascribed them as primitive motions to the atom. The parable on the contrary preserves the heterogeneity and exclusion throughout, both in substance and motion. But it further intimates, that there is some end and limit to these exclusions; for Nox does not sit for ever. And certainly it is the prerogative of God alone, that when his nature is inquired of by the sense, exclusions shall not end in affirmations. But here the case is different; and the result is, that after due exclusions and negations something is affirmed and determined, and an egg laid, as it were, after a proper course of incubation; and not only that Nox lays her egg, but that from this egg is hatched the person of Cupid: that is to say, not only is some notion of the thing educed and extracted out of ignorance, but a distinct and definite notion. With regard then to the kind of demonstrations which are possible concerning primary matter, this is what I conceive to be most in accordance with the meaning of the parable. Let us now proceed to Cupid himself, that is, primary matter, together with its properties, which are surrounded by so dark a night: and see what light the parable throws upon this. Now I am well aware that opinions of this kind sound harsh and almost incredible to the senses and thoughts of men. As we see it has been tried and proved in this very philosophy of Democritus respecting atoms⁶, which because it penetrated somewhat more sharply and deeply into nature and was further removed from common ideas, was treated as childish by the vulgar; and was moreover by the disputes of other philosophies more adapted to their capacity blown about and almost extinguished. And yet this man was much admired in his day⁷, and was called Pentathlus from the variety of his knowledge, and by consent of all was esteemed the greatest physical philosopher, so that he obtained also the surname of Magus. Nor could either the battles and contests of Aristotle (who after the Ottoman fashion felt insecure about his own kingdom of philosophy till he had slain his

⁵ Id. i. 779:—

At primordia gignundis in rebus oportet
Naturam clandestinam cæcamque adhibere,
Emineat ne quid, quod contra pugnet et obstet.

⁶ Lucret. ii. 82.

Cuncta necesse est
Aut gravitate sua ferri primordia rerum,
Aut ictu forte alterius.

But Democritus himself did not ascribe gravity to the atom, and in this as in some other points Bacon was misled by assuming that Lucretius always represents the opinions of Democritus. See Stobæus, *Ecl. Phys.* i. 15. ⁷ Diog. Laërt. ix. 37.

brethren ; and who was likewise anxious, as appears from his own words, that posterity should doubt about nothing), or the majesty and solemnity of Plato, so far prevail—the one by violence, the other by reverence—as to obliterate entirely this philosophy of Democritus. But while that of Plato and Aristotle was noised and celebrated in the schools amid the din and pomp of professors, this of Democritus was held in great honour with the wiser sort, and those who embraced more closely the more silent and arduous kinds of speculation. Certainly in the times of Roman learning that of Democritus was not only extant but well accepted ; for Cicero mentions him everywhere in terms of the highest praise ; and the well-known lines of the poet, who appears to have spoken (as poets commonly do) according to the judgment of his own time, were written not long after ; wherein he is quoted as an instance to prove that great men may be born in heavy climates⁸. Therefore it was not Aristotle or Plato, but Genserich and Attila and the barbarians, who destroyed this philosophy. For at that time, when all human learning had suffered shipwreck, these planks of Aristotelian and Platonic philosophy, as being of a lighter and more inflated substance, were preserved and came down to us, while the more solid parts sank and almost passed into oblivion. But to me the philosophy of Democritus seems worthy to be rescued from neglect ; especially as in most things it agrees with the authority of the earliest ages. First therefore Cupid is described as a person ; and to him are attributed infancy, wings, arrows, and other things of which I will afterwards speak separately. But in the mean time I make this assumption ; that the ancients set down the first matter (such as may be the beginning of things) as having form and qualities, not as abstract, potential and unshapen. And certainly that despoiled and passive matter seems altogether a fiction of the human mind, arising from this, that to the human mind those things most seem to exist, which itself imbibes most readily, and by which it is most affected. It follows therefore that forms (as they call them) seem to exist more than either matter or action ; because the former is hidden, the latter variable ; the former does not strike so strongly, the latter does not rest so constantly. These images on the other hand are thought to be both manifest and constant ; so that the first and common matter seems to be as an accessory and support ; and action, of whatever kind, to be merely an emanation from the form ; and altogether the first place is assigned to forms. And hence appears to have come the reign of forms and ideas in essences ; with the addition (that is to say) of a kind of fantastical matter. All which was increased, moreover, by superstition (intemperance following error) ; and abstract ideas and their dignities were also introduced, with so much confidence and majesty, that the dreamers almost overpowered the wakers. These things however have now for the most part vanished ; though an individual in our age has tried, with more boldness (as it appears to me) than success, to prop them up in their decline and resuscitate them⁹. But how contrary to reason it is to lay down abstract matter as a principle is easily seen, if prejudices be not in the way. For the actual existence of separate forms has been asserted by some¹⁰, of separate

⁸ Juv. x. 48 :—

Cujus prudentia monstrat,
Magnos posse viros, et magna exempla daturos,
Verecun in patria crassoque sub aere nasci.

⁹ The allusion is apparently to Patricius, whose *Nova Philosophia* was published in 1593 ; a work long since so rare that Sorellus (apud Brucker, iv. 28) says that a small library might be purchased for the price of this single book. See for an account of it Brucker, ubi modo.

¹⁰ Angels are regarded by the schoolmen as forms not immersed in matter. Thus St. Thomas says, "Angeli sunt formæ immateriales".—*Sum. Theol.* i. q. 61. Even the soul of man is spoken of as a form "non penitus materia immersa" ; a way of speaking probably employed for two reasons,—to save the possibility of the soul's separate existence, and to obviate the difficulty of the Scotists, that an unextended, or intense, form like the soul cannot give extension or corporeity. From this difficulty Duns Scotus deduced the existence of a "forma corporeitatis" distinct from the soul ; a doctrine not to be confounded with that of Avicenna, who, from the impossibility of conceiving

matter by no one ; not even by those who have taken it for a principle ; and to constitute entities from things imaginary seems hard and perverse, and not consonant with the inquiry concerning principles. For the inquiry is not how we may most conveniently embrace and distinguish the nature of entities in our thoughts, but what are really the first and most simple entities from which the rest are derived. Now, the first entity must exist no less really than the things derived from it ; and in a certain way more. For it is self-subsisting, and other things subsist by it. But the things which are said about this abstract matter are not much better than if a man were to assert that the world and all things are made of categories and such like logical notions, as principles. For it makes little difference whether you say that the world is made of matter, form, and privation, or of substance and contrary qualities. But almost all the ancients, as Empedocles, Anaxagoras, Anaximenes, Heraclitus, and Democritus, though in other respects they differed about the first matter, agreed in this, that they set down matter as active, as having some form, as dispensing that form, and as having the principle of motion in itself. Nor can any one think otherwise, unless he plainly deserts experience. Therefore all these submitted their minds to the nature of things. Whereas Plato made over the world to thoughts ; and Aristotle made over thoughts to words ; men's studies even then tending to dispute and discourse, and forsaking the stricter inquiry of truth. Hence such opinions are rather to be condemned in the whole, than confuted separately in the parts ; for they are the opinions of those who wish to talk much, and know little. And this abstract matter is the matter of disputation, not of the universe. But one who philosophises rightly, and in order, should dissect nature and not abstract her (but they who will not dissect are obliged to abstract) ; and must by all means consider the first matter as united to the first form, and likewise to the first principle of motion, as it is found. For the abstraction of motion also has begotten an infinite number of fancies about souls, lives, and the like ; as if these were not satisfied by matter and form, but depended on principles of their own. But these three are by no means to be separated, only distinguished ; and matter (whatever it is) must be held to be so adorned, furnished, and formed, that all virtue, essence, action, and natural motion, may be the consequence and emanation thereof. Nor need we fear that the result will be general torpor, or that the variety of things which we see cannot be explained ; as I will show hereafter. Now that the first matter has some form is demonstrated in the fable by making Cupid a person : yet so that matter as a whole, or the mass of matter, was once without form ; for Chaos is without form ; Cupid is a person. And this agrees well with Holy Writ ; for it is not written that God in the beginning created matter, but that he created the heaven and the earth.

There is subjoined likewise some description of the state of things as it was before the work of the six days, wherein distinct mention is made of earth and water, which are the names of forms ; but yet in the whole the mass was still unformed¹¹. But though Cupid is represented in the allegory as a person, he is yet naked. Therefore, next to those who make matter abstract they are most in error (though on the contrary side) who make it clothed. I have slightly touched on this in what has been already said of the demonstrations applicable to the first matter, and of the heterogeneous nature of matter itself. But this part on which I am now entering is the proper place for treating of them. We must see therefore among those who have grounded the principles of things in formed matter, who they are who have attributed a native and naked form to matter, and who one appareled and clothed. Now, in all there are four different opinions on this. The first is that of those who assert that there is some one principle of things, but make the diversity of beings to consist in the inconstant and dispensable nature of that same principle. The second is that of those who make the principle of things one in substance, and that fixed and invariable ; but deduce the diversity of beings from the different magnitudes, configurations, and positions of that same principle. The third is that of those who set up many principles of things, and lay

unextended matter, was led to assert the existence of a form of corporeity primitively inherent in all matter.

¹¹ Compare St. Thomas, *Summa*, i. 66. 1.

the diversity of beings to the tempering and mixing of them. The fourth is that of those who constitute infinite or at least numerous principles, but make them specific and formed; and these have no need of any device to account for the multiplicity of things; for they diversify nature at the very outset¹². Of these sects the second alone appears to me to represent Cupid as he is—native and naked. For the first introduces him as separated by a veil, the third as wearing a tunic, and the fourth as cloaked and almost masked. But on each of these I will speak a few words, for the better explanation of the allegory. First therefore among those who have asserted one principle of things, I have found no one who would affirm that principle to be the earth. For the quiet, sluggish, and inactive nature of the earth which submits patiently to the heaven, fire, and other things, prevented such an assertion from entering into any one's mind¹³. Nevertheless the wisdom of the ancients made Earth to come next to Chaos, and to be first the parent, then the bride of Cœlum, from which marriage all things were born¹⁴. But it is not to be therefore understood that the ancients ever constituted the earth the principle of essence; but only the principle, or rather origin, of configuration or system. I refer this point therefore to the following allegory respecting Cœlum, when I shall inquire about origins; which inquiry is posterior to that of principles.

Thales asserted Water to be the principle of things¹⁵. For he saw that matter was principally dispensed in moisture, and moisture in water; and it seemed proper to make that the principle of things, in which the virtues and powers of beings, and especially the elements of their generations and restorations, were chiefly found. He saw that the breeding of animals is in moisture; that the seeds and kernels of plants (as long as they are productive and fresh), are likewise soft and tender; that metals also melt and become fluid, and are as it were concrete juices of the earth, or rather a kind of mineral waters; that the earth itself is fertilised and revived by showers or irrigation, and that earth and mud seem nothing else than the lees and sediment of water; that air most plainly is but the exhalation and expansion of water; nay, that even fire itself cannot be lighted, nor kept in and fed, except with moisture and by means of moisture. He saw, too, that the fatness which belongs to moisture, and which is the support and life of flame and fire, seems a kind of ripeness and concoction of the water. Again, that the body and bulk of water is distributed throughout the universe, as the common support of everything; that the earth is encircled by the ocean; that there is a vast supply of fresh water within the earth, whence come springs and rivers, which like the veins of a body carry off water over the surface and through the bowels of the earth. That there are also immense masses and collections of vapours and waters in the upper regions;—another universe of waters, as it were, for the repair and refreshment of those below, and indeed of the ocean itself. He also supposed that even the celestial fires fed on these vapours and waters, inasmuch as they could neither subsist without aliment nor be nourished by anything else; also that the configuration of water as seen in its particles (I mean drops), is the same as the configuration of the universe, namely, round and spherical; moreover that the undulation of water is seen and observed likewise in air and flame; and lastly, that the motion of water is easy, neither sluggish nor too rapid, and that the generation of fish and water animals is very numerous. But Anaximenes selected Air to be the one principle of things. For if mass is to be

¹² In enumerating these four sects, Bacon alludes successively to the Ionian physicists; to the atomists; to Parmenides, Telesius, Empedocles, and many others; and lastly to Anaxagoras.

¹³ This remark Bacon may have derived from Aristotle, *Metaph.* i. 7. However, Hippo of Rhegium, or rather Hippo the atheist, who is probably the same person, made earth the principle of all things, at least according to the scholiast on Hesiod's *Theogony*. (See Heinsius's Hesiod, p. 237.) Others, however, give a different account of Hippo's opinions, and it is possible that the scholiast's story was suggested to him merely by what Aristotle says of him in the third chapter of the same book.

¹⁴ As I have remarked in the preface, reference is here made to Hesiod.

¹⁵ Plutarch, *De Plac. Philosoph.* i. 3.

regarded in constituting the principles of things, air seems to occupy by far the greatest space in the universe. For unless a separate vacuum be allowed, or the superstition concerning the heterogeneity between celestial and sublunary bodies be received, it would seem that the whole extent of space between the globe of the earth and the bodies of the heaven,—all of it that is not either star or meteor,—is filled with an airy substance. Now the terrestrial globe is but as a point compared with the heaven that surrounds it. But in the ether itself how small a portion is studded with stars! In the spheres next the earth each star is seen singly; and in that furthest from it, though the number of them is immense, yet they occupy a small space in comparison to the distances between them; so that all things seem to float as it were in a vast sea of air. Nor is it a small portion of air and spirit which resides in waters and in cavities of the earth; whence waters receive their fluidity, and sometimes also spread and swell; and the earth, besides its porosity, has its tremblings and shakings, which are evident signs of confined air and wind. And if a kind of middle nature be suited to principle, as being susceptible of so great a variety, this seems to be found in perfection in the air. For air is as the common link of things, not only because it is everywhere present, and comes in and occupies vacuities, but much rather because it seems to have a middle and indifferent nature. For it is a body which receives and conveys light, opacity, the tints of all colours, and obscurations of shade; which likewise distinguishes with the greatest accuracy the different impressions and notes of musical and (what is greater) articulate sounds; which admits without confusion the differences of smells, not only the general ones of sweet, foul, heavy, brisk, and the like, but also the peculiar and specific, as the smell of a rose or violet; which is indifferently disposed towards the great and powerful qualities of heat, cold, moisture and dryness; in which watery vapours, fat exhalations, spirits of salts and fumes of metals hang and float; lastly, in which the radiations of the heavenly bodies, and the closer agreements and disagreements of things, secretly communicate and dispute; so that air is like a second chaos, in which the seeds of so many things act, wander, endeavour, and experiment. Finally you consult the generative and vivifying power in things as that which may lead us up to principles, and make them manifest; in these likewise air seems to play the principal part; so that the names of air and spirit and life or breath are sometimes confounded. And rightly; since respiration is as it were the inseparable companion of the more advanced states of life, (that is, excepting the first rudiments of life in embryos and eggs); insomuch that fish are suffocated when the surface of the water is hard frozen. Even fire itself, unless it be animated by the surrounding air, dies out, and seems to be nothing else than air rubbed together, excited and kindled; as water, on the other hand, seems to be but a congelation and contraction of air. The earth also perpetually exhales air, and has no need to pass through water into the form of air. Heraclitus, on the other hand, with more acuteness but less credibility, made Fire to be the principle of things¹⁶. For he did not look for a middle nature, which is usually the most vague and corruptible, to constitute the principles of things; but for a consummate and perfect one, such as might be the end and period of corruption and alteration. Now he saw that the greatest variety and confusion was found in solid and consistent bodies. For such bodies may be organic, and like machines, which from their very configuration admit innumerable variations; such as are the bodies of plants and animals. And even those which are not organic, are yet on minute inspection found to be very dissimilar. For how great is the dissimilarity between those parts of animals which are called similar? the brain, the crystalline humour, the white of the eye, bone, membrane, cartilage, nerve, vein, flesh, fat, marrow, blood, seed, spirit, chyle, and the like? and likewise in the parts of vegetables, the root, bark, stem, leaf, flower, seed, and the like? Fossils of certainly are not organic, but yet they exhibit both a great mixture in one species and a very plentiful variety compared one with another. Wherefore this broad, ample, and extensive basis of the diversity of beings, wherein so large an array of things displays itself and comes into action, seems to consist in the nature

¹⁶ Plutarch, l. c.

of solidity and consistence. But the bodies of liquids are plainly without the power of organic structure. For through the whole world of visible nature there is found no animal or plant in a body simply fluid; and therefore this infinite variety is precluded and cut off from the nature of liquidity. And yet the liquid nature has its variety, and that in no small degree, as is manifested in the great diversity of melted bodies, juices, distilled liquors, and the like. Whereas in airy and pneumatic bodies this variety is much more limited, and a sort of promiscuous resemblance of things takes its place. Certainly that virtue of colours and tastes, whereby liquids are sometimes distinguished, absolutely ceases; that of odours indeed and some other things remains, yet only transitory, confused, and separable; so that as a general rule, the nearer bodies approach to the nature of fire, the more do they lose of variety. And after they have assumed the nature of fire, and that in a rectified and pure state, they throw off every organ, every property, and every dissimilarity; and nature seems as it were to gather to a point in the vertex of the pyramid, and to have reached the limit of her proper action. Therefore this kindling or catching fire Heraclitus called peace; because it composed nature and made her one; but generation he called war, because it multiplied and made her many¹⁷. And that this process (by which things flowed and ebbed, like the tide, from variety to unity, and from unity to variety) might be some way explained, he maintained that fire was condensed and rarefied, yet so that its rarefaction towards a fiery nature was the direct and progressive action of nature; while its condensation was a kind of retrograde action or failing of the same. Both of these he considered to take place by fate, and (in the sum of things) at certain periods; so that this revolving world would some time or other be set on fire, and afterwards renewed again, and that this series and succession of conflagration and generation would go on for ever. Only the inflammation and the extinction were according to him (if one studies diligently the scanty account which has come down to us of the man and his opinions) to take place in a different order. For as to the process of inflammation, he no way differed from the common opinions; that the progress of rarefaction and extenuation went on from earth to water, from water to air, from air to fire. But the way back was not by the same stages; the order being directly inverted¹⁸. For he affirmed that fire by its extinction produces earth, as its dregs and soot; that these then conceive and collect moisture, whence proceeds an overflow of water, which again emits and exhales air; so that the change from fire to earth is sudden, not gradual.

Such then, or better than these, were the opinions of those who laid down one principle of things; regarding nature simply, not contentiously. And they deserve commendation for giving Cupid but one garment, which is the next degree to nakedness; and that garment too (as I have said) like a veil, and of no thicker texture. Now by the garment of Cupid I mean some form attributed to the primary matter, that may be said to be substantially homogeneous with the form of any of the secondary essences. But the assertions made by them with respect to water, air, and fire, which rest on no very firm grounds, it will not be difficult to confute; nor does there seem to be any reason for discussing them severally, so I will only touch on them in general. First therefore, in the inquiry of principles these ancient philosophers do not appear to have adopted a very perfect system; but what they did was only to seek out among apparent and manifest bodies that which seemed most excellent, and set down that as the principle of all things; by right, as it were, of its excellence; not as being truly and really so. For they thought that such a nature was the only one of which it could be said that it is what it seems; other things they thought were this same nature, though not according to appearance; so that they seem to have spoken either figuratively, or under the influence of fascination; the stronger impression carrying the rest with it. But a true philosopher should look at all things alike, and lay down those as the principles of things, which agree as well with the

¹⁷ Diog. Laërt. ix. 8.

¹⁸ Plutarch, l. c. Diogenes Laërtius, however, does not support the statement of the text.

smallest, rarest, and most neglected of essences, as with the greatest and most numerous and vigorous. For though we men most admire the beings which are most universal, yet the bosom of nature is opened to all. If on the other hand they hold this principle of theirs not by excellence, but simply, they seem certainly to have fallen on a harsh figure of speech; for it brings it plainly to a matter of equivocation, what they assert not being predicated either of natural fire or natural air or natural water, but of some imaginary and ideal fire, air, etc., which retains the name, but does not answer the definition. They seem further to be driven to the same difficulties in which the assertors of abstract matter are involved; for as those introduce a potential and imaginary matter altogether, so do these likewise in part. Moreover they make matter formed and actual with respect to one thing (namely, that principle of theirs), but potential with respect to everything else. Nor does there seem to be any advantage in this kind of single principle, more than in that of abstract matter; except that it has something to offer to the human understanding, whereon the thoughts of men may better fix themselves and rest, and by which the notion of the principle itself becomes somewhat fuller, than that of all others things more abstruse and hard. But the fact is that at that time the *Predicaments* had not commenced their reign, whereby this principle of an abstract nature might have sheltered itself under the credit and protection of the predicament of substance; and therefore no one durst feign a matter quite imaginary, but asserted a principle according to sense; some true entity; the manner only of dispensation (for in that they used greater license) being imaginary¹⁹. For they do not discover, nay, do not even speculate, by what appetite or spur, or by what reason, way, or inducement, that principle of theirs degenerates from, and again recovers its nature. But seeing there are such armies of contraries in the world, as of dense and rare, hot and cold, light and darkness, animate and inanimate, and many others, which oppose, deprive, and destroy one another in turn; to suppose that all these emanate from some one source of a material substance, and yet not to show any manner in which the thing can be, seems but a confused speculation, and an abandonment of inquiry. For if the thing itself were ascertained by the sense, you must receive it, though the manner thereof be hidden; and again, if by force of reason any convenient and credible manner could be discovered, you must perhaps give up appearances; but you should by no means be required to assent to those things whereof neither the being is manifest by the sense, nor the explanation probable by the reason. Besides, if there were but one principle of things, it ought to have a visible mark, and as it were a superiority and predominance in all things; nor should anything of importance be found diametrically opposite to that principle. Likewise it should hold a middle position, so as to be more conveniently available for everything, and diffuse itself around. But there is nothing of this found in the principles of those philosophers. For the earth, which is cut off and excluded from the honour of a principle, seems to receive and cherish natures opposed to those three principal natures; for to the mobility and lucidity of fire it opposes rest and opacity; to the tenuity and softness of air, in like manner, it opposes density and hardness; and to the moistness and sequacity of water, dryness, rigidity, and asperity; besides, the earth itself occupies the central place, the rest being turned out. And further, if there were only one principle of things, it ought to have a nature indifferently disposed towards the generation and the dissolution of them. For it is as much the condition of a principle that things should resolve themselves into it, as that things should be produced from it. But this is not the case; for of these bodies, air and fire seem unsuited to supply matter for the generation of things, though ready to receive their dissolution; whereas water, on the other hand, is favourable and good for generation, but more unfit and averse to dissolution or restoration; as would be easily seen if for some time there were to be no rain. Moreover, putrefaction itself in no way reduces things to crude and pure water. But by far the greatest error is that they set up for a principle that which is corruptible and mortal; for they do no less when they introduce such a principle

¹⁹ Cf. Aristot. *Met.* i. 3.

as forsakes and lays aside its nature in compositions. "For when a thing shifts and changes, that which it was dies ²⁰."

But I shall have to make further use of this reason presently, now that our discourse has come down in order to the third sect, which asserted many principles of things; a sect which seems to have more strength on its side, and certainly has more prejudice. Therefore I will not examine their opinions in general or in common, but one by one.

Amongst those who have maintained that there are many principles I shall set aside those who hold them to be infinite; for the point concerning infinity belongs to the allegory respecting *Cœlum*. But among the ancients Parmenides maintained two principles of things, fire and earth, or heaven and earth ²¹. For he asserted that the sun and stars were real fire, pure and limpid ²², not degenerate as fire is with us, which is only as Vulcan thrown down from heaven, and lamed by the fall. And these opinions of Parmenides Telesius has in our age revived; a man strong and well armed with the reasonings of the Peripatetics (if they were worth anything), which likewise he has turned against themselves; but embarrassed in his affirmations, and better at pulling down than at building up. Of the discoveries of Parmenides himself the account is very scanty and shadowy; yet the foundations of a similar opinion seem plainly laid in the book written by Plutarch on the "Primal Cold"; which appears to have been derived from some ancient treatise, at that time extant but now lost. For it contains not a few things both more acute and more sound than the speculations of the author himself commonly are, and by these Telesius appears to have been prompted and incited to take them up studiously and follow them out strenuously in his "Commentaries on the Nature of Things". Now the opinions of this sect are as follows ²³: That the first forms, and the first active entities, and therefore the first substances are heat and cold; yet that these have no body, but a passive and potential matter, which supplies a corporeal bulk, and is equally susceptible of both natures; itself without any action at all. That light is a sprouting of heat, but of heat dissipated, which being multiplied by collection becomes robust and sensible. That darkness in like manner is the destitution and confusion of the radiating nature from cold. That density and rarity are but the textures and, as it were, the webs of heat and cold; heat and cold being the producers and operatives thereof; cold condensing and thickening the work, heat separating and extending it. That from such textures a disposition towards motion, either apt or reverse, is impressed upon bodies; that is, prompt and apt upon rare bodies, sluggish and averse upon dense. Therefore that heat by tenuity excites and creates motion; cold by density checks and quiets it. Hence that there are four co-essential and conjugate natures, and those of two kinds, preserving the respective order I have mentioned (for the source is heat and cold, the rest are emanations); but yet always concomitant and inseparable. These are heat, lucidity, rarity, mobility; and again, their four opposites cold, opacity, density, immobility. That the seats and stages of the first conjugation are placed in the heaven, stars, and especially in the sun; of the second, in the earth. For that the heaven from its perfect and entire heat and the extreme extension of matter is most hot, lucid, rarefied, and movable; whereas the earth, on the contrary, from its entire and unrefracted cold, and the extreme contraction of matter, is most cold, dark, and dense, completely immovable, and exceedingly averse to motion. That the summits of the heaven preserve their nature entire and

²⁰ Lucret. iii. 518:—

Nam quodcumque suis mutatum finibus exit,
Continuo hoc mors est illius, quod fuit ante.

²¹ This opinion, or something analogous to it, was held by many of the older physicists. (See Karsten's Parmenides, p. 230.) Beside those whom Karsten mentions we know that Hippo Rheginus is said to have made fire and earth, or heat and cold, his first principles. (See Pseudo-Origen. [Hippolytus, i. 14] *Philosoph.* c. 16.)

²² Stobæus, *Eclog. Phys.* i. 23.

²³ [In his notes to the original, Mr. Ellis supplies parallel passages from the *De natura rerum* of Telesius to the statements in Bacon's text.]

inviolable, admitting some diversity among themselves, but completely removed from the violence and insult of a contrary body; that there is a like constancy in the depths or innermost parts of the earth; and that it is only the extremities, where contrary bodies approach and meet together, which struggle and suffer, and are assailed by one another. That the heaven therefore, in its whole bulk and substance, is hot, and quite free from every contrary nature, but that heat is unequal; some parts being more, others less hot. For that in the body of the stars heat is more intense, in the space between them less so; moreover that of the stars themselves, some are more burning than others, and have a livelier and more radiant fire; yet so that the contrary nature of cold, or any gradation thereof, never penetrates there; for that it admits a difference of nature, but not a contrariety. That you must not however judge of the heat or fire of celestial bodies, which is entire and native, from common fire. For that our fire is out of its place, trembling, surrounded with contrary bodies, needy, dependent for its preservation on the fuel given it, and fugitive; whereas in heaven it is in its true position, apart from the violence of any contrary body, constant, kept up by itself and similar things, and performing its proper operations free and undisturbed. Also that the heaven is bright everywhere, but with differences of more or less. For that, seeing there are among the known and numbered stars some which are only visible in a clear sky, and in the milky way there are knots of small stars which show a kind of whiteness all together, but are not severally distinguishable as bright bodies; no one can doubt but that there are many stars invisible to us; and indeed that the whole heaven is endued with light, though not with a splendour so strong and far-darting, nor with rays so thick and close, as can travel so great a distance and come to our view. So again, that the whole heaven consists of a fine and rare substance, nothing in that substance being crowded or packed closer than it likes, but yet that in some parts matter is more extended, in others less. Lastly, that the motion of the heaven is found to be that which suits the most movable body; namely, the motion of conversion or rotation. For circular motion is interminable and for its own sake. Motion in a straight line is to an end, and for the sake of something, and as it were to obtain rest. Therefore that the whole heaven moves with a circular motion, and no part of it is free from that motion; but yet as in the heat, light, and rarity of heaven there is inequality, the same likewise is observed in its motion; an inequality the more conspicuous because it more invites and bears human observation, and may even be reduced to calculation. Now, orbicular motion may differ both in velocity and direction; in velocity it may be quicker or slower; in direction, it may be in a perfect circle, or it may have something of a spiral course, and not return exactly to the same spot; for a spiral line is made up of a straight line and a circle. Therefore that these very inequalities have place in the heaven—variety of velocity, and deviation from the point of return, or spirality. For both the fixed stars and the planets are unequal in their velocity; and the planets evidently deviate from tropic to tropic; and the higher the heavenly bodies are, the greater is their velocity, and the more spiral their course. For if phenomena be taken simply and as they are seen, and there be set down one natural and simple daily motion in the heavenly bodies, and the mathematical propriety of reducing motions to perfect circles be rejected, and spiral lines be admitted, and those contrarieties of motions following the order from east to west (which they call the motion of primitive mobility) and again from west to east (which they call the proper motion of the planets) be reduced to one; difference of time in the return being accounted for by differences of speed, and difference of position with regard to the zodiac by spiral lines, it is plain that what I have said must come to pass—that the moon, for instance, which is the lowest of the planets, must proceed both slowest of all, and in the rarest and most open spirals. Such then appears to be the opinion of this sect respecting the nature of that portion of the heaven which (by reason of its distance from a contrary) is firm and perpetual. But whether Telesius kept to the old limits, and imagined that such was the nature of everything above the moon, together with the moon itself, or whether he held that the hostile force could ascend higher, he does not clearly lay down. But of the earth (which is

the stage and seat of the contrary nature) he asserts likewise, that the greatest part is inviolate and undisturbed, and that the heavenly bodies do not penetrate thither. But of what kind it is, he says, need not be inquired. It is enough to consider it endowed with these four natures—coldness, opacity, density, and rest, and those absolute and in no degree impaired. Now the part of the earth towards the surface, being like a crust or rind, he assigns to the generation of things; and supposes all entities any way known to us, even the heaviest, hardest, and those which lie the deepest, as metals, stones, the sea, to consist of earth in some degree changed and wrought by the heat of the heaven, and which has already conceived some heat, radiation, tenuity, and nobility, and partakes in short of an intermediate nature between the sun and pure earth. It follows therefore that this pure earth must be depressed below the lowest depths of the sea, the deepest mines, and all generated bodies; and that between this pure earth and the moon, or perhaps higher, there must be situated a middle nature composed by the temperaments and refractions of heaven and earth. Having thus sufficiently fortified the interior of both kingdoms he gets up an invasion and war. For he supposes that in the regions lying between the furthest parts of the heaven and the innermost of the earth, there is found all tumult, conflict, and perturbation, as we see in empires whose borders are ravaged by incursions and violence, while the interior provinces enjoy secure peace; that such natures therefore, with their concretions, have the appetite and faculty of constantly generating, multiplying, and spreading themselves in all directions, of occupying the whole mass of matter, of mutually assailing and invading one another, of turning one another out from their proper seats and settling themselves therein; and moreover of perceiving and apprehending the force and actions of another nature as well as their own, and by means of such perception of shifting and adjusting themselves; and that from this contest every variety of entity, action, and virtue is derived. Yet he seems in some places, though hesitatingly and cursorily, to assign to matter some quality of its own; as first, that it is neither increased nor diminished by forms and active entities, but consists of a universal sum; secondly, that to it is referred the motion of gravity or descent; and he also adds something about the blackness of matter. But this is set down plainly, that heat and cold, in the same power and quantity, remit or increase their strength accordingly as the matter in which they exist is opened out or folded up; since they fill the measure of the matter, not their own. But Telesius proceeds to devise and explain the manner in which, by means of this strife and contest, so fruitful and manifold a generation of beings may be induced and turned out. He begins by securing the earth, as being the inferior principle; and shows the reason why it has not been long ago destroyed and absorbed by the sun, nor ever can be²⁴. The first and principal point which he alleges is the immense distance of the earth from the fixed stars, and its very great distance from the sun—a distance tolerably well measured. The second point is the declination of the sun's rays from the perpendicular with respect to the different parts of the earth; that is, that over the greatest part of the earth the sun is never vertical, nor his rays perpendicular; so that he never affects the whole globe of the earth with any remarkable force of heat. The third point is the obliquity of the sun's motion in passing through the zodiac with respect to the same parts of the earth; whence the heat, whatever be its force, is not continually

²⁴ The tenth chapter of Telesius's first book is teleological. "Summa Dei bonitas . . . ens nullum . . . perdi velit." For the preservation of the universe and the balance of heat and cold, the earth is put in the middle point of the heavens. The heavens and the earth are both spherical—the former according to the free and uniform motion of the different orbs, and the latter that half of it may always be exposed to the sun's influence. If the earth were larger and not in the centre of the universe, the power of cold would predominate and destroy the lower part of heaven. For the security of the earth, the density and heat of the heavens are not uniform, and both sun and stars are at a great distance; and the oblique and unequal motion of the sun prevents his remaining too long over any part of the earth's surface. All this agrees tolerably well with Bacon's account of it, but to his fifth reason I do not find anything corresponding in the text.

redoubled, but returns after long intervals. The fourth point is the velocity of the sun in its diurnal motion, performing as it does so large a circuit in so short a time, whereby the heat stays the less, and is not stationary for an instant. The fifth point is the continuation of bodies between the sun and the earth, whereby the heat of the sun does not come through a vacuum with its force entire, but by passing through so many resisting bodies, with each of which it has to struggle and dispute, is immensely weakened and enfeebled; and so much the more because the further it goes and the weaker it becomes the more stubborn are the bodies it meets and most of all when it arrives at the surface of the earth, where there seems not only resistance, but a direct repulsion. But the process of mutation laid down by Telesius is as follows. The war (he holds) is absolutely inexpiable and internecine. These contrary natures do not agree in any one point, nor do they meet in a third, excepting in Hyle. Therefore the one nature desires, strives, and contends absolutely to destroy the other, and to impress matter with itself only and its own image; so that the sun's work (as he says clearly and often) is plainly to turn the earth into sun, and *vice versâ* the earth's work is to turn the sun into earth. This however does not prevent everything being done in certain order, definite times, and just measure; and every action in its due course beginning, working, flourishing, languishing, and ceasing; but this is not caused by any laws of alliance or concord, but entirely by a want of power; for all more or less in virtue and action proceeds not from the regulation of the intensive power (which desires something entire) but from the stroke and curb of the opposite nature. The diversity, multiplicity, and likewise the perplexity of operation must certainly proceed from one of three things; namely, the force of heat, the disposition of matter, or the manner of working; which three are nevertheless united together by a mutual bond and are causes one of the other. Heat itself differs in power, quantity, continuance, mean, and succession; succession again has its own manifold variations in approaching and withdrawing, or in intension and remission; in sudden or graduated accession; in return or repetition at longer or shorter intervals; and such like alterations. Heats therefore are far the most varied in their force and nature, according as they are made purer or less pure, with reference to the first fountain thereof, namely, the sun. Neither does all heat cherish heat, but when two heats differ many degrees from one another, either kills and destroys the other no less than cold; each having its proper actions, and thwarting and opposing the actions of the other; so that Telesius makes lesser heats to be as traitors and deserters towards great ones, and as conspiring with cold. Therefore the feeble heat which creeps in water destroys the lively heat which vibrates in fire; and in like manner the preternatural heat of putrid humours in the human body suffocates and extinguishes the natural heat. But that quantity of heat makes a great difference, is too manifest to need explanation. For one or two burning coals are not so hot as a whole heap; but the effect of quantity is most remarkably shown in the multiplication of the sun's heat, by the reflection of the rays; for the number of rays is doubled by simple and multiplied by various reflection. But to quantity of heat there should be added also union; which is likewise best shown in the oblique and perpendicular direction of rays, since the nearer the direct and reflected rays coincide, and the acuter the angle which they make with each other, the stronger is the force of heat thrown out. Moreover the sun himself when he is present among the larger and stronger fires of the fixed stars, Regulus, the Dog Star, and Spica, sends out stronger heats. But continuance of heat is most plainly an operation of the greatest importance; as all natural virtues respect and observe their times, some time being required to put their strength in action, and a good deal to give it full vigour. Therefore continuance of heat converts an equal heat into a progressive and unequal one, because both the preceding and the subsequent heat are united together; and this is clearly shown in the heats of autumn, inasmuch as they are felt to be more burning than the heats of summer, and in the heats of summer afternoons, inasmuch as they are felt to be more burning than those of noonday. So also the weakness of heat in the colder countries is sometimes compensated by the continuance and length of the days in summer. But the power and efficacy of

the medium in conveying heat is wonderful. For hence the temperature of the seasons is exceedingly varied, so that with an unspeakable changeableness it is sometimes found to be chilly in summer and sunny in winter; the sun meanwhile keeping his course and distance constantly and regularly. Crops of corn likewise and grapes ripen sooner with a south wind and a cloudy sky. And every disposition and excretion of the heaven in the various revolutions of years, sometimes pestilent and diseased, sometimes healthy and favourable, derives its cause and origin from this; namely, from the variation of the intermediate air, which gathers a different disposition from the very change and alteration of the seasons, perhaps in a long series. But the succession of heat, and the order in which one follows another, as the reasons of it are manifold, so its virtue is supreme. For the sun could not have generated so numerous and prolific an offspring, did not the configuration of the sun's body as it moves, with respect to the earth and the parts of the earth, partake of very much inequality and variation. For the sun moves both in a circle and rapidly and obliquely, and changes himself, so as to be both absent and present, nearer and further off, more perpendicular and more oblique, returning slowly and quickly, and never for a single moment is the heat emanating from the sun constant, and nowhere (unless it be in the tropics) does it return at a short interval; so that such variation of the generator excellently agrees with such variety of the thing generated. Whereto may be added the extreme diversity of the nature of the medium or conductor. The other things also, which have been said of the inequality and degrees of a single heat, may be referred to the changes and varieties of succession in different heats. Therefore not without reason did Aristotle attribute the generation and corruption of things to the oblique course of the sun, and set down that as the efficient cause thereof; had he not from his love of laying down the law and of acting as the arbiter of nature, and of distinguishing and arranging things according to his own pleasure, spoiled a sound conception. For he should have assigned generation and corruption (which is never merely privative, but is still pregnant with the generation of something else) to the inequality of the sun's heat as a whole; that is, to his advance and retreat both together; not generation to the advance and corruption to the retreat separately; a thing which he did stupidly and almost according to the vulgar judgment. And if any one is surprised that generation of things is attributed to the sun; seeing the sun is asserted and supposed to be fire, and fire generates nothing; it is a weak objection. For that notion of the heterogeneity of the heats of the sun and of fire is plainly a dream. For there are infinite operations in which the action of the sun and of fire agree; as in the ripening of fruits, the preservation in cold climates of tender plants accustomed to warm skies, the hatching of eggs, the clarifying of urine (for I put the heat of the sun and of animals together), the reviving of small animals stiffened with cold, the raising of dews and vapours, and the like. Nevertheless our fire is a bad actor, and cannot well imitate or come near to the actions of the sun, for the sun's heat has three properties, which common fire can by scarce any device represent. First by reason of its distance it is less in degree and gentler; this however is a property which may in some measure be matched; for such a measure of heat is rather unknown than unprocurable. Secondly by flowing and shooting through so many and such different mediums, it borrows and obtains a certain dissimilar and generative force. But above all, it is so regular in the inequality with which it increases and diminishes, advances, and retreats, never succeeding by starts or precipitately. Which two latter properties are almost imitable by fire, though the matter may be advanced by a perspicacious and well-considered industry. Such then are the opinions of Telesius respecting the diversity of heats.

But cold, that is, the contrary principle, and the distribution thereof, he scarce mentions; unless he thought that in treating of the disposition of matter (to which I now proceed in the second place) he had sufficiently provided for it. Yet this he should not have done; seeing that he held cold to be by no means the privation of heat, but a decidedly active principle; a rival as it were and competitor with heat. And what he says concerning the disposition of matter goes to show how matter suffers and is worked upon and converted by heat,

without any mention or thought about cold. Of cold however (for I wish to deal quite fairly with every man's opinions, and to give them the benefit of a favourable construction) he might have said something of this kind:—that the immovable and fixed seat of cold answers excellently to the movable and changeable structure of heat; as the anvil to the hammer. For if both principles had been subject to variety and alteration they would doubtless have produced hourly and momentary beings. Likewise that the immense regions of heat (namely, the heavens) are somewhat balanced by the compact nature of the earth and surrounding objects; since it is not space that is regarded, but the quantity of matter in space. But for the nature of cold and its virtues and proportions it is fit they should be passed over in silence, or with few words; seeing no certain and well-approved information can be had concerning it from experience. For we have common fire, as a kind of substitute for the sun, to manifest the nature of heat. But for the cold of the earth there is no substitute which is at man's command and available for experiment. For those chills and rigours of cold which in winter time and in the coldest countries are exhaled into the air from the globe and circumference of the earth are merely tepid airs and baths, compared to the nature of the primal cold shut up in the bowels of the earth; insomuch that that cold whereof men have perception and command is much the same as if they had no other heat than that of the summer sun in hot countries; which as compared with the fire of a burning furnace may be regarded as coolness. However not to dwell longer on supposititious suggestions, let us next see what Telesius says of the disposition of matter on which heat acts; and which has such power as to promote, impede, and change the very action of heat. It falls under four heads. The first difference is derived from the pre-existence or non-pre-existence of heat. The second, from the abundance or paucity of matter. The third, from the degree in which it is worked. The fourth, from the closeness or openness of the body worked upon. With regard to the first, Telesius supposes that in all known beings there exists some latent heat, though imperceptible to the touch, which unites itself to the new or supervenient heat; and which is itself moreover excited and inflamed by this same foreign heat to perform its own actions in its proper sphere: of this he says it is a notable argument, that there is no being,—neither metal, nor stone, nor water, nor air,—which does not grow warm at the touch, or even at the approach, of fire or a hot body; which would probably not be so, were there not some pre-existing and latent heat to prepare the way for this new and manifest heat. Also that the more or less in this respect, that is the greater or less readiness to catch fire, which is found in beings, corresponds with the measure of pre-existing heat. For air warms with a little heat, and such as in the body of water would not be perceptible by the sense. Water likewise warms sooner than stone, or metal, or glass. For though it is true that some of these, as metal and stone, seem to warm sooner than water, that is only on the surface and not in the inner part of the body; for consistent bodies have less free communication in their parts than liquids. Therefore the exterior of metal is warmed sooner than the exterior of water, but the whole body not so soon. The second difference is laid in the collection and bulk of matter. For if this be closed, the strength and heat is more limited, and by union more increased and intensified; on the other hand, if it be loose, the strength is more dispersed, and by dispersion more diminished and weakened. Therefore the heat of ignited metals is stronger than that of boiling water, even than of flame itself, except that flame, by reason of its tenuity, finds easier entrance. For the flame of coals or wood, unless it be excited by blowing, so that the motion may help to drive it in and make it penetrate, is not very furious; nay, some flame (as the flame of spirit of wine, for instance, especially in a small quantity and scattered), has so gentle a heat that the hand may almost bear it. The third difference, which is taken from the degree in which matter is wrought upon, is manifold; for he mentions some seven degrees of this working: of which the first is pliancy, or that disposition of matter which makes a body yield a little to any great violence, or bear compression, and especially extension; in a word, flexible or ductile. The second is softness, when there is no need of any great violence, but the body yields upon the slightest impulse and at a touch, without

any apparent resistance. The third is viscosity or tenacity, which is a kind of beginning of fluidity. For a viscous body seems at the touch and embrace of another body to begin to flow and continue itself, and not to be terminated in itself; though it does not flow spontaneously and of its own accord; for a fluid follows itself, a viscous body rather something else. The fourth is fluidity itself, where a body partaking of an inner spirit is glad to be in motion, and follows itself, and is not easily defined or fixed. The fifth is vapour, when the body is attenuated into something intangible, which likewise gives, flows, undulates, and trembles with greater agility and mobility. The sixth is exhalation, which is a kind of vapour more concocted and ripened, and prepared for the reception of a fiery nature. The seventh is air itself; which Telesius contends is actually endowed with a native heat of its own, and that not small or weak; because even in the coldest regions the air is never congealed or frozen. Likewise that we have an evident proof that the air in its own nature is hot, in this: that all air enclosed, separated from the universal body of air, and left to itself, manifestly contracts warmth, as appears in wool and fibrous bodies. Again, in close and confined places, the air, when breathed, feels somewhat suffocating; which comes from heat. And that the reason of this is that air, when confined, begins to exercise its nature, whereas the open air out of doors is refrigerated by the cold which the globe of the earth perpetually emits and discharges. Moreover our common air has some slender portion of the qualities of the heavenly bodies; since it contains some light in itself: as is shown by the sight of animals, who can see at night and in dark places²⁵. Such then, according to Telesius, is the order of the disposition of matter; in intermediate bodies, that is; for the extremes, namely hard and rigid bodies on the one side, fire itself on the other, as being the limits of those lying between, are not counted. But besides these simple gradations he finds a great diversity in the disposition of matter, by reason of similarity and dissimilarity of body; since the various portions of matter, which are compounded and united together in one body, may either be referred equally to some one of the above-mentioned gradations, or unequally to different ones. For thence arises by far the greatest difference in the operation of heat. Therefore the fourth difference necessarily depends on the nature and also the position of the body on which heat acts, whether it be close or porous and open. For when heat works on an open and exposed nature, it works in succession and part by part, attenuating and at the same time drawing out and separating. But when it works in a confined and compact nature, it operates in the whole and in the mass, without losing any heat, but the old and the new heat plainly uniting and conspiring together; whence it comes that it effects more powerful, more profound, and more exquisite alterations and preparations; of these however I shall presently speak more when I come to the manner of preparation. Meanwhile Telesius labours hard and strangely perplexes himself to explain the manner of the divorce and separation of his primary connatural qualities, heat, light, tenuity, and mobility, and the four opposed to them, according as they take place in bodies; for there are found some bodies hot or excellently prepared for heat, which are also dense, quiet, and dark; others rare, movable, bright or white, yet cold; and in like manner with regard to the rest: there being some one quality existing in things, with which the rest do not agree; and again, others partake of two of these natures, without the other two, with a great variety of permutations and assortments. In which part Telesius does not acquit himself very happily, but behaves like his opponents; who, having formed their

²⁵ That certain animals can see at night is with Telesius a proof that the apparently obscure parts of the heavens—the highest and lowest,—give out a perceptible amount of light, not that the air is itself luminous,—unless the “*infima cœli portio*” be understood to mean our atmosphere. (See *De Rer. Nat.* i. 3.) It is remarkable that Bacon omits Telesius’s chief argument in favour of the opinion that the air is generated by and contains heat, namely that it partakes in some measure of the circular motion which the heavens derive from the pure and effectual heat by which they are constituted. The natural motion of the air is made manifest according to Telesius by the sound heard when a shell is put to the ear.

opinion before they made the trial, when they come to particulars, abuse both their own wit and the facts of nature, and miserably mangle and torture both ; and yet they proceed confidently and (if you believe themselves) victoriously, and by one means or another still find enough to say for themselves. In the end, however, he gives up in despair, and falls to wishes, intimating that though both the power and quantity of heat and the disposition of matter may be grossly and in sum distinguished and determined, yet their exact and accurate proportions, and their distinct and as it were measured methods are placed beyond the reach of human inquiry ; and yet so that (if of two impossibles one can be said to be easier than another) the diversity of the disposition of matter may be better discerned than the strength and gradations of heat ; and nevertheless that in these very things (if the fates allow) is to be found the summit and culmination both of the knowledge and the power of man. But having plainly professed despair, he yet does not cease from vows and prayers. For his words are : " Further, what heat and how much,—that is, what strength and what amount of it,—can turn what earth and what entities into what,—is a question not to be asked ; being a thing impossible (as it seems to me) for man to know. For how is it possible to divide, as it were, into degrees either the force of heat or heat itself, or to have a distinct perception of the amount and quantity of matter into which it is infused, and to assign to a certain and determinate force and quantity of heat a certain quality and disposition and certain actions of matter ; or on the other hand, to a certain quantity and certain actions of matter a certain and determinate quantity of heat ? Would that they who enjoy leisure and a clearer intellect, and who have the means of searching the nature of things in perfect tranquillity, may find this out ; that men may not only understand all things, but likewise be masters of all ²⁶ ! " wherein he shows himself somewhat honest than his adversaries usually are, who set down as absolutely unattainable by art everything which the arts that they themselves have made do not attain ; so that no art can be found guilty, being itself both party and judge. There remains the method which was mentioned in the third place, that of working upon ; which Telesius disposes of by three dogmas. The first is, what I before remarked by the way, that we know of no concordance (as in the doctrine of the Peripatetics), whereby things are cherished and conspire as by agreement. For all generation, and therefore all effect in the natural body, is accomplished by victory and predominance of one or other, and not league or compact between the two. And this is no new thing, as Aristotle likewise remarked it in the doctrine of Empedocles ²⁷ ; namely, that Empedocles, although he had set down strife and friendship as the efficient principles of things, yet in his explanations of causes commonly makes use of hostility, as if forgetful of the other. The second is that heat, by its own action, always turns being into moisture, and that neither dryness has any agreement with heat, nor moisture with cold. For to attenuate is the same as to moisten ; and what is rarest is also moistest ; by moisture understanding that which yields, divides into parts, and restores itself again most easily, and is defined and fixed with difficulty. All which qualities exist more in flame than in air, which is made by the Peripatetics to be most moist. Therefore heat perpetually attracts, feeds upon, extends, supplies, and generates moisture ; and on the other hand cold drives all things into dryness, concretion and hardness : and here he holds Aristotle to be both dull in observation and inconsistent with himself, and imperious and wilful as regards experience, because he unites heat with dryness. For that heat sometimes dries beings, happens by accident ; that is to say, in a body dissimilar, and made up of parts some grosser and some finer, heat attracts and (by attenuation) gives an outlet to the finer part, while the grosser part is thereby forced together and more constrained ; which grosser part nevertheless, if a stronger heat be applied, itself becomes fluid, as is shown in bricks. For, in the first place, a moderate heat forces the clay to become brick, the finer part having evaporated ; but a stronger heat melts this brick substance into glass. Now these two dogmas may be regarded as confutations of errors ; the third plainly affirms, and not only that, but also clearly dis-

²⁶ This quotation is inaccurate.

²⁷ Arist. *Meteor.* iii. 4.

tinguishes the manner of working and preparation. This is twofold, either by rejection or conversion ; either of which methods is carried out into acts according to the force of heat and disposition of matter. Yet in this there seem to be as it were two rules ; one, that when heat and cold meet together in great quantities and in regular armies, there follows an ejection. For the beings are dislodged like armies, and driven from their place. But when a smaller quantity is engaged then there follows conversion ; for the beings are destroyed and rather change their nature than their place. Of this there is a remarkable and noble instance in the upper regions of the air, which, though they are situated nearer to the heat of heaven, are yet found to be colder than the confines of the earth. For in those places where a nearer approach is made to the seat of primitive heat, the heat, collecting itself at once, drives out and thrusts down the entire force of cold that had risen up, and prevents its approach. And it may be, in like manner, that in the depths of the earth the heats are more intense than on the surface ; for that as the seat of primitive cold is approached, the cold, exciting itself, drives back and puts to flight the heat with great impetuosity, and converts it into itself. The other rule is, that in an open place there follows ejection ; in a confined, conversion. Now this is wonderfully shown in close vessels, where the emission of the rarefied body (which we commonly call spirit) being prevented and driven back, there follows deep and radical alterations and fermentations in bodies. But this in like manner happens when a body, from the compactness of its parts, is itself like a close vessel. Such then are the opinions of Telesius, and perhaps also of Parmenides, concerning the principles of things, except that Telesius has added something of his own respecting Hyle, being led astray by the Peripatetic notions.

Now what Telesius says would have been probable, if man were removed from the world, and with him the mechanical arts which vex matter, and the fabric of the world were regarded simply. For this philosophy of his seems a kind of pastoral philosophy, which contemplates the world placidly and at its ease. Of the system of the world he discourses well enough, but of principles most unskilfully. Moreover in his system itself there is a great mistake ; namely, that he frames such a system as may apparently be eternal, without supposing a chaos, or any changes of the great configuration of things. For whatever philosophy it be, whether the Telesian or the Peripatetic, or any other, that professes a system so furnished, balanced, and guarded, that it may seem not to have come from chaos, it is a philosophy of little value, and conceived in the narrowness of the human breast. For by one who philosophises according to the sense alone, the eternity of matter is asserted, the eternity of the world (such as we now see it) is denied ; and this was the conclusion both of the primitive wisdom, and of him who comes nearest to it, Democritus. The same thing is testified by Sacred Writ ; the principal difference being, that the latter represents matter also as proceeding from God ; the former, as self-existing. For there seem to be three things with regard to this subject which we know by faith. First, that matter was created from nothing. Secondly, that the development of a system was by the word of Omnipotence ; and not that matter developed itself out of chaos into the present configuration. Thirdly, that this configuration (before the fall) was the best of which matter (as it had been created) was susceptible. These however were doctrines to which those philosophies could not rise. Creation out of nothing they cannot endure ; the existing configuration of the world they suppose to have grown out of many indirect and circuitous processes, and many attempts and efforts of matter : and as for its being the best possible, they do not trouble themselves about that, seeing they maintain it to be perishable and variable. In these points therefore we must rest upon faith and the firmaments of faith. But whether it would have been possible for this created matter, in a long course of ages, by the force which was given to it, to have gathered and shaped itself into that perfect configuration (as it did at once without any rounding about at the word of command), is a question perhaps not to be asked. For the anticipation of time is as much a miracle, and belongs to the same omnipotence as the formation of being. Now the Divine nature seems to have chosen to manifest itself by both these emanations of omnipotence,

by operating omnipotently, first on being and matter in the creation of something out of nothing; secondly on motion and time in anticipating the order of nature and accelerating the process of being. But these things belong to the allegory of *Cœlum*, where I will discuss more fully what I now briefly glance at. Let us proceed then to the principles of Telesius. And would that this were but agreed on for once by all, that beings are not to be made out of things which have no being; nor principles out of what are not principles; and that a manifest contradiction is not to be admitted. Now an abstract principle is not a being; and again, a mortal being is not a principle; so that a necessity plainly inevitable drives men's thoughts (if they would be consistent) to the atom; which is a true being, having matter, form, dimension, place, resistance, appetite, motion and emanations; which likewise, amid the destruction of all natural bodies, remains unshaken and eternal. For seeing the corruptions of the greater bodies are so many and various, it must needs be that that which remains as the centre immutable should be either something potential or infinitely small. But it is not potential: for the original potentiality cannot be like other potentialities, which are one thing actually and another potentially. But it must necessarily be something entirely abstract, since it refuses all act and contains all power. It remains therefore that this immutable thing must be infinitely small; unless indeed it be asserted that there are no principles at all, but that one thing is as a principle to another; that the law and order of change are things constant and eternal, but essence itself inconstant and mutable. And it would be better to affirm directly something of this kind than, from a desire to maintain some eternal principle, to fall into the greater inconvenience of making that principle imaginary. For the former method seems to have some issue; namely that things change in a circle; whereas this would have none at all, which regards as beings things that are merely notional and instruments of the mind. And yet that this is no way the case, shall be shown hereafter. Telesius however chose *Hyle*, which, though the offspring of a later age, he transferred into the philosophy of Parmenides. But he institutes a strange and altogether unequal contest between his active principles, unequal both in numbers and the method of fighting. For as to numbers, the earth with him is single, while the heaven has a great army; the earth likewise is almost like a point, whereas the space and region of the heaven are immense. Nor can this inconvenience be removed by the assertion that the earth and its connaturals are of a matter most compact, whereas the heavens and the ethereal bodies are of a matter most spread out. For though this certainly makes a considerable difference, yet it by no means equalises the forces, not by a wide interval. But the strength of Telesius's doctrine depends principally upon the possibility of assigning, as it were, an equal portion of *Hyle* (equal in quantity, not in bulk) to each of the active principles; so that things may last, and a system be constituted and established. For whoever, agreeing with Telesius in other respects, shall admit the superabundance of *Hyle* in one principle as compared with the other, especially in so great an excess, will find himself in a difficulty, and will not be able to make it out. Therefore in the dialogue of Plutarch respecting the face in the moon's orb, this consideration is wisely proposed, that it is not probable that in the dispersion of matter nature enclosed every compact body in the globe of the earth alone, when there were so many globes of stars revolving. But Gilbert has indulged this thought to such excess, as to assert that not only the earth and moon, but many other solid and opaque globes are scattered amid the shining globes throughout the expanse of heaven²⁸. Nay, the Peripatetics themselves, when they had set down the heavenly bodies as eternal in their own state, and sublunary bodies as eternal by succession and renovation, were not confident of being able to maintain that doctrine without assigning as it were equal portions of matter to the elements. For this is what they are thinking of in that dream of theirs about the tenfold proportion of the ambient to the interior element. Nor do I adduce these things because none of them please me, but to show that it is an inconceivable thing and a thought altogether ill-measured, to

²⁸ Gilbert, *Nov. Phys.* i. 10.

set down the earth as the contrary active principle to heaven, which Telesius did. And the supposition becomes much harder, if, besides the difference in quantity between heaven and earth, a man shall consider the difference in virtue and act. For the conditions of battle are entirely destroyed if the weapons on one side take effect, and on the other do not reach their distance, but fall short. Now, it is certain that the sun's force reaches the earth; but who will undertake to say that the earth's force reaches the sun? For of all the virtues which nature produces, that of light and shade is emitted furthest, and spreads round in the widest circle. But the shade of the earth stops on this side of the sun, whereas the light of the sun, if the earth were transparent, would strike quite through the globe of the earth. Heat and cold again (of which we are now speaking) are never found to carry their virtue so far as light and shade. Therefore if the shade of the earth does not reach the sun, much less is it probable that the cold of the earth reaches thither. If it be the case that the sun and heat act on certain intermediate bodies to which the virtue of the contrary principle does not ascend, and where it does not in any way interfere with their action, it must needs be that they (the sun, I say, and heat) first occupy all bodies near them, and then take in those also which are further off, till it would end in the conflagration of Heraclitus, the solar and celestial nature gradually descending, and approaching nearer to the earth and its confines. Nor does it well agree with the supposition, that this power of imposing and multiplying its nature and converting other things into itself, which Telesius attributes to principles, does not operate on similar things equally or more than on contraries; in which case the heaven should now be of a white heat, and the stars united with one another. But to come closer, it seems there are four demonstrations to be proposed, by any one of which, much more by all together, Telesius's philosophy respecting principles may be pulled to pieces and destroyed. Of these the first is, that there are found in nature certain actions and effects, even among the most powerful and universal, which can in no way be referred to heat and cold. The second is, that there are found some natures, of which heat and cold are the effects and consequences; and that not by the excitation of pre-existing heat, or the application of an adventitious heat, but in which heat and cold, in their original essence, are implanted and generated. Therefore the condition of a principle fails here in both ways; as there is both something that does not proceed from them, and they themselves proceed from something. The third is, that even those things which derive their origin from heat and cold (which certainly are very many) yet proceed from them as from their efficient and instrument, not as from their proper and intimate cause. The last is, that this coordination of four connatural bodies is altogether disordered and confused. I will speak therefore on each of these points separately. And to some it may perhaps seem scarce worth while to take such pains in refuting the philosophy of Telesius, a philosophy not much spoken of or received. But I do not stand upon such points of dignity. For of Telesius himself I have a good opinion, and acknowledge him as a lover of truth, useful to the sciences, the reformer of certain opinions, and the first of the moderns; at the same time it is not as Telesius that I have to do with him, but as the restorer of the philosophy of Parmenides, to whom much respect is due. But my principal reason for being more full in this part is that, in dealing with him who comes first, I take occasion to discuss many questions which may be transferred to the refutation of other sects, of which I shall have to treat hereafter; that I may not be obliged to say the same things many times over. For errors, though different, have their fibres strangely entangled and intertwined; yet so that they may often be mowed down by one refutation as by a sweep of a scythe. But, as I was going to say, we must see what virtues and actions there are in nature, which can by no consent of things or force of wit be attributed to heat and cold. First therefore let us assume what Telesius grants, that the sum of matter is eternal and without increase or diminution. This property, by which matter preserves and supports itself, he dismisses as passive, and as belonging rather to quantity than to form and action; as if there were no need to ascribe it to heat and cold, which are set down as the sources only of active forms and virtues; for that matter is

not destitute simply, but only destitute of all active virtue. Now in these assertions there is a great mental error,—an error truly wonderful, were it not that consent and common and inveterate opinion take away the wonder. For there is scarce any error comparable to that of taking this virtue implanted in matter (by which it saves itself from destruction, insomuch that not the smallest portion of matter can either be overpowered by the whole mass of the world, or destroyed by the force and power of all agents together, or any way so annihilated and reduced to order, but that it both occupies some space, and maintains a resistance with impenetrable dimensions, and itself attempts something in its turn, and never deserts itself) not to be an active virtue; whereas, on the contrary, it is of all virtues far the most powerful, and plainly insuperable, and as it were mere fate and necessity. And yet Telesius does not even attempt to refer this virtue to heat and cold. And rightly so; for it is a thing which neither conflagration, nor torpor and congelation, can add anything to or detract anything from or have any power over while itself meantime is active both in the sun and at the centre of the earth, and everywhere else. But his mistake appears to have lain here—that while he acknowledges a certain and definite mass of matter, he is blind to the virtue by which that matter keeps itself undiminished in quantity, and (buried in the deepest darkness of the Peripatetics) ranks this as an accessory; whereas it is the very principal,—vibrating one body, removing another, solid and adamantine in itself, and the fountain whence emanate the decrees of possible and impossible with inviolable authority. The common school philosophy likewise childishly attempts to grasp it in a set of words; thinking it enough to set it down as a rule that there cannot be two bodies in the same place; but the virtue and the process thereof it never contemplates with its eyes open, nor dissects to the quick; little knowing how much depends on it, and what a light may thence rise to the sciences. But (to return to the present business) this virtue, however great it be, falls beyond the principles of Telesius. I must now pass on to that virtue which is as the converse of the former, namely, that which maintains the connexion of matter. For as matter refuses to be overpowered by matter, so does matter refuse to be separated from matter. Notwithstanding there is great doubt whether this law of nature be as peremptory as the other. For Telesius maintained, and so did Democritus, the existence of a collective vacuum without any limit, in order that individual beings may lay aside and sometimes even forsake the one contiguous to them, with difficulty (as they say), and against their will,—that is, when subdued and forced by some greater violence; and this he tries to prove by certain experiments, especially adducing those which are everywhere cited for the contradiction and refutation of a vacuum, and as it were making extracts from them, and amplifying them so as to allow beings to be under some slight necessity of holding to that which is contiguous, but so that if they be more strongly pressed, they will admit a vacuum; as we see in water-clocks, in which if the hole through which the water runs is too small, they will want an air-hole to enable the water to descend; but if the hole be larger, even though there be no air-hole, the water, pressing with a heavier weight on the hole, flows downwards, not caring for the vacuum above. In like manner, in bellows, if you shut them and then stop the mouth so that there is no passage for the air to enter, and then raise and expand them,—if the leather be thin and weak it bursts; if it be thick and not liable to burst it holds; and so in other things. But these experiments are neither exactly proved nor do they altogether satisfy the inquiry or settle the question; and though by them Telesius thinks that he is applying himself to things and inventions, and endeavours to distinguish more accurately what has been observed confusedly by others, yet he is no way equal to the work, nor does he unravel the matter to the end, but falls off in the middle,—a habit common both to him and the Peripatetics; who are very owls in looking at experiments; and that not so much from weakness of vision, as because it is clouded by opinions, as by cataracts, and from impatience of full and fixed consideration. But this question (one of the most difficult) as to how far a vacuum is allowed, and at what distances seeds may attract or repel each other, and what there is in this matter peremptory and invariable, I refer to the place

where I shall treat of a vacuum. For it is not of much importance to the present question whether Nature utterly abhors a vacuum, or whether beings (as Telesius thinks it more correct to say) delight in mutual contact. For I make it plain that this, whether it be abhorrence of vacuum or desire of contact, no way depends on heat and cold; nor is it ascribed thereto by Telesius himself, nor can it be ascribed to them upon any evidence in the nature of things; seeing matter when moved from its place cannot but draw other matter to it, whether it be hot or cold, wet or dry, hard or soft, friendly or unfriendly; insomuch that a hot body will sooner attract the coldest body to its side, than suffer itself to be deserted and separated from all. For the bond of matter is stronger than the enmity of heat and cold; nor does the sequacity of matter care for the diversity of special forms. Therefore this virtue of connexion does not at all depend upon those principles of heat and cold. Next come two virtues opposed to each other, by which this kingdom of principles has been transferred (as may be thought) to heat and cold, but on a claim of right not well made out; I mean those virtues by which beings open and rarefy, dilate and expand themselves, so as to occupy a greater space and spread themselves over a larger sphere; or contrariwise close and condense, confine and contract themselves, so as to cover less space and shrink into a smaller sphere. We must show therefore how far this virtue has its origin from heat and cold, and how far it keeps separate and unmixed with them. Now it is most true, as Telesius affirms, that density and rarity are as it were the proper work of heat and cold; for they have far the most to do in making bodies occupy a larger or less space; but yet these things are understood confusedly. For bodies seem sometimes to migrate and transfer themselves from one natural dimension to another, and that freely and as it were willingly, and with a change of form; sometimes they seem only to be forced away from their natural dimension, and their old form still remaining, to return to their usual dimension again. Now that virtue of progression into a new space is almost governed by heat and cold. But it is not so with that other virtue of restitution; since water expands itself into vapour and air, oil likewise and fat things into exhalation of flame, by the power of heat; nor (if the transmigration be perfect) do they care to return; nay the air itself also swells and is extended by heat. Whereas if the migration be only half effected, then after the heat is withdrawn it easily returns to itself; so that even in the virtue of restitution heat and cold have something to do. But things which are extended and drawn asunder not by means of heat, but by some violence, as soon as the violence ceases return most eagerly (even without any accession of cold or diminution of heat) to their former dimensions; as we see in the sucking of the glass egg, and the raising of the bellows. But this is still more evident in solid and gross bodies. For if a piece of cloth or a harp-string be stretched, on the removal of the force they rebound with great velocity; and it is the same with compression. For air compressed and imprisoned by any violence bursts out with a great force; and indeed all that mechanical motion caused by the striking of one hard body by another, commonly termed violent motion, by which solid bodies are sent flying through the air and water, is nothing but an endeavour of the parts of the discharged body to free themselves from compression; and yet here there are no apparent traces of heat and cold. Nor can any such fine argument be made upon this doctrine of Telesius as to say, that to every natural dimension there is assigned a quantity of heat and cold, in a certain proportion; therefore it may be that although no heat and cold are added, yet if the dimensions of the material body be extended or contracted it will come to the same thing; because more or less of matter is put in the space than is proportionate to the heat and cold. Such things, though not absurd in words, are yet the suggestions of men who are always seeking some device by which they may maintain their first thought, and do not follow out the inquiry in nature and fact. For if heat and cold be added to such extended or compressed bodies, and that in a greater measure than is proportionate to the nature of the body itself (let the stretched cloth for instance be warmed by the fire), yet it will by no means restore the balance, nor extinguish the force of restitution. I have therefore now made it plain that this virtue of dimension does not depend in any notable proportion on heat or cold; although it is this

very virtue which has given most authority to these principles. Next come two virtues, which are in everybody's mouth, and are spread far and wide, namely those by which bodies are carried towards the greater masses and collections of their connaturals; in the observation whereof, as in the rest, men either trifle or go quite wrong. For the common philosophy of the school holds it enough to distinguish natural from violent motion; and to assert that heavy bodies by a natural motion are borne downwards and light bodies upwards. But such speculations are of little help to philosophy. For these words, *nature*, *art*, and *violence*, are but compendious phrases and trifles. They ought not only to refer this motion to nature, but likewise to seek in this very motion for the particular and proper affection and appetite of the natural body. For there are a great many other natural motions arising from very different passions of things. Therefore the thing is to be propounded according to its differences. Nay, those very motions which they call violent may be said to be more according to nature than that which they call natural; if that be more according to nature which is stronger, or even which is more according to the system of the universe. For this motion of ascent and descent is not very imperious, nor even universal; but provincial as it were, and confined to certain regions; and it is moreover obedient and subject to other motions. And as for saying that heavy things move downwards and light upwards, it is the same as saying that heavy things are heavy and light light. For that which is predicated is assumed in the subject by the very force of the term. But if by heavy they mean dense and by light rare, they do advance somewhat; yet so as to arrive at an adjunct and concomitant rather than a cause. Those on the other hand who explain the appetites of heavy and light things by contending that the one are borne to the centre of the earth, and the other to the circumference and compass of the heaven, as to their proper places, certainly assert something, and likewise point towards a cause; but altogether wrongly. For place has no forces, nor is body acted on except by body; and all swift motion of a body, which seems as if it were seeking a place for itself, is really in pursuit not of location or position simply, but with reference to some other body.

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A DESCRIPTION OF THE INTELLECTUAL GLOBE.

[TRANSLATION OF THE *DESCRIPTIO GLOBI INTELLECTUALIS*.]

PREFACE.

BY ROBERT LESLIE ELLIS.

THIS tract, published by Gruter in 1653, must have been written about 1612. This follows from what is said of the new star in Cygnus¹, which was first observed in 1600. It is therefore intermediate in date between the *Advancement of Learning* and the *De Augmentis*; and though on a larger scale than either, it is to be referred to the same division of Bacon's writings. The design of all three is the same, namely, a survey of the existing state of knowledge. The commendation of learning which forms the first book of the other two works being in this one omitted, it commences with the tripartite division of knowledge which Bacon founded on the corresponding division of the faculties of man—memory, imagination, and reason. History, which corresponds to memory, is here as in the *De Augmentis* primarily divided into natural and civil, whereas in the *Advancement* the primary division of history is quadripartite, literary and ecclesiastical history being made co-ordinate with civil history, instead of being as here subordinated to it.

The divisions of natural history are then stated, and are the same as in the *De Augmentis*; and the remainder of the tract relates to one of these divisions, namely the history of things celestial, or in other words to astronomy. The problems which it should consider, and the manner in which they ought to be solved, are treated of at some length; but even with respect to astronomy much which it is proposed to do is left undone, the whole tract being merely a fragment.

Bacon has nowhere else spoken so largely of astronomy; the reason of which apparently is, that he was writing just after Galileo's discoveries had been made known in the *Sydericus Nuncius*, published in 1611; a circumstance which makes the *Descriptio Globi Intellectualis* one of the most interesting of his minor writings. The oracles of his mind were in this case evoked by the contemplation, not of old errors, but of new truths.

The *Thema Cæli*, which contains a provisional statement of his own astronomical opinions, is immediately connected with the astronomical part of the *Descriptio Globi Intellectualis*. They are clearly of the same date, and form in reality but one work.

In the *De Augmentis* Bacon has expressed the same general views on the subject of astronomy as in these tracts; and they are in truth views which it was natural for a man not well versed in the phenomena of the science to entertain and to promulgate. What had been done by the old astronomers seemed to him full of useless subtleties and merely mathematical conceptions; men therefore were to be exhorted to cast all these aside, and to study the phenomena of the heavens independently of arbitrary hypotheses. Let us first obtain an accurate knowledge of the phenomena, and then begin to search out their real causes. Orbs, eccentrics, and epicycles must not stand between the astronomer and the facts with which he has to deal. In this language, which had been held by others, there is

¹ Stella nova in pectore Cygni . . . jam per duodecim annos integros duravit.

something not wholly untrue ; yet the counsel which it contains would, if it could have been followed, have put an end to the progress of astronomical science. Let us obtain an accurate knowledge of the phenomena—this no doubt is necessary, but then how is it to be done ? To say that instead of trying to resolve the motion of the planets into a combination of elementary circular motions, we ought to be content to save the appearance by means of spirals, is to no purpose unless we are prepared to give an accurate definition of the kind of spiral we mean. Failing this, a statement that the apparent path of a planet is a spiral or irregular line along which it moves with varying velocity, is much too vague to be of any scientific value whatever ; and if we seek to give precision to this statement, we find ourselves led back again into the region of mathematical conceptions, or, if the phrase be preferred, of mathematical hypotheses. The distinction between what is real and what is only apparent lies at the root of all astronomy ; and it is in vain to seek for a physical cause of that which has only a phenomenal existence, as for instance of the stations and regressions of the planets. Thus in two points of view, astronomy must of necessity employ mathematical hypotheses, firstly in order to the distinct conception of the phenomena, and secondly in order to be able to state the problems which a higher science is afterwards to solve. If the hypotheses employed are inappropriate, as in the systems of Ptolemy or Tycho Brahe, they may nevertheless have done good service in making it possible to conceive the phenomena, and moreover may serve to suggest the truer views by which they are to be replaced. Almost any hypothesis is better than none: "citius enim," as Bacon has elsewhere said, "emergit veritas ex errore quam ex confusione". The wrong hypotheses doubtless lead to premature speculation touching physical causes ; but this is a mischief which in course of time tends to correct itself, as we see in the Ptolemaic system, of which the overthrow was in good measure due to the cumbrous machinery of solid orbs, which had been constructed to explain the motions mechanically. It came to be seen that even if this system could save the phenomena, it was unable to give a basis on which a just explanation of their causes could be founded.

I have said that almost any hypothesis is better than none. But the truth is that as soon as men begin to speculate at all an hypothesis of some kind or other is a matter of necessity. On merely historical grounds and apart from any consideration of the relation between facts and ideas, questions might be propounded to a writer who was trying to describe the phenomena of the heavens without introducing any portion of theory, to which he would not find it easy to give clear answers. Thus we know that one of the philosophers of antiquity affirmed that the sun is new every day ;—are you prepared, we might ask, to set aside the authority of Heraclitus, and to maintain your theory in opposition to his ? If you affirm that the sun which set last night is the same as that which rose this morning, you are no longer a describer of phenomena, but, like those whom you condemn, a dealer in hypotheses.

However this difficulty is got over, you will at any rate not venture to confound Hesperus and the morning star. It is true that one of the great teachers of Greece long since asserted that they are the same ; but the speculative fancies of Pythagoras must be rejected not less than those of Ptolemy or Regiomontanus.

We find that Bacon, both in the *De Augmentis* and in the following tract, speaks of the constructions of astronomy as purely hypothetical. In this he agrees with many other writers. It was a common opinion that these constructions had no foundation in reality, but were merely employed as the basis of mathematical calculations. They served to represent the phenomena, and that was all. This view, which has not been without influence on the history of astronomy, inasmuch as it made the transition from one hypothesis to another more easy than it would have been if either had been stated as of absolute truth, connected itself with a circumstance not unfrequently overlooked. The struggle between the peripatetic philosophers and the followers of Copernicus has caused an earlier struggle of the same kind to be forgotten. The Ptolemaic system is in reality not much more in accordance with the philosophy of Aristotle than the Copernican ; and therefore, while the authority of Aristotle was unshaken, it could only be accepted, if accepted at all, as a means of representing the phenomena. The mo-

tions of the several orbs of heaven must, if our astronomy is to accord with Aristotle, be absolutely simple and concentric. On these conditions only can the incorruptibility of the heavens be secured. Consequently eccentrics and epicycles must be altogether rejected; and as the Ptolemaic system necessarily employs them, it follows that this system is only of value as a convenient way of expressing the result of observation. Such was the view of those who, while they adopted Aristotle's principles, were aware that the astronomical system with which he was satisfied, and of which he has given an account in the twelfth book of the *Metaphysics*, was wholly inadequate as a representation of the phenomena. But his more strenuous adherents went further, and followed Averroes in speaking with much contempt of Ptolemy and of his system; an excess of zeal which Melancthon, in the spirit of conciliation which belongs to his gentle nature, has quietly condemned².

Out of this antinomy, if the word may be so used, sprang several attempts to replace the Ptolemaic system by a construction which should be in accordance both with the phenomena and with Aristotle. Of these the best known is the Homocentrica of Fracastorius. As the name implies, all the orbs have on this hypothesis the same centre, and of these homocentric orbs he employs seventy-seven. But a fatal objection to this and all similar attempts is that they can give no explanation of changes in apparent distance. Fracastorius tries to set aside this objection by asserting that although the distance of some of the heavenly bodies from the earth may seem to vary, yet it never does so in reality, the apparent variation being caused by the varying medium through which they are seen.

Though this explanation is wholly unsatisfactory, the wish to get rid of eccentrics and epicycles was sufficiently strong to win for Fracastorius a much more favourable reception than his complex and imperfect hypothesis deserved. He was spoken of as a man who had succeeded in overcoming the divorce which had so long separated astronomy from philosophy³.

Of the similar attempt made by D'Amico I know no more than what is mentioned by Spiriti in his *Scrittori Cozzentini*.

The Ptolemaic system being thus treated as a mere hypothesis by the followers of Aristotle, for of course the astronomers who accepted Purbach's theory of solid orbs must have regarded it as a reality, it was natural that Bacon should have thought that what we now call physical astronomy, that is the causal explanation of the phenomena, ought to be studied independently of this system. Whatever it had accomplished might be as well done without it. Spirals and dragons would be found sufficient to represent the phenomena, if the perverse love of simplicity which had led the mathematicians to confine themselves to circles and combinations of circles was once got rid of. Galileo's view of this matter is however undoubtedly the true one, "Le linee irregolari son quelle che, non avendo determinazione veruna sono infinite e casuali, e perciò indefinibili, ne di esse si può in conseguenza dimostrar proprietà alcuna, ne in somma saperne nulla; sicchè il voler dire, il tale accidente accade mercè di una linea irregolare, è il medesimo che dire io non so perchè ei si accagia⁴".

Bacon was not the first who proposed to sweep away from astronomy the mathematical constructions by which it seemed to be encumbered. We find in Lucretius nearly the same views as those of Bacon. The astronomers, Bacon often says, insist on explaining the retardation of the inferior orbs by giving them a proper motion of their own, opposite to that which they derive from the starry heaven: surely it would be simpler to say that all the orbs move in the same direction with unequal velocities; the inequality depending on their remoteness from the prime mover.

² See his *Initia Physicæ*.

³ See Flaminius. [Carmin. lib. ii. f. 30. Ed. Lutet. per Nicol. Divitem.] It is remarkable that Delambre declares that he cannot see why Fracastorius should have thought his own system better than the old one. The reason is perfectly obvious if we consider the matter in connection with the history of philosophy.

⁴ Saggiatore, ii. p. 187.

Compare with this the following lines of Lucretius :—

“ Quanto quæque magis sint terram sidera propter,
Tanto posse minus cum cœli turbine ferri :
Evanescere enim rapidas illius, et acreis
Imminui subter, viries ; ideoque relinqui
Paullatim solem cum posterioribu' signis,
Inferior multum quum sit quam fervida signa :
Et magis hoc lunam ; ” etc.⁵.

But it was probably not from Lucretius that Bacon derived this way of considering the matter. For Telesius, whom Bacon esteemed “ the best of the novelists,” and whose pastoral philosophy, as he has not unhappily called it, was contented with vague speculations as to the causes of phenomena without any accurate knowledge of their details, had suggested to his followers that it was nowise necessary to resolve the motion of the sun into the motion of the starry heaven and the motion of his own orb, and that on the contrary this composition of motions is unintelligible. You may see, he affirms, with your own eyes the way in which the sun, moving with one motion only, advances continually from east to west, and alternately towards the north and south ; all that is necessary is to admit that the poles on which he revolves are not constantly at the same distance from the poles of heaven, but on the contrary are always receding from or advancing towards them⁶.

Amongst those who called themselves Telesians the view here suggested received a fuller development ; they adopted the doctrine of Alpetragius, a Latin translation of whose *Theorica Planetarum* was published at Venice in 1531. Alpetragius professes that he found the complication of the Ptolemaic system intolerable, and that the foundation of his own is much simpler. “ Apparet sensu quod quilibet planeta revolvitur singulo die super circulis æquidistantibus ab æquinoctiali ; attamen diurnitate temporis et revolutione planetæ multis revolutionibus ex periodis diurnis, videtur ille planeta moveri a puncto in quo visus est primum æquinoctialis et respectu motus similis ei postponi in longitudine et declinare a suo primo loco in latitudine”, of which the reason is that it does not really revolve in circles parallel to the equator, “ sed est revolutio girativa dicta laulabina ex declinatione planetæ a loco suo in latitudine ”. Of this the reason is twofold : the planet's orb moves more slowly than the prime mover in consequence of its essential inferiority, an inferiority which increases in the case of different planets with their nearness to the earth ; and its poles revolve on two small circles parallel to the equator. Alpetragius goes on to apply these hypotheses to each of the planets. It is needless to point out of how little value his speculations necessarily are. Such as they are, however, the Telesians, as we learn from Tassoni⁸, were content to accept them. Of the astronomical writings of the Telesians I have not been able to find any account. None of those who are mentioned by Spiriti appear to have published anything on the subject. However this may be, the authority of Tassoni is sufficient to show that the school of Telesius rejected the Ptolemaic system and especially the notion that the planets etc. have a proper motion from west to east ; and that their views are therefore in accordance with those which Bacon propounds in the *Thema Cali*, so far at least as relates to the general conception of the planetary motions.

Patricius, on whom the influence of Telesius is manifest, and who furnished Bacon with many of the facts contained in the following treatises, also rejected, and more contemptuously than Telesius, the common astronomical hypotheses. The planetary motions, their stations and regressions, are, he says, explained by astronomers by the help of epicycles and eccentrics ; but we ascribe them to the natures and spirits of the planets, and in a higher degree to their souls and minds. Of this idle talk Gilbert remarks that it destroys the study of astronomy. “ Quid autem,” he observes, “ tum postea spectabit otiosus incassum philosophus, opinione suâ satiatus, cœlum sine usu sine motuum prævidentiâ : ita nullius usus erit

⁵ Lucret. v. 622.

⁷ Alpetragius, fo. 14. v.

⁶ Telesius, *De Rer. Nat.* iv. 25.

⁸ *Pensieri diversi*, ii. 4. (Venice, 1636.)

illa scientia⁹". But Patricius's opinions on astronomy could clearly not be of much value, seeing that he was sufficiently ignorant to blame astronomers for not taking into account the distance of the place where their observations are made, from the centre of the earth; and speaks of this omission as "a most evident fallacy": a remark which proves that he had either never heard of the correction for parallax, or having heard of it was unable to understand its nature.

From him, however, Bacon derived some of the most remarkable statements in the *Descriptio Globi Intellectualis*; particularly the incredible account of the mutations which Venus underwent in 1578. That, setting aside Patricius's loose way of speaking, the real phenomenon was simply that Venus was visible before sunset, is probably the safest explanation of the whole story; of which I have found no mention elsewhere. Thus much however is certain, that there could have been no such peculiarity in her appearance as to suggest to well-informed persons the notion that she had undergone any real change, since in the controversy whether there were any evidence of corruption or generation in the heavens a fact like this could not have been passed over.

Of the discoveries announced by Galileo in the *Syderus Nuncius* Bacon does not speak at much length, though it is difficult not to believe that he was led to say so much of astronomical theories by the interest which these discoveries must have excited when they were first made known. The discovery of Jupiter's satellites, the resolution into stars of the nebula Præsepe, and the irregularities in the moon's surface, are all mentioned in the following tract; but, as I have said, somewhat briefly¹⁰.

It is remarkable that neither in the following tracts nor in his subsequent writings has Bacon mentioned the discoveries of Kepler. The treatise *De Stellâ Martis* was published in 1609, and became known in England at least as early as 1610. Harriot, it appears from Professor Rigaud's account of his papers, was then in correspondence with him, and repeated his calculations. That Bacon was acquainted with his writings we can hardly believe; they bear so directly on the questions which he has discussed that he could scarcely have neglected to notice them, had he known them even by report. In the very first page of Kepler's great work we find a quotation from Peter Ramus, declaring that he would resign his professorship in favour of any one who should produce an astronomy without hypotheses. To this Kepler subjoins an apostrophe to Ramus, telling him that it is well that death had relieved him of the necessity of redeeming his pledge, and vindicating Copernicus from the charge of having explained the phenomena of astronomy by unreal hypotheses. The same subject is resumed in the preface, and elsewhere throughout the book. Again, in another point of view, it makes Bacon's complaints that astronomers cling superstitiously to perfect circles appear somewhat out of date, to find that before the time at which he wrote the man who professedly both by his genius and his official position stood at the head of the astronomers of Europe and, so to speak, represented them, had succeeded in saving the phenomena more accurately than had been done before, by means of ellipses. A great change had just taken place; two most remarkable laws, the foundations of modern physical astronomy, had just been propounded, namely the law of elliptic motion, and that of the equable description of areas; and the whole state of the question with respect to the truth or falsehood of the Copernican system was thus changed. In truth this system was inextricably connected not only with Kepler's results, but with his method. In his dedication to the Emperor he says, "Locum (that is, the place of Mars) indagine cinxi, curribus

⁹ *Physiol. Nov.* ii. 9.

¹⁰ The interest which these discoveries excited must have been very great. Sir William Lower writes to Harriot, "I gave your letter a double welcome, both because it came from you and contained news of that strange nature. . . . Methinks my diligent Galileus hath done more in his threefold discovery than Magellane in opening the straits to the South Sea, or the Dutchmen that were eaten by bears in Nova Zembla". The news had just reached him. His date is "the longest day of 1610." It had taken rather more than three months to travel from Italy to Wales.—*Professor Rigaud's Supplement*, etc., p. 26.

magnæ Matris Telluris in gyrum circumactis". He means by this that he used observations of Mars made when in the same point of his orbit, the earth being at the time of the different observations in different points of hers. The same idea of the connection of the Copernican hypothesis with Kepler's method, is expressed in one of the complimentary stanzas prefixed to the book:—

Cœlos Keplerus terrarum oppugnat alumnus :
De scalis noli quærere : terra volat.

In one of Kepler's letters to David Fabricius, nothing can be more decided than his rejection of the notion that all motions of the heavenly bodies are in perfect circles. "Quod ais non dubium quin omnes motus fiant per circulum perfectum, si de compositis (id est de realibus) loqueris, falsum : fiunt enim Copernico, ut dixi, per orbitam ad latera circuli excedentem, Ptolemæo et Braheo insuper per spiras. Sin autem loqueris de componentibus, de fictis igitur hoc est de nullis loqueris. Nihil enim in cœlo circumit præter ipsum corpus planetæ, nullus orbis, nullus epicyclus : quod Braheanæ Astronomiæ initiatus ignorare non potes." And it is interesting to observe how clearly he distinguishes between the real motions and the component elements into which they may be resolved.

Until the language of modern analysis had enabled us to express the nature and properties of curves merely quantitatively, without reference to genesis or construction, it was difficult to attain to a clear way of thinking as to the relation which astronomical hypotheses bear to reality. In order to define the motion which actually takes place, it was necessary to refer to simpler motions which have only an abstract or ideal existence. But then it was asked, how can the result be real if the elements are not so ? In this point of view the unpicturesqueness of symbolical language, though it has led to other inconveniences, has delivered us from a great deal of confused thinking. If Poinson's illustration of the motion of a rigid body by means of a central ellipsoid rolling on a fixed plane, had been proposed at the beginning of the seventeenth century, most people would have said that the hypothesis was absurd, though it might correspond to the phenomena.

To take the matter more generally, it must be remembered that positive truth or falsehood belongs only to the region of the actual and individuated. To say that two and three make five is not to deny that four and one do so too, although if I assert that of five houses, first three were built and then two added, I contradict that four were built at first and that only one is of later date. Not merely in the relation between cinemactical or formal and physical astronomy, but generally, the question whether an hypothesis be true or false does not arise unless it is presented as a causal explanation. Thus when Berosus taught that one half of the moon is luminous, and that her phases arise from this half being always turned towards the sun in virtue of their mutual sympathy, both being bright, the explanation is unexceptionable, except so far as relates to the efficient cause. One half of the moon always is bright ; and always is turned to the sun ; and this Berosus saw as clearly as we do. It is in this way that false hypotheses are transformed into true ones ; not by the transformation of anything false into truth, but by the severance of the causal or real element from that which is neither true nor false, namely the abstract conception. But the interest of the subject has led me to dwell on it at too much length.

It is curious to observe that in the interval between the composition of the following tracts and that of the *De Augmentis* Bacon's leaning against the Copernican system became more decided, though in the same interval the system had received an accession of strength, of which doubtless he was not aware, in the discovery of Kepler's third law¹¹. This law, connecting as it does the planets with

¹¹ This discovery was made, as Kepler has informed us, on the 15th of May, 1618. In Professor Rigaud's account of Harriot's papers, published in 1833, it is mentioned that Harriot, who was apparently the first person to determine the periods of Jupiter's satellites, committed an error of calculation, in consequence of which that of the first satellite is given at about half its real length, but that Harriot, even before the publication in 1614 of Marius's *Mundus Jovialis*, seems to have suspected his error. The Pro-

the sun by an uniform relation which is fulfilled also by the earth, is in some respects the most remarkable of the three, and points the most directly to the sun as the great centre of our system. No doubt neither this law, nor all three together, amounts to a positive demonstration: it has sometimes been forgotten that after all they are but approximations to the truth; but of all approximations these laws are the most remarkable, and it would be very difficult to doubt, even without the knowledge we now possess, that they are grounded on a physical basis. This basis is their correspondence with a causal or physical approximation. They would be absolutely true if the lesser bodies of the solar system did not attract one another, and if all were attracted by the sun as if he and they were physical points. It would be possible to crowd together a number of epicycles whereby the orbit of the earth would be better represented than on the elliptic hypothesis; but such a system would have no physical significance. No doubt too, all the laws might be true and yet the earth at rest; but we could not adopt such an opinion without doing violence to all our ideas of symmetry and harmony,—ideas which influence our judgments of natural things more than we are aware of. Such a doctrine would be felt “*primam violare fidem*”. We may well believe that had Bacon been acquainted with the discoveries of Kepler, he would not only have been impressed by their astronomical importance, but have felt the full force of the lesson which they convey. He would have felt that they constituted a sufficient reason for transferring the allegiance which had been paid to Mother Earth to a nobler object more justly entitled to the homage which she had so long received. We now know that neither Earth nor Sun is the true Hestia of the old Philosopheme. We know too, that in all the orbs of heaven that we can see or dream of, there can be nothing fully entitled to the appellation,—nothing wholly fixed, or wholly unperturbed. Happy for us if we feel also that there is a Sun of suns whose absolute existence transcends our conceptions of space and time¹².

fessor enquires why he did not try his result by means of Kepler's third law, as we know that he was a student of the work in which this law is stated; forgetting that only the first two laws were given in the *De Stellâ Martis*, and that in the interval referred to, between 1610 and 1614, Harriot could no more have known of Kepler's third law than of Newton's *Principia*. But it is really curious that Kepler does not seem to have applied his law to the satellites. The application is said to have been first made by Vendelinus. See Narrien, *Hist. of Astronomy*, p. 398.

¹² Deus, sine qualitate bonus, sine quantitate magnus, sine indigentia creator, sine situ præsens, sine habitu omnia continens, sine loco ubique totus, sine tempore sempiternus, sine ulla mutatione mutabilia faciens, nihilque patiens.—St. Augustine, *De Trin.*

A DESCRIPTION OF THE INTELLECTUAL GLOBE.

CHAPTER I.

Division of all Human Learning into History, Poesy, and Philosophy, according to the three faculties of the mind, Memory, Imagination, and Reason: and that the same division holds good likewise in Theology; the vessel (that is, the human understanding) being the same, though the matter and the manner of conveyance be different.

I ADOPT that division of human learning which corresponds to the three faculties of the understanding. Its parts therefore are three; History, Poesy, and Philosophy. History is referred to the Memory; poesy to the Imagination; philosophy to the reason. And by poesy here I mean nothing else than feigned history. History is properly concerned with individuals; the impressions whereof are the first and most ancient guests of the human mind, and are as the primary material of knowledge. With these individuals and this material the human mind perpetually exercises itself, and sometimes sports. For as all knowledge is the exercise and work of the mind, so poesy may be regarded as its sport. In philosophy the mind is bound to things; in poesy it is released from that bond, and wanders forth, and feigns what it pleases. That this is so any one may see, who seeks ever so simply and without subtlety into the origins of intellectual impressions. For the images of individuals are received by the sense and fixed in the memory. They pass into the memory whole, just as they present themselves. Then the mind recalls and reviews them, and (which is its proper office) compounds and divides the parts of which they consist. For the several individuals have something in common one with another, and again something different and manifold. Now this composition and division is either according to the pleasure of the mind, or according to the nature of things as it exists in fact. If it be according to the pleasure of the mind, and these parts are arbitrarily transposed into the likeness of some individual, it is the work of imagination; which, not being bound by any law and necessity of nature or matter, may join things which are never found together in nature and separate things which in nature are never found apart; being nevertheless confined therein to these primary parts of individuals. For of things that have been in no part objects of the sense, there can be no imagination, not even a dream. If on the other hand these same parts of individuals are compounded and divided according to the evidence of things, and as they really show themselves in nature, or at least appear to each man's comprehension to show themselves, this is the office of reason; and all business of this kind is assigned to reason. And hence it is evident that from these three fountains flow these three emanations, History, Poesy, and Philosophy; and that there cannot be other or more than these. For under philosophy I include all arts and sciences, and in a word whatever has been from the occurrence of individual objects collected and digested by the mind into general notions. Nor do I think that there is need of any other division than this for Theology. For the informations of revelation and of sense differ no doubt both in matter and in the manner of entrance and conveyance; but yet the human spirit is one and the same; and it is but as if different liquors were poured through different funnels into one and the same vessel. Therefore I say that Theology itself likewise consists either of sacred history, or of divine precepts and doctrines, as a kind of perennial philosophy. And that

part which seems to fall outside this division (that is, prophecy) is itself a species of history, with the prerogative of divinity wherein times are joined together, that the narrative may precede the fact; and the manner of delivery, both of prophecies by means of visions and of divine doctrine by parables, partakes of poesy.

CHAPTER II.

Division of History into Natural and Civil; Ecclesiastical and Literary History being included under Civil. Division of Natural History into History of Generations, Preter-generations, and Arts, according to the three states of Nature, namely, Nature Free, Nature Erring, and Nature Constrained.

HISTORY is either Natural or Civil. Natural history relates the deeds and actions of nature; civil history those of men. Matter of Divinity shows itself no doubt in both, but more in civil; so much so indeed as to constitute a distinct species in history, which we call Sacred or Ecclesiastical. This therefore I attribute to Civil; but first I will speak of Natural. Natural history does not treat of particular objects separately. Not that I was wrong in saying that history deals with individuals, circumscribed by place and time. For properly it is so. But since there is in natural objects a promiscuous resemblance one to another, insomuch that if you know one you know all, it would be a superfluous and endless labour to speak of them severally. And therefore we see that where there is no such promiscuous resemblance, natural history does take in individuals; such I mean of which there is not a body, or nation as it may be called. For of the sun, moon, earth, and the like, which are unique in their species, it is very right that separate histories should be written; nor less of such things as notably deviate from their species, and are prodigies; since in their case a description and knowledge of the species itself is neither sufficient nor competent. These two kinds of individuals therefore natural history does not reject; but for the most part (as has been said) it is concerned with species. But I will make the division of natural history according to the force and condition of nature itself; which is found in three states, and subject as it were to three kinds of regimen. For nature is either free, and allowed to go her own way and develop herself in her ordinary course; that is when she works by herself, without being any way obstructed or wrought upon; as in the heavens, in animals, in plants, and in the whole array of nature;—or again she is forced and driven quite out of her course by the perversities and insubordination of wayward and rebellious matter, and by the violence of impediments; as in monsters and heteroclitcs of nature;—or lastly, she is constrained, moulded, translated, and made as it were new by art and the hand of man; as in things artificial. For in things artificial nature seems as it were made, whereby a new array of bodies presents itself, and a kind of second world. Natural history therefore treats either of the *liberty* of nature or her *errors* or her *bonds*. And if any one dislike that arts should be called the bonds of nature, thinking they should rather be counted as her deliverers and champions, because in some cases they enable her to fulfil her own intention by reducing obstacles to order; for my part I do not care about these refinements and elegancies of speech; all I mean is, that nature, like Proteus, is forced by art to do that which without art would not be done; call it which you will,—force and bonds, or help and perfection. I will therefore divide natural history into history of generations, history of preter-generations, and history of arts; which I also call mechanical and experimental history. And I am the rather induced to set down the history of arts as a species of natural history, because it is the fashion to talk as if art were something different from nature, so that things artificial should be separated from things natural, as differing totally in kind; whence it comes that most writers of natural history think it enough to make a history of animals or plants or minerals, without mentioning the experiments of mechanical arts (which are far the most important for philosophy); and not only that, but another and more subtle error finds its way into men's minds; that of looking upon art merely as a kind of supplement to nature; which has power enough to finish what nature has begun or correct her when

going aside, but no power to make radical changes, and shake her in the foundations; an opinion which has brought a great deal of despair into human concerns. Whereas men ought on the contrary to have a settled conviction, that things artificial differ from things natural, not in form or essence, but only in the efficient; that man has in truth no power over nature, except that of motion—the power, I say of putting natural bodies together or separating them—and that the rest is done by nature working within. Whenever therefore there is a possibility of moving natural bodies towards one another or away from one another, man and art can do everything; when there is no such possibility, they can do nothing. On the other hand, provided this motion to or from, which is required to produce any effect, be duly given, it matters not whether it be done by art and human means, or by nature unaided by man; nor is the one more powerful than the other. As for instance when a man makes the appearance of a rainbow on a wall by the sprinkling of water, nature does the work for him, just as much as when the same effect is produced in the air by a dripping cloud; and on the other hand when gold is found pure in sands, nature does the work for herself just as much as if it were refined by the furnace and human appliance. Sometimes again the ministering office is by the law of the universe deputed to other animals; for honey, which is made by the industry of the bee, is no less artificial than sugar, which is made by man; and in manna (which is a thing of like kind) nature asks no help, but does all herself. Therefore as nature is one and the same, and her power extends through all things, nor does she ever forsake herself, these three things should by all means be set down as alike subordinate only to nature; namely, the course of nature; the wandering of nature; and art, or nature with man to help. And therefore in natural history all these things should be included in one continuous series of narratives; as indeed Pliny has in great part done; who conceived an idea of natural history suitable to its dignity, but handled it in a manner most unworthy of the conception. Let this then be the first division of natural history.

CHAPTER III.

Division of Natural History according to its use and end; and that by far the noblest end of Natural History is to lay a foundation for Philosophy; and that such a history (a history framed with a view to that end) is wanting.

NATURAL history, which in subject (as I said) is threefold, is in use twofold. For it is used either for the sake of the knowledge of the things themselves which are committed to it, or as the primary material of philosophy. Now the noblest end of natural history is this; to be the stuff and matter of true and lawful induction; and to draw from the sense enough to inform the intellect. For that other kind which aims either to please by the agreeableness of the narrative, or to help by the use of experiments, and is pursued for the sake of such pleasure or such profit, is an inferior thing, and in its very kind of less value, than that which is qualified to be a proper preparative for the building up of philosophy. For this is that natural history which constitutes a solid and eternal basis of true and active philosophy; this it is which gives the first spark to the pure and real light of nature; and whose genius being neglected and not propitiated, has caused us to be visited most unhappily by that host of spectres and kingdom of shadows which we see flitting about among the philosophies, afflicting them with utter barrenness in respect of works. Now I affirm and bear witness that a natural history properly adapted to this end is not extant, but is wanting, and should be set down among the deficient. And let no man be so dazzled either by the great names of ancient writers or the great volumes of modern, as to think this complaint of mine unjust. I know well that a natural history is extant, large in bulk, pleasing in variety, curious often in diligence; and yet strip it of fables, antiquities, quotations and opinions of authors, empty disputes and controversies, philology and ornaments (which are more fitted for table-talk and the noctes of learned men than for the institution of philosophy), and it will shrink into small compass; so that it would seem as if people were engaged in getting up a treasure-house of eloquence, rather than a sound and faithful narra-

tive of facts. Besides, it is not of much use to recount or to know the exact varieties of flowers, as of the iris or tulip, no, nor of shells or dogs or hawks. For these and the like are but sports and wanton freaks of nature, and almost approach to the nature of individuals. And though they involve an exquisite knowledge of the particular objects, the information which they afford to the sciences is slight and almost useless. And yet these are the things which our ordinary natural history takes pride in. And while it descends to matters which do not belong to it, and indulges to excess in matters superfluous, on the other hand its great and solid parts are either entirely omitted or carelessly and lightly treated. And indeed in the whole course of inquiry pursued and the whole mass of matter gathered, it appears to be in no way adapted or qualified for the end which I have mentioned, namely the building up of philosophy. This will be best shown in the particular branches of it, and by comparing the history of which I am now going to set forth a description, with that which we have.

CHAPTER IV.

Beginning of a treatise showing of what nature the required history should be ; namely the Natural History which is to serve as a foundation of Philosophy. For the clearer explanation of this, a division of the History of Generations is first subjoined. This is digested into five parts. The first the History of the Heavens ; the second, the History of Meteors ; the third, the History of Earth and Sea ; the fourth, the History of Collegia Majora, or Elements or Masses ; the fifth, the History of Collegia Minora, or Species. The history of Primary Virtues is postponed, till the explanation of this first division, of Generations, Preter-generations, and Arts, is concluded.

ALTHOUGH I consider myself bound not to leave the completion of this history which I pronounce deficient to others, but to take it upon myself ; because the more it may seem a thing open to every man's industry, the greater fear there is that they will go astray from my design ; and I have therefore marked it out as the third part of my instauration ; yet that I may still keep true to my plan of giving either explanations or specimens of those things which are wanting, and likewise that in case of my death there may be something saved, I think fit now in this place to set down my opinion and advice in this matter. Of the History of Generations or Nature at large I set down five parts. These are the History of Ether ; the History of Meteors and of the Regions of the Air, as they are called ; for the sublunar region down to the surface of the earth, and the bodies situated upon it, I assign to the history of meteors ; Comets likewise of all kinds (however the truth may be) yet for the sake of order I include among meteors. Third comes the History of the Earth and Sea, which together make up one globe. And so far the nature of things is distributed according to places and positions. The two remaining parts distinguish the substances of things or rather masses. For connatural bodies are congregated into greater and lesser masses ; which I commonly term greater and lesser Colleges, and which are related to one another in the polity of the world as tribes or families. Therefore fourth in order is placed the History of Elements or the Greater Colleges ; fifth and last, the History of Species or the Lesser Colleges. For I mean by Elements not the commencements of things, but only the greater masses of connatural bodies. Now this greatness of mass is owing to the texture of the matter of which they are composed being easy, simple, obvious, and prepared ; whereas species are sparingly supplied by nature, because the texture of matter is complex, and in most cases organic. As for those virtues which may be regarded as cardinal and universal in nature, as Dense, Rare, Light, Heavy, Hot, Cold, Consistent, Fluid, Similar, Dissimilar, Specific, Organic, and the like, together with the motions contributing to them, as Resistance, Connexion, Contraction, Expansion, and the rest (the history of which I would by all means have collected and constructed, even before we come to the work of the intellect), I will treat of the history of these and of the manner of constructing it, when I have completed the explanation of this triple division, of Generations, Preter-generations, and Arts. For I have not included it in that threefold division, because it is not properly a history, but as it were a middle term between history and philo-

sophy. But now I will speak of the History of the Celestial Bodies, and give precepts concerning them, and then of the rest.

CHAPTER V.

The history of Celestial Bodies is resumed ; showing both what it should be in kind, and that the legitimate ordering of such a history turns on three kinds of precepts ; namely, the End, the Matter, and the Manner of Construction.

I WOULD have the History of Celestial Bodies simple, and without any infusion of dogmas ; all theoretical doctrine being as it were suspended : a history embracing only the phenomena themselves (now almost incorporated with the dogmas) pure and separate ; a history in short, setting forth a simple narrative of the facts, just as if nothing had been settled by the arts of astronomy and astrology, and only experiments and observations had been accurately collected and described with perspicuity. In which kind of history there is nothing extant which satisfies me. Something of the kind indeed Pliny has touched on cursorily and loosely ; but that would be the best history of the celestial bodies which might be extracted and worked out from Ptolemæus and Copernicus and the more learned writers on astronomy, taking the experiments detached from the art, and adding the observations of more modern writers. It may seem strange that I should wish to recall to their primitive rudeness and the simplicity of naked observations things so laboriously produced, advanced, and amended. But the truth is that, without meaning to throw away the benefit of former inventions, I am attempting a far greater work : for it is not merely calculations or predictions that I aim at, but philosophy : such a philosophy I mean as may inform the human understanding, not only of the motion of the heavenly bodies and the period of that motion, but likewise of their substance, various qualities, powers, and influences, according to natural and certain reasons, free from the superstition and frivolity of traditions ; and again such as may discover and explain in the motion itself, not what is accordant with the phenomena, but what is found in nature herself, and is actually and really true. Now it is easy to see, that both they who think the earth revolves, and they who hold the *primum mobile* and the old construction, are about equally and indifferently supported by the phenomena. Nay, and the author of the new construction in our own day, who made the sun the centre of the *secundum mobile*, as the earth of the *primum mobile*, whereby the planets in their proper revolutions would seem to wheel in dance round the sun (as some of the ancients suspected to be the case with Venus and Mercury), if he had thought the matter fairly out, might probably have brought it to a very good conclusion¹. Nor have I any doubt but that other similar constructions might by wit and severe thought be invented. Neither indeed do they who propose these theories mean to say that the things they allege are actually true, but only that they are convenient hypotheses for calculations and the construction of tables. But my plan has a different aim ; for I seek not for ingenious adjustments, which may be many, but for the truth of the thing, which is simple. And to this a history of phenomena kept pure and simple will open the way, while one tintured with dogma will obstruct it. I may say also, that as I hope for the discovery of the truth regarding the heavenly bodies from a history made and compiled according to my principle, by itself alone ; so I rest that hope much more upon observation of the common passions and desires of matter in both globes. For those supposed divorces between ethereal and sublunary things seem to me but figments, superstitions mixed with rashness ; seeing it is most certain that very many effects, as of expansion, contraction, impression, cession, collection into masses, attraction, repulsion, assimilation, union, and the like, have place not only here with us, but also in the heights of the heaven and the depths of the earth. Nor have we any more faithful interpreters to consult in order that the human understanding may penetrate the depths of the earth, which are never seen at all, and the heights

¹ The reference is to Tycho Brahe, and by *nonnulli ex antiquis* Bacon probably meant Martianus Capella and Vitruvius.

of heaven which are for the most part seen untruly. Most excellently therefore did the ancients represent Proteus, him of the many shapes, to be likewise a prophet triply great; as knowing the future, the past, and the secrets of the present. For he who knows the universal passions of matter and thereby knows what is possible to be, cannot help knowing likewise what has been, what is, and what will be, according to the sums of things. Therefore the best hope and security for the study of celestial bodies I place in physical reasons; meaning by physical reasons not such as are commonly supposed, but only the doctrine concerning those appetites of matter which no diversity of regions or places can distract or disserve. Not that on this account (to return to my design) I would have any diligence spared in descriptions and observations of the celestial phenomena themselves. For the fuller our supply of such appearances, the readier and surer will everything be. But before I speak more of this, I have to congratulate both the industry of mechanics, and the zeal and energy of certain learned men, that now of late by the help of optical instruments, as by skiffs and barks, they have opened a new commerce with the phenomena of the heavens; an undertaking which I regard as being both in the end and in the endeavour a thing noble and worthy of the human race; the rather because these men are as much to be praised for their honesty as for their boldness; seeing that they have ingenuously and perspicuously explained the manner in which each point of their proceeding in each case has been made out. All that is wanted further is constancy and great severity of judgment, to change the instruments, to increase the number of witnesses, to try each particular experiment many times and many ways; lastly, to suggest to themselves and open to others every objection that can be made, not despising even the minutest scruple; lest it fare with them as with Democritus in the matter of the sweet figs, when it turned out that the old woman was wiser than the philosopher, and that a vast and wonderful speculation was built upon a trifling and ridiculous mistake. But now having made these general remarks by way of preface, let us go on to a description of the history of celestial bodies more at large, to show what and what kind of things are to be sought concerning them. First, therefore, I will set down the questions in nature, at least some of them, and those the chief; to these I will add the uses which may probably be derived to man from the study of celestial bodies; both of these as being the mark at which the history aims; that they who undertake to compose a history of the heavens may know what we are about, and may keep these questions, together with these operations and effects, in mind and view; and so proceed to form such a history as shall be adapted to the solution of the said questions, and the procuring of such fruits and benefits to the human race. Now the questions I mean are of that kind which inquire of the fact in nature, not of causes. For this is the proper business of history. Next, I will show distinctly in what the history of celestial bodies consists, and what are its parts; what things are to be understood or inquired, what experiments to be collected and procured, what observations to be employed and sifted; preponing as it were certain Inductive Topics, or Articles of Interrogation concerning the heavens. Lastly, I will give some precepts, not only concerning that which should be sought, but also how the matters under inquiry are to be examined and how presented and put in writing; that the diligence of the first inquiry may not be lost in passing it on, nor (what is worse) the beginning of the work, on which the subsequent progress depends, prove weak and fallacious. In short I will explain both what should be inquired with regard to the heavenly bodies, and with what view, and in what manner.

CHAPTER VI.

That philosophical questions concerning the Celestial Bodies, even such as are contrary to opinion, and somewhat harsh, should be received. Five questions are propounded concerning the system itself; namely, is there a system? if there be, what is the centre of it, what the depth, what the connexion, and what the position of the parts?

Most men no doubt will think that I am digging up the remains of old questions long since laid up and buried, and in a manner raising their ghosts, and mixing

fresh questions with them. But since the philosophy of which we are hitherto in possession concerning the heavens has no soundness; and since it is my constant determination to refer everything to a new trial by legitimate induction; and since if any questions are passed over, there will be so much less pains and diligence bestowed on the history, because it will perhaps seem superfluous to inquire of things concerning which no question has been raised; I hold it necessary to take in hand all questions which the nature of things anywhere presents. Nay, the less certain I am concerning the questions which are to be determined by my method, the less difficulty do I make in entertaining them. For I see an end of the matter. The first question therefore is, *whether there be a system?* that is, whether the world or universe compose altogether one globe, with a centre; or whether the particular globes of earth and stars be scattered dispersedly each on its own roots, without any system or common centre? Certainly the school of Democritus and Epicurus boasted that their founders had overthrown the walls of the world; yet this did not absolutely follow from their words. For when Democritus had set down matter or seeds as infinite in quantity and finite in attributes and power, as moving about, and never located in any position from all eternity, he was driven by the very force of this opinion to constitute multiform worlds, subject to birth and death, some well ordered, others badly put together, even essays of worlds and vacant spaces between. But yet though this were admitted, there was no reason why that part of matter which is assigned to this particular world which is visible to us, should not have the shape of a globe. For each one of those worlds must have received some shape; and although there can be no middle point in infinity, yet in the parts of infinity a round figure may exist, no less in a world than in a ball. Now Democritus was a good dissector of the world, but in the integral parts of the world inferior even to the ordinary philosophers. But the opinion of which I am now speaking, which destroyed and confounded system, was that of Heraclides Ponticus, Ecphantus, and Nicetas of Syracuse, and most of all Philolaus, and likewise, in our own day, of Gilbert, and all those (except Copernicus) who believed that the earth was a planet and movable, and as it were one of the stars¹. And the effect of this opinion is that the several planets and stars, together with innumerable other stars which elude our sight by reason of their distance, and others again which are invisible to us from their nature being not lucent but opaque, having each of them obtained their own globes and primary forms, are scattered and suspended through that immense expanse which we behold above us, whether it be of vacuum or some thin and almost indifferent body, like so many islands in an immense sea, and revolve not round any common centre, but each separately round its own; some simply, others with some progressive motion of the

¹ All the persons here mentioned affirmed that the earth moved, but their opinions are not accurately represented. Thus Ecphantus and Heraclides denied that the earth changes its place. According to them it moves, but *οὐ μὴν γε μεταβατικῶς* (Plutarch, *De Placit. Philos.* iii. 13): and with respect to Ecphantus we are expressly told by the pseudo-Origen, *Philos.* c. 15, that he affirmed *τὴν γῆν μέσον κόσμου κινεῖσθαι περὶ τὸ αὐτῆς κέντρον, ὡς πρὸς ἀνατολήν*; so far was he from rejecting the notion of a *κόσμος* or system. Philolaus undoubtedly admitted the motion of the earth through space, and so probably did Nicetas, or rather Hicetas; but neither of them rejected the notion of a system. For Philolaus, see Boeckh's *Philolaus* and the second dissertation *De Platonico Systemate*. The Philolaic system (although Martin appears to doubt it) was probably the same as that of the Pythagoreans in general. According to it, neither the earth nor the sun is at rest, but both, with the planets, revolve about a central fire, the light from which is reflected to us from the sun. It never reaches us directly, because between us and it revolves the Antichthon, which is either a separate planet, or simply the other side of the earth, for the point does not seem quite settled. [See Berry, *Short Hist. of Astron.*, p. 25, for a solution.—Ed.] The passage in the text is apparently taken from Gilbert, *De Magnete*, vi. 3. Heraclides, though he did not believe in the earth's moving through space, yet affirmed, as did also the Pythagoreans, that each of the heavenly bodies constitutes a *κόσμος* in itself. See Stobæus, *Ec. Phys.* i. 25. On the other hand, Philolaus and Ecphantus distinctly asserted the unity of the universe. See Stobæus, i. 16, 23.

centre. Now the harshest thing in this opinion is, that they take away quiet or immobility from nature². But it seems that as there are bodies in the universe which revolve, that is, which move with an infinite and perpetual motion, so on the other hand there should be some body which is at rest; between which comes a middle nature, of such as move in a straight line; seeing that motion in a straight line suits the parts of globes, and things banished from their native countries, which move towards the globes of their connaturals, that being united with them they may themselves also either revolve or rest. But this question (namely, *whether there be a system*) will be answered by that which shall be determined concerning the motion of the earth, that is, *whether the earth stands still or revolves*, and the substance of the stars, *whether they are solid or flamy*, and the ether or interstellar spaces in the heaven, *whether they consist of body or vacuum*. For if the earth be stationary and the heavens revolve in a diurnal motion, there is doubtless a system; but if the earth revolve, it does not necessarily follow that there is no system; because there may be some other centre of the system; the sun, for instance, or something else. Again, if the globe of the earth be the only one dense and solid, it would seem that the matter of the universe is collected and condensed to that centre; but if it be found that the moon or some of the planets consist likewise of dense and solid matter, it would seem that dense bodies collect not to any one centre, but dispersedly, and as it were fortuitously. Lastly, if it be asserted that there is a collective vacuum in the interstellar spaces it would seem that each globe has round it an emanation of rarer substance, and beyond that a vacuum³. But if these spaces be filled with body, it would seem that there is a union of dense things in the middle, and a repulsion of rarer things to the circumference. Now it is of great importance to science to know the conjugations of questions; because in some cases there is history or inductive matter by which they may be settled, in others not so. But granting that there is a system, we come next to the second question, *what is the centre of that system?* For if any one of the globes is to occupy the position of centre, there are two especially, which offer themselves as having the nature of a middle or centre; namely, the earth and the sun. In favour of the earth, we have the evidence of our sight, and an inveterate opinion; and most of all this, that as dense bodies are contracted into a narrow compass, and rare bodies are widely diffused (and the area of every circle is contracted to the centre), it seems to follow almost of necessity that the narrow space about the middle of the world be set down as the proper and peculiar place for dense bodies. In favour of the sun, on the other hand, we have this consideration, that that body which has the chief office in the system should occupy that place from which it may best act on the whole system and communicate its influence. And since the sun is that which seems most to vivify the world by imparting heat and light, it appears to be altogether right and in order that it should be placed in the middle of the world. Besides, the sun manifestly has Venus and Mercury as his satellites⁴, and in the opinion

² Yet Bacon would have found, by referring to Cicero, that Nicetas at least denied that any part of the universe except the earth is in motion.

³ Compare Gilbert, *Physiol.* ii. 27.

⁴ It is difficult to see why Bacon should speak of this as manifest; the theory that Mercury and Venus are satellites of the sun constitutes a distinct system, often called the Egyptian. See with respect to it Martin, *Etudes*, etc., vol. ii. p. 129. According to Gassendi, Copernicus was much struck by the passage of Martianus Capella in which this system is mentioned. Apelt has remarked that the Copernican system includes two distinct elements: the first the reference of the motion of the planets to the sun as a common centre; the second the doctrine of the motion of the earth. The first was common to Copernicus with Tycho Brahe; the second was his own exclusively. Tycho's system, as Apelt well observes, is the natural transition from Ptolemy's to the Copernican, and must of necessity have been arrived at as soon as the true distances between the sun and the planets were introduced into the Ptolemaic hypothesis. Thus Tycho's system is a step backwards, although it saved the phenomena as well as that of Copernicus; but, as Apelt goes on to remark, Tycho was an observer, and Copernicus a philosopher who sought not merely for an astronomical hypothesis, but for a new idea of the universe.

of Tycho the other planets also ; whence it is plain that the sun can sustain the nature of a centre, and perform its office in some things, and so has the better title to be constituted the centre of the universe ; as was asserted by Copernicus. Nevertheless, in the system of Copernicus there are found many and great inconveniences ; for both the loading of the earth with a triple motion is very inconvenient⁵, and the separation of the sun from the company of the planets, with which it has so many passions in common, is likewise a difficulty, and the introduction of so much immobility into nature, by representing the sun and stars as immovable, especially being of all bodies the highest and most radiant, and making the moon revolve about the earth in an epicycle, and some other assumptions of his, are the speculations of one who cares not what fictions he introduces into nature, provided his calculations answer. But if it be granted that the earth moves, it would seem more natural to suppose that there is no system at all, but scattered globes, according to the opinion of those I have already mentioned, than to constitute a system in which the sun is the centre. And this the consent of ages and of antiquity has rather embraced and approved. For the opinion concerning the motion of the earth is not new, but revived from the ancients, as I said ; whereas the opinion that the sun is the centre of the world and immovable is altogether new (except one verse, wrongly translated⁶),

Copernicus says of himself, that he had set the sun, the great light of the universe, in the midst of the temple of nature, and as on a kingly throne. No man less deserved to be spoken of as a merely calculating astronomer. Bacon's difficulty, that in the Copernican system the moon revolves about the earth, had been felt by others. Galileo, at the end of the *Sydericus Nunciatus*, points out the analogy of this hypothesis with what he had discovered to be the case with respect to Jupiter and his satellites, remarking that it removed the difficulty in question.

⁵ Copernicus conceived the earth's motion round the sun to be as if the earth were rigidly attached to the line which joins them. Thus the motion round the sun results from the composition of two simpler motions, namely that of the earth's centre and the change of the direction of its axis. The second of these components is eliminated from the hypothesis by supposing that the earth, besides the motion round the sun and about its own axis, has a third motion, namely a change in the direction of its axis equal and opposite to that which results from the motion round the sun. Galileo showed, by an illustrative experiment, that this kind of motion was in reality only an unnecessary complication ; and Gilbert also makes the same remark. See the *Saggiatore*, ii. 304, and the *Physiol. Nova*. In Germany the same thing was remarked by Rothman ; but I am not aware whether he or Gilbert was the first person to introduce the simplification, which is indeed obvious. Nevertheless the notion of a triple motion long adhered to the Copernican hypothesis. See *Paradise Lost*, viii. 130. Of course the earth's axis really has a third motion which gives rise to the phenomena of precession and mutation ; but this is exceedingly slow. In justice to Copernicus it should be added, that though his notion of an annual third motion was unnecessary, yet he employed it, and in a correct manner, to explain precession. Boeckh's notion that the movement of the fixed stars in the theory of Philolaus was introduced for the same purpose, does not seem to be well made out. No doubt, as the earth revolved every day round Hestia, the fixed stars might have been allowed to remain at rest ; but we have a remarkable example of a similar pleonasm in the astronomical theory of Cardinal Cusanus. See the fragment of Cusanus first published by Clemens in 1843 : it is given *in extenso* in Apelt *On the Reformation of Astronomy*, p. 23.

⁶ Bacon alludes to Job, ix. 6. On this verse, " Qui commovet terram de loco suo et columnæ ejus concutiuntur," Didacus à Stunica, in his Commentary on Job, published in 1584, founded an argument in favour of the Copernican hypothesis, alleging that no text could be found in which the earth's motion is as distinctly denied as it is here asserted :—" Nullus dabitur scripturæ sacrosanctæ locus qui tam aperte dicat terram non moveri quam hic moveri dicit".—*Stunica on Job*, p. 41. (I quote from the edition of 1591). This argument of Stunica's seems to have attracted some attention. Galileo mentions it in his letter to the Grand Duchess Christina, which was written about 1615. See the new edition of his works (Florence, 1843), ii. p. 52. The passage of Stunica's Commentary in which it occurs is inserted in Salisbury's *Mathematical Collections and*

and was first introduced by Copernicus. Then comes the third question, concerning the depth of the system; not with a view to find its exact measure, but to ascertain whether the starry heaven be like one region, or orb, as it is commonly called; or whether of the fixed stars, as they call them, some are higher than others, with an immeasurable depth between? For it cannot be that they are of equal height, if the words be taken exactly; since the stars are certainly not situated as in a plain, so as to have a superficial dimension only, like spots or bubbles, but they are entire globes, great and deep; and being of such different magnitudes, it must needs be that some protrude more than others either upwards or downwards, nor is it possible for them to be united in one surface, either above or below. And if this be the case in the parts of stars, it would plainly be rash to assert that there are not some stars higher than others in their whole body. But though this be true, it may nevertheless be maintained that the width of that region which they call the sphere or starry heaven, though great, is definite; and that within this those prominences and degrees of altitude are in a manner limited; for we see from the apogees and perigees of the planets that every one of their heavens through which they ascend and descend has an observable width. But the question proposed relates only to this,—whether some stars are above others, like planet above planet, and as it were in different orbs. And this question is in like manner related to that other concerning the motion or fixedness of the earth. For if the stars move in a diurnal motion round the earth, since they all move with the same velocity, and as it were with one spirit (and since it is very evident in planets that as they vary in height and lowness of position, so they vary in quickness and slowness of motion), it is probable that the stars, being equal in velocity, are situated likewise in one region of the ether, the width or profundity of which, although it be great, yet is not so great as to make a difference in the velocity or quickness of motion; but so that throughout the whole of that region everything being united together by a kind of bond of conaturality revolves equally, or at least with so little difference that at this distance it is not visible to the sight. But if the earth moves, the stars may either be stationary, as Copernicus thought, or, as is far more probable, and has been suggested by Gilbert, they may revolve each round its own centre in its own place, without any motion of its centre, as the earth itself does; if only you separate that diurnal motion of the earth from those two supposititious motions which Copernicus superadded. But either way, there is no reason why there

Translations (1661), which contains, beside a translation of the *Dialogi dei Sistemi*, translations of certain tracts on the religious question involved in the Copernican controversy. —I am not sure, though *versiculus* is an odd expression for anything except a verse in the Bible, that M. Bouillet is not right in thinking that the reference is to what is said of Philolaus by Plutarch, *De Placit. Phil.*, which (as Apelt has remarked) Copernicus has always mistranslated, confounding the central fire, the seat of the gods, with the sun: See Apelt's *Reformation of Astronomy*, 1852, p. 128.

Apelt altogether agrees with Bacon as to the complete originality of Copernicus, and, apparently forgetting what is said of Aristarchus by Archimedes and others, says that the idea of the annual movement of the earth sprang out of the mind of Copernicus, as Minerva from the head of Jupiter. But yet, as Humboldt has remarked, he may have been acquainted with the doctrine of Aristarchus. See *Cosmos*, vol. ii. p. 349. Bacon was not, or he would not have said that the immobility of the sun was, "excepting one versicle," a wholly new doctrine.

A third hypothesis as to Bacon's meaning is that he refers to some passage in which the sun is spoken of as τὸ μέσον, as Boeckh has pointed out in his *Commendatio Academicæ alteræ de Platonicæ Systemate*, etc. The sun is sometimes called μέση on musical grounds and sometimes spoken of as μέσον πάντων, simply because it occupies a middle place among the planets. Such a passage occurs in the *Placit. Phil.*; and it is perhaps to this that Bacon refers. Compare Martin, *Études sur le Timée*, vol. ii. pp. 103. and 128. I have not seen Gruppe's recent work on the Cosmical System of the Ancients. The notion that Plato was the first proposer of the Copernican system seems altogether unfounded. According to Apelt, Gruppe relies on a passage in the seventh book of the *De Legibus*.

should not be stars above stars till they go beyond our sight. The fourth question is concerning the connexion of the system. Now of the nature and essence of the body or thing which is regarded as pure ether, and occupies the space between the stars, I will inquire afterwards. At present I will only speak of the coherence of the system. This may be in three ways. For there is either vacuum, or contiguity, or continuity; therefore we must first inquire, *whether there be a collective vacuum in the interstellar spaces?* a thing which Gilbert distinctly affirmed⁷, and which likewise some of those among the ancients who thought that the globes were dispersed, without any system, seem to intimate; especially those who asserted that the bodies of the stars are compact. The opinion is this: that all the globes, as well the stars as the earth, consist of solid and dense matter: that these are immediately surrounded by a kind of bodies which are to a certain extent connatural with the globe itself, but yet more imperfect, languid, and attenuated; and are in fact nothing else than the effluvia and emanations of the globes themselves; such as vapours are, and exhalations, and indeed the air itself, when compared with the earth: that these emanations do not extend for any great distance round each globe; and that the remaining space (which is far the most extensive) is empty. Which opinion is countenanced by the fact that the bodies of the stars are seen at such an immense distance. For if all that space were filled, especially with bodies which are doubtless very unequal in density and rarity, the refraction of rays would be so great that they would not reach our sight; whereas if far the greatest part of that space be a vacuum, it is natural to suppose that they traverse it more easily. And indeed this question will in great part depend on the question which I shall next bring forward concerning the substance of the stars, *whether it be dense, or rare and open*. For if their substance be solid, it will seem as if nature were only busy and anxious about the globes and their immediate neighbourhood; and that she leaves and passes by, as it were, the intermediate spaces. Therefore it would not be improbable that the globes are denser about the centre, more open towards the circumference, in the surrounding atmosphere and effluvia almost exhausted, and so terminated at last in vacuum. On the other hand, if the nature of the stars be rare and flamy, it will appear that the nature of rarity is not merely the diminution of density, but powerful and primary of itself, no less than the nature of solidity; and that it abounds both in the stars themselves, and in the ether, and in the air, so that there is no need of a collective vacuum. This question concerning a vacuum in the interstellar spaces will depend likewise on that question which relates to the principles of nature; *Does nature admit a vacuum?* Not however on this absolutely, without proper distinction. For it is one thing to deny a vacuum absolutely, another to deny a collective vacuum. For the reasons which may be advanced in favour of a vacuum interspersed, whereby bodies are relaxed and opened, are far stronger than those on which the assertion of a collective vacuum, that is, a vacuum extending over great spaces, is supported. And it was not Hero alone, a man of wit and a mechanician, who saw this⁸, but Leucippus likewise and Democritus, the founders of the opinion concerning the vacuum, which Aristotle endeavours by certain fine reasons to attack and destroy; which two philosophers, certainly most acute and famous men, in admitting an interspersed vacuum, do in fact deny a collective one. For in the opinion of Democritus vacuity is bounded and circumscribed, so that beyond certain limits distraction or divulsion of bodies is no more possible than compulsion or compaction⁹. For although in those works of Democritus which have come down to us this is never expressly declared, yet he seems to imply as much when he asserts that bodies as well as spaces are infinite: using as his argument, that otherwise (that is, if space were infinite and bodies finite) bodies would never cohere. Therefore by reason of matter and space being equally infinite, vacuity is necessarily confined within certain bounds, which seems to have been his real opinion rightly understood; that is, that there is a certain limit to the expansion of bodies by reason of the vacuum with which they are

⁷ Gilbert, *Physiol. Nova*, i. 22.

⁸ See Hero, *Spiritualia*, proëm.

⁹ Cf. Lucretius, i. 983.

coupled; and that there is no solitary vacuum, not enclosed in a body. But if there be no vacuum amounting to a solution of continuity in the system, yet as there is found so great a diversity of bodies in the parts and regions of the system that they seem to belong as it were to different nations and countries, there arises a second question, which relates to the connexion of the system, this is, *whether the pure ether be one perpetual and continuous fluid, or consist of many contiguous to one another?* Now it is not for me to refine about words, but by a contiguous body I understand a body which lies on another without mixing with it. I do not mean however a series of hard rigid floors, like the stories of a house, such as the vulgar astronomers imagine, but such a succession, as fluids admit of, as when water floats on quicksilver, oil on water, air on oil. For no one can doubt but that in that immense tract of pure ether there are wonderful differences as to density and rarity and many other things; but upon either supposition (that is, whether you assume continuity or contiguity) this may be the case. For it is certain that even in the sea the water at the top and the water at the bottom are not of the same consistency and taste; while in the air, there is a very great difference between the air contiguous to the earth and the upper air, and yet the fluidity is one and entire and uninterrupted. The question therefore is brought to this, *whether the differences in the tract of pure air insinuate themselves gradually and with a continuous flow; or whether they take place at certain distinguishable limits, where the bodies which cannot mix are joined to each other; as with us air lies on water.* For indeed to a simple observer the whole of that pure and clear body in which the globes of the earth and stars float and hang as in an immense sea, and which is infinitely greater both in quantity and the space which it occupies than the globes between which it is interposed, seems to be a thing undivided and completely united. But to a deeper searcher of nature it will plainly appear that nature is accustomed to proceed for some distance by degrees, and then suddenly by jumps, and to take these processes in turn. Otherwise, if a man examine it well, no structure of things or organic figure could be formed, if the proceeding were always by imperceptible degrees. Therefore this gradual progress may do for the spaces between the worlds, but not for the world, the construction of which requires that things very dissimilar be separated one from the other, and yet brought into approximation. Thus air succeeds to and touches earth and water, a body very different from them, and yet placed in immediate proximity; not first mud, then vapour or mist, and then pure air; but air at once, without any thing between. But in air and ether (for I put the two together) the most remarkable and radical division of all may be derived from a greater or less susceptibility of the starry nature. Between the globe of the earth then and the summits of heaven there seem to be generally three regions especially remarkable; namely, the tract of the air, the tract of the planetary heaven, and the tract of the starry heaven. Now in the lowest of these tracts, the starry nature is not consistent; in the middle it is consistent, but gathers into separate globes; in the highest it diffuses itself among a great number of globes, till at the summits thereof it seems to pass as it were into the perfect empyrean. But in the meantime I must not forget what I said just now, that nature is accustomed to adopt the gradual and the sudden process by turns, so that the confines of the first region communicate with the second, and the second with the third. For both in the higher air, when the air has begun to be cleared from the emanations of the earth and to be more rarefied by the emanations of the heavens, flame tries and endeavours to be consistent; as we see in the lower comets, which are of a middle nature between the starry nature in consistence and in evanescence; and again in the neighbourhood of the sun (it may be) where the heaven seems to become starry, and to begin to pass into the nature of the starry heaven. For it may be that those spots which have been discovered in the sun, certainly by faithful and diligent observation, are a kind of rudiments of starry matter; whereas in the heaven of Jupiter absolute and perfect stars are discernible, though too small to be seen without the aid of telescopes; and again in the summits of the starry heaven it seems from the innumerable sparklings of the ether between the numbered stars (for which other causes bald enough

are usually given) that the starry nature is more diffused and continuous¹⁰. Of these things however I will speak further in the questions which I shall presently propose about the substance of the stars and the interstellar heaven. For the things which I have just said relate only to connexion of system. There remains the fifth question, *concerning the collocation of the parts of the system, or the order of the heavens*. And whether it be assumed that there is no system, but that the globes are scattered, or that there is a system, of which the sun is the centre; or even though astronomers look for some new system; yet there still remains the inquiry, *which planet is nearer to another planet, or further off*; and in like manner *which planet is more or less elongated from the earth or from the sun*. Now if the ancient system be received, there seems to be no reason why we should insist much upon a new inquiry concerning the four superior heavens, namely, the heavens of the fixed stars, of Saturn, of Jupiter, and of Mars. For with respect to their position and order the consent of ages is agreed, and there is no contrary phenomenon; the calculations of their motions also (whence is derived the chief proof of the heights of the heavens) are agreeable, and present no difficulty. But with regard to the Sun, Venus, Mercury, and the Moon, according to the old system, the ancients were in doubt¹¹; and among the moderns also there is a question with regard to Venus and Mercury which of them is superior. For in favour of Venus being superior, there is the reason that she moves somewhat slower; and in favour of Mercury, that he is fixed at a less distance from the sun, whence one might assert that he ought to be placed next to the sun. But with regard to the moon, no one has ever doubted that she is placed nearest to the earth, though there are various opinions about her approximation to the sun. Nor should any one who is seriously considering the subject let another kind of question escape him, pertaining to the constitution of the system; that is, *whether one planet sometimes goes above another and sometimes again comes below*; a thing which seems to be proved with regard to Venus by some tolerably diligent demonstrations, that she is found sometimes above and sometimes below the sun. It is a very fit inquiry also, *whether the apogee of the lower planet does not cut the perigee of the higher and enter its boundaries*. There remains the last question, *concerning the position of the parts of the system*; that is, *whether there be many different centres in the system, and as it were many dances*; especially as not only the earth is set down as the centre of the *primum mobile*, and the sun (according to Tycho) of the *secundum mobile*; but Jupiter likewise is supposed by Galileo to be the centre of those smaller and recently discovered wanderers. Such then are these five questions, which seem fit to be proposed concerning the system itself, namely, *is there a system? what is the centre of it? what the depth? what the connexion? and what the order of the position of the parts?*

As for the extremities of the heaven and the empyrean, I do not draw up any propositions or questions concerning them. For there is no history of these things nor any phenomenon extant. And therefore what can be known about them

¹⁰ See the *Syderens Nuncius* of Galileo, which had just appeared when this tract was written; and compare the following passage in the letter of Sir Wm. Lower to Harriot, written when he had first heard of Galileo's discoveries. "We Traventane philosophers were a consideringe of Kepler's reasons by which he indeavors to overthrow Nolanus' and Gilbert's opinions concerning the immensitie of the spheare of the starres. . . Said I (having heard you say often as much) what is [if?] in that huge space betweene the starres and Saturne, ther remaine ever fixed infinite numbers which by reason of their lesser magnitudes doe flie our sighte. . . what if about 1/2 1/3 etc., ther move other planets also which appear not. Just as I was saying this comes your letter, which when I had redd, Loe, quod I, what I spoke probable, experience hath made good". The name "Traventane" is taken from his house Traventi. It probably alludes to the title Cosentine philosophers, affected by the disciples of Telesius. Bruno affected to talk of the Nolan philosophy.

¹¹ It was doubted whether the orbs of Venus and Mercury are superior to the sun's or inferior to it. The former was the older hypothesis and is preferred by Ptolemy; who however remarks that some had dissented from it. See the *Megal. Syntaxis*, iv. 1. Bacon's information is apparently derived from Patricius, *Pancosmia*, 13.

can only be known by consequence, and not at all by induction. For such inquiry however there will come a fit time, and a plan and method. But with regard to the immateriate heavens and spaces, we must rest entirely upon religion, and leave them to it. For as for what the Platonists and of late Patricius¹² (by way of giving their philosophy a diviner character) have alleged, not without superstition, arrogance, and some disorder of mind, and in a word, with too much presumption and no fruit, like the images and dreams of Valentinus¹³; I regard all such things as idle fancies. For an apotheosis of Folly, like that of the Emperor Claudius, is a thing not to be endured; and most mischievous it is, and a very pest and destruction of the understanding, for vanity to be made an object of veneration.

CHAPTER VII.

Then follow questions concerning the substance of heavenly bodies; namely, what is the substance of heavenly bodies generally as compared with sublunary bodies; what is the substance of the interstellar ether as compared with the body of a star; what is the substance of the stars as compared with one another, with our fire, and in their own nature; what is the substance of the Milky Way, and the black spots in the antarctic hemisphere? Then is proposed the first question, Is there a heterogeneity between celestial and sublunary bodies, and of what nature may it be?

HAVING finished the questions concerning the system, we must proceed to those concerning the substance of the heavenly bodies. For the inquiry concerning the substance of the heavenly bodies, and the causes of their motion, belongs principally to philosophy; the inquiry concerning the motion itself and the accidents thereof, to astronomy; the inquiry concerning their influence and power, to both. Now it ought to have been so arranged between astronomy and philosophy, that astronomy should prefer those hypotheses which are most convenient for compendious calculations; philosophy those which come nearest to the truth of nature. And further, that while the hypotheses adopted by astronomy for convenience should by no means prejudice the truth of the thing, the judgments of philosophy in their turn should be such as are perfectly reconcilable with the phenomena of astronomy. But now it comes to pass, contrariwise, that the fictions of astronomy have been introduced into philosophy and corrupted it; while the speculations of philosophers about the celestial bodies please none but themselves, and almost forsake astronomy, looking at the celestial regions in general, but not at all addressing themselves to particular phenomena and their causes. Therefore since both sciences (as now practised) are slight and superficial, we must plant our footing deeper; and treat these two, which by reason of the narrowness of men's views and the practice of professors have been for so many ages separated, as one and the same thing, and making up together one body of science. The first question proposed therefore is, *whether the substance of the heavenly bodies is different in kind from the substance of those below?* For Aristotle's temerity and cavilling has begotten for us a fantastic heaven, composed of a fifth essence, free from change, and free likewise from heat¹. Now to say nothing at present about the four elements, which this fifth essence sup-

¹² Patricius, from whom much of the latter part of the present tract is taken, was born at Cherso in 1529, and died in 1597. He wrote a treatise on philosophy—*Nova de Universis Philosophia*—[which was published in 1591]. It is an attempt, of no great value, to conciliate Plato and Aristotle. In the last book, entitled *Pancosmia*, there is some interesting information touching theories of the tides.

¹³ Valentinus is the alchemist Basil Valentine. He is said to have been a Benedictine of the congregation of St. Peter's, at Erfurd, and to have lived in the beginning of the fifteenth century. But it seems that the writings which bear his name are spurious. See Sprengel, *Hist. Med.* iii. p. 267, and Morhof, *Polyhistor*, i. p. 84, who mentions that Piacius, in the *Pseudon. Catalog.*, is disposed to deny the existence of any such person, and does not believe that his name could be found either in the provincial catalogue of Benedictines at Erfurd, or in the general one at Rome.

¹ Arist. *De Cælo*, ii. 7.

poses, it was certainly an act of great boldness to destroy altogether the relationship between the elementary, as they call them, and the celestial bodies; seeing two of the elements, namely air and fire, agree so well with the stars and ether; only that it was his way to abuse his wit, and make difficulties for himself, and prefer those things which were more obscure. Yet there is no doubt that the regions above and below the moon, together with the bodies contained in the same space, differ in many important points; but then again there is as little doubt that the bodies of both regions have many common inclinations, passions and motions; so that, with due regard to the unity of nature, we should rather distinguish these than separate them. But as for that point of heterogeneity, that the heavenly bodies should be supposed eternal, the inferior corruptible; the opinion seems to fail both ways, for neither does such eternity as they feign belong to the heaven, nor such mutability to the earth. For with respect to the earth, if the matter be truly considered, judgment is not to be made from the things which are visible to us, since among the bodies seen by man's eye there is none that has been disinterred or cast up from a depth of above three miles at the most, which is as nothing compared with the extent of the whole terrestrial globe. Therefore there is no reason for thinking that the interior of the earth is not endowed with the same eternity as the heaven itself. For if the earth underwent changes in its inmost depths, it could not be but that the consequences of those changes would produce, even in this region where we tread, greater accidents than we see take place. For of the changes visible to us here towards the surface of the earth, there appears almost always some manifest cause sent from above, due to the state of the atmosphere, to rains, heats, and the like; so that the earth itself, of its own proper force, does not seem to cause any considerable change. And if it be granted (which certainly is probable) that the earth itself also, as well as the heavenly bodies, acts upon the regions of the air, either by exhaling cold, or by emitting winds, or the like; yet all that variety may be referred to the parts of the earth close at hand, in which no man in his senses would deny that very many changes and alterations take place. It must certainly be confessed that of all terrestrial phenomena, those which penetrate deepest into the earth are earthquakes and things of that sort, as eruptions of water, vomitings of flames, yawnings and rents of the earth, and the like; yet even these seem to rise from no great distance, seeing most of them occupy only a small space in the surface of the earth. For the wider the space an earthquake or anything of that kind extends on the surface of the earth, the deeper must we suppose its roots and sources to penetrate into the interior; and the narrower the less deep. And if it be said that there are sometimes earthquakes which shake vast and extensive districts of country, so no doubt it is. But these certainly happen seldom, and are to be numbered among the greater accidents; and may be compared therefore with the higher comets, which are also uncommon. For I am not attempting to prove simply that the earth is eternal, but only (as I said at first) that between heaven and earth, as regards constancy and change, there is not much difference. Neither is it worth while to reason of eternity from the principles of motion; for as circular motion may be without limits, so may rest; and the consistency of dense bodies in the place and great congregation of their connaturals is not less susceptible of eternity than the rotation of rare bodies; seeing that the parts of both when separated from the rest move in a straight line. That the interior of the earth is not more subject to corruption than the heaven itself, may be inferred also from this, that waste commonly takes place where there are means of supply. Now as rains and things falling from above, which renew the surface of the earth, cannot penetrate far into the interior, which nevertheless remains undiminished in bulk and quantity, it must be that nothing is lost, since there is nothing to take its place. Lastly, the mutability which is discovered in the exterior of the earth seems itself to be by accident. For that small incrustation which seems to extend a few miles downwards (within which those noble workshops and fabrics of plants and minerals are enclosed) would scarce receive any variety, much less such beautiful and elaborate contrivances, unless that part of the earth were acted upon and perpetually stimulated by the heavenly bodies. And if any one think that the heat

and active power of the sun and heavenly bodies can strike through the thickness of the whole earth, he may be regarded as superstitious and fanatical; seeing it is very evident by how small an obstacle they may be repelled and restrained. So much then for the constancy of the earth; we must now inquire concerning the mutability of the heavens.

First then we are not to infer that changes in the heavens do not take place because they are not visible to us. For the sight is disabled both by distance of place, and by excess or deficiency of light, and by the fineness or smallness of the body; and if a man were to look from the moon he would not be able to see the changes which take place here with us on the surface of the earth, such as inundations, earthquakes, buildings, structures, and the like; which would not show so big as little straws at so great a distance. Nor from the fact that the interstellar heaven is transparent, and in clear nights the stars are seen the same in number and appearance, can a man conclude that the whole body of ether is clear, pure, and immutable. For we know that the air below admits innumerable varieties of heat, cold, odours, and all kinds of mixture with the finer vapours, and does not thereby lose its transparency; in like manner therefore we must not trust to the face or appearance of the heaven. For if those great masses of clouds which sometimes obscure the heaven, and by reason of their proximity to our view take away from us the light of the sun and stars, were hung in the higher parts of the heaven, they would no way alter the face of a clear sky; since they would neither be visible themselves by reason of the distance, nor would they at all eclipse the stars, by reason of the smallness of their bodies, in respect to the magnitude of the stars. Nay the body of the moon itself, except in the part which the light strikes, does not change the appearance of the sky; so that, if that light were absent, so great a body as that would be altogether imperceptible to us. On the other hand it is quite plain from the masses of bodies which by their bulk and magnitude can overcome the distance of space, and by the luminous nature and brilliancy of their matter can affect our sight, that wonderful changes and unusual appearances do happen in the heaven. For this is shown in the higher comets, those I mean which have appeared in the figure of a star without a tail, and are not only proved from the doctrine of parallax² to be situated above the moon, but have likewise had a certain and constant position relative to the fixed stars, and kept their places, and not been wanderers; such as our age has witnessed more than once, first in Cassiopea³, and again not so long ago in Ophiuchus. And as for the notion that this constancy visible in comets proceeds from their following some star (which was the opinion of Aristotle, who affirmed that there was the same relation between a comet and a single star as between the Milky Way and the collection of stars, an assertion false both ways), this has long ago been exploded, not without a censure on the wit of Aristotle, who ventured to invent such theories on slight grounds⁴. Neither does that change in the celestial regions with regard to new stars hold with regard to those stars only which seem to be of an evanescent nature, but likewise in those which remain. For in the case of the new star of Hipparchus, mention is made by the ancients of the appearance of it⁵; but no mention of the disappearance. There appeared also of late a new star in the breast of Cygnus, which has now lasted for twelve whole years⁶, having already exceeded the age (as it is held) of a comet, without as yet any diminution or preparation for flight.

² Galileo (in the opening of his first lecture on the new star in 1604) "showed from the absence of parallax that the new star could not be, as the vulgar hypothesis represented, a mere meteor engendered in our atmosphere and nearer the earth than the moon, but must be situated among the most remote heavenly bodies".—*Life of Galileo*, L. U. K. p. 16.—J. S.

³ A new star was observed in Cassiopeia by Cornelius Gemma and Tycho Brahe in 1572; it disappeared in 1574. The star in Ophiuchus was observed by Kepler in 1604, and disappeared about the end of 1605. Compare with the argument in the text, Galileo, *Dialogi dei Sistemi*. ⁴ Cf. Arist. *Meteorol.* i. 8. ⁵ Cf. Pliny, ii. 23.

⁶ This star, which is of variable magnitude, was first observed by Jansen in 1600, so that the *Descriptio Globi Intellectualis* must have been written in 1612.

Nor again can it be affirmed as a fact without exception* that the old stars suffer no change at all, but only those that have appeared more recently; in which it is no wonder that a change should take place, seeing their very generation and origin is not immemorial. For setting aside the fable of the Arcadians about the first appearance of the moon, which they assert to be younger than themselves⁷, there are not wanting examples within trustworthy memory, when the sun on three several occasions, without eclipse or interposition of clouds, the air being clear and serene, appeared for many days with an altered visage; yet not affected in the same manner each time, but once faint, and twice of a reddish brown. For such phenomena happened in the year 790 for seventeen days, and in the times of Justinian for half a year⁸, and after the death of Julius Cæsar for several days. Of the Julian darkness there remains that notable testimony of Virgil:—

Ille etiam extincto miseratus Cæsare Romam,
Cum caput obscurâ nitidum ferrugine texit,
Impiaque æternam timuerunt secula noctem⁹.

The narrative of Varro, a man most learned in antiquity respecting the star Venus, which is found in Augustine¹⁰,—namely, that in the time of King Ogyges she changed colour, size, and shape,—might have been of doubtful credit, had not a like event recurred in our age, in the year 1578, and attracted much notice. For then also through a whole year a remarkable alteration took place in the star Venus, which appeared of unusual magnitude and brilliancy, and redder than Mars himself, and changed her shape several times, becoming sometimes triangular, sometimes quadrangular, and even sometimes round, as if her very mass and substance were affected¹¹. Again, that old star in the hip of Cani-

⁷ Cf. Ovid. *Fasti*, i. 469.

⁸ These phenomena are mentioned in juxtaposition by Patricius, *Pancosmia*, p. 111, from whom Bacon probably derived his knowledge of them. For the darkness in 790 Patricius quotes Paul the Deacon, and for that in Justinian's time Peter Messias or Mexia, who was almost a contemporary of his own. The original authority for it is Procopius, *Bell. Vandal.* ii. 14. It is to this darkening of the sun that Bacon refers in the phrase "semel luce exili". Compare a list of seventeen examples of obscuration of the sun's light in the third volume of Humboldt's *Cosmos*. He does not mention that which took place in 790; and the obscuration in the time of Justinian is said on the authority of Abul-Faragius to have lasted fourteen months. Humboldt compares it to that which took place in 1783.

⁹ Georg. i. 469:—

Then did the sun in pity dim his light,
And drew a dusk veil o'er his visage bright,
And shook the impious times with dread of endless night.

¹⁰ St. August. *De Civit. Dei*, xxi. 8.

¹¹ Patricius was Bacon's authority for this story. After mentioning what Augustine repeats from Varro, he goes on thus: "Quæ res ævo etiam nostro accidit anno M.D. LXXVIII. Romæque visum id est die xvi. Novembris. In Germaniâ vero die Decembris xxvi. Perque totum eum annum, sub vesperam, sole nondum merso visa est magnitudine insolitâ, figurâ vero modo triangulâ, modo quadrangulâ, modo rotundâ, et splendore maximo, et rubedine majore quam sit Martis rubedo. Cursum tamen non mutavit".—Patricius, *Pancosmia*, p. 107. This is given as evidence against the Aristotelian doctrine of the immutability of the heavens; and that it is not mentioned by Galileo and the other writers who so constantly refer to the new stars in Cassiopeia and Serpentarius for similar evidence seems to show that the story has no other foundation than that Venus was then visible before sunset. The story would, if true, have been a better proof of a change in the superlunary heavens than the new stars, seeing that it could not be said that Venus was a merely sublunary meteor. So wonderful a fact ought not to have been quoted on the authority of a loose and somewhat rhetorical writer like Patricius. [We must not forget however that this is an unfinished work, not published, nor prepared, nor perhaps intended, for publication by the writer.—J.S.] [And see p. 700.—ED.]

It is possible that Patricius's story may be connected with the phenomenon observed

cula, which Aristotle says that he himself saw with somewhat of a tail, and that tail, especially when cursorily looked at, vibrating, seems now to be changed and to have lost its tail; since nothing of the kind can now in our time be detected¹². Besides, many changes of heavenly bodies, especially in the smaller stars, may easily from neglect of observation pass unnoticed, and be lost to us. That these things are due to vapours and the disposition of the medium will occur at once to any sciolist; but changes which are found to attend the body of any star constantly, equably, and for a long continuance, and to revolve along with it, must be regarded as being in the star itself, or at least in the ether near it, not in the lower regions of the air; which is likewise confirmed by the fact, that such changes take place seldom, and at long intervals; whereas those which are caused in the air by the interposition of vapours take place more frequently. And if any man concludes from the order of the heaven and the equability of the motion itself that the heaven is immutable; taking this certainty of revolutions and restitutions for a sure token of eternity, inasmuch as constancy of motion can hardly belong to a corruptible substance; he should look about him a little more attentively, and observe that this return of things by turns and as it were in circle at fixed times, is found even with us here below in some things; most of all in the tide of the ocean; while those smaller differences which may take place in the heavens both in the revolutions and restitutions escape our sight and reckoning. No more again can the circular motion of the heaven be taken as a proof of eternity; on the ground that circular motion has no limit¹³, and eternal motion belongs to eternal substance. For the lower comets that are situated below the moon revolve likewise, and that of their own force; unless you had rather believe the fiction of their being attached to a star. And assuredly if we argue of the eternity of the heavenly bodies from their circular motion, we must apply the argument to the whole heaven, and not to parts of it; for we know that the air, sea, earth, though eternal in their masses, are perishable in their parts. But it may rather be said, contrariwise, that this argument from the motion of rotation does not tell in favour of the eternity of the heaven; because this motion itself is not perfect in the heaven, and does not restore itself exactly in a pure and perfect circle, but with deviations, curves, and spirals. If again a man retort upon me that which I said concerning the earth (namely, that the changes which take place in it happen by accident, because the earth is acted on by the heaven), and assert that the case of the heaven is different, seeing that the heaven cannot in any way be acted upon in its turn by the earth, inasmuch as all emanation from the earth stops on this side of the heaven, and therefore it is probable that the heaven, being set apart beyond the reach of any hostile force, is susceptible of eternity, not being disturbed or shaken by an opposite nature; his objection is not to be despised. For I have no respect for the simple notion of Thales, who thought that the celestial fires fed on the clarified vapours of the earth and ocean, and were thence nourished and repaired¹⁴; (whereas these vapours fall back again in almost the same quantity as they rose, and are far from being enough to refresh both the earth and the celestial globes, nor can they at all mount so high); but yet admitting that these materiate emanations of the earth stop far below the heaven, nevertheless if the earth be, as Parmenides and Telesius supposed, the original source of cold, it is not easy to say for certain to what height this opposite and rival power to the heaven may insinuate itself by series and succession; especially as rare bodies

in China in 1578, and which is thus mentioned in Biot's extracts from the annals of the Ming dynasty. "1578. 22 Fevrier (période Wanli 6^{me} année 1^{me} lune jour Woutchin) il parut une étoile grande comme le soleil."

Humboldt observes that it is extraordinary that no mention was made in the 16th century by European astronomers of this phenomenon. It seems that Bacon has mistaken Patricius's expression "totum eum annum"; which appears to mean, not that the phenomenon lasted a year, but that it was visible to the end of the year in which it appeared. See *Connaissances des Temps* for 1846.

¹² Arist. *Meteorol.* i. 6.

¹³ Arist. *De Cælo*, i. 9.

¹⁴ Plutarch, *De Placit. Philosoph.* i. 3.

imbibe the nature and impression of heat and cold, and transmit it to a great distance. Grant however that the heaven is not acted upon by the earth, why may not celestial bodies be affected and changed one by another,—the sun by the stars, the stars by the sun, the planets by both, and all by the ambient ether, especially at the borders of their globes? Then again the opinion of the eternity of the heaven derives much apparent strength from the very machinery and construction of the heaven, about which astronomers have taken such pains. For great provision seems to be made thereby to exempt the celestial bodies from all change besides simple rotation, and leave them in other respects at rest and without perturbation. Therefore they have supposed the bodies of the stars to be fixed in their orbs, as if they were nailed; while to each of their declinations, elevations, depressions, and sinuous movements they have assigned so many perfect circles of suitable width; carefully turning and smoothing both the concave and the convex parts of those circles, so as to leave no prominence or roughness, but that one may fit into another, and, being by reason of the polish at once exactly contiguous and free to slide easily, may move quietly and happily; which immortal contrivance removes all violence and perturbation, the inseparable forerunners of corruption. For certainly if such great bodies as the globes of stars are, do pass through ether, and yet do not always travel through the same parts of it, but through parts and tracts very different, sometimes invading the higher regions, sometimes descending to the lower, sometimes turning to the south, sometimes to the north, there is danger no doubt of very many impressions, concussions, reciprocations, and fluctuations in the heaven, and that hence may ensue condensations and rarefactions of bodies, which may procure and prepare the way to generations and alterations. But since it will clearly appear from physical reasons, and withal from the phenomena themselves, that this last is really the fact; and those figments of astronomers of which I spoke are, as any man of sound judgment will see, mere mockeries of nature, without any reality in them; it is but reasonable that the opinion of the eternity of the heaven, connected as it is with them, should undergo the same judgment. And if objection be here made on religious grounds, I answer that it is only heathen arrogance that attributes this eternity to the heaven alone; sacred writ assigns eternity to earth and heaven alike¹⁵. For we read not only that "the Sun and Moon are eternal and faithful witnesses in the heaven", but also that "Generations come and go, but the Earth remaineth for ever"¹⁶. And for the transitory and perishable nature of both, we find it concluded in one oracle, "Heaven and earth shall pass away, but the Word of the Lord shall not pass away"¹⁷. Again, if it be still urged that for all this it must be admitted that there are innumerable changes in the surface of the earth and the parts next to it, whereas it is not so in the heaven; I reply that in the first place I do not maintain them to be in all respects alike; and yet that if we take what are called the upper and middle regions of the air for the surface or inner covering of the heaven, as we take that space with us in which animals, plants, and minerals are contained, for the surface or outer covering of the earth, various and multiform generations are found there likewise. It would seem therefore that all tumult, conflict, and disorder take place only in the confines of heaven and earth; just as it is in civil matters, in which it is commonly found that the border land of two kingdoms is troubled by continual inroads and violence, while the interior provinces of both countries are in the enjoyment of long peace, and are not disturbed except by

¹⁵ Lansberg makes a curious remark as to the difficulties which may arise from a literal interpretation of Scripture. "You may so interpret it," he says, "as to make it interfere not only with astronomy but with geometry; as when it is said that one of the ewers in the temple was ten cubits across and thirty cubits round". Campanella, in his *Apologia pro Galilæo*, tells a story of one Ulysses Albergettus, who wishing to show that the moon shines by her own light, quoted the text "*Luna non dabit lumen suum*"—"faciens vim in ly suum".—*Ly*, it may be well to remark, is used by the schoolmen as $\rho\delta$ in Greek; probably because transcribers were often ignorant of Greek, and copying by eye changed the form of what they did not understand.

¹⁶ Ecclesiastes, i. 4.

¹⁷ St. Matth. xxiv. 35.

the more serious wars, which happen rarely. As for that other point of heterogeneity in the celestial bodies (as asserted by Aristotle¹⁸;) that they are not hot in themselves (for otherwise the conflagration of Heraclitus might ensue), but only the cause of heat by accident, through the friction and diverberation of the air; I know not what a man can mean who abandons experience in this way, and that too against the consent of the ancients. But it is nothing new in him to snatch some one thing from experience, and straightway proceed to trample on nature, joining pusillanimity with audacity. Of this however I shall speak presently upon the question, *whether the stars are real fires*; and more fully and accurately in my precepts concerning the history of Virtues, where I shall treat of the origins and cradles of Heat and Cold, a subject hitherto unknown and untouched by men. Let the question then of the heterogeneity of the celestial bodies be propounded in this manner; for though the case calls perhaps for judgment against the opinion of Aristotle without adjournment, yet my plan of proceeding does not allow of it.

Another question is, *what is contained in the interstellar spaces?* For they are either empty, as Gilbert thought; or filled with a body which is to the stars what air is to flame,—a supposition which comes familiarly to the sense; or filled with a body homogeneous with the stars themselves, lucid and almost empyreal, but in a less degree, that is with a light not so refulgent and flashing,—which seems to be the meaning of the received opinion¹⁹ that a star is the denser part of its sphere. Nor is there any reason why a lucid body should not be a transparent medium for the transmission of a stronger light. For Telesius has acutely remarked that even common air contains some light, using as an argument that there are some animals which see by night, their sight being (it would seem) adapted to receive and cherish this feeble light²⁰: for that it is not credible that the action of light can take place without any light, or merely by the internal light itself of the visual spirit. But we see that flame itself is a transparent medium for the transmission even of the species of an opaque body, as is shown in the wick of a candle; much more of the species of an intenser light. Of flames likewise some are more pellucid than others. And this is caused either by the nature of the lighted body or the quantity. For the flame of tallow or wax is more luminous and (so to speak) more fiery; whereas the flame of spirit of wine is more opaque, and as it were airy, especially if it be in a small quantity, so that the flame does not thicken itself. Of this I have myself made trial. For I took a wax candle and set it upright in a socket (making use of a metal one for the purpose, that the body of the candle might be protected against the flame by which it was to be surrounded); and having placed the socket in a porringer where there was a little spirit of wine, I lighted first the candle, and then the spirit of wine; when it was easy to see the flame of the candle coruscating and white, through the middle of the flame of the spirit of wine, which was weak and inclining to transparency. And in like manner lucid beams are often seen along the heaven, emitting a manifest light, and wonderfully illuminating the darkness of the night; through the borders of which nevertheless the stars are visible. This inequality however between the stars and interstellar ether is not well defined by rarity and density; as if the star were denser, the ether rarer. For in general here with us flame is a body more subtle than air,—more expansive, I say, and having less matter in proportion to the space it occupies; and it is probable that this is the case also in the heavens. But the error is more harsh, if they mean that the star is a portion of the sphere fixed as with a nail, and the ether that which carries the star²¹. For

¹⁸ Aristot. *De Cælo*, ii. ¹⁹ Aristot. *De Cælo*, ii. 7. ²⁰ Telesius, *De Rer. Nat.* i. 3.

²¹ The phrase fixed stars, *Sidera infixæ cœlo*, was originally connected with the notion of the stars being fastened to the vault of heaven. The substitution, as Humboldt has remarked, of *fixa* for *infixa* or *affixa*, indicates the transition to our notion of fixed stars, which relates only to their relative immobility. See *Cosmos*, vol. iii., chapter on Fixed Stars. There is a curious passage in Acosta's *History of the Indies* on this subject. He conceives that both the Milky Way and what are commonly called the Coal Bags belong to the substance of the heaven itself, and prove by their motion that the heavens turn as well as the stars [i. 2].

this is a fiction, like that series of orbs ranged one above another which is described. For either the body of star passes through the body of the ether in its course, or else the ether itself revolves at the same time with an equal motion. For if the motion be not equal, in that case also must the star pass through the ether. And as for that structure of contiguous circles, whereby the concave part of the outer admits the convex of the inner, and yet by reason of the smoothness of both the one does not obstruct the other in its rotations, though they are unequal,—it is not a reality; the body of ether being uninterrupted and continuous, as that of the air is; although, there being so great difference between the two as regards rarity and other things, their regions are for convenience of explanation very properly distinguished. Let this question therefore be admitted, as I have thus explained it. Next comes another question, and that likewise not a simple one; concerning the substance of the stars themselves. For it is asked first, *whether there be other globes or masses of solid and compact matter besides the earth itself?* For it is a speculation soberly proposed in a book concerning the face in the moon's orb, that it is not probable that in the dispersion of matter nature included all compact body in the globe of the earth alone, when there is so great an array of globes composed of rare and expansive matter²². But Gilbert carried the same idea so immoderately far (wherein however he had some of the ancients as precursors, or rather guides), as to assert that not only the earth and moon, but likewise many other globes, solid and opaque, are scattered among the shining globes throughout the expanse of heaven²³. Neither did his opinion stop here, but he thought likewise that those globes which are shining in appearance, namely, the sun and the brightest stars, consisted of a kind of solid matter, though more splendid and equal; confusing primitive light with luminous matter, which is regarded as its image (for he thought that even our sea throws out light of its own for a proportionate distance); but he acknowledged no conglobation, except in solid matter; of which matter he held those rare and fine bodies that surround it to be a kind of effluvia, and as it were defections; and beyond them a vacuum. Now that the moon is composed of solid matter is a thought which might occur to the most diligent and sober investigator of nature. For it reflects light, it does not transmit light, it is without any proper light of its own, and it is full of inequality; which are all properties of solid bodies. For we see that the ether itself and the air, which are rare bodies, receive the sun's light but do not reflect it; which the moon does. The sun's rays are so vigorous that they can penetrate and pass through very thick clouds, which are of a watery matter; but they cannot pass through the moon. The moon itself in some eclipses gives some degree of light, though obscure; but in new moons and the quarters no light at all is visible except in the part which is touched by the sun's rays. Moreover, though it be true that impure and feculent flames (of which kind of substance Empedocles²⁴ thought the moon consisted) are unequal, yet the inequalities have no fixed places, but are commonly movable; whereas the spots in the moon are supposed to be constant. Besides, it is now ascertained by telescopes that these spots also have their own inequalities, so that the moon is found to be clearly of manifold configuration, and that selenography or map of the moon, which Gilbert conceived²⁵, seems now by the industry of Galileo and others to be nearly attained. But if it may be that the moon is made of a certain solid matter, as being kindred to the earth, or the dregs of heaven (and such things are talked of), we must next inquire whether it be the only one of this kind. For Mercury too is sometimes

²² Plutarch, *De Facie in Orbe Lunæ*, p. 924.

²³ Gilbert, *Physiol. Nov.* ii. 10. Thales is said to have been the first person who asserted that the moon is illuminated by the sun. Ocellus, and perhaps Heraclides, said that she consists of earth surrounded by a mist. Diogenes Apolloniates, probably following Anaxagoras, affirmed that along with the visible stars revolve in the heavens ἀφανείς λίθοι, which occasionally fall to the earth. Stobæus, *Eclog. Phys.* i. 25.

²⁴ Stobæus, *Eclog. Phys.* i. 27. Heeren remarks that Stobæus is the only author by whom this opinion is mentioned.

²⁵ See his *Physiologia Nova*, ii. 14, and the map of the moon by which it is illustrated.

found in conjunction with the sun, like a spot or little eclipse. But those dusky spots which are observed in the antarctic hemisphere, and which are fixed, like the milky way, suggest a greater doubt concerning the existence of opaque globes in the higher parts of the heaven²⁶. For that they are caused by the heaven in those places being rare and as it were perforated, is not probable; because such a diminution and as it were privation of a visible object could not affect our sight at so great a distance; since the rest of the body of ether is itself invisible, and can only be distinguished by comparison with the bodies of stars. It would perhaps be more probable to attribute these blacknesses to defect of light, because the stars are fewer in that part of the heaven, as on the other hand in the neighbourhood of the milky way they are more crowded; so that the one place would seem to be continuously luminous, the other interspersed with shadows. For the celestial fires appear to be more joined together in the antarctic hemisphere than in ours; there being larger stars there, but not so many, and greater spaces between. But the report itself concerning those spots is not much to be relied on; at least there has not been enough diligence used in the observation to justify us as yet in drawing any consequences therefrom. A fact which touches the present inquiry nearer is, that there may possibly be other opaque bodies scattered through the ether, which are not seen at all. For the moon herself when new, though the horn and thin rim of the outer circle, as far as the sun's rays touch, strike the sight, is not visible at all in the middle of the disc: that part is not distinguishable in appearance from the rest of the ether; and those wandering stars discovered (if the report may be trusted) about Jupiter by Galileo are lost to our sight in that sea of ether, like so many small and invisible islands; and in like manner also those stars whereof the collection makes the Milky Way, if they were placed each apart, and not assembled in a crowd, would escape our sight altogether; as likewise many others, that in clear nights, especially in winter, sparkle; besides, those nebulous stars or openings in *Præsepe*²⁷ are now resolved by telescopes into a number of distinct stars; nay, and it seems that in the very purest fountain of light (I mean the sun), there is some reason, on the evidence of these same telescopes, to suspect the existence of spots, opacity, and inequalities. But if there were no other evidence, the very gradation of light among the celestial stars, descending as it does from the most brilliant to those which are obscure and misty, is enough to prove that there may likewise be globes which are completely opaque. For there seems less difference between a nebulous and opaque star than between the brightest star and a nebulous one. But our sight is plainly deceived and circumscribed; for whatever is dispersed in the heaven, and has not great magnitude and likewise a strong and vivid light, is concealed from us, and does not alter the face of the heaven. And let not any unskilful person be astonished if it be made a question whether globes of compact matter can remain pendulous. For both the earth itself floats pendulous in the middle of the surrounding air, which is an exceedingly soft thing; and great

²⁶ See for this Patricius, fol. 90, and Acosta's *History of the Indies*, bk. i. ch. 2.

²⁷ The nebula *Præsepe* in Cancer, and the one in the head of Orion, were the two first nebulae ever resolved into distinct stars. Galileo gave figures of them as they appeared through his telescope in the *Sydericus Nuncius*. What Bacon goes on to say of spots in the sun is particularly interesting. Galileo did not publish on the subject before 1613; so that Bacon's information was probably not derived from Galileo, though it is believed that Galileo's first observations were made in November 1610. The earliest account which is known to have been printed of these spots is that of Fabricius, whose father's interesting correspondence with Kepler has recently been published. His tract *De Maculis in Sole observatis* was published at Wittenberg, 1611. It seems difficult to decide the question of priority of observation between him and Galileo. Harriot observed the spots in December 1610, but did not apparently know what to make of the appearance, and does not designate the phenomena by the specific name of spots until December 1611, before which time their existence had been fully ascertained by others. He drew a picture however of what he had seen on the first occasion, of which a facsimile has been published by Professor Rigaud, to whom I am indebted for most of the substance of this note. See his Supplement to Bradley's Works, pp. 32, 35, 37.

masses of watery clouds and stores of hail hang in the regions of the air, whence they are rather forced down than fall of themselves, before they begin to feel the neighbourhood of the earth. Excellently therefore did Gilbert remark, that heavy bodies when removed to a great distance from the earth gradually lose their motion downwards; inasmuch as that motion rises from no other appetite of bodies than that of uniting and collecting themselves to the earth (which is the mass of bodies of the same nature with them), and is confined within the orb of its own virtue²⁸. For as for what is said of motion to the earth's centre, it would indeed be a potent kind of Nothing that should draw such great things to it; nor is body acted on except by body. Therefore let this question concerning solid and opaque globes, though new and harsh to vulgar opinions, be admitted; and let there be joined with it the old though still unsettled question, *which of the stars emit a primitive light, and from themselves, and which a light derived from the sun?* whereof the one seems to be consubstantial with the sun, the other with the moon. And in short, all inquiry concerning the different substance of the stars as compared one with the other, which appears to be multifarious, some stars looking fiery, others lead-coloured, others white, others brilliant, others manifestly and constantly nebulous, I mean to be referred to this seventh question. Another question is, *are the stars true fires?* a question however which requires some care to understand it rightly. For it is one thing to say, that *the stars are true fires*; and another thing to say that *the stars (admitting them to be true fires) exert all the powers and produce the same effects which common fire does*. Nor does this require us to suppose some notional or imaginary fire, retaining the name of fire without its properties. For our fire also, if it were placed in the ether in such a quantity as the stars are, would perform different operations to those which it does here with us; seeing things acquire very different virtues, both from quantity and from relative position or location. For the greater masses I mean, connatural bodies which are collected in such quantity as to bear a due proportion to the sum of the universe, assume cosmical virtues, which are not to be found in the portions of them. Thus the ocean, which is the largest collection of waters, ebbs and flows; whereas pools and lakes do not. In like manner the whole earth hangs suspended; a piece of earth falls. And the relative position of a thing is of great importance in all respects both in the larger and smaller parts, by reason of the contiguity and neighbourhood of friendly or unfriendly bodies. But there must also be a far greater diversity of actions between the fire of the stars and our own, because it varies not only in quantity and relative position, but also to some extent in substance. For the fire of the stars is pure, perfect, and native; whereas our fire is degenerate, like Vulcan thrown from heaven and halting with the fall. For if a man observe it, fire as we have it here is out of its place, trembling, surrounded by contraries, needy, depending for sustenance upon fuel, and fugitive. Whereas in heaven fire exists in its true place, removed from the assault of any contrary body, constant, sustained by itself and things like itself, and performing its proper operations freely and without molestation. And therefore Patricius had no need, in order to preserve the pyramidal form of flame, as it is found with us, to fancy that the upper part of a star, which is turned towards the ether, may be pyramidal, though the lower, which is visible to us, be globular²⁹. For that pyramid of flame comes by accident, from the air closing in and crushing it; since the flame, which is fuller in the region of its aliment, is by the hostility of the air insensibly contracted and moulded into the form of a pyramid. Hence flame is broad at the base and pointed at the apex, smoke on the other hand is pointed at the bottom and broad at the apex, and like a pyramid inverted; because the air receives smoke, but quenches flame. It is natural therefore that flame should with us be pyramidal, and in the heaven globular. In like manner also flame with us is a momentary body, in ether permanent and durable. And yet even with us flame might last and subsist in its own form, if it were not destroyed by the things about it; which is most manifest in the larger flames. For all that part of a flame which is situated in the midst and surrounded by flame on all sides, perishes not, but remains the

²⁸ Gilbert, *Physiol. Nova*, i. 21.

²⁹ Patricius, *Pancosmia*, xv.

same in quantity, unextinguished, and rising rapidly upwards; whereas at the sides it is troubled, and it is there that extinction commences. The manner whereof (I mean the permanency of the inner flame in a globular figure, and the vanishing and pyramidal form of the outer flame) may be experimentally demonstrated by using flames of two colours. Then again in point of fierceness there may be a great deal of variation between the celestial flame and ours. For the celestial flame unfolds itself freely and calmly, as being at home, whereas our flame, as being a stranger, is pent in and violent and furious. All fire likewise when close-packed and imprisoned becomes fiercer. For the rays of celestial flame themselves when they reach the denser and more obstinate bodies, lay aside their gentleness, and become more scorching. Aristotle ought not therefore to have feared the conflagration of Heraclitus for his world, although he had determined the stars to be real fires. This question then may be received according to this explanation. Next comes another question; *whether the stars are nourished*, and likewise, *whether they are increased, diminished, generated, and extinguished*. There was one of the ancients indeed who with a plebeian kind of observation thought that the stars are nourished as fire is, and that they feed on the waters and ocean and moisture of the earth, and are repaired by vapours and exhalations. But this opinion does not seem worthy to supply matter for a question. For such vapours are both exhausted long before they reach the heights of the stars, nor is there enough of them to repair the waters and the earth with rains and dews, and withal to refresh so many and great celestial globes; especially as it is evident that the earth and ocean have continued now for many ages without decrease of moisture; whereby it seems that no more is drawn out than comes back again. Nor again does the principle of aliment apply to the stars as it does to our fire. For the principle is that wherever anything perishes and departs there likewise something is replaced and assimilated; which kind of assimilation belongs to the region of confusions, and comes of being surrounded by contrary or dissimilar bodies; whereas in the similar and inner mass of the stars nothing of the kind happens, no more than in the bowels of the earth, which themselves also receive no nourishment, but preserve their substance in its identity, not by assimilation. With regard however to the outer borders of the sidereal bodies, the question is rightly asked, *whether these remain of one and the same tenor, or whether they prey on the surrounding ether, and likewise infect it?* In this sense therefore a question may be put concerning the aliments of the stars. And to this is rightly joined a question as to the augmentations and diminutions of stars in their whole; though the phenomena are very few which can give occasion to this doubt. For in the first place there is no example of the thing, nor anything resembling it among the things found with us, to countenance such a question; seeing that our globe of earth and water does not seem to be liable to any evident or notable augmentation or diminution on the whole, but to preserve its mass and quantity. But the stars (it will be said) appear to our eyes sometimes of a greater, sometimes of a smaller body. True; but that greatness and smallness of a star is due either to distance and vicinity, as in the apogees and perigees of planets, or to the constitution of the medium. Now that which is caused by the constitution of the medium is easily distinguished, because it changes the appearance, not of some one particular star, but of all alike; as we see in winter nights, in hard frost, when the stars appear increased in magnitude, because vapours both rise more sparingly and are harder strained, and the whole body of the air is somewhat condensed, and inclines to the aqueous or crystalline, which shows forms more large. And if there chance to be any particular interposition of vapours between our sight and one particular star, which magnifies its apparent size (as is frequently and manifestly the case with the sun and moon, and may happen with the rest), neither can this appearance deceive; because this change of magnitude does not last, nor does it follow the star or move with the body of it, but the star is soon freed from it and recovers its usual appearance. Nevertheless although these things be so, yet since both formerly in ancient times and likewise in our own age—when it was a great sight and much talked of—a great change took place in the star of Venus both as to magnitude and colour and even shape; and since a change which perpetually and constantly follows

one particular star, and is seen to revolve along with it, must necessarily be set down as being in the star and not in the medium; and since through neglect of observation many things that are conspicuous in the heavens are passed by and lost to us; I think that this part of the ninth question is rightly admitted. The other part of the question is of the same kind; *whether stars are in long revolutions of ages created and dissipated?* There is a greater number of phenomena indeed to challenge this question than that about their augmentations and diminutions; but yet only of one kind. For as to the old stars, neither have we in all the memory of ages any record of the first birth of any of them (except the stories which the Arcadians of old told about the moon), nor is one of them missing. Of those however which have been regarded as comets, yet having the form and motion of stars, and being exactly like new stars³⁰, we have witnessed both appearances (of which we have likewise heard from the ancients) and dissappearances; when they looked to some persons as if consumed, to some as if taken up (that is, as if having come down to us in their perigees, they returned again to the higher regions), to others as if rarefying and dissolving into ether. But all this question concerning new stars I refer to that place where I shall speak of comets. There remains another question, namely concerning the Milky Way; *is the Milky Way a collection of small stars, or a continuous body, and part of the ether, of a middle nature between the ethereal and the starry?* For that opinion concerning exhalations has itself long ago exhaled, not without censure of the wit of Aristotle, who ventured to invent such a matter³¹, ascribing to a thing so constant and fixed a nature transitory and variable. And this question moreover, as I put it, seems on the point of being settled, if we believe the report of Galileo, who has resolved this confused appearance of light into stars numbered and placed. For the fact that the milky way does not hide from view those stars which are found within it, certainly does not settle the question, nor incline the balance either way. Only perhaps it proves by way of negation that the milky way is not situated below the starry heaven. For if it were, and if withal that continuous body of the milky way had any depth, our view would probably be intercepted. But if be situated at the same altitude as the stars which are seen through it, why may not stars be scattered in the milky way itself, as well as in the rest of the ether? This question therefore I admit likewise. And these six questions pertain to the substance of the heavenly bodies; namely, what is the substance of the heaven in kind, what that of the interstellar ether, what that of the milky way, and what that of the stars themselves, compared either with one another, or with our fire, or with their own body. As to the number, magnitude, configuration, and distance of the stars, besides the phenomena themselves and historical questions, of which I shall speak afterwards, the philosophical problems are mostly simple. With regard to the number there follows this other question; *is the number of the stars that which appears, and which has been observed and set down by the diligence of Hipparchus, and included in his model of the celestial globe?* For not only is that a poor reason that is given for the countless multitude of hidden stars not distinctly visible, which is usually seen in clear nights, especially during the winter; namely that these appearances are not smaller stars, but only

³⁰ This mode of speaking of the new stars confirms Professor Rigaud's explanation of a curious phrase in one of Sir William Lower's letters to Harriot. "His elliptical Iter planetarum, methinkes, shewes a way to the solving of the unknown walks of comets" (he is speaking of Kepler); "for as his ellipsis in the earth's motion is more a circle, and in Mars is more longe, and in some of the other planets may be longer againe, so in thos commets that appeare fixed the ellipsis may be neere a right line". The Professor remarks that he may possibly allude to phenomena like the new star of 1572. It is this letter of Sir William Lower's, the first part of which Baron Zach ascribed to the Earl of Northumberland, an error which is repeated by Apelt in his *Reformation of Astronomy*. See Rigaud's Supplement to Bradley's Works, pp. 43, 49.

The idea that the new star of 1572 moved alternately towards and from the earth in a right line, was proposed by John Dee. See Narrien's *Hist. of Astronomy*, p. 384.

³¹ Aristot. *Meteor.* i. 8.

radiations and flashings and as it were darts cast from the known stars; but the census now made by Galileo of the celestial population contains additional heads, not only in that cluster denominated the Milky Way, but likewise among the very stations and ranks of the planets. And stars become invisible, either by reason of smallness of body or by reason of opacity (for I do not much approve of the term "tenuity," seeing that pure flame is a body of extreme tenuity), or by reason of elongation and distance. As for the question respecting the increase of the number of the stars by the generation of new ones, I refer it as before to the place where I shall speak of comets. Now with regard to the magnitude of the stars, the apparent magnitude belongs to phenomena, but the true magnitude to philosophical inquiry, within the limits of that twelfth problem; *what is the true magnitude of each star, either measured, or at least compared?* for it is easier to discover and prove that the globe of the moon is smaller than the globe of the earth, than that the globe of the moon is so many miles in circumference. We must therefore find exact magnitudes, if we can; and if they cannot be had we must make use of comparative. Now true magnitudes are taken and concluded either by eclipses and shadows; or by extensions as well of light as of other virtues which each body shoots out and diffuses to a greater or less distance in proportion to its magnitude; or lastly by the symmetry of the universe, which by a kind of necessity governs and defines the portions of connatural bodies. We are not however to be bound by the statements of astronomers regarding the true magnitudes of stars; statements made (though it may seem a matter of great accuracy and subtlety) loosely and carelessly enough; but we must seek proofs (if there be any) more trustworthy and genuine. Now the magnitude and the distance of the stars mutually indicate each other from optical calculations; which themselves however require sifting. This question then concerning the true magnitude of the stars is the twelfth in number. Next comes another concerning their figure; *whether the stars are globes;* that is collections of matter in a solid round figure? To appearance there seem to be three figures of heavenly bodies; globular and beamy like the sun, globular and angular like the stars (the beams and angles referring only to sight, the globular form only to substance); globular simply, like the moon. For there is no star to be seen which is oblong or triangular or square, or of any other figure. And it seems natural that the greater masses of things should for their preservation and more perfect union collect into globes. The fourteenth question relates to distance; *what is the true distance of any star in the depth of heaven?* For the distances of the planets both from one another and from the fixed stars, laterally, or in the superficial compass of the heaven, are governed by their motions. But as I said before concerning the magnitude of the stars, that if an exact and measured magnitude is not to be had, we must take a comparative magnitude; so I say with respect to their distances; namely that if the distance (say from the earth to Saturn or Jupiter) cannot be exactly taken, yet let us make it certain that Saturn is higher than Jupiter. For neither is the interior system of the heaven, I mean the order of the planets in point of attitude, entirely without controversy; nor were the doctrines now prevalent believed in former times. And even now the question whether Mercury or Venus be the higher, is still pending. Now distances are discovered either from parallaxes, or eclipses, or calculations of motions, or differences in apparent magnitude. And other aids are to be provided for the determination of this, which may be devised by human industry. The thicknesses or depths of the spheres also have relation to distances.

THEORY OF THE EARTH.

[TRANSLATION OF THE *THEMA COELI*.]

SEEING then that there are such difficulties on all sides, we must be content if something be asserted that is not harsh. I will myself therefore construct a Theory of the Universe, according to the measure of the history as yet known to us; keeping my judgment however in all points free, for the time when history, and by means of history my inductive philosophy, shall have been further advanced. Wherein I will first propound some things respecting the matter of the heavenly bodies, whereby their motion and construction may be better understood; and then I will bring forward my thoughts and views concerning the motion itself, which is now the principal question. It seems then that nature has in the distribution of matter separated fine bodies from gross; and assigned the globe of the earth to the gross, and the whole space from the surface of the earth and waters to the very extremities of the heaven, to the fine or pneumatic, as the two primary classes of things, in proportions not equal indeed, but suitable. And this is the natural and proper collocation of things, nor is it confounded either by water hanging in the clouds or wind pent within the earth. Now this distinction of fine or pneumatic and gross or tangible, is quite primordial, and the one which is most employed in the system of the universe. And it is derived from that condition of things which is of all the simplest, namely the quantity and paucity of matter in proportion to bulk. The pneumatic bodies which are found here with us (I speak of such as exist simple and perfect, not compound and imperfectly mixed), are those two, Air and Flame. And these are to be regarded as bodies altogether heterogeneous; not as is commonly imagined, that flame is only air on fire. To these correspond, in the upper world, the ethereal and the starry nature; as in the lower, water and oil; and lower still, mercury and sulphur; and generally, crude bodies and fat bodies, or in other words, bodies which abhor and bodies which conceive flame (salts being of a compound nature, consisting at once of crude and inflammable parts¹). Now for these two great families of things, the Airy and the Flamy, we have to inquire upon what conditions they have taken possession of by far the greater part of the universe, and what office they have in the system. In the air next the earth, flame only lives for a moment and at once perishes. But when the air begins to be cleared of the exhalations of the earth and well rarefied, the nature of flame makes divers trials and experiments to attain consistency therein, and sometimes acquires a certain duration, not by succession as with us, but in identity; as happens for a time in some of the lower comets, which are of a kind of middle nature between successive and consistent flame; it does not however become fixed or constant till we come to the body of the Moon. There flame ceases to be extinguishable, and in some way or other supports itself; but yet such flame is weak and without vigour, having little radiation, and being neither vivid in its own nature, nor much excited by the contrary nature. Neither is it pure and entire, but spotted and crossed by the substance of ether (such as it exists there), which mixes with it. Even in the region of Mercury flame is not very happily placed, seeing that by uniting together it makes but a little planet; and that with a great perturbation, variety, and

¹ Salt is mentioned here, because Mercury, Sulphur, and Salt are according to Paracelsus the three constituent principles of all substances. Bacon however, as we see in the *Historia Sulphuris, Mercurii et Salis*, of which only the aditus or preface has been preserved, refuses to recognise salt as a co-ordinate principle with the other two.

fluctuation of motions, like *ignis fatuus*, labouring and struggling, and not bearing to be separated from the protection of the sun except for a little distance. When we come to the region of Venus, the flamy nature begins to grow stronger and brighter, and to collect itself into a globe of considerable size; yet one which itself also waits on the sun and cannot bear to be far away from him. In the region of the Sun, flame is as it were on its throne, midway between the flames of the planets, stronger, likewise and more vibrating than the flames of the fixed stars, by reason of the greater reaction, and exceeding intensity of union. In the region of Mars flame appears even robust; acknowledging the vicinity of the sun by its redness, but now independent, and bearing to be separated from the sun by the whole diameter of the heavens. In the region of Jupiter, flame, gradually ceasing to be contentious, seems calmer and whiter, not so much from its own nature (as the star Venus is, being more fiery), but from the surrounding nature being less irritated and exasperated; in which region it is probable, according to the discovery of Galileo, that the heaven begins to be set with stars, though stars invisible from their smallness². But in the region of Saturn, the flamy nature appears again to grow somewhat feeble and dull, as being both further removed from the support of the sun, and exhausted by the proximity of the starry heaven. Last of all, the flamy and sidereal nature, victorious over the ethereal, produces the starry heaven, which is compounded of the ethereal and sidereal nature (as the globe of the earth is compounded of land and water variously diffused, yet with the ethereal substance so converted, wrought, and assimilated, as to be completely patient and obedient to the sidereal. Thus we have between the earth and the summits of heaven three general regions, and as it were three stages, in respect of the flamy nature; the region of the extinction of flame, the region of its union, and the region of its dispersion. Now to argue of contiguity and continuity in the case of soft bodies and fluids would be vulgar. But it must be understood, that it is the way of nature to proceed a certain distance by gradations, and then suddenly by jumps; and to alternate this process; otherwise there could be no structural fabric, if all changes proceeded by insensible gradations. For how great a leap it is (in respect of expansion of matter) from earth and water to air, even the grossest and most nebulous! And yet these bodies so different in nature are in place and surface joined together, without any medium or interval. Nor is it a less leap (in respect of substantial nature) from the region of the air to the region of the moon: an immense leap again from the heaven of the moon to the starry heaven. Therefore if continuity and contiguity be understood with reference not to the manner of connexion, but to the diversity of the bodies connected, these three regions which I have mentioned may be regarded as being in their boundaries only contiguous. But now we must examine clearly and perspicuously what and what kind of points this theory of mine on the substances of the system affirms, and what and what kind it denies; that it may the more easily be either maintained or overthrown. It denies the common theory, that *flame is air on fire*; affirming that these two bodies, air and flame, are completely heterogeneous, like water and oil, sulphur and mercury. It denies Gilbert's doctrine of a *collective vacuum between the scattered globes*; affirming that space is filled with either an airy or a flamy nature. It denies that *the moon is either a watery or a dense or a solid body*; affirming that it is of a flamy nature, though slow and weak, as being the first rudiment and last sediment of celestial flame; flame admitting (as regards density), no less than air and liquids, of innumerable degrees. It affirms that *flame, in its true place and left to itself, is fixed and constant*, no less than air and water; and that it is not a thing momentary, and preserved in its mass only by succession through renovation and aliment, as it is here with us. It affirms that *flame has a nature apt to unite and gather into globes*, like the nature of earth; not like that of air and water, which are collected in the circles and interstices of globes, but never into entire globes. It affirms that *the same flamy nature in its own place (that is, the starry heaven) is scattered about in infinite clusters*, yet in such sort that the dualism of

² This reference to Jupiter's satellites shows that the *Thema Cæli* was written after the publication of the *Sydericus Nuncius*.

ether and star is still maintained, and flame does not continue into the perfect empyrean. It affirms that *the stars are real flames*, but that the actions of flame in heavenly bodies are in no way to be applied to the actions of our flame, most of which operate only by accident. It affirms that *the interstellar ether and the stars bear to each other the relations of air and flame, but sublimed and rectified*. Regarding the Substance then of the System of the Universe, such are the thoughts which occur to me. I must now speak of the Motions of the Heavenly Bodies with reference to which I have brought these things forward. It seems reasonable to suppose that rest is not excluded from nature, as regards any whole (for I am not now talking of particles). This (discarding logical and mathematical subtleties) appears most clearly from the fact, that the speed and velocities of the celestial motions relax themselves gradually, as if about to end in something immovable; and that even the celestial bodies have a share of rest in respect of the poles; and that if immobility be excluded, the system is dissolved and dispersed. Now if there be any collection and mass of the immovable nature, we need not look further to show that this mass is the globe of the earth. For close and strict compaction of matter induces a disposition towards motion torpid and averse; as on the other hand free explication of it induces a disposition prompt and apt. Nor was it ill done by Telesius (who revived the philosophy and discussions of Parmenides in his book on the original source of cold) to introduce into nature, not indeed coessentiality and conjugation (which he would have), but yet affinity and conspiracy; making heat, light, tenuity, and mobility to be allied on one part; cold, darkness, density, and immobility on the opposite; and placing the seat of the first set in the heaven, of the second in the earth. But if *rest and immobility* be admitted, it seems that *motion without limit and perfect mobility* should likewise be admitted, especially in opposite natures. Now this motion is the motion of rotation, such as is generally found in the celestial bodies. For motion in a circle has no limit, and seems to proceed from an appetite of the body which moves merely for the sake of moving and following itself and seeking its own embraces, and exciting and enjoying its own nature, and performing its own operation; whereas contrariwise motion in a straight line seems like a journey to an end, as seeking both to reach the limit where it may cease and rest, and to attain some object and then discontinue its motion. We must see therefore how this motion of rotation, which is the true and perennial motion, and commonly considered peculiar to the heavenly bodies, acquits itself, and by what control it spurs and bridles itself, and generally how it is affected; in the explanation of which things I shall not stand upon that piece of mathematical elegance, the reduction of motions to perfect circles, either eccentric or concentric, or that high speech, that the earth in comparison to heaven is a point and not a quantity, or many other fictitious inventions of astronomers; but remit them to calculations and tables. But first I will make a division of the motions of the heavenly bodies. *Some are cosmical, others mutual*. Those I call *cosmical*, which celestial bodies assume by consent, not only of the heavens, but likewise of the universe; those *mutual*, in which one celestial body depends on another. And this is a true and necessary division. The earth then being stationary (for that I now think the truer opinion³), it is manifest that the heaven revolves in a diurnal motion, the measure whereof is the space of twenty-four hours or thereabouts, the direction from east to west, the axis of revolution certain points (which they call poles) north and south. For the heavens do not travel on movable poles, nor are there any other points than those I have mentioned. And this motion appears to be truly cosmical, and therefore one and the same; except in so far as it admits both diminutions and deviations; according to which diminutions and deviations this motion strikes through the whole universe of things movable, and penetrates from the starry

³ Bacon, in his later writings, rejected more decidedly than in this passage the doctrine of the earth's motion. Thus in the *Nov. Org.* ii. 46, it is said that Galileo's theory of the tides is founded on a "concessum non concessibile," namely, that the earth moves; and in the third book of the *De Augmentis*, Bacon, in speaking of the cumbrous machinery of the Ptolemaic system, remarks, "harum suppositionum absurditas in motum terræ diurnum (quod nobis constat falsissimum esse) homines impigit".

heaven to the bowels and depths of the earth ; not forcing them along with violence or vexation, but by a perpetual consent. And this motion is in the starry heaven perfect and entire, as well in just measure of time, as in exact restitution of place. But the lower down we come, the more imperfect is this motion, in respect of slowness, and in respect likewise of deviation from circular motion. And first I must speak of the slowness separately. I say then that the diurnal motion of Saturn is too slow to allow of its completing the circle or coming back to the same place within twenty-four hours ; but that the starry heaven moves faster, and outstrips Saturn each day by a distance which multiplied by the number of days in thirty years makes up the whole circuit of the heaven. So also with regard to the other planets, according to the diversity of their several periods ; so that the diurnal motion of the starry heaven (speaking of the period only, without reference to the magnitude of the circle) is about one hour quicker than the diurnal motion of the moon. For if the moon completed its course in twenty-four days, it would be quicker by an hour exactly. Therefore that motion of opposition and resistance from west to east which they talk of, and which is attributed to the planets as peculiar to them, is not a real motion, but only in appearance, owing to the starry heaven advancing faster to the west, and so leaving the planets behind towards the east. Upon which supposition, it is manifest that the velocity of this cosmical motion decreases in regular order as it descends, so that the nearer every planet approaches the earth the slower it moves ; whereas the received opinion disturbs and inverts the order ; and by attributing a peculiar motion to the planets falls into the absurdity of supposing that the nearer the planets approach the earth (which is the seat of immobility) the quicker they move ; a thing which astronomers idly and unsuccessfully endeavour to account for by supposing a remission of the violence of the *primum mobile*. And if it seem strange that in so great a space as lies between the starry heaven and the moon this motion diminishes so little ; namely less than one hour, which is a twenty-fourth part of the diurnal motion ; it is to be remembered that the nearer a planet is to the earth the smaller is the circle of its revolution ; so that if we add the decrease in the magnitude of the circle to the decrease in the time of revolution, we shall see that the motion is diminished very considerably. Thus far I have spoken of velocity separately ; as if the planets (placed, for instance, under the equinoctial, or any of the parallels) were only outrun by the starry heaven and by one another, but yet in the same circle. For this would be simple leaving behind without obliquity of motion. But it is manifest that the planets not only move with unequal velocity, but do not return to the same point of the circle, deflecting to the north and south ; the limits of which deflexion are the tropics ; and to this deflexion it is that we owe the Oblique Circle and the Difference of Polarity ; just as we owe to the inequality of velocity the motion of resistance. But the nature of things does not stand in need of this device, more than of the other ; seeing that by adopting spiral lines (the supposition which comes nearest to the sense and the fact) the thing is accomplished, and those phenomena are saved. And (which is the chief point) these spirals are nothing else than defections from perfect circular motion, whereof the planets are impatient. For in proportion as substances degenerate in purity and freedom of development, so do their motions degenerate. Now it happens, that as in point of velocity the higher planets move faster, and the lower less fast ; so also the higher planets make spirals more closely coincident and coming nearer to circles the lower make spirals more disjointed and further apart. For continually as they descend they recede more and more both from that height of velocity and that perfection of circular motion, in regular order. Yet in this the planets agree (as being bodies that retain much of a common nature, though otherwise differing) that they have the same limits of deflexion ⁴. For neither does Saturn come back within the tropics, nor the moon go forth beyond the tropics (and yet with regard to the wandering of Venus there are certain traditions and observations not to be overlooked) ; but all the planets, whether the higher or lower, as

⁴ It appears from this that Bacon was not aware of the obliquity to the ecliptic of all the planetary orbits.

soon as they reach the tropics, turn back and retrace their course, disliking the smaller spiral in which they would have to move if they approached nearer the poles; and shrinking from that loss of motion, as from the destruction of their nature. For however in the starry heaven both the stars near the poles and the stars about the equinoctial maintain their ranks and stations, one being kept in order by another, with a perfect and equable constancy; yet the planets seem to be of such a mixed nature as not willingly to endure either a shorter circle or a larger. These views then concerning the celestial motions appear to me a little better than the carrying by force, the repugnance of motions, the different polarity of the zodiac, the inverted order of velocity, and the like; which have no manner of agreement with the nature of things, however they keep peace, such as it is, with the calculations. Neither were the better astronomers blind to these things; but being intent on their art, and foolishly attached to perfect circles, and catching at subtleties, and too servile to philosophy, they scorned to follow nature. But this imperious disposition of philosophers towards nature is worse even than the simplicity and credulity of the vulgar; if a man disdains a plain thing because it is plain. And yet a vast evil it is and of very wide extent, that the human wit, not being able to match nature, must needs put itself above nature. But now we must inquire whether that single and simple motion, in a circle and spiral, from east to west, on certain poles south and north, ends and terminates with the heaven, or extends likewise to things below. For it will not be open to us to invent here in the regions next us such things as they suppose in the heavens. If therefore in these regions also this motion be found, it will appear that in heaven likewise it is, under the conditions of a common or cosmical nature, such as we experience it. First then it is plain that it is not confined within the limits of heaven. But the demonstrations and evidences on this point I have fully treated in my "anticipation" concerning the ebb and flow of the sea; to which men are therefore referred; and taking this for settled and concluded, I will proceed to the other motions of celestial bodies. These I have said are not cosmical, but mutual, or having relation one to another. There are four kinds of motions visible in heavenly bodies besides that which I have called cosmical, which is the diurnal motion by spirals within the tropics. For the stars either rise higher and again sink lower, so as to be further off and nearer the earth; or they turn and wind from side to side of the zodiac, running out more to the south or more to the north, and forming what they call dragons; or they vary in velocity and likewise in direction of motion (for I put these two together), proceeding sometimes quicker, sometimes slower, sometimes in progression, sometimes in regression, sometimes likewise stopping and remaining stationary; or they are attached and circumscribed at a greater or less distance from the sun. The causes and natures of these motions I will only give in general and by heads; for this the plan of my work here demands. But to pave and open the way for this, I must say without reserve what I think with regard to certain philosophical doctrines, as well as astronomical hypotheses, and likewise with regard to the observations of astronomers in various ages, upon which they build their art; all which appear to me full of error and confusion. There are some axioms then, or rather opinions, which being received by philosophers, transferred into astronomy, and unhappily believed, have corrupted the art. Of these my rejection and judgment will be simple: for I have no time to spend in confutations. The first is, that all things above the moon inclusive are incorruptible, and not subject to new generations or changes of any kind. Of this I have spoken elsewhere, as being a superstition and a vanity. But it is the fountain from which springs that vast evil, that upon every anomaly astronomers frame new and (as they think) corrected theories, and often apply to things that are as it were fortuitous, causes eternal and invariable. The second is, that the heaven (as consisting of a fifth essence, and of no elementary substance) admits not of those turbulent actions of compression, relaxation, repulsion, submission, and the like, that seem to be produced by a certain hardness and softness of bodies, which are regarded as elementary qualities. But this assertion is an insolent and licentious repudiation of fact and sense. For wherever a natural body is placed, there also is resistance, and that in proportion to the

body. And wherever there are natural bodies and local motion, there is either repulsion, or yielding, or division; for these things above mentioned, namely, compression, relaxation, repulsion, yielding with many others, are universal passions of matters every where, and yet from this fountain has flowed that multiplication of circles complicated at pleasure, which they will nevertheless have to be so adapted to each other, and to move and turn with such smoothness and slipperiness one within the other, that there is no obstruction at all, no fluctuation; all which are plainly fanciful, and trample upon the nature of things. The third is, that all natural bodies have their own proper motions; and if any be found to have more than one, that all the rest come from elsewhere, and from some separate moving body. Than which nothing falser can be devised, seeing all bodies by the manifold consent of things are endued likewise with many motions, some ruling, some obeying, and some also lying dormant unless exerted; and proper motions of things there are none, except exact measures and modes of common motions. Hence again has come forth a separate *primum mobile*, and heavens above heavens, and a continuous chain of new structures, to meet the demands of such different motions. The fourth is, that all celestial motions are performed in perfect circles; a thing very cumbersome, which has produced for us those prodigies of eccentrics and epicycles; whereas if they had consulted nature, they would have found that while motion orderly and uniform is in a perfect circle, motion orderly but multiform, such as is found in many heavenly bodies, is in other lines; and deservedly does Gilbert laugh at this, saying that it is not probable nature would have formed wheels of one or two miles for instance in circuit, to carry a ball the size of a palm⁵. For it seems that the body of a planet is no bigger, as compared with those circles which they invent for it to move in. The fifth is, that the stars are parts of their own orb fixed as it were by a nail. But this is very evidently a conceit of those who deal with mathematics, not with nature, and fixing all their attention on the motion of bodies entirely forget their substances. For that fixation is a particular affection of compact and consistent things, which keep firm hold by reason of the pressure of their parts. But it is quite inconceivable, if it be transferred to soft or liquid bodies. The sixth is, that a star is the denser part of its own orb; whereas the stars are neither parts, nor denser⁶. For they are not homogeneous with the air, differing only in degree, but they are quite heterogeneous and differ in substance; which substance also is in respect of density rarer and more open than the ethereal. There are likewise many other opinions equally vain; but these will suffice for the present business. So much then for the doctrines of philosophy concerning celestial bodies. As for the hypotheses of astronomers, it is useless to refute them, because they are not themselves asserted as true, and they may be various and contrary one to the other, yet so as equally to save and adjust the phenomena. Let it then be arranged, if you will, between philosophy and astronomy, as by a convenient and legitimate compact, that astronomy shall prefer those hypotheses which are most suitable for compendious calculation, philosophy those which approach nearest the truth of nature; and that the hypotheses of astronomy shall not prejudice the truth of the thing, while the decisions of philosophy shall be such as are explicable on the phenomena of astronomy. And so much for hypotheses. But with respect to astronomical observations, which are assiduously accumulated, and are continually dropping like waters from the heaven, I would by all means have men beware, lest Æsop's pretty fable of the fly that sate on the pole of a chariot at the Olympic races and said, "What a dust do I raise," be verified in them. For so it is that some small observation, and that disturbed sometimes by the instrument, sometimes by the eye, sometimes by the calculation, and which may be owing to some real change in the heaven, raises new heavens and new spheres and circles. Nor do I say this because I would have any relaxation of industry in observations and history, which I say should be sharpened and strengthened in all ways, but only that prudence and a perfect and settled maturity of judgment may be employed in rejecting or altering hypotheses. Having therefore now opened the way, I will make a few general observations on

⁵ Gilbert *Physiol. Nov. ii. 11.*

⁶ Cf. Arist. *De Cælo*, ii. 7.

the motions themselves. I have said that there are four kinds of greater motions in the heavens. *Motion in the depth of heaven*, upward or downward; *motion through the latitude of the zodiac*, deviating to south and north; *motion in the direction of the zodiac*, quick, slow, progressive, retrograde, and stationary; and *motion of elongation* from the sun. And let no one object that this second motion of latitude, or the dragons, might have been referred to that great cosmical motion, being an alternate inclination towards north and south; inasmuch as these spirals move in like manner from tropic to tropic; only that the cosmical motion is spiral simply, whereas the other is likewise sinuous and with much smaller intervals. For this has not escaped me. But the fact is, that the constant and perpetual motion of the sun in the ecliptic without latitude and dragons, which sun nevertheless has a common motion with the other planets in respect of spirals between the tropics, forbids me to agree with this opinion. We must therefore seek other sources both of this and of the three other motions. Such are the ideas with regard to the celestial motions which seem to me to have least inconvenience. Let us see then what they deny and what they affirm. They *deny* that the earth revolves. They *deny* that there are two motions in the heavenly bodies, one being from west to east; and *affirm* a difference in speed, one out-stripping and leaving the other behind. They *deny* an oblique circle with a different position of its poles; and *affirm* spirals. They *deny* separate *primum mobile*, and carriage by force; and *affirm* a cosmical consent as the common bond of the system. They *affirm* that the diurnal motion is found not in the heaven only⁷, but also in the air, water, and even the exterior of the earth, in respect of its verticity. They *affirm* that this cosmical motion of flowing and rolling in fluids, becomes verticity and direction in solids, until it passes into pure immobility. They *deny* that the stars are fixed like knots in a board. They *deny* that eccentrics, epicycles, and such structures are real. They *affirm* that the magnetic motion, or that which brings bodies together, is active in the stars, whereby fire evokes and raises fire. They *affirm* that in the planetary heavens the bodies of the planets move and revolve with greater velocity than the rest of the heaven in which they are situated, which does indeed revolve, but more slowly. They *affirm* that from this inequality come the fluctuations, waves, and reciprocations of the planetary ether, and from them a variety of motions. They *affirm* a necessity in the planets of revolving faster and slower, according as they are situated high or low in the heaven, and that by consent of the universe. But at the same time they *affirm* a dislike in the planets of preternatural velocity as well of the greater as of the lesser circle. They *affirm* a tendency to follow the sun, by reason of neediness of nature, in the weaker fires of Venus and Mercury; the rather, because Galileo has discovered certain small wandering stars attendant upon Jupiter. These then are the things I see, standing as I do on the threshold of natural history and philosophy; and it may be that the deeper any man has gone into natural history the more he will approve them. Nevertheless I repeat once more that I do not mean to bind myself to these; for in them as in other things I am certain of my way, but not certain of my position. Meanwhile, I have introduced them by way of interlude, lest it be thought that it is from vacillation of judgment or inability to affirm that I prefer negative questions. I will preserve therefore, even as the heavenly bodies themselves do (since it is of them I am discoursing), a variable constancy.

⁷ *Motum diurnum inveniri non in calo, sed et in aere, aquis, etiam extimis terræ, quoad verticitatem.* So the sentence stands in the original. But it seems that *tantum* or some equivalent word has dropped out.—J. S.

THE NEW ATLANTIS

PREFACE.

BY JAMES SPEDDING.

THE *New Atlantis* seems to have been written in 1624, and, though not finished, to have been intended for publication as it stands. It was published accordingly by Dr. Rawley in 1627, at the end of the volume containing the *Sylva Sylvarum*; for which place Bacon had himself designed it, the subjects of the two being so near akin; the one representing his idea of what should be the end of the work which in the other he supposed himself to be beginning. For the story of Solomon's House is nothing more than a vision of the practical results which he anticipated from the study of natural history diligently and systematically carried on through successive generations.

In this part of it, the work may probably be considered as complete. Of the state of Solomon's House he has told us all that he was as yet qualified to tell. His own attempts to "interpret nature" suggested the apparatus which was necessary for success: he had but to furnish Solomon's House with the instruments and preparations which he had himself felt the want of. The difficulties which had baffled his single efforts to provide that apparatus for himself suggested the constitution and regulations of a society formed to overcome them: he had but to furnish Solomon's House with the helps in head and hand which he had himself wished for. His own intellectual aspirations suggested the result: he had but to set down as known all that he himself most longed to know. But here he was obliged to stop. He could not describe the *process* of a perfect philosophical investigation; because it must of course have proceeded by the method of the *Novum Organum*, which was not yet expounded. Nor could he give a particular example of the result of such investigation, in the shape of a Form or an Axiom; for that presupposed the completion, not only of the *Novum Organum*, but (at least in some one subject) of the Natural History also; and no portion of the Natural History complete enough for the purpose was as yet producible. Here therefore he stopped; and it would almost seem that the nature of the difficulty which stood in his way had reminded him of the course he ought to take; for just at this point (as we learn from Dr. Rawley) he did in fact leave his fable and return to his work. He had begun it with the intention of exhibiting a model political constitution, as well as a model college of natural philosophy; but "his desire of collecting the natural history diverted him, which he preferred many degrees before it". And in this, according to his own view of the matter, he was no doubt right; for though there are few people now who would not gladly give all the *Sylva Sylvarum*, had there been ten times as much of it, in exchange for an account of the laws, institutions, and administrative arrangements of Bensalem, it was not so with Bacon; who being deeper read in the phenomena of the human heart than in those of the material world, probably thought the perfect knowledge of nature an easier thing than the perfect government of men,—easier and not so far off; and therefore preferred to work where there was fairest hope of fruit.

To us, who can no longer hope for the fruits which Bacon expected, the *New Atlantis* is chiefly interesting as a record of his own feelings. Perhaps there is no single work of his which has so much of himself in it. The description of Solomon's House is the description of the vision in which he lived,—the vision not of an ideal world released from the natural conditions to which ours is subject, but of our own world as it might be made if we did our duty by it; of a state of things which he believed would one day be actually seen upon this earth such as it is by men

such as we are; and the coming of which he believed that his own labours were sensibly hastening. The account of the manners and customs of the people of Bensalem is an account of his own taste in humanity; for a man's ideal, though not necessarily a description of what he is, is almost always an indication of what he would be; and in the sober piety, the serious cheerfulness, the tender and gracious courtesy, the open-handed hospitality, the fidelity in public and chastity in private life, the grave and graceful manners, the order, decency, and earnest industry, which prevail among these people we recognise an image of himself made perfect,—of that condition of the human soul which he loved in others, and aspired towards in himself. Even the dresses, the household arrangements, the order of their feasts and solemnities, their very gestures of welcome and salutation, have an interest and significance independent of the fiction, as so many records of Bacon's personal taste in such matters. Nor ought the stories which the Governor of the House of Strangers tells about the state of navigation and population in the early post-diluvian ages, to be regarded merely as romances invented to vary and enrich the narrative, but rather as belonging to a class of serious speculations to which Bacon's mind was prone. As in his visions of the future, embodied in the achievements of Solomon's House, there is nothing which he did not conceive to be really practicable by the means which he supposes to be used; so in his speculations concerning the past, embodied in the traditions of Bensalem, I doubt whether there be any (setting aside, of course, the particular history of the fabulous island) which he did not believe to be historically probable. Whether it were that the progress of the human race in knowledge and art seemed to him too small to be accounted for otherwise than by supposing occasional tempests of destruction, in which all that had been gathered was swept away, or that the vicissitudes which had actually taken place during the short periods of which we know something had suggested to him the probability of similar accidents during those long tracts of time of which we know nothing,—or merely that the imagination is prone by nature to people darkness with shadows,—certain it is that the tendency was strong in Bacon to credit the past with wonders; to suppose that the world had brought forth greater things than it remembered, had seen periods of high civilisation buried in oblivion, great powers and peoples swept away and extinguished. In the year 1607, he avowed before the House of Commons a belief that in some forgotten period of her history (possibly during the Heptarchy) England had been far better peopled than she was then. In 1609, when he published the *De Sapientia Veterum*, he inclined to believe that an age of higher intellectual development than any the world then knew of had flourished and passed out of memory long before Homer and Hesiod wrote; and this upon the clearest and most deliberate review of all the obvious objections; and more decidedly than he had done four years before when he published the *Advancement of Learning*. And I have little doubt that when he wrote the *New Atlantis* he thought it not improbable that the state of navigation in the world 3000 years before was really such as the Governor of the House of Strangers describes; that some such naval expeditions as those of Coya and Tyrambel may really have taken place; and that the early civilisation of the Great Atlantis may really have been drowned by a deluge and left to begin its career again from a state of mere barbarism.

Among the few works of fiction which Bacon attempted, the *New Atlantis* is much the most considerable; which gives an additional interest to it, and makes one the more regret that it was not finished according to the original design. Had it proceeded to the end in a manner worthy of the beginning, it would have stood, as a work of art, among the most perfect compositions of its kind.

The notes to this piece, which are not marked with Mr. Ellis's initials, are mine.

J. S.

TO THE READER.

THIS fable my Lord devised, to the end that he might exhibit therein a model or description of a college instituted for the interpreting of nature and the producing of great and marvellous works for the benefit of men, under the name of Salomon's House, or the College of the Six Days' Works. And even so far his Lordship hath proceeded, as to finish that part. Certainly the model is more vast and high than can possibly be imitated in all things; notwithstanding most things therein are within men's power to effect. His Lordship thought also in this present fable to have composed a frame of Laws, or of the best state or mould of a commonwealth; but foreseeing it would be a long work, his desire of collecting the Natural History¹ diverted him, which he preferred many degrees before it.

This work of the *New Atlantis* (as much as concerneth the English edition) his Lordship designed for this place²; in regard it hath so near affinity (in one part of it) with the preceding Natural History.

W. RAWLEY.

NEW ATLANTIS.

We sailed from Peru, (where we had continued by the space of one whole year,) for China and Japan, by the South Sea³; taking with us victuals for twelve months; and had good winds from the east, though soft and weak, for five months' space and more. But then the wind came about, and settled in the west for many days so as we could make little or no way, and were sometimes in purpose to turn back. But then again there arose strong and great winds from the south, with a point east; which carried us up (for all that we could do) towards the north: by which time our victuals failed us, though we had made good spare of them. So that finding ourselves in the midst of the greatest wilderness of waters in the world, without victuals, we gave ourselves for lost men, and prepared for death. Yet we did lift up our hearts and voices to God above, who *showeth his wonders in the deep*; beseeching him of his mercy, that as in the beginning he discovered⁴ the face of the deep, and brought forth dry land, so he would now discover land to us, that we might⁵ not perish. And it came to pass that the next day about evening, we saw within a kenning before us, towards the north, as it were thick clouds, which did put us in some hope of land; knowing how that part of the South Sea was utterly unknown; and might have islands or continents that hitherto were not come to light. Wherefore we bent our course thither, where we saw the appearance of land, all that night; and in the dawning of the next day, we might plainly discern that it was a land; flat to our sight, and full of boscaje; which made it shew the more dark. And after an hour and a half's sailing, we entered into a good haven, being the port of a fair city; not great indeed, but well built, and that gave a pleasant view from the sea: and we thinking every minute long till we were on land, came close to the shore, and offered to land. But straightways we saw divers of the people, with bastons in their hands, as it were forbidding us to land; yet without any cries or fierceness, but only as warning us off by signs that they made. Whereupon being not a little discomforted, we were advising with ourselves what we should do. During which time there made forth to us a small boat, with about eight persons in it; whereof one of them had in his hand a tipstaff of a yellow cane, tipped at both

¹ In the Latin translation Rawley adds, *aliarumque Instauracionis partium contexendarum*; alluding probably to the *De Augmentis*, the only portion of the Instauracion not belonging to the Natural History, which he seems to have been employed upon afterwards.

² It was published at the end of the volume containing the *Sylva Sylvarum*.

³ The words "by the South Sea" are omitted in the translation.

⁴ So in the original. If *discovered* be the right word, it must mean *removed the covering of the face of the deep*. But I think there must be some mistake. The Latin version has *quemadmodum in principio congregationes aquarum mandavit et Aridam apparere fecit*. The allusion is, no doubt, to Genes. i. 9: "Let the waters under the heaven be gathered together unto one place, and let the dry land appear".

⁵ *mought* in the original; a form of the word frequently, though not uniformly, adopted by Bacon. I have always substituted *might*.

ends with blue, who came aboard our ship, without any show of distrust at all. And when he saw one of our number present himself somewhat afore the rest, he drew forth a little scroll of parchment, (somewhat yellower than our parchment, and shining like the leaves of writing tables, but otherwise soft and flexible,) and delivered it to our foremost man. In which scroll were written in ancient Hebrew and in ancient Greek, and in good Latin of the School, and in Spanish, these words; "Land ye not, none of you; and provide to be gone from this coast within sixteen days, except you have further time given you. Meanwhile, if you want fresh water, or victual, or help for your sick, or that your ship needeth repair, write down your wants, and you shall have that which belongeth to mercy." This scroll was signed with a stamp of cherubins' wings, not spread but hanging downwards, and by them a cross. This being delivered, the officer returned, and left only a servant with us to receive our answer. Consulting hereupon amongst ourselves, we were much perplexed. The denial of landing and hasty warning us away troubled us much; on the other side, to find that the people had languages and were so full of humanity, did comfort us not a little. And above all, the sign of the cross to that instrument was to us a great rejoicing, and as it were a certain presage of good. Our answer was in the Spanish tongue; "That for our ship, it was well; for we had rather met with calms and contrary winds than any tempests. For our sick, they were many, and in very ill case; so that if they were not permitted to land, they ran danger of their lives." Our other wants we set down in particular; adding, "that we had some little store of merchandise, which if it pleased them to deal for, it might supply our wants without being chargeable unto them". We offered some reward in pistolets unto the servant, and a piece of crimson velvet to be presented to the officer; but the servant took them not, nor would scarce look upon them; and so left us, and went back in another little boat which was sent for him.

About three hours after we had dispatched our answer, there came towards us a person (as it seemed) of place. He had on him a gown with wide sleeves, of a kind of water chamolet, of an excellent azure colour, far more glossy than ours; his under apparel was green; and so was his hat, being in the form of a turban, daintily made, and not so huge as the Turkish turbans; and the locks of his hair came down below the brims of it. A reverend man was he to behold. He came in a boat, gilt in some part of it, with four persons more only in that boat; and was followed by another boat, wherein were some twenty. When he was come within a flight-shot⁶ of our ship, signs were made to us that we should send forth some to meet him upon the water; which we presently did in our ship-boat, sending the principal man amongst us save one, and four of our number with him. When we were come within six yards of their boat, they called to us to stay, and not to approach farther; which we did. And thereupon the man whom I before described stood up, and with a loud voice in Spanish, asked, "Are ye Christians?" We answered, "We were"; fearing the less, because of the cross we had seen in the subscription. At which answer the said person lifted up his right hand towards heaven, and drew it softly to his mouth, (which is the gesture they use when they thank God) and then said: "If ye will swear (all of you) by the merits of the Saviour that ye are no pirates, nor have shed blood lawfully nor unlawfully within forty days past, you may have licence to come on land." We said, "We were all ready to take that oath". Whereupon one of those that were with him, being (as it seemed) a notary, made an entry of this act. Which done, another of the attendants of the great person, which was with him in the same boat, after his lord had spoken a little to him, said aloud; "My lord would have you know, that it is not of pride or greatness that he cometh not aboard your ship but for that in your answer you declare that you have many sick amongst you, he was warned by the Conservator of Health of the city that he should keep a distance". We bowed ourselves towards him, and answered, "We were his humble servants; and accounted for great honour and singular humanity towards us

⁶ *spiculi jactum*. When archers try which can shoot furthest, they call it flight-shooting. The distance would be between 200 and 300 yards. Old Double, according to Justice Shallow, would have "carried you a forehand shaft a fourteen and fourteen and half"; that is, 284 or 294 yards. See *Hen. IV.* Part II. act 3. sc. 2.

that which was already done ; but hoped well that the nature of the sickness of our men was not infectious". So he returned ; and a while after came the notary to us aboard our ship ; holding in his hand a fruit of that country, like an orange, but of colour between orange-tawney and scarlet, which cast a most excellent odour. He used it (as it seemeth) for a preservative against infection. He gave us our oath : " By the name of Jesus and his merits " : and after told us that the next day by six of the clock in the morning we should be sent to, and brought to the Strangers' House, (so he called it,) where we should be accommodated of things both for our whole and for our sick. So he left us ; and when we⁷ offered him some pistolets, he smiling said, " He must not be twice paid for one labour ; " meaning (as I take it) that he had salary sufficient of the state for his service. For (as I after learned) they call an officer that taketh rewards, *twice paid*.

The next morning early, there came to us the same officer that came to us at first with his cane, and told us, " He came to conduct us to the Strangers' House ; and that he had prevented the hour, because we might have the whole day before us for our business. " For," said he, " if you will follow my advice, there shall first go with me some few of you, and see the place, and how it may be made convenient for you ; and then you may send for your sick, and the rest of your number which ye will bring on land." We thanked him, and said, " That this care which he took of desolate strangers God would reward ". And so six of us went on land with him : and when we were on land, he went before us, and turned to us, and said, " He was but our servant, and our guide ". He led us through three fair streets ; and all the way we went there were gathered some people on both sides standing in a row ; but in so civil a fashion, as if it had been not to wonder at us but to welcome us ; and divers of them, as we passed by them, put their arms a little abroad ; which is their gesture when they bid any welcome. The Strangers' House is a fair and spacious house, built of brick, of somewhat a bluer colour than our brick ; and with handsome windows, some of glass, some of a kind of cambric oiled. He brought us first into a fair parlour above stairs, and then asked us, " What number of persons we were ? And how many sick ? " We answered, " We were in all (sick and whole) one and fifty persons, whereof our sick were seventeen ". He desired us to have patience a little, and to stay till he came back to us ; which was about an hour after ; and then he led us to see the chambers which were provided for us, being in number nineteen : they having cast it (as it seemeth) that four of those chambers, which were better than the rest, might receive four of the principal men of our company, and lodge them alone by themselves ; and the other fifteen chambers were to lodge us two and two together. The chambers were handsome and cheerful chambers, and furnished civilly. Then he led us to a long gallery, like a dorture⁸, where he showed us all along the one side (for the other side was but wall and window) seventeen cells, very neat ones, having partitions of cedar wood. Which gallery and cells, being in all forty, (many more than we needed,) were instituted as an infirmary for sick persons. And he told us withal, that as any of our sick waxed well, he might be removed from his cell to a chamber ; for which purpose there were set forth ten spare chambers, besides the number we spake of before. This done, he brought us back to the parlour, and lifting up his cane a little, (as they do when they give any charge or command⁹), said to us, " Ye are to know that the custom of the land requireth, that after this day and to-morrow, (which we give you for removing of your people from your ship), you are to keep within doors for three days. But let it not trouble you, nor do not think yourselves restrained, but rather left to your rest and ease. You shall want nothing, and there are six of our people appointed to attend you, for any business you may have abroad." We gave him thanks with all affection and respect, and said, " God surely is manifested in this land ". We offered him also twenty pistolets ; but he smiled, and only said ; " What ? twice paid ! " And so he left us. Soon after our dinner was served in ; which was right good viands, both for bread and meat¹⁰ ; better than any colle-

⁷ So ed. 1635. Ed. 1629 has *he*.

⁸ Dormitory. The Latin translation has, *qualia solent esse dormitoria monachorum*.

⁹ *i.e.*, any charge which they have received from superior authority.

¹⁰ The translation has both for meat and drink : *tam respectu ciborum quam potus*.

giate diet that I have known in Europe. We had also drink of three sorts, all wholesome and good ; wine of the grape ; a drink of grain, such as is with us our ale, but more clear ; and a kind of cider made of a fruit of that country ; a wonderful pleasing and refreshing drink. Besides, there were brought in to us great store of those scarlet oranges for our sick ; which (they said) were an assured remedy for sickness taken at sea. There was given us also a box of small grey or whitish pills, which they wished our sick should take, one of the pills every night, before sleep ; which (they said) would hasten their recovery. The next day, after that our trouble of carriage and removing of our men and goods out of our ship was somewhat settled and quiet, I thought good to call our company together, and when they were assembled said unto them ; " My dear friends, let us know ourselves, and how it standeth with us. We are men cast on land, as Jonas was out of the whale's belly, when we were as buried in the deep : and now we are on land, we are but between death and life ; for we are beyond both the old world and the new ; and whether ever we shall see Europe, God only knoweth. It is a kind of miracle hath brought us hither : and it must be little less that shall bring us hence. Therefore in regard of our deliverance past, and our danger present and to come, let us look up to God, and every man reform his own ways. Besides we are come here amongst a Christian people, full of piety and humanity : let us not bring that confusion of face upon ourselves, as to show our vices or unworthiness before them. Yet there is more. For they have by commandment (though in form of courtesy) cloistered us within these walls for three days : who knoweth whether it be not to take some taste of our manners and conditions ? and if they find them bad, to banish us straightways ; if good, to give us further time. For these men that they have given us for attendance may withal have an eye upon us. Therefore for God's love, and as we love the weal of our souls and bodies, let us so behave ourselves as we may be at peace with God, and may find grace in the eyes of this people." Our company with one voice thanked me for my good admonition, and promised me to live soberly and civilly, and without giving any the least occasion of offence. So we spent our three days joyfully and without care, in expectation what would be done with us when they were expired. During which time, we had every hour joy of the amendment of our sick ; who thought themselves cast into some divine pool of healing, they mended so kindly and so fast.

The morrow after our three days were past, there came to us a new man that we had not seen before, clothed in blue as the former was, save that his turban was white, with a small red cross on the top. He had also a tippet of fine linen. At his coming in, he did bend to us a little, and put his arms abroad. We of our parts saluted him in a very lowly and submissive manner ; as looking that from him we should receive sentence of life or death. He desired to speak with some few of us : whereupon six of us only stayed, and the rest avoided the room. He said, " I am by office governor of this House of Strangers, and by vocation I am a Christian priest ; and therefore am come to you to offer you my service, both as strangers and chiefly as Christians. Some things I may tell you, which I think you will not be unwilling to hear. The state hath given you licence to stay on land for the space of six weeks : and let it not trouble you if your occasions ask further time, for the law in this point is not precise ; and I do not doubt but myself shall be able to obtain for you such further time as may be convenient. Ye shall also understand, that the Strangers' House is at this time rich, and much aforehand ; for it hath laid up revenue these thirty-seven years ; for so long it is since any stranger arrived in this part : and therefore take ye no care ; the state will defray you all the time you stay ; neither shall you stay one day the less for that. As for any merchandise ye have brought, ye shall be well used, and have your return either in merchandise or in gold and silver : for to us it is all one. And if you have any other request to make, hide it not. For ye shall find we will not make your countenance to fall by the answer ye shall receive. Only this I must tell you, that none of you must go above a *karan* " (that is with them a mile and an half) " from the walls of the city, without especial leave." We answered, after we had looked awhile one upon another admiring this gracious and parent-like usage ; " That we could not tell what to say : for we wanted words to express

our thanks ; and his noble free offers left us nothing to ask. It seemed to us that we had before us a picture of our salvation in heaven ; for we that were awhile since in the jaws of death, were now brought into a place where we found nothing but consolations. For the commandment laid upon us, we would not fail to obey it, though it was impossible but our hearts should be inflamed to tread further upon this happy and holy ground." We added ; " That our tongues should first cleave to the roofs of our mouths, ere we should forget either his reverend person or this whole nation in our prayers." We also most humbly besought him to accept of us as his true servants, by as just a right as ever men on earth were bounden ; laying and presenting both our persons and all we had at his feet. He said : " He was a priest, and looked for a priest's reward ; which was our brotherly love and the good of our souls and bodies ". So he went from us, not without tears of tenderness in his eyes ; and left us also confused with joy and kindness, saying amongst ourselves, " That we were come into a land of angels, which did appear to us daily and prevent us with comforts, which we thought not of, much less expected ".

The next day, about ten of the clock, the governor came to us again, and after salutations said familiarly, " That he was come to visit us," and called for a chair, and sat him down : and we, being some ten of us, (the rest were of the meaner sort, or else gone abroad,) sat down with him. And when we were set, he began thus : " We of this island of Bensalem," (for so they call it in their language,) " have this : that by means of our solitary situation, and of the laws of secrecy which we have for our travellers, and our rare admission of strangers, we know well most part of the habitable world, and are ourselves unknown. Therefore because he that knoweth least is fittest to ask questions, it is more reason, for the entertainment of the time, that ye ask me questions, than that I ask you." We answered ; " That we humbly thanked him that he would give us leave so to do : and that we conceived by the taste we had already, that there was no worldly thing on earth more worthy to be known than the state of that happy land. But above all," (we said), " since that we were met from the several ends of the world, and hoped assuredly that we should meet one day in the kingdom of heaven, (for that we were both parts Christians,) we desired to know (in respect that land was so remote, and so divided by vast and unknown seas, from the land where our Saviour walked on earth,) who was the apostle of that nation, and how it was converted to the faith ? " It appeared in his face that he took great contentment in this our question : he said, " Ye knit my heart to you, by asking this question in the first place ; for it showeth that you *first seek the kingdom of heaven* ; and I shall gladly and briefly satisfy your demand.

" About twenty years after the ascension of our Saviour, it came to pass that there was seen by the people of Renfusa, (a city upon the eastern coast of our island,) within night, (the night was cloudy and calm,) as it might be some mile into the sea, a great pillar of light ; not sharp, but in form of a column or cylinder, rising from the sea a great way up towards heaven : and on the top of it was seen a large cross of light, more bright and resplendent than the body of the pillar. Upon which so strange a spectacle, the people of the city gathered apace together upon the sands, to wonder ; and so after put themselves into a number of small boats, to go nearer to this marvellous sight. But when the boats were come within about sixty yards of the pillar, they found themselves all bound, and could go no further ; yet so as they might move to go about, but might not approach nearer : so as the boats stood all as in a theatre, beholding this light as an heavenly sign¹¹. It so fell out, that there was in one of the boats one of the wise men of the society of Salomon's House ; which house or college (my good brethren) is the very eye of this kingdom ; who having awhile attentively and devoutly viewed and contemplated this pillar and cross, fell down upon his face ; and then raised himself upon his knees, and lifting up his hands to heaven, made his prayers in this manner :

" Lord God of heaven and earth, thou hast vouchsafed of thy grace to those of our order, to know thy works of creation, and the secrets of them ; and to dis-

¹¹ *tanquam scenam caelestem* in the translation.

cern (as far as appertaineth to the generations of men) between divine miracles, works of nature, works of art, and impostures and illusions of all sorts¹². I do here acknowledge and testify before this people, that the thing which we now see before our eyes is thy Finger and a true Miracle; and forasmuch as we learn in our books that thou never workest miracles but to a divine and excellent end, (for the laws of nature are thine own laws and thou exceedest them not but upon great cause,) we most humbly beseech thee to prosper this great sign, and to give us the interpretation and use of it in mercy; which thou dost in some part secretly promise by sending it unto us.'

"When he had made his prayer, he presently found the boat he was in movable and unbound; whereas all the rest remained still fast; and taking that for an assurance of leave to approach, he caused the boat to be softly and with silence rowed towards the pillar. But ere he came near it the pillar and cross of light brake up, and cast itself abroad, as it were, into a firmament of many stars; which also vanished soon after, and there was nothing left to be seen but a small ark or chest of cedar, dry, and not wet at all with water, though it swam. And in the fore-end of it, which was towards him, grew a small green branch of palm; and when the wise man had taken it with all reverence into his boat, it opened of itself, and there were found in it a Book and a Letter; both written in fine parchment, and wrapped in sindons of linen. The Book contained all the canonical books of the Old and New Testament, according as you have them, (for we know well what the Churches with you receive); and the Apocalypse itself¹³, and some other books of the New Testament which were not at that time written, were nevertheless in the book. And for the letter, it was in these words:

"I Bartholomew, a servant of the Highest, and Apostle of Jesus Christ, was warned by an angel that appeared to me in a vision of glory, that I should commit this ark to the floods of the sea. Therefore I do testify and declare unto that people where God shall ordain this ark to come to land, that in the same day is come unto them salvation and peace and goodwill, from the Father, and from the Lord Jesus.'

"There was also in both these writings, as well the Book as the Letter, wrought a great miracle, conform to that of the Apostles in the original Gift of Tongues. For there being at that time in this land Hebrews, Persians, and Indians, besides the natives, every one read upon the Book and Letter, as if they had been written in his own language. And thus was this land saved from infidelity (as the remain of the old world was from water) by an ark, through the apostolical and miraculous evangelism of St. Bartholomew." And here he paused, and a messenger came, and called him from us. So this was all that passed in that conference.

The next day, the same governor came again to us immediately after dinner, and excused himself, saying, "That the day before he was called from us somewhat abruptly, but now he would make us amends, and spend time with us, if we held his company and conference agreeable". We answered, "That we held it so agreeable and pleasing to us, as we forgot both dangers past and fears to come, for the time we heard him speak; and that we thought an hour spent with him, was worth years of our former life". He bowed himself a little to us, and after we were set again, he said: "Well, the questions are on your part". One of our number said, after a little pause; "That there was a matter we were no less desirous to know, than fearful to ask, lest we might presume too far. But encouraged by his rare humanity towards us, (that could scarce think ourselves strangers, being his vowed and professed servants), we would take the hardiness to propound it: humbly beseeching him, if he thought it not fit to be answered, that he would pardon it, though he rejected it." We said: "We well observed those his words, which he formerly spake, that this happy island where we now stood was known to few, and yet knew most of the nations of the world; which

¹² *illusiones dæmonum cum imposturis omnimodis.*

¹³ The original has a semicolon after "itself", which would seem to connect this clause with the last. But the translation (*Apocalypsis ipsa*) shows that it was meant to be the beginning of a new sentence.

we found to be true, considering they had the languages of Europe, and knew much of our state and business; and yet we in Europe (notwithstanding all the remote discoveries and navigations of this last age,) never heard any of the least inkling or glimpse of this island. This we found wonderful strange; for that all nations have inter-knowledge¹⁴ one of another either by voyage into foreign parts, or by strangers that come to them; and though the traveller into a foreign country doth commonly know more by the eye, than he that stayeth at home can by relation of the traveller; yet both ways suffice to make a mutual knowledge, in some degree, on both parts. But for this island, we never heard tell of any ship of theirs that had been seen to arrive upon any shore of Europe; no, nor of either the East or West Indies; nor yet of any ship of any other part of the world that had made return from them. And yet the marvel rested not in this. For the situation of it (as his lordship said) in the secret conclave of such a vast sea might cause it. But then that they should have knowledge of the languages, books, affairs, of those that lie such a distance from them, it was a thing we could not tell what to make of; for that it seemed to us a condition and propriety of divine powers and beings, to be hidden and unseen to others, and yet to have others open and as in a light to them." At this speech the governor gave a gracious smile, and said; "That we did well to ask pardon for this question we now asked; for that it imported as if we thought this land a land of magicians, that sent forth spirits of the air into all parts, to bring them news and intelligence of other countries". It was answered by us all, in all possible humbleness, but yet with a countenance taking knowledge that we knew that he spake it but merrily, "That we were apt enough to think there was somewhat supernatural in this island; but yet rather as angelical than magical. But to let his lordship know truly what it was that made us tender and doubtful to ask this question, it was not any such conceit, but because we remembered he had given a touch in his former speech, that this land had laws of secrecy touching strangers." To this he said; "You remember it aright; and therefore in that I shall say to you I must reserve some particulars, which it is not lawful for me to reveal; but there will be enough left to give you satisfaction.

"You shall understand (that which perhaps you will scarce think credible that about three thousand years ago, or somewhat more, the navigation of the world, (specially for remote voyages,) was greater than at this day. Do not think with yourselves that I know not how much it is increased with you within these six-score years; I know it well, and yet I say greater then than now; whether it was, that the example of the ark, that saved the remnant of men from the universal deluge, gave men confidence to adventure upon the waters; or what it was; but such is the truth. The Phœnicians, and especially the Tyrians, had great fleets. So had the Carthaginians, their colony, which is yet further west. Toward the east, the shipping of Egypt and of Palestina was likewise great. China also, and the great Atlantis (that you call America), which have now but junks and canoes¹⁵, abounded then in tall ships. This island (as appeareth by faithful registers of those times) had then fifteen hundred strong ships, of great content. Of all this there is with you sparing memory, or none; but we have large knowledge thereof.

"At that time, this land was known and frequented by the ships and vessels of all the nations before named. And (as it cometh to pass) they had many times men of other countries, that were no sailors, that came with them; as Persians, Chaldeans, Arabians; so as almost all nations of might and fame resorted hither; of whom we have some stirps and little tribes with us at this day. And for our own ships, they went sundry voyages, as well to your Straits, which you call the Pillars of Hercules¹⁶, as to other parts in the Atlantic and Mediterrane Seas; as

¹⁴ *enterknowledge* in the original.

¹⁵ *Canoo's* in the original.

¹⁶ Hercules is called by Edrisi Dhoulcarnain. He says he lived in the time of Abraham, and has been confounded with Iscander Dhoulcarnain, or Alexander the two-horned. That the limits beyond which it is impossible to pass were set up by Dhoulcarnain gives the obvious explanation of the passage in Chaucer's *Troilus and Cressida* :—

"I am tyl God me bettre mynde sende,

At Dulcarnon, right at my wytte's end"—

"qui interpretes mire torsit".—R. L. E.

to Paguin¹⁷ (which is the same with Cambaline¹⁸) and Quinzy¹⁹, upon the Oriental Seas, as far as to the borders of the East Tartary.

"At the same time, and an age after, or more, the inhabitants of the great Atlantis did flourish²⁰. For though the narration and description which is made by a great man with you, that the descendants of Neptune planted there; and of the magnificent temple, palace, city, and hill; and the manifold streams of goodly navigable rivers, (which, as so many chains, environed the same site and temple); and the several degrees of ascent whereby men did climb up to the same, as if it had been a *scala cæli*, be all poetical and fabulous: yet so much is true, that the said country of Atlantis, as well that of Peru, then called Coya, as that of Mexico, then named Tyrambel, were mighty and proud kingdoms in arms, shipping, and riches: so mighty, as at one time (or at least within the space of ten years) they both made two great expeditions; they of Tyrambel through the Atlantic to the Mediterranean Sea; and they of Coya through the South Sea upon this our island. And for the former of these, which was into Europe, the same author amongst you (as it seemeth) had some relation from the Egyptian priest whom he citeth. For assuredly such a thing there was. But whether it were the ancient Athenians that had the glory of the repulse and resistance of those forces, I can say nothing; but certain it is, there never came back either ship or man from that voyage. Neither had the other voyage of those of Coya upon us had better fortune, if they had not met with enemies of greater clemency. For the king of this island (by name Altabin) a wise man and a great warrior, knowing well both his own strength and that of his enemies, handled the matter so, as he cut off their land-forces from their ships; and entailed both their navy and their camp with a greater power than theirs, both by sea and land; and compelled them to render themselves without striking stroke; and after they were at his mercy, contenting himself only with their oath that they should no more bear arms against him, dismissed them all in safety. But the Divine Revenge overtook not long after those proud enterprises. For within less than the space of one hundred years, the great Atlantis was utterly lost and destroyed: not by a great earthquake, as your man saith, (for that whole tract is little subject to earthquakes,) but by a particular deluge or inundation; those countries having, at this day, far greater rivers and far higher mountains to pour down waters, than any part of the old world. But it is true that the same inundation was not deep; not past forty foot, in most places, from the ground: so that although it destroyed man and beast generally, yet some few wild inhabitants of the wood²¹ escaped. Birds also were saved by flying to the high trees and woods. For as for men, although they had buildings in many places higher than the depth of the water, yet that inundation, though it were shallow, had a long continuance; whereby they of the vale that were not drowned, perished for want of food and other things necessary. So as marvel you not at the thin population of America, nor at the rudeness and ignorance of the people; for you must account your inhabitants of America as a young people; younger a thousand years, at the least, than the rest of the world; for that there was so much time between the universal flood and their particular inundation. For the poor remnant of human seed which remained in their mountains peopled

¹⁷ Peking. It seems as if Bacon supposed that Peking was a sea-port.—R. L. E. [The translation adds *civitatem in Chinâ antiquissimam*].

¹⁸ Cambalu is the reading of the common text of Marco Polo. The word is properly Khambalik. It is the Tartar name for Peking.—R. L. E. [It is *Cambalu* in the translation; and in the English Bacon probably wrote *Cambaluc*.—J. S.]

¹⁹ The Quinsai of Marco Polo, now Hangchowfoo.—R. L. E.

²⁰ See Plato, *Critias*, p. 113, and *Timæus*, p. 25. Everything relating to the story of Atlantis has been collected by Humboldt, *Examen critique de l'Histoire de la Géographie*, etc., i. p. 167. Compare Martin, *Études sur le Timée*; and see Gesenius, *Monumenta Phœnicia*, for an account of a spurious Phœnician inscription, purporting to give the history of the destruction of Atlantis. It may be a question whether there be not some affinity between Atlantis and Homer's Phœacia.—R. L. E.

²¹ The translation says, of the *mountains: silvestres habitatores quidam montium*.

the country again slowly, by little and little ; and being simple and savage people, (not like Noah and his sons, which was the chief family of the earth,) they were not able to leave letters, arts, and civility to their posterity ; and having likewise in their mountainous habitations been used (in respect of the extreme cold of those regions) to clothe themselves with the skins of tigers, bears, and great hairy goats, that they have in those parts ; when after they came down into the valley, and found the intolerable heats which are there, and knew no means of lighter apparel, they were forced to begin the custom of going naked, which continueth at this day. Only they take great pride and delight in the feathers of birds, and this also they took from those their ancestors of the mountains, who were invited unto it by the infinite flights of birds that came up to the high grounds, while the waters stood below. So you see, by this main accident of time, we lost our traffic with the Americans, with whom of all others, in regard they lay nearest to us, we had most commerce. As for the other parts of the world, it is most manifest that in the ages following (whether it were in respect of wars, or by a natural revolution of time,) navigation did everywhere greatly decay ; and specially far voyages (the rather by the use of galleys, and such vessels as could hardly brook the ocean), were altogether left and omitted. So then, that part of intercourse²² which could be from other nations to sail to us, you see how it hath long since ceased ; except it were by some rare accident, as this of yours. But now of the cessation of that other part of intercourse, which might be by our sailing to other nations, I must yield you some other cause. For I cannot say (if I shall say truly,) but our shipping, for number, strength, mariners, pilots, and all things that appertain to navigation, is as great as ever ; and therefore why we should sit at home, I shall now give you an account by itself : and it will draw nearer to give you satisfaction to your principal question.

" There reigned in this island, about nineteen hundred years ago, a King, whose memory of all others we most adore ; not superstitiously, but as a divine instrument, though a mortal man ; his name was Solamona ; and we esteem him as the law-giver of our nation. This king had a *large heart*, inscrutable for good ; and was wholly bent to make his kingdom and people happy. He therefore, taking into consideration how sufficient and substantive this land was to maintain itself without any aid at all of the foreigner ; being five thousand six hundred miles in circuit, and of rare fertility of soil in the greatest part thereof ; and finding also the shipping of this country might be plentifully set on work, both by fishing and by transportations from port to port, and likewise by sailing unto some small islands that are not far from us, and are under the crown and laws of this state ; and recalling into his memory the happy and flourishing estate wherein this land then was, so as it might be a thousand ways altered to the worse, but scarce any one way to the better ; thought nothing wanted to his noble and heroic intentions, but only (as far as human foresight might reach) to give perpetuity to that which was in his time so happily established. Therefore amongst his other fundamental laws of this kingdom, he did ordain the interdicts and prohibitions which we have touching entrance of strangers ; which at that time (though it was after the calamity of America) was frequent ; doubting novelties, and commixture of manners. It is true, the like law against the admission of strangers without licence is an ancient law in the kingdom of China, and yet continued in use. But therein it is a poor thing ; and hath made them a curious, ignorant, fearful, foolish nation. But our lawgiver made his law of another temper. For first, he hath preserved all points of humanity, in taking order and making provision for the relief of strangers distressed ; whereof you have tasted." At which speech (as reason was) we all rose up, and bowed ourselves. He went on. " That king also, still desiring to join humanity and policy together ; and thinking it against humanity to detain strangers here against their wills, and against policy that they should return and discover their knowledge of this state, he took this course : he did ordain that of the strangers that should be permitted to land, as many (at all times) might depart as would ; but as many as would stay should have very good conditions and means to live from the state. Wherein he saw so far, that now in so

²² *entercourse* in orig.

many ages since the prohibition, we have memory not of one ship that ever returned; and but of thirteen persons only, at several times, that chose to return in our bottoms. What those few that returned may have reported abroad I know not. But you must think, whatsoever they have said could be taken where they came but for a dream. Now for our travelling from hence into parts abroad, our Lawgiver thought fit altogether to restrain it. So is it not in China. For the Chinese sail where they will or can; which sheweth that their law of keeping out strangers is a law of pusillanimity and fear. But this restraint of ours hath one only exception, which is admirable; preserving the good which cometh by communicating with strangers, and avoiding the hurt; and I will now open it to you. And here I shall seem a little to digress, but you will by and by find it pertinent. Ye shall understand (my dear friends) that amongst the excellent acts of that king, one above all hath the pre-eminence. It was the erection and institution of an Order or Society which we call *Salomon's House*; the noblest foundation (as we think) that ever was upon the earth; and the lanthorn of this kingdom. It is dedicated to the study of the Works and Creatures of God. Some think it beareth the founder's name a little corrupted, as if it should be Solomona's House. But the records write it as it is spoken. So as I take it to be denominate of the King of the Hebrews, which is famous with you, and no stranger to us. For we have some parts of his works which with you are lost; namely, that Natural History which he wrote, of all plants, from the *cedar of Libanus* to the *moss that groweth out of the wall*, and of all things that have life and motion. This maketh me think that our king, finding himself to symbolize in many things with that king of the Hebrews (which lived many years before him), honoured him with the title of this foundation²³. And I am the rather induced to be of this opinion, for that I find in ancient records this Order or Society is sometimes called *Salomon's House*, and sometimes the *College of the Six Days Works*; whereby I am satisfied that our excellent king had learned from the Hebrews that God had created the world and all that therein is within six days; and therefore he instituting that House for the finding out of the true nature of all things, (whereby God might have the more glory in the workmanship of them, and men the more fruit in the use of them), did give it also that second name. But now to come to our present purpose. When the king had forbidden to all his people navigation into any part that was not under his crown, he made nevertheless this ordinance; That every twelve years there should be set forth out of this kingdom two ships, appointed to several voyages; That in either of these ships there should be a mission of three of the Fellows or Brethren of *Salomon's House*; whose errand was only to give us knowledge of the affairs and state of those countries to which they were designed, and especially of the sciences, arts, manufactures, and inventions of all the world; and withal to bring unto us books, instruments, and patterns in every kind; That the ships, after they had landed the brethren, should return; and that the brethren should stay abroad till the new mission. These ships are not otherwise fraught, than with store of victuals, and good quantity of treasure to remain with the brethren, for the buying of such things and rewarding of such persons as they should think fit. Now for me to tell you how the vulgar sort of mariners are contained from being discovered at land; and how they that must be put on shore for any time, colour themselves under the names of other nations; and to what places these voyages have been designed; and what places of *rendezvous* are appointed for the new missions; and the like circumstances of the

²³ Bacon in speaking of this king who symbolizes with Solomon seems to allude to James I.—*R. L. E.* [If the *New Atlantis* had been written in the earlier part of James's reign, Bacon might have been suspected perhaps of some such allusion. He might have hoped to encourage James to justify the parallel by going and doing likewise. But since James had now reigned above twenty years without doing or attempting to do anything for the furtherance of Natural Philosophy; without showing any interest in it or any taste or capacity for it; I cannot understand what the allusion can be or where the resemblance. Nor does it seem necessary to suppose anything of the kind in order to explain why a model-king for wisdom and knowledge should be likened to Solomon.—*J. S.*

practique; I may not do it: neither is it much to your desire. But thus you see we maintain a trade, not for gold, silver, or jewels; nor for silks; nor for spices; nor any other commodity of matter; but only for God's first creature, which was *Light*: to have *light* (I say) of the growth of all parts of the world²⁴. And when he had said this, he was silent; and so were we all. For indeed we were all astonished to hear so strange things so probably told. And he, perceiving that we were willing to say somewhat but had it not ready, in great courtesy took us off, and descended to ask us questions of our voyage and fortunes; and in the end concluded, that we might do well to think with ourselves what time of stay we would demand of the state; and bade us not to scant ourselves; for he would procure such time as we desired. Whereupon we all rose up, and presented ourselves to kiss the skirt of his tippet; but he would not suffer us; and so took his leave. But when it came once amongst our people that the state used to offer conditions to strangers that would stay, we had work enough to get any of our men to look to our ship, and to keep them from going presently to the governor to crave conditions. But with much ado we refrained them, till we might agree what course to take.

We took ourselves now for free men, seeing there was no danger of our utter perdition; and lived most joyfully, going abroad and seeing what was to be seen in the city and places adjacent within our tetter; and obtaining acquaintance with many of the city, not of the meanest quality; at whose hands we found such humanity, and such a freedom and desire to take strangers as it were into their bosom, as was enough to make us forget all that was dear to us in our own countries; and continually we met with many things right worthy of observation and relation; as indeed, if there be a mirror in the world worthy to hold men's eyes, it is that country. One day there were two of our company bidden to a Feast of the Family, as they call it. A most natural, pious, and reverend custom it is, shewing that nation to be compounded of all goodness. This is the manner of it. It is granted to any man that shall live to see thirty persons descended of his body alive together, and all above three years old, to make this feast; which is done at the cost of the state. The Father of the Family, whom they call the *Tirsan*, two days before the feast, taketh to him three of such friends as he liketh to choose; and is assisted also by the governor of the city or place where the feast is celebrated; and all the persons of the family, of both sexes, are summoned to attend him. These two days the *Tirsan* sitteth in consultation concerning the good estate of the family. There, if there be any discord or suits between any of the family, they are compounded and appeased. There, if any of the family be distressed or decayed, order is taken for their relief and competent means to live. There, if any be subject to vice, or take ill courses, they are reprov'd and censured. So likewise direction is given touching marriages, and the courses of life which any of them should take, with divers other the like orders and advices. The governor assisteth, to the end to put in execution by his public authority the decrees and orders of the *Tirsan*, if they should be disobey'd; though that seldom needeth; such reverence and obedience they give to the order of nature. The *Tirsan* doth also then ever choose one man from amongst his sons, to live in house with him: who is called ever after the Son of the Vine. The reason will hereafter appear. On the feast-day, the Father or *Tirsan* cometh forth after divine service into a large room where the feast is celebrated; which room hath an half-pace²⁵ at the upper end. Against the wall, in the middle of the half-pace, is a chair placed for him, with a table and carpet before it. Over the chair is a state²⁶, made round or oval, and it is of ivy; an ivy somewhat whiter than ours, like the leaf of a silver asp, but more shining; for it is green all winter. And the state is curiously wrought with silver and silk of divers colours building or binding in the ivy; and is ever of the work of some of the daughters of the family; and veiled over at the top with a fine net of silk and silver. But the substance of it is true ivy; whereof, after it is taken down, the friends of the family are desirous to have

²⁴ i.e., in whatever parts of the world it is to be found.

²⁵ Half-pace or dais, the part raised by a low step above the rest of the floor.—R. L. E.

²⁶ i.e. a canopy, *conopeum*.

some leaf or sprig to keep. The Tirsan cometh forth with all his generation or lineage,²⁷ the males before him, and the females following him; and if there be a mother from whose body the whole lineage²⁷ is descended, there is a traverse placed in a loft above on the right hand of the chair, with a privy door, and a carved window of glass, leaded with gold and blue; where she sitteth, but is not seen. When the Tirsan is come forth, he sitteth down in the chair; and all the lineage place themselves against the wall, both at his back and upon the return of the half-pace, in order of their years without difference of sex; and stand upon their feet. When he is set; the room being always full of company, but well kept and without disorder; after some pause there cometh in from the lower end of the room a *Taratan* (which is as much as an herald) and on either side of him two young lads; whereof one carrieth a scroll of their shining yellow parchment; and the other a cluster of grapes of gold, with a long foot or stalk. The herald and children are clothed with mantles of sea-water-green sattin; but the herald's mantle is stream'd with gold, and hath a train. Then the herald with three curtesies, or rather inclinations, cometh up as far as the half-pace; and there first taketh into his hand the scroll. This scroll is the King's Charter, containing gift of revenew, and many privileges, exemptions, and points of honour, granted to the Father of the Family; and is ever stiled and directed, *To such an one our well-beloved friend and creditor*: which is a title proper only to this case. For they say the king is debtor to no man, but for propagation of his subjects. The seal set to the king's charter is the king's image, imbossed or moulded in gold; and though such charters be expedited of course, and as of right, yet they are varied by discretion, according to the number and dignity of the family. This charter the herald readeth aloud; and while it is read, the father or Tirsan standeth up, supported by two of his sons, such as he chooseth. Then the herald mounteth the half-pace, and delivereth the charter into his hand: and with that there is an acclamation by all that are present in their language, which is thus much: *Happy are the people of Bensalem*. Then the herald taketh into his hand from the other child the cluster of grapes, which is of gold, both the stalk and the grapes. But the grapes are daintily enamelled; and if the males of the family be the greater number, the grapes are enamelled purple, with a little sun set on the top; if the females, then they are enamelled into a greenish yellow, with a crescent on the top. The grapes are in number as many as there are descendants of the family. This golden cluster the herald delivereth also to the Tirsan; who presently delivereth it over to that son that he had formerly chosen to be in house with him: who beareth it before his father as an ensign of honour when he goeth in public, ever after; and is thereupon called the Son of the Vine. After this ceremony ended, the father or Tirsan retireth; and after some time cometh forth again to dinner, where he sitteth alone under the state, as before; and none of his descendants sit with him, of what degree or dignity soever, except he hap to be of Salomon's House. He is served only by his own children, such as are male; who perform unto him all service of the table upon the knee; and the women only stand about him, leaning against the wall. The room below the half-pace hath tables on the sides for the guests that are bidden; who are served with great and comely order; and towards the end of dinner (which in the greatest feasts with them lasteth never above an hour and an half) there is an hymn sung, varied according to the invention of him that composeth it, (for they have excellent poesy), but the subject of it is (always) the praises of Adam and Noah and Abraham; whereof the former two peopled the world, and the last was the Father of the Faithful: concluding ever with a thanksgiving for the nativity of our Saviour, in whose birth the births of all are only blessed. Dinner being done, the Tirsan retireth again; and having withdrawn himself alone into a place where he maketh some private prayers, he cometh forth the third time, to give the blessing; with all his descendants, who stand about him as at the first. Then he calleth them forth by one and by one, by

²⁷ *linage* in the original; which seems to be the proper form of the word. The *e* may have been introduced originally as a direction for the lengthening of the first syllable, and then the resemblance of the word to such words as *lineal* may have suggested the modern pronunciation.

name, as he pleaseth, though seldom the order of age be inverted. The person that is called (the table being before removed) kneeleth down before the chair, and the father layeth his hand upon his head, or her head, and giveth the blessing in these words: *Son of Bensalem, (or Daughter of Bensalem,) thy father saith it; the man by whom thou hast breath and life speaketh the word; The blessing of the everlasting Father, the Prince of Peace, and the Holy Dove be upon thee, and make the days of thy pilgrimage good and many.* This he saith to every of them; and that done, if there be any of his sons of eminent merit and virtue, (so they be not above two,) he calleth for them again; and saith, laying his arm over their shoulders, they standing; *Sons, it is well ye are born, give God the praise, and persevere to the end.* And withal delivereth to either of them a jewel, made in the figure of an ear of wheat, which they ever after wear in the front of their turban or hat. This done, they fall to music and dances, and other recreations, after their manner, for the rest of the day. This is the full order of that feast.

By that time six or seven days were spent, I was fallen into strait acquaintance with a merchant of that city, whose name was Joabin. He was a Jew, and circumcised; for they have some few stirps of Jews yet remaining among them, whom they leave to their own religion. Which they may the better do, because they are of a far differing disposition from the Jews in other parts. For whereas they hate the name of Christ, and have a secret inbred rancour against the people amongst whom they live: these (contrariwise) give unto our Saviour many high attributes, and love the nation of Bensalem extremely. Surely this man of whom I speak would ever acknowledge that Christ was born of a virgin, and that he was more than a man; and he would tell how God made him ruler of the Seraphims which guard his throne; and they call him also the *Milken Way*, and the *Elijah of the Messiah*; and many other high names; which though they be inferior to his divine Majesty, yet they are far from the language of other Jews. And for the country of Bensalem, this man would make no end of commending it: being desirous, by tradition among the Jews there, to have it believed that the people thereof were of the generations of Abraham, by another son, whom they call Nachoran; and that Moses by a secret cabala ordained the laws of Bensalem which they now use; and that when the Messiah should come, and sit in his throne at Hierusalem, the king of Bensalem should sit at his feet, whereas other kings should keep a great distance. But yet setting aside these Jewish dreams, the man was a wise man, and learned, and of great policy, and excellently seen in the laws and customs of that nation. Amongst other discourses, one day I told him I was much affected with the relation I had from some of the company, of their custom in holding the Feast of the Family; for that (methought) I had never heard of a solemnity wherein nature did so much preside. And because propagation of families proceedeth from the nuptial copulation, I desired to know of him what laws and customs they had concerning marriage; and whether they kept marriage well; and whether they were tied to one wife? For that where population is so much affected, and such as with them it seemed to be, there is commonly permission of plurality of wives. To this he said, "You have reason for to commend that excellent institution of the Feast of the Family. And indeed we have experience, that those families that are partakers of the blessing of that feast do flourish and prosper ever after in an extraordinary manner. But hear me now, and I will tell you what I know. You shall understand that there is not under the heavens so chaste a nation as this of Bensalem; nor so free from all pollution or foulness. It is the virgin of the world. I remember I have read in one of your European books, of an holy hermit amongst you that desired to see the Spirit of Fornication; and there appeared to him a little foul ugly Æthiop²⁸. But if he had desired to see the Spirit of Chastity of Bensalem, it would have appeared to him in the likeness of a fair beautiful Cherubin. For there is nothing amongst mortal men more fair and admirable, than the chaste minds of this people. Know therefore, that with them there are no stews, no dissolute houses, no courtesans, nor any thing of that kind. Nay they wonder (with detestation) at you in Europe, which permit such things. They say ye have put marriage out

²⁸ The Klein Meister of La Motte Fouqué's *Sintram*.—R. L. E.

of office : for marriage is ordained a remedy for unlawful concupiscence ; and natural concupiscence seemeth as a spur to marriage. But when men have at hand a remedy more agreeable to their corrupt will, marriage is almost expelled. And therefore there are with you seen infinite men that marry not, but chuse rather a libertine and impure single life, than to be yoked in marriage ; and many that do marry, marry late, when the prime and strength of their years is past. And when they do marry, what is marriage to them but a very bargain ; wherein is sought alliance, or portion, or reputation, with some desire (almost indifferent) of issue ; and not the faithful nuptial union of man and wife, that was first instituted. Neither is it possible that those that have cast away so basely so much of their strength, should greatly esteem children, (being of the same matter²⁹), as chaste men do. So likewise during marriage, is the case much amended, as it ought to be if those things were tolerated only for necessity ? No, but they remain still as a very affront to marriage. The haunting of those dissolute places, or resort to courtesans, are no more punished in married men than in bachelors. And the depraved custom of change, and the delight in meretricious embraces, (where sin is turned into art),³⁰ maketh marriage a dull thing, and a kind of imposition or tax. They hear you defend these things, as done to avoid greater evils ; as advoutries, deflouring of virgins, unnatural lust, and the like. But they say this is a preposterous wisdom ; and they call it *Lol's offer*, who to save his guests from abusing, offered his daughters : nay they say farther that there is little gained in this ; for that the same vices and appetites do still remain and abound ; unlawful lust being like a furnace, that if you stop the flames altogether, it will quench ; but if you give it any vent, it will rage. As for masculine love, they have no touch of it ; and yet there are not so faithful and inviolate friendships in the world again as are there ; and to speak generally, (as I said before,) I have not read of any such chastity in any people as theirs. And their usual saying is, *That whosoever is unchaste cannot reverence himself ; and they say, That the reverence of a man's self is, next religion, the chiefest bridle of all vices*". And when he had said this, the good Jew paused a little ; whereupon I, far more willing to hear him speak on than to speak myself, yet thinking it decent that upon his pause of speech I should not be altogether silent, said only this ; " That I would say to him, as the widow of Sarepta said to Elias ; that he was come to bring to memory our sins ; and that I confess the righteousness of Bensalem was greater than the righteousness of Europe ". At which speech he bowed his head, and went on in this manner : " They have also many wise and excellent laws touching marriage. They allow no polygamy. They have ordained that none do intermarry or contract, until a month be passed from their first interview. Marriage without consent of parents they do not make void, but they mulct it in the inheritors : for the children of such marriages are not admitted to inherit above a third part of their parents' inheritance. I have read in a book of one of your men, of a Feigned Commonwealth, where the married couple are permitted, before they contract, to see one another naked³¹. This they dislike ; for they think it a scorn to give a refusal after so familiar knowledge : but because of many hidden defects in men and women's bodies³², they have a more civil way ; for they have near every town a couple of pools, (which they call *Adam and Eve's pools*), where it is permitted to one of the friends of the man, and another of the friends of the woman, to see them severally bathe naked."

And as we were thus in conference, there came one that seemed to be a messenger, in a rich huke³³, that spake with the Jew : whereupon he turned to me and said ; " You will pardon me, for I am commanded away in haste ". The

²⁹ *liberi (pars nostri altera).*

³⁰ Non v'era giunto ancor Sardanapalo

A mostrar cio ch' in camera si puote.

Dante, *Paradiso*, xiv. —R. L. E.

³¹ See More's *Utopia*, book ii.—R. L. E.

³² The translation adds *qui matrimonium postea infelix reddere possint.*

³³ *indutus tunicâ pictâ et inauratâ.*

next morning he came to me again, joyful as it seemed, and said, "There is word come to the governor of the city, that one of the Fathers of Salomon's House will be here this day seven-night: we have seen none of them this dozen years. His coming is in state; but the cause of his coming is secret. I will provide you and your fellows of a good standing to see his entry". I thanked him, and told him, "I was most glad of the news". The day being come, he made his entry. He was a man of middle stature and age, comely of person, and had an aspect as if he pitied men. He was clothed in a robe of fine black cloth, with wide sleeves and a cape. His under garment was of excellent white linen down to the foot, girt with a girdle of the same; and a sindon or tippet of the same about his neck. He had gloves that were curious, and set with stone; and shoes of peach-coloured velvet. His neck was bare to the shoulders. His hat was like a helmet, or Spanish Montera; and his locks curled below it decently; they were of colour brown. His beard was cut round, and of the same colour with his hair, somewhat lighter³⁴. He was carried in a rich chariot without wheels, litter-wise; with two horses at either end, richly trapped in blue velvet embroidered; and two footmen on each side in the like attire. The chariot was all of cedar, gilt, and adorned with crystal; save that the fore-end had pannels of sapphires, set in borders of gold, and the hinder-end the like of emeralds³⁵ of the Peru colour. There was also a sun of gold, radiant, upon the top, in the midst³⁶; and on the top before, a small cherub of gold, with wings displayed. The chariot was covered with cloth of gold tissue upon blue. He had before him fifty attendants, young men all, in white satten loose coats to the mid-leg; and stockings of white silk; and shoes of blue velvet; and hats of blue velvet; with fine plumes of divers colours, set round like hat-bands. Next before the chariot went two men, bare-headed, in linen garments down to the foot, girt, and shoes of blue velvet; who carried the one a crosier, the other a pastoral staff like a sheep-hook; neither of them of metal, but the crosier of balm-wood, the pastoral staff of cedar. Horsemen he had none, neither before nor behind his chariot: as it seemeth, to avoid all tumult and trouble. Behind his chariot went all the officers and principals of the Companies of the City. He sat alone, upon cushions of a kind of excellent plush, blue: and under his foot curious carpets of silk of divers colours, like the Persian, but far finer. He held up his bare hand as he went, as blessing the people, but in silence. The street was wonderfully well kept: so that there was never any army had their men stand in better battle-array, than the people stood. The windows likewise were not crowded, but every one stood in them as if they had been placed. When the shew was passed, the Jew said to me; "I shall not be able to attend you as I would, in regard of some charge the city hath laid upon me, for the entertaining of this great person". Three days after, the Jew came to me again, and said; "Ye are happy men; for the Father of Salomon's House taketh knowledge of your being here, and commanded me to tell you that he will admit all your company to his presence, and have private conference with one of you that ye shall choose: and for this hath appointed the next day after to-morrow. And because he meaneth to give you his blessing, he hath appointed it in the forenoon." We came at our day and hour, and I was chosen by my fellows for the private access. We found him in a fair chamber, richly hanged, and carpeted under foot, without any degrees to the state. He was set upon a low throne richly adorned, and a rich cloth of state over his head, of blue satten embroidered. He was alone, save that he had two pages of honour, on either hand one, finely attired in white. His under-garments were the like that we saw him wear in the chariot; but instead of his gown, he had on him a mantle with a cape, of the same fine black, fastened about him. When we came in, as we were taught, we bowed low at our first entrance; and when we were come near his chair, he stood up, holding forth his hand ungloved, and in posture of blessing; and we every one of us stooped down, and kissed the hem of his tippet. That done, the rest departed, and I

³⁴ The words "somewhat lighter" are omitted in the translation.

³⁵ *emerauds* in orig.

³⁶ *Etiam in medio verticis cathedræ, sol erat, ex auro radians.* The English in the original has a comma after "gold," and no stop after "radiant"; a misprint probably.

remained. Then he warned the pages forth of the room, and caused me to sit down beside him, and spake to me thus in the Spanish tongue :

"God bless thee, my son ; I will give thee the greatest jewel I have. For I will impart unto thee, for the love of God and men, a relation of the true state of Salomon's House. Son, to make you know the true state of Salomon's House, I will keep this order. First, I will set forth unto you the end of our foundation. Secondly, the preparations and instruments we have for our works. Thirdly, the several employments and functions whereto our fellows are assigned. And fourthly, the ordinances and rites which we observe.

"The End of our Foundation is the knowledge of Causes, and secret motions of things ; and the enlarging of the bounds of Human Empire, to the effecting of all things possible.

"The Preparations and Instruments are these. We have large and deep caves of several depths : the deepest are sunk six hundred fathom ; and some of them are digged and made under great hills and mountains : so that if you reckon together the depth of the hill and the depth of the cave, they are (some of them) above three miles deep. For we find that the depth of a hill, and the depth of a cave from the flat, is the same thing ; both remote alike from the sun and heaven's beams, and from the open air. These caves we call the Lower Region. And we use them for all coagulations, indurations, refrigerations, and conservations of bodies. We use them likewise for the imitation of natural mines ; and the producing also of new artificial metals, by compositions and materials which we use and lay there for many years. We use them also sometimes, (which may seem strange,) for curing of some diseases, and for prolongation of life in some hermits that choose to live there, well accommodated of all things necessary ; and indeed live very long ; by whom also we learn many things.

"We have burials in several earths, where we put divers cements, as the Chineses do their porcellain. But we have them in greater variety, and some of them more fine. We have also great variety of composts, and soils, for the making of the earth fruitful.

"We have high towers ; the highest about half a mile in height ; and some of them likewise set upon high mountains ; so that the vantage of the hill with the tower is in the highest of them three miles at least. And these places we call the Upper Region : accounting the air between the high places and the low, as a Middle Region. We use these towers, according to their several heights and situations, for insolation, refrigeration, conservation ; and for the view of divers meteors ; as winds, rain, snow, hail, and some of the fiery meteors also. And upon them, in some places, are dwellings of hermits, whom we visit sometimes, and instruct what to observe.

"We have great lakes both salt and fresh, whereof we have use for the fish and fowl. We use them also for burials of some natural bodies : for we find a difference in things buried in earth or in air below the earth, and things buried in water. We have also pools, of which some do strain fresh water out of salt ; and others by art do turn fresh water into salt. We have also some rocks in the midst of the sea, and some bays upon the shore for some works wherein is required the air and vapour of the sea. We have likewise violent streams and cataracts, which serve us for many motions : and likewise engines for multiplying and enforcing of winds, to set also on going divers motions.

"We have also a number of artificial wells and fountains, made in imitation of the natural sources and baths ; as tinted upon vitriol, sulphur, steel, lead, brass, nitre, and other minerals. And again we have little wells for infusions of many things, where the waters take the virtue quicker and better than in vessels or basons. And amongst them we have a water which we call Water of Paradise, being, by that we do to it, made very sovereign for health, and prolongation of life.

"We have also great and spacious houses, where we imitate and demonstrate ³⁷

³⁷ i.e. exhibit : *in quibus imitamenta et representationes meteororum exhibemus.*

meteors; as snow, hail, rain, some artificial rains of bodies and not of water, thunders, lightnings³⁸; also generations of bodies in air; as frogs, flies, and divers others.

"We have also certain chambers, which we call Chambers of Health, where we qualify the air as we think good and proper for the cure of divers diseases, and preservation of health³⁹.

"We have also fair and large baths, of several mixtures, for the cure of diseases, and the restoring of man's body from arefaction; and others for the confirming of it in strength of sinews, vital parts, and the very juice and substance of the body.

"We have also large and various orchards and gardens, wherein we do not so much respect beauty, as variety of ground and soil, proper for divers trees and herbs; and some very spacious, where trees and berries are set whereof we make divers kinds of drinks, besides the vineyards. In these we practise likewise all conclusions of grafting and inoculating, as well of wild-trees as fruit-trees, which produceth many effects. And we make (by art) in the same orchards and gardens, trees and flowers to come earlier or later than their seasons; and to come up and bear more speedily than by their natural course they do. We make them also by art greater much than their nature; and their fruit greater and sweeter and of differing taste, smell, colour, and figure, from their nature. And many of them we so order, as they become of medicinal use.

"We have also means to make divers plants rise by mixtures of earths without seeds; and likewise to make divers new plants, differing from the vulgar; and to make one tree or plant turn into another.

"We have also parks and inclosures of all sorts of beasts and birds, which we use not only for view or rareness, but likewise for dissections and trials; that thereby we may take light what may be wrought upon the body of man. Wherein we find many strange effects; as continuing life in them, though divers parts, which you account vital, be perished and taken forth; resuscitating of some that seem dead in appearance; and the like. We try also all opisons and other medicines upon them, as well of chirurgery as physic⁴⁰. By art likewise, we make them greater or taller than their kind is; and contrariwise dwarf them, and stay their growth; we make them more fruitful and bearing than their kind is; and contrariwise barren and not generative. Also we make them differ in colour, shape, activity, many ways. We find means to make commixtures and copulations of different kinds; which have produced many new kinds, and them not barren, as the general opinion is. We make a number of kinds of serpents, worms, flies, fishes, of putrefaction; whereof some are advanced (in effect) to be perfect creatures, like beasts or birds; and have sexes, and do propagate. Neither do we this by chance, but we know beforehand of what matter and commixture what kind of those creatures will arise⁴¹.

"We have also particular pools, where we make trials upon fishes, as we have said before of beasts and birds.

"We have also places for breed and generation of those kinds of worms and flies which are of special use; such as are with you your silk-worms and bees.

"I will not hold you long with recounting of our brew-houses, bake-houses, and kitchens, where are made divers drinks, breads, and meats, rare and of special effects. Wines we have of grapes; and drinks of other juice of fruits, of grains,

³⁸ The translation adds *coruscationum*.

³⁹ This experiment has been tried, especially by Dr. Beddoes of Clifton, but without any marked result. Some relief has been obtained in cases of phthisis by inhaling oxygenated air.—R. L. E.

⁴⁰ The translation adds *ut corpori humano melius caveamus*.

⁴¹ This passage is quoted with great approbation by Geoffroi St. Hilaire at the end of a memoir on the results of artificial incubation read before the Academy of Sciences in 1826, and published in the *Annales du Muséum* for that year. It may be said that he was the first by whom the scientific importance of monstrosities was fully appreciated, and in answer to the objections which were made to the study of Teratology on the ground of its inutility, he invokes the authority of Bacon.—R. L. E.

and of roots : and of mixtures with honey, sugar, manna, and fruits dried and decocted. Also of the tears or woundings of trees, and of the pulp of canes. And these drinks are of several ages, some to the age or last of forty years. We have drinks also brewed with several herbs, and roots, and spices ; yea with several fleshes, and white meats ; whereof some of the drinks are such, as they are in effect meat and drink both ⁴² : so that divers, especially in age, do desire to live with them, with little or no meat or bread. And above all, we strive to have drinks of extreme thin parts, to insinuate into the body, and yet without all biting, sharpness, or fretting ; insomuch as some of them put upon the back of your hand will, with a little stay, pass through to the palm, and yet taste mild to the mouth. We have also waters which we ripen in that fashion, as they become nourishing ; so that they are indeed excellent drink ; and many will use no other. Breads we have of several grains, roots, and kernels ; yea and some of flesh and fish dried ; with divers kinds of leavenings and seasonings : so that some do extremely move appetites ; some do nourish so, as divers do live of them, without any other meat ; who live very long. So for meats, we have some of them so beaten and made tender and mortified, yet without all corrupting, as a weak heat of the stomach will turn them into good chylus, as well as a strong heat would meat otherwise prepared. We have some meats also and breads and drinks, which taken by men enable them to fast long after ; and some other, that used make the very flesh of men's bodies sensibly more hard and tough, and their strength far greater than otherwise it would be.

" We have dispensaries, or shops of medicines. Wherein you may easily think, if we have such variety of plants and living creatures more than you have in Europe, (for we know what you have,) the simples, drugs, and ingredients of medicines, must likewise be in so much the greater variety. We have them likewise of divers ages, and long fermentations. And for their preparations, we have not only all manner of exquisite distillations and separations, and especially by gentle heats and percolations through divers strainers, yea and substances ; but also exact forms of composition, whereby they incorporate almost, as they were natural simples.

" We have also divers mechanical arts, which you have not ; and stuffs made by them ; as papers, linen, silks, tissues ; dainty works of feathers of wonderful lustre ; excellent dyes, and many others ; and shops likewise, as well for such as are not brought into vulgar use amongst us as for those that are. For you must know that of the things before recited, many of them are grown into use throughout the kingdom ; but yet if they did flow from our invention, we have of them also for patterns and principals.

" We have also furnaces of great diversities, and that keep great diversity of heats ; fierce and quick ; strong and constant ; soft and mild ; blown, quiet ; dry, moist ; and the like. But above all, we have heats in imitation of the sun's and heavenly bodies' heats, that pass divers inequalities and (as it were) orbs, progresses, and returns, whereby we produce admirable effects. Besides, we have heats of dungs, and of bellies and maws of living creatures, and of their bloods and bodies ; and of hays and herbs laid up moist ; of lime unquenched ; and such like. Instruments also which generate heat only by motion ⁴³. And farther, places for strong insulations ; and again, places under the earth, which by nature or art yield heat. These divers heats we use, as the nature of the operation which we intend requireth.

" We have also perspective-houses, where we make demonstrations of all lights and radiations ; and of all colours ; and out of things uncoloured and transparent, we can represent unto you all several colours ; not in rain-bows, as it is in gems and prisms, but of themselves single. We represent also all multiplications of

⁴² Chocolate, which however was well known in Bacon's time, seems to fulfil this description. It long since gave rise to a doubt whether drinking it amounted to breaking fast. See the treatise of the Jesuit Hurtado, " *Utrum potio chocolatica frangat jejuniu Ecclesiæ* ".—*R. L. E.*

⁴³ Bacon seems to refer to the result of his investigation into the form of heat, namely that heat is a kind of motion.—*R. L. E.*

light, which we carry to great distance, and make so sharp as to discern small points and lines; also all colorations of light: all delusions and deceits of the sight, in figures, magnitudes, motions, colours: all demonstrations of shadows. We find also divers means, yet unknown to you, of producing of light originally from divers bodies. We procure means of seeing objects afar off; as in the heaven and remote places; and represent things near as afar off, and things afar off as near; making feigned distances. We have also helps for the sight, far above spectacles and glasses in use. We have also glasses and means to see small and minute bodies perfectly and distinctly; as the shapes and colours of small flies and worms, grains and flaws in gems, which cannot otherwise be seen; observations in urine⁴⁴ and blood, not otherwise to be seen⁴⁵. We make artificial rainbows, halos, and circles about light. We represent also all manner of reflexions, refractions, and multiplications of visual beams of objects.

"We have also precious stones of all kinds, many of them of great beauty, and to you unknown; crystals likewise; and glasses of divers kinds; and amongst them some of metals vitrified, and other materials besides those of which you make glass. Also a number of fossils, and imperfect minerals, which you have not. Likewise loadstones of prodigious virtue; and other rare stones, both natural and artificial.

"We have also sound-houses, where we practise and demonstrate all sounds, and their generation. We have harmonies which you have not, of quarter-sounds, and lesser slides of sounds. Divers instruments of music likewise to you unknown, some sweeter than any you have; together with bells and rings that are dainty and sweet. We represent small sounds as great and deep; likewise great sounds extenuate and sharp; we make divers tremblings and warblings of sounds, which in their original are entire. We represent and imitate all articulate sounds and letters, and the voices and notes of beasts and birds. We have certain helps which set to the ear do further the hearing greatly. We have also divers strange and artificial echos, reflecting the voice many times, and as it were tossing it: and some that give back the voice louder than it came; some shriller, and some deeper; yea, some rendering the voice differing in the letters or articulate sound from that they receive. We have also means to convey sounds in trunks and pipes, in strange lines and distances⁴⁶.

"We have also perfume-houses; wherewith we join also practices of taste. We multiply smells, which may seem strange. We imitate smells, making all smells to breathe out of other mixtures than those that give them⁴⁷. We make divers imitations of taste likewise, so that they will deceive any man's taste. And in this house we contain also a confiture-house; where we make all sweet-meats, dry and moist⁴⁸, and divers pleasant wines, milks, broths, and sallets, far in greater variety than you have.

⁴⁴ It has been proposed to facilitate the examination of diabetic urine by an apparatus in which the amount of sugar present in it is to be measured by its effect on the plane of polarisation of polarised light transmitted through it.—R. L. E.

⁴⁵ Nothing that has been accomplished with the microscope would have interested Bacon more than the discoveries of Schleiden and Schwann, because nothing has brought us so near the *latens processus* by which the tissues of organic life are formed. It is remarkable that when Schleiden had as he conceived destroyed the analogy between the developments of vegetable and animal life, by showing that all vegetable tissues are developed by cells, Schwann should have re-established it more clearly than before by showing that this is true of all animal tissues also.—R. L. E.

⁴⁶ [*ad magnam distantiam, et in lineis tortuosis.*] This is now done very effectively by means of gutta percha tubing.—R. L. E.

⁴⁷ This power of imitating smells is one of the recent achievements of chemistry. From fusil oil, a product of the distillation of spirits from potatoes, itself exceedingly offensive, may be got oil of apples, oil of pears, oil of grapes, and oil of cognac. The oil of pine-apples and that of bitter almonds enable confectioners to imitate perfectly the scent and flavour of pine-apples and bitter almonds respectively, and both, like the perfumes already mentioned, are got from very offensive substances.—R. L. E.

⁴⁸ The translation adds *imò et condimus ea cum rebus aliis dulcibus, gratissimis, præter saccharum et mel.*

" We have also engine-houses, where are prepared engines and instruments for all sorts of motions. There we imitate and practise to make swifter motions than any you have, either out of your muskets or any engine that you have ; and to make them and multiply them more easily, and with small force, by wheels and other means : and to make them stronger, and more violent than yours are ; exceeding your greatest cannons and basilisks. We represent also ordnance and instruments of war, and engines of all kinds : and likewise new mixtures and compositions of gun-powder, wildfires burning in water, and unquenchable. Also fire-works of all variety both for pleasure and use. We imitate also flights of birds ; we have some degrees of flying in the air ; we have ships and boats for going under water⁴⁹, and brooking of seas ; also swimming-girdles and supporters. We have divers curious clocks, and other like motions of return, and some perpetual motions. We imitate also motions of living creatures, by images of men, beasts, birds, fishes, and serpents. We have also a great number of other various⁵⁰ motions, strange for equality, fineness, and subtily.

" We have also a mathematical-house, where are represented all instruments, as well of geometry as astronomy, exquisitely made.

" We have also houses of deceits of the senses ; where we represent all manner of feats of juggling, false apparitions, impostures, and illusions ; and their fallacies. And surely you will easily believe that we that have so many things truly natural which induce admiration, could in a world of particulars deceive the senses, if we would disguise those things and labour to make them seem more miraculous. But we do hate all impostures and lies ; insomuch as we have severely forbidden it to all our fellows, under pain of ignominy and fines, that they do not shew any natural work or thing, adorned or swelling ; but only pure as it is, and without all affectation of strangeness.

" These are (my son) the riches of Salomon's House.

" For the several employments and offices of our fellows ; we have twelve that sail into foreign countries, under the names of other nations, (for our own we conceal ;) who bring us the books, and abstracts, and patterns of experiments of all other parts. These we call Merchants of Light.

" We have three that collect the experiments which are in all books. These we call Depredators.

" We have three that collect the experiments of all mechanical arts ; and also of liberal sciences ; and also of practices which are not brought into arts. These we call Mystery-men⁵¹.

" We have three that try new experiments, such as themselves think good. These we call Pioners or Miners.

" We have three that draw the experiments of the former four into titles and tables, to give the better light for the drawing of observations and axioms out of them. These we call Compilers⁵².

" We have three that bend themselves, looking into the experiments of their fellows, and cast about how to draw out of them things of use and practice for man's life, and knowledge as well for works as for plain demonstration of causes, means of natural divinations, and the easy and clear discovery of the virtues and parts of bodies. These we call Dowry-men or Benefactors⁵³.

" Then after divers meetings and consults of our whole number, to consider of

⁴⁹ A boat for going under water was one of Drebbel's inventions exhibited in 1620. Bacon in the *De Augmentis* refers to another, namely Drebbel's method of producing cold.—R. L. E.

⁵⁰ The word " various," which seems to be redundant, is omitted in the translation.

⁵¹ In the translation they are called *Venatores*, hunters ; a name, however, which does not seem to distinguish their peculiar office so accurately as " mystery-men," that is, men whose business was to inquire after mysteries, *i.e.* crafts.

⁵² These represent the formation of the tables *comparentiæ*, *absentia in proximo*, and *graduam*. See *Novum Organum*, ii. § 11-13.—R. L. E.

For " compilers," the translation has *divisores*, distributors.

⁵³ These represent the *Vindemiatio prima*. See *Nov. Org.* ii. § 20.—R. L. E.

the former labours and collections, we have three that take care, out of them, to direct new experiments, of a higher light, more penetrating into nature than the former. These we call Lamps.

"We have three others that do execute the experiments so directed, and report them. These we call Inoculators.

"Lastly, we have three that raise the former discoveries by experiments into greater observations, axioms, and aphorisms⁵⁴. These we call Interpreters of Nature.

"We have also, as you must think, novices and apprentices, that the succession of the former employed men do not fail; besides a great number of servants and attendants, men and women. And this we do also: we have consultations, which of the inventions and experiments which we have discovered shall be published, and which not: and take all an oath of secrecy, for the concealing of those which we think fit to keep secret: though some of those we do reveal sometimes to the state, and some not.

"For our ordinances and rites: we have two very long and fair galleries: in one of these we place patterns and samples of all manner of the more rare and excellent inventions: in the other we place the statua's of all principal inventors. There we have the statua of your Columbus, that discovered the West Indies: also the inventor of ships: your monk that was the inventor of ordnance and of gunpowder: the inventor of music: the inventor of letters: the inventor of printing: the inventor of observations of astronomy: the inventor of works in metal: the inventor of glass: the inventor of silk of the worm: the inventor of wine: the inventor of corn and bread: the inventor of sugars: and all these by more certain tradition than you have. Then have we divers inventors of our own, of excellent works; which since you have not seen, it were too long to make descriptions of them; and besides, in the right understanding of those descriptions you might easily err. For upon every invention of value, we erect a statua to the inventor, and give him a liberal and honourable reward. These statua's are some of brass; some of marble and touch-stone; some of cedar and other special woods gilt and adorned: some of iron; some of silver; some of gold.

"We have certain hymns and services, which we say daily, of laud and thanks to God for his marvellous works: and forms of prayers, imploring his aid and blessing for the illumination of our labours, and the turning of them into good and holy uses.

"Lastly, we have circuits or visits of divers principal cities of the kingdom: where, as it cometh to pass, we do publish such new profitable inventions as we think good. And we do also declare natural divinations of diseases, plagues, swarms of hurtful creatures, scarcity, tempests, earthquakes, great inundations, comets, temperature of the year, and divers other things; and we give counsel thereupon what the people shall do for the prevention and remedy of them".

And when he had said this, he stood up; and I, as I had been taught, kneeled down; and he laid his right hand upon my head, and said, "God bless thee, my son, and God bless this relation which I have made. I give thee leave to publish it for the good of other nations; for we here are in God's bosom, a land unknown". And so he left me; having assigned a value of about two thousand ducats, for a bounty to me and my fellows. For they give great largesses where they come upon all occasions.

[THE REST WAS NOT PERFECTED.]

⁵⁴ The translation adds that this was only done after consultation with the whole body. *Quod faciunt non nisi consultatione et colloquiis prius habitis cum sociis universis.*

ESSAYS OR COUNSELS CIVIL AND MORAL

PREFACE.

BY JAMES SPEDDING.

AMONG the innumerable editions of Bacon's Essays that have been published, there are only four which, as authorities for the text, have any original or independent value; namely those published by Bacon himself in 1597, in 1612, and in 1625; and the Latin version published by Dr. Rawley in 1638. The rest are merely reprints of one or other of these.

The edition of 1597 contained ten essays, together with the *Meditationes Sacræ*, and the *Colours of Good and Evil*. That of 1612, a small volume in 8vo., contained essays only; but the number was increased to thirty-eight, of which twenty-nine were quite new, and all the rest more or less corrected and enlarged. That of 1625, a 4to. and one of the latest of Bacon's publications, contained fifty-eight essays, of which twenty were new, and most of the rest altered and enlarged.

The gradual growth of this volume, containing as it does the earliest and the latest fruits of Bacon's observation in that field in which its value has been most approved by universal and undiminished popularity, is a matter of considerable interest; and as the successive changes are not such as could be represented by a general description or conveniently specified in foot-notes, I have thought it best to reprint the two first editions entire, and add them in an appendix¹. Considering also that, although it has been thought expedient throughout the text of this edition of Bacon's works to modernize the spelling, it may nevertheless be convenient to the reader to have a specimen of the orthography of Bacon's time, I have taken this opportunity in giving one; and preserved the original spelling throughout both these reprints.

I have also been able to supply from a manuscript in the British Museum evidence of another stage in the growth of this volume, intermediate between the editions of 1597 and 1612; of which manuscript, in connexion with the reprint of the latter, a complete account will be given.

The text of the Essays is taken of course from the edition of 1625; a correct representation of which is nearly all that a modern reader requires. The only points in which the audience to which they now address themselves stands in a different position towards them from that to which they were originally addressed, appear to be,—first, knowledge of Latin, which is probably a less general accomplishment among the readers of books now than it was then; and secondly, familiarity with the ordinary language of that day, in which some expressions have worn out of use with time, and some have acquired new meanings. To meet these changes, I have in the first place translated the Latin quotations, in the same manner and upon the same principle which I have explained at length in my preface to the *Advancement of Learning* (pp. 40-41.); and in the second place, I have added an explanatory note wherever I have observed any expression which a modern reader is likely to misunderstand or not to understand. But I have not attempted to develop allusions, or to canvass historical statements, or to point out inaccuracies of quotation, where the difference does not affect the argument,—still less to entertain the reader with discourses of my own; conceiving that the worth of writings of this kind depends in great part

¹ [Not given in the present edition.]

upon the rejection of superfluities, and that an annotator who is too diligent in producing all that he can find to say about his text runs a great risk of merely encumbering the reader with the very matter from which it was the author's labour to disembarrass him. I have even had my doubts whether in writings which remain as fresh as these, the very insertion of references to passages quoted be not an unwelcome interruption and an unwarrantable liberty. When a modern writer introduces, for ornament or illustration or impression, a line from Virgil or Milton, he never thinks of adding a reference to the book and verse; and I suppose that Mr. Singer would not look upon an asterisk and a foot-note, with *Hor. Carm. I. 12.45* as any improvement to the elegant motto which occupies the blank page fronting the title of his very elegant edition of these Essays. Bacon's philosophical works stand in many respects in a different position. Their value is in great part historical and antiquarian. They no longer speak to us as to contemporaries. To understand their just import, we must be carried back to the time, and it is of importance to know what books were then in estimation and what authors were familiarly appealed to, and carried weight as vouchers. The Essays, on the contrary, have for us precisely the same sort of interest which they had for the generation to which they were immediately addressed; they "come home to men's business and bosoms" just in the same way; they appeal to the same kind of experience; the allusions and citations are still familiar, and produce the same kinds of impression on the imagination. So that I do not see why the reason which induced Bacon to cite an ancient saying, a tradition of the poets, an observation of one of the fathers, or a sentence from some classical writer, without specifying the volume and page where he found it, should not still, be held a reason for leaving them to produce the effect which he intended, unincumbered with a piece of information which I suppose he thought superfluous or inconvenient.

The Latin translation of the Essays, published by Dr. Rawley in 1638 among the *Opera Moralia et Civilia*, under the weightier² title of *Sermones Fideles sive Interiora Rerum*, has (as I said) an original and independent value. Whether any of them were actually translated by Bacon himself, or how far he superintended the work, it seems impossible to know. Mr. Singer indeed represents them, on the authority of the title³, as having been put into Latin by Bacon himself "*præterquam in paucis*"; but the words which he quotes occur in the title not of the *Sermones Fideles*, but of the whole volume, which contains four other works; the *Sermones Fideles* forming less than a fourth of the whole: so that for any thing these words imply they may themselves have been among the things excepted⁴. As it is certain however that Bacon himself regarded the Latin version as that in which they were to live, we may be sure that he took care to have it properly done: only as it was not published till twelve years after his death, we cannot be sure that it was all finished before he died. Several hands are said to have been employed in the work, and in the absence of all specific information, it is not improbable that there are parts of it which he did not live to see completed. Taken with this caution however, the Latin translation must

² Deinde sequetur libellus ille quem vestra lingua *Saggi Morali* appellastis. Verum illi libro nomen gravius impono: scilicet ut inscribatur *Sermones Fideles, sive Interiora Rerum*.—Bacon's *Letter to Fulgentio*.

³ "In the year 1638, Dr. Rawley, who had been Bacon's chaplain, published a folio volume, containing, amongst other works in Latin, a translation of the Essays, under the title of '*Sermones Fideles, ab ipso Honoratissimo Auctore, præterquam in paucis, Latinitate donati*.'—Pref. p. xvi.

⁴ Francisci Baconi . . . operum moralium et civilium tomus.

Qui continet	{	<i>Historiam Regni Henrici Septimi Regis Angliæ.</i>
		<i>Sermones Fideles, sive Interiora Rerum.</i>
		<i>Tractatum de Sapientia Veterum.</i>
		<i>Dialogum de Bello Sacro.</i>
		<i>Et Novam Atlantidem.</i>

Ab ipso Honoratissimo Auctore, præterquam in paucis, Latinitate donatus.

be accepted as a work of authority, and in one respect of superior authority to the original, because of later date.

I am not aware that any such value belongs to any of the translations into modern languages. An Italian translation of the Essays and the De Sapientia Veterum, published in London in 1618, with a dedicatory letter from Tobie Matthew to Cosmo de' Medici, may be presumed to have been made with Bacon's sanction; both because Matthew was so intimate a friend, and because it includes one essay which had not then been published⁵, as well as a large extract from the letter to Prince Henry which Bacon had intended to prefix to the edition of 1612, but was prevented by his death. But there is no reason to suppose that Bacon had anything more to do with it. It is true that Andrea Cioli, who by Cosmo's direction brought out a new and revised edition of this volume at Florence in 1619, seems at first sight to speak of the translation as if it were Bacon's own composition—(ma non hò già voluto alterare alcuna di quelle parole, che forse nella lingua nostra non appariscono interamente proprie del senso, à che sono state in detta Opera destinate, per non torre all' Autore la gloria, che merita di havere così ben saputo esprimere i suoi Concetti in Idioma altrettanto diverso dal suo, quanto è lontana da questa nostra la sua Regione)—but the supposition is hardly reconcilable with the words of Matthew's dedicatory letter (non può mancar la scusa à chi s'è ingegnato tradur li concetti di questo Autore, etc.); and in the absence of all other evidence is too improbable to be believed. Nor do Cioli's words necessarily imply more than that the translator was an Englishman. That the translation was not the work of an Italian,—and therefore not (according to Mr. Singer's conjecture) by Father Fulgentio,—they afford evidence which may be considered conclusive.

THE EPISTLE DEDICATORY.

To the Right Honourable my very good Lo. the DUKE of BUCKINGHAM his Grace
Lo. High Admiral of England.

EXCELLENT LO.

SALOMON says, *A good name is as a precious ointment*; and I assure myself, such will your Grace's name be with posterity. For your fortune and merit both have been eminent. And you have planted things that are like to last. I do now publish my Essays; which, of all my other works, have been most current; for that, as it seems, they come home to men's business and bosoms. I have enlarged them both in number and weight; so that they are indeed a new work. I thought it therefore agreeable to my affection and obligation to your Grace, to prefix your name before them, both in English and in Latin. For I do conceive that the Latin volume of them (being in the universal language) may last as long as books last. My Instauration I dedicated to the King; my History of Henry the Seventh (which I have now also translated into Latin), and my portions of Natural History, to the Prince; and these I dedicate to your Grace; being of the best fruits that by the good encrease which God gives to my pen and labours I could yield. God lead your Grace by the hand.

Your Grace's most obliged and
faithful seruant,

FR. Sr. ALBAN.

⁵ Mr. Singer says two: but one of those he quotes—the Essay "Of Honour and Reputation"—will be found in the edition of 1597.

I. OF TRUTH.

What is Truth? said jesting Pilate; and would not stay for an answer. Certainly there be that delight in giddiness, and count it a bondage to fix a belief; affecting free-will in thinking, as well as in acting. And though the sects of philosophers of that kind be gone, yet there remain certain discoursing wits which are of the same veins, though there be not so much blood in them as was in those of the ancients. But it is not only the difficulty and labour which men take in finding out of truth; nor again that when it is found it imposeth upon men's thoughts; that doth bring lies in favour; but a natural though corrupt love of the lie itself. One of the later school of the Grecians examineth the matter, and is at a stand to think what should be in it, that men should love lies; where neither they make for pleasure, as with poets, nor for advantage, as with the merchant; but for the lie's sake. But I cannot tell; this same truth is a naked and open day-light that doth not shew the masks and mummeries and triumphs of the world, half so stately and daintily as candle-lights. Truth may perhaps come to the price of a pearl, that sheweth best by day; but it will not rise to the price of a diamond or carbuncle, that sheweth best in varied lights. A mixture of a lie doth ever add pleasure. Doth any man doubt, that if there were taken out of men's minds vain opinions, flattering hopes, false valuations, imaginations as one would, and the like, but it would leave the minds of a number of men poor shrunken things, full of melancholy and indisposition, and unpleasing to themselves? One of the Fathers, in great severity, called poesy *vinum dæmonum* [devil's-wine], because it filleth the imagination; and yet it is but with the shadow of a lie. But it is not the lie that passeth through the mind, but the lie that sinketh in and settleth in it, that doth the hurt; such as we spake of before. But howsoever these things are thus in men's depraved judgments and affections, yet truth, which only doth judge itself, teacheth that the inquiry of truth, which is the love-making or wooing of it, the knowledge of truth, which is the presence of it, and the belief of truth, which is the enjoying of it, is the sovereign good of human nature. The first creature of God, in the works of the days, was the light of the sense; the last was the light of reason; and his sabbath work ever since is the illumination of his Spirit. First he breathed light upon the face of the matter or chaos; then he breathed light into the face of man; and still he breatheth and inspireth light into the face of his chosen. The poet that beautified the sect that was otherwise inferior to the rest⁶, saith yet excellently well: *It is a pleasure to stand upon the shore, and to see ships tossed upon the sea; a pleasure to stand in the window of a castle, and to see a battle and the adventures thereof below; but no pleasure is comparable to the standing upon the vantage ground of Truth* (a hill not to be commanded, and where the air is always clear and serene), *and to see the errors, and wanderings, and mists, and tempests, in the vale below*; so always that this prospect be with pity, and not with swelling or pride. Certainly, it is heaven upon earth, to have a man's mind move in charity, rest in providence, and turn upon the poles of truth.

To pass from the theological and philosophical truth, to the truth of civil business; it will be acknowledged even by those that practise it not, that clear and round dealing is the honour of man's nature; and that mixture of falsehood is like allay in coin of gold and silver, which may make the metal work the better, but it embaseth it. For these winding and crooked courses are the goings of the serpent; which goeth basely upon the belly, and not upon the feet. There is no vice that doth so cover a man with shame as to be found false and perfidious. And therefore Montaigne saith prettily, when he inquired the reason, why the word of the lie should be such a disgrace and such an odious charge? Saith he, *If it be well weighed, to say that a man lieth, is as much to say, as that he is brave towards God and a coward towards men*⁷. For a lie faces God, and shrinks from man. Surely the wickedness of falsehood and breach of faith cannot possibly be so highly expressed, as in that it shall be the last peal to call the judgments of God upon the generations of men; it being foretold, that when Christ cometh, *he shall not find faith upon the earth*.

⁶ Lucretius. B. II: beginning. ⁷ Essais, II. 18. Cf. Plutarch, Lysand. c. 8.

II. OF DEATH.

MEN fear Death, as children fear to go in the dark ; and as that natural fear in children is increased with tales, so is the other. Certainly, the contemplation of death, as the wages of sin and passage to another world, is holy and religious ; but the fear of it, as a tribute due unto nature, is weak. Yet in religious meditations there is sometimes mixture of vanity and of superstition. You shall read in some of the friars' books of mortification, that a man should think with himself what the pain is if he have but his finger's end pressed or tortured, and thereby imagine what the pains of death are, when the whole body is corrupted and dissolved ; when many times death passeth with less pain than the torture of a limb : for the most vital parts are not the quickest of sense. And by him that spake only as a philosopher and natural man, it was well said, *Pompa mortis magis terret, quam mors ipsa*⁸ : [it is the accompaniments of death that are frightful rather than death itself]. Groans and convulsions, and a discoloured face, and friends weeping, and blacks, and obsequies, and the like, shew death terrible. It is worthy the observing, that there is no passion in the mind of man so weak, but it mates and masters the fear of death ; and therefore death is no such terrible enemy when a man hath so many attendants about him that can win the combat of him. Revenge triumphs over death ; Love slights it ; Honour aspireth to it ; Grief flieth to it⁹ ; Fear pre-occupateth it ; nay we read, after Otho the emperor had slain himself, Pity (which is the tenderest of affections) provoked many to die, out of mere compassion to their sovereign, and as the truest sort of followers. Nay, Seneca adds niceness and satiety : *Cogita quamdiu eadem feceris ; mori velle, non tantum fortis, aut miser, sed etiam fastidiosus potest*. A man would die, though he were neither valiant nor miserable, only upon a weariness to do the same thing so oft over and over. It is no less worthy to observe, how little alteration in good spirits the approaches of death make ; for they appear to be the same men till the last instant. Augustus Cæsar died in a compliment : *Livia, conjugii nostri memor, vive et vale* [farewell, Livia ; and forget not the days of our marriage]. Tiberius in dissimulation ; as Tacitus saith of him, *Jam Tiberium vires et corpus, non dissimulatio, deserebant* : [his powers of body were gone, but his power of dissimulation still remained]. Vespasian in a jest ; sitting upon the stool, *Ut puto Deus fio* [I think I am becoming a god]. Galba with a sentence ; *Feri, si ex re sit populi Romani* [strike, if it be for the good of Rome] ; holding forth his neck. Septimius Severus in despatch ; *Adeste si quid mihi restat agendum* [make haste, if there is anything more for me to do]. And the like. Certainly the Stoics bestowed too much cost upon death, and by their great preparations made it appear more fearful. Better saith he, *qui finem vitæ extremum inter munera ponat naturæ* [who accounts the close of life as one of the benefits of nature]. It is as natural to die as to be born ; and to a little infant, perhaps, the one is as painful as the other. He that dies in an earnest pursuit, is like one that is wounded in hot blood ; who, for the time, scarce feels the hurt ; and therefore a mind fixed and bent upon somewhat that is good doth avert the dolours of death. But above all, believe it, the sweetest canticle is, *Nunc dimittis* ; when a man hath obtained worthy ends and expectations. Death hath this also ; that it openeth the gate to good fame, and extinguisheth envy. *Extinctus amabitur idem* [the same man that was envied while he lived, shall be loved when he is gone].

⁸ Seneca, Ep. 24. Tolle istam pompam sub qua lates et stultos territis : mors es, quem nuper servus meus, quem ancilla contempsit. See the rest of the passage, and my note on Rawley's Life of Bacon, *supra*, p. 8.

⁹ The translation adds, *metus ignominie eligit* : a sentence which is also found in the edition of 1612,—"Delivery from ignominy chooseth it" ; omitted here probably by accident.

III. OF UNITY IN RELIGION.

MAN being the chief band of human society, it is a happy thing when itself is well contained within the true band of Unity. The quarrels and divisions about religion were evils unknown to the heathen. The reason was, because the religion of the heathen consisted rather in rites and ceremonies, than in any constant belief. For you may imagine what kind of faith theirs was, when the chief doctors and fathers of their church were the poets. But the true God hath this attribute, that he is a *jealous God*; and therefore his worship and religion will endure no mixture nor partner. We shall therefore speak a few words concerning the Unity of the Church; what are the Fruits thereof; what the Bounds; and what the Means.

The Fruits of Unity (next unto the well pleasing of God, which is all in all) are two; the one towards those that are without the church, the other towards those that are within. For the former; it is certain that heresies and schisms are of all others the greatest scandals; yea, more than corruption of manners. For as in the natural body a wound or solution of continuity is worse than a corrupt humour; so in the spiritual. So that nothing doth so much keep men out of the church, and drive men out of the church, as breach of unity. And therefore, whensoever it cometh to that pass, that one saith *Ecce in deserto*, another saith *Ecce in penetralibus*: that is, when some men seek Christ in the conventicles of heretics, and others in an outward face of a church, that voice had need continually to sound in man's ears, *Nolite exire,—Go not out*. The Doctor of the Gentiles (the propriety of whose vocation drew him to have a special care of those without) saith, *If an heathen come in, and hear you speak with several tongues, will he not say that you are mad?* And certainly it is little better, when atheists and profane persons do hear of so many discordant and contrary opinions in religion; it doth avert them from the church, and maketh them to sit down in the chair of the scorners. It is but a light thing to be vouched in so serious a matter, but yet it expresseth well the deformity. There is a master of scoffing, that in his catalogue of books of a feigned library sets down this title of a book, *The morris-dance of Heretics*. For indeed every sect of them hath a diverse posture or cringe by themselves, which cannot but move derision in worldlings and depraved politics, who are apt to contemn holy things.

As for the fruit towards those that are within; it is peace; which containeth infinite blessings. It establisheth faith. It kindleth charity. The outward peace of the church distilleth into peace of conscience. And it turneth the labours of writing and reading of controversies into treatises¹⁰ of mortification and devotion.

Concerning the Bounds of Unity; the true placing of them importeth exceedingly. There appear to be two extremes. For to certain zelants all speech of pacification is odious. *Is it peace, Jehu? What hast thou to do with peace? turn thee behind me.* Peace is not the matter, but following and party. Contrariwise, certain *Lactucians* and lukewarm persons think they may accommodate points of religion by middle ways, and taking part of both, and witty reconcilements; as if they would make an arbitrement between God and man. Both these extremes are to be avoided; which will be done, if the league of Christians penned by our Saviour himself were in the two cross clauses thereof soundly and plainly expounded: *He that is not with us is against us*; and again, *He that is not against us is with us*; that is, if the points fundamental and of substance in religion were truly discerned and distinguished from points not merely of faith, but of opinion, order, or good intention. This is a thing may seem to many a matter trivial, and done already. But if it were done less partially, it would be embraced more generally.

Of this I may give only this advice, according to my small model. Men ought to take heed of reading God's church by two kinds of controversies. The one is, when the matter of the point controverted is too small and light, not worth the heat and strife about it, kindled only by contradiction. For as it is noted by one of the fathers, *Christ's coat indeed had no seam, but the church's vesture was of divers colours*; whereupon he saith, *In veste varietas sit, scissura non sit* [let there be variety in the garment, but let there be no division]: they be two things, *Unity and Uniformity*. The other is, when the matter of the point controverted

¹⁰ treatises, in the original.

is great, but it is driven to an overgreat subtilty and obscurity; so that it becometh a thing rather ingenious than substantial. A man that is of judgment and understanding shall sometimes hear ignorant men differ, and know well within himself that those which so differ mean one thing, and yet they themselves would never agree. And if it come so to pass in that distance of judgment which is between man and man, shall we not¹¹ think that God above, that knows the heart, doth not discern that frail men in some of their contradictions intend the same thing; and accepteth of both? The nature of such controversies is excellently expressed by St. Paul in the warning and precept that he giveth concerning the same, *Devita profanas vocum novitates, et oppositiones falsi nominis scientiæ* [Avoid profane novelties of terms, and oppositions of science falsely so called]. Men create oppositions which are not; and put them into new terms so fixed, as whereas the meaning ought to govern the term, the term in effect governeth the meaning. There be also two false peaces or unities: the one, when the peace is grounded but upon an implicit ignorance; for all colours will agree in the dark: the other, when it is pieced up upon a direct admission of contraries in fundamental points. For truth and falsehood, in such things, are like the iron and clay in the toes of Nabuchadnezzar's image; they may cleave, but they will not incorporate.

Concerning the Means of procuring Unity; men must beware, that in the procuring or muniting of religious unity they do not dissolve and deface the laws of charity and of human society. There be two swords amongst Christians, the spiritual and temporal; and both have their due office and place in the maintenance of religion. But we may not take up the third sword, which is Mahomet's sword, or like unto it; that is, to propagat religion by wars or by sanguinary persecutions to force consciences; except it be in cases of overt scandal, blasphemy, or intermixture of practice against the state; much less to nourish seditions; to authorise conspiracies and rebellions; to put the sword into the people's hands; and the like; tending to the subversion of all government, which is the ordinance of God. For this is but to dash the first table against the second; and so to consider men as Christians, as we forget that they are men. Lucretius the poet, when he beheld the act of Agamemnon, that could endure the sacrificing of his own daughter, exclaimed:

Tantum Relligio potuit suadere malorum:

[to such ill actions Religion could persuade a man]. What would he have said, if he had known of the massacre in France, or the powder treason of England? He would have been seven times more Epicure and atheist than he was. For as the temporal sword is to be drawn with great circumspection in cases of religion; so it is a thing monstrous to put it into the hands of the common people. Let that be left unto the Anabaptists, and other furies. It was great blasphemy when the devil said, *I will ascend and be like the Highest*; but it is greater blasphemy to personate God, and bring him in saying, *I will descend, and be like the prince of darkness*: and what is it better, to make the cause of religion to descend to the cruel and execrable actions of murdering princes, butchery of people, and subversion of states and governments? Surely this is to bring down the Holy Ghost, instead of the likeness of a dove, in the shape of a vulture or raven; and set out of the bark of a Christian church a flag of a bark of pirates and Assassins. Therefore it is most necessary that the church by doctrine and decree, princes by their sword, and all learnings, both Christian and moral, as by their Mercury rod, do damn and send to hell for ever those facts and opinions tending to the support of the same; as hath been already in good part done. Surely in counsels concerning religion, that counsel of the apostle would be prefixed, *Ira hominis non implet justitiam Dei* [The wrath of man worketh not the righteousness of God]. And it was a notable observation of a wise Father, and no less ingenuously confessed, that those which held and persuaded *pressure of consciences, were commonly interested therein themselves for their own ends.*

¹¹ So in the original. One of the *nots* should obviously be struck out.

IV. OF REVENGE.

REVENGE is a kind of wild justice ; which the more man's nature runs to, the more ought law to weed it out. For as for the first wrong, it doth but offend the law ; but the revenge of that wrong putteth the law out of office. Certainly, in taking revenge, a man is but even with his enemy ; but in passing it over, he is superior ; for it is a prince's part to pardon. And Salomon I am sure, saith, *It is the glory of a man to pass by an offence.* That which is past is gone, and irrevocable ; and wise men have enough to do with things present and to come ; therefore they do but trifle with themselves, that labour in past matters. There is no man doth a wrong for the wrong's sake ; but thereby to purchase himself profit, or pleasure, or honour, or the like. Therefore why should I be angry with a man for loving himself better than me ? And if any man should do wrong merely out of ill-nature, why, yet is it but like the thorn or briar, which prick and scratch, because they can do no other. The most tolerable sort of revenge is for those wrongs which there is no law to remedy ; but then let a man take heed the revenge be such as there is no law to punish ; else a man's enemy is still beforehand, and it is two for one. Some, when they take revenge, are desirous the party should know whence it cometh. This the more generous. For the delight seemeth to be not so much in doing the hurt as in making the party repent. But base and crafty cowards are like the arrow that flieth in the dark. Cosmus, duke of Florence, had a desperate saying against perfidious or neglecting friends, as if those wrongs were unpardonable ; *You shall read (saith he) that we are commanded to forgive our enemies ; but you never read that we are commanded to forgive our friends.* But yet the spirit of Job was in a better tune : *Shall we (saith he) take good at God's hands, and not be content to take evil also ?* And so of friends in a proportion. This is certain, that a man that studieth revenge keeps his own wounds green, which otherwise would heal and do well. Public revenges are for the most part fortunate ; as that for the death of Cæsar ; for the death of Pertinax ; for the death of Henry the Third¹² of France ; and many more. But in private revenges it is not so. Nay rather, vindictive persons live the life of witches ; who, as they are mischievous, so end they infortunate.

V. OF ADVERSITY.

It was a high speech of Seneca (after the manner of the Stoics), *that the good things which belong to prosperity are to be wished ; but the good things that belong to adversity are to be admired. Bona rerum secundarum optabilia ; adversarum mirabilia.* Certainly if miracles be the command over nature, they appear most in adversity. It is yet a higher speech of his than the other (much too high for a heathen), *It is true greatness to have in one the frailty of a man, and the security of a God. Vere magnum habere fragilitatem hominis, securitatem Dei.* This would have done better in poesy, where transcendences are more allowed. And the poets indeed have been busy with it ; for it is in effect the thing which is figured in that strange fiction of the ancient poets, which seemeth not to be without mystery ; nay, and to have some approach to the state of a Christian ; that *Hercules, when he went to unbind Prometheus* (by whom human nature is represented), *sailed the length of the great ocean in an earthen pot or pitcher ;* lively describing Christian resolution, that saileth in the frail bark of the flesh through the waves of the world. But to speak in a mean. The virtue of Prosperity is temperance, the virtue of Adversity is fortitude ; which in morals is the more heroic virtue. Prosperity is the blessing of the Old Testament ; Adversity is the blessing of the New ; which carrieth the greater benediction, and the clearer revelation of God's favour. Yet even in the Old Testament, if you listen to David's harp, you shall hear as many hearse-like airs as carols ; and

¹² So the original. The Latin translation has *Henrici Quarti, magni illius Gallie regis.* It is probable therefore that we should read here *fourth* instead of *third.* But the observation is true to a certain extent with regard to both.

the pencil of the Holy Ghost hath laboured more in describing the afflictions of Job than the felicities of Salomon. Prosperity is not without many fears and distastes ; and Adversity is not without comforts and hopes. We see in needle-works and embroideries, it is more pleasing to have a lively work upon a sad and solemn ground, than to have a dark and melancholy work upon a lightsome ground : judge therefore of the pleasure of the heart by the pleasure of the eye. Certainly virtue is like precious odours, most fragrant when they are incensed or crushed : for Prosperity doth best discover vice, but Adversity doth best discover virtue.

VI. OF SIMULATION AND DISSIMULATION.

DISSIMULATION is but a faint kind of policy or wisdom, for it asketh a strong wit and a strong heart to know when to tell truth, and to do it. Therefore it is the weaker sort of politics that are the great dissemblers.

Tacitus saith, *Livia sorted well with the arts of her husband and dissimulation of her son* ; attributing arts or policy to Augustus, and dissimulation to Tiberius. And again, when Mucianus encourageth Vespasian to take arms against Vitellius, he saith, *We rise not against the piercing judgment of Augustus, nor the extreme caution or closeness of Tiberius*. These properties of arts or policy and dissimulation or closeness, are indeed habits and faculties several, and to be distinguished. For if a man have that penetration of judgment as he can discern what things are to be laid open, and what to be secreted, and what to be shewed at half lights, and to whom and when, (which indeed are arts of state and arts of life, as Tacitus well calleth them), to him a habit of dissimulation is a hindrance and a poorness. But if a man cannot obtain to that judgment, then it is left to him generally to be close, and a dissembler. For where a man cannot choose or vary in particulars, there it is good to take the safest and wariest way in general ; like the going softly, by one that cannot well see. Certainly the ablest men that ever were have had all an openness and frankness of dealing ; and a name of certainty and veracity ; but then they were like horses well managed ; for they could tell passing well when to stop or turn ; and at such times when they thought the case indeed required dissimulation, if then they used it, it came to pass that the former opinion spread abroad of their good faith and clearness of dealing made them almost invisible.

There be three degrees of this hiding and veiling of a man's self. The first, Closeness, Reservation, and Secrecy ; when a man leaveth himself without observation, or without hold to be taken, what he is. The second, Dissimulation, in the negative ; when a man lets fall signs and arguments, that he is not that he is. And the third, Simulation, in the affirmative ; when a man industriously and expressly feigns and pretends to be that he is not.

For the first of these, Secrecy ; it is indeed the virtue of a confessor. And assuredly the secret man heareth many confessions. For who will open himself to a blab or babbler ? But if a man be thought secret, it inviteth discovery ; as the more close air sucketh in the more open ; and as in confession the revealing is not for worldly use, but for the ease of a man's heart, so secret men come to the knowledge of many things in that kind ; while men rather discharge their minds than impart their minds. In few words, mysteries are due to secrecy. Besides (to say truth) nakedness is uncomely, as well in mind as body ; and it addeth no small reverence to men's manners and actions, if they be not altogether open. As for talkers and futile persons, they are commonly vain and credulous withal. For he that talketh what he knoweth, will also talk what he knoweth not. Therefore set it down, *that an habit of secrecy is both politic and moral*. And in this part, it is good that a man's face give his tongue leave to speak. For the discovery of a man's self by the tracts of his countenance is a great weakness and betraying ; by how much it is many times more marked and believed than a man's words.

For the second, which is Dissimulation ; it followeth many times upon secrecy by a necessity ; so that he that will be secret must be a dissembler in some degree. For men are too cunning to suffer a man to keep an indifferent carriage between both, and to be secret, without swaying the balance on either side. They will so beset a man with questions, and draw him on, and pick it out of him, that,

without an absurd silence, he must shew an inclination one way ; or if he do not, they will gather as much by his silence as by his speech. As for equivocations, or oraculous speeches, they cannot hold out long. So that no man can be secret except he give himself a little scope of dissimulation ; which is, as it were, but the skirts or train of secrecy.

But for the third degree, which is Simulation and false profession ; that I hold more culpable, and less politic ; except it be in great and rare matters. And therefore a general custom of simulation (which is this last degree) is a vice, rising either of a natural falseness or fearfulness, or of a mind that hath some main faults, which because a man must needs disguise, it maketh him practise simulation in other things, lest his hand should be out of use.

The great ¹³ advantages of simulation and dissimulation are three. First, to lay asleep opposition, and to surprise. For where a man's intentions are published, it is an alarum to call up all that are against them. The second is, to reserve to a man's self a fair retreat. For if a man engage himself by a manifest declaration, he must go through or take a fall. The third is, the better to discover the mind of another. For to him that opens himself men will hardly shew themselves adverse ; but will (fair) ¹⁴ let him go on, and turn their freedom of speech to freedom of thought. And therefore it is a good shrewd proverb of the Spaniard, *Tell a lie and find a troth*. As if there were no way of discovery but by simulation. There be also three disadvantages, to set it even. The first, that simulation and dissimulation commonly carry with them a shew of fearfulness which in any business doth spoil the feathers of round flying up to the mark. The second, that it puzzleth and perplexeth the conceits of many that perhaps would otherwise co-operate with him ; and makes a man walk almost alone to his own ends. The third and greatest is, that it depriveth a man of one of the most principal instruments for action ; which is trust and belief. The best composition and temperature is to have openness in fame and opinion ; secrecy in habit ; dissimulation in seasonable use ; and a power to feign, if there be no remedy.

VII. PARENTS AND CHILDREN.

The joys of parents are secret ; and so are their griefs and fears. They cannot utter the one ; nor they will not utter the other. Children sweeten labours ; but they make misfortunes more bitter. They increase the cares of life ; but they mitigate the remembrance of death. The perpetuity by generation is common to beasts ; but memory, merit, and noble works are proper to men. And surely a man shall see the noblest works and foundations have proceeded from childless men ; which have sought to express the images of their minds, where those of their bodies have failed. So the care of posterity is most in them that have no posterity. They that are the first raisers of their houses are most indulgent towards their children ; beholding them as the continuance not only of their kind but of their work ; and so both children and creatures.

The difference in affection of parents towards their several children is many times unequal ; and sometimes unworthy ; especially in the mother ; as Salomon saith, *A wise son rejoiceth the father, but an ungracious son shames the mother*. A man shall see, where there is a house full of children, one or two of the eldest respected, and the youngest made wantons ; but in the midst some that are as it were forgotten, who many times nevertheless prove the best. The illiberality of parents in allowance towards their children is an harmful error ; makes them base ; acquaints them with shifts ; makes them sort with mean company ; and makes them surfeit more when they come to plenty. And therefore the proof is best, when men keep their authority towards their children, but not their purse. Men

¹³ So in original, and in ed. 1639. *Great* is omitted in the translation, and in some modern editions, including Mr. Singer's.

¹⁴ So in the original, and also in edition 1639. The translation has : *Etenim ei qui consilia sua proferi, non facile quis se adversarium profiteatur, verum assentabitur potius*. I do not remember to have met with this use of *fair* anywhere else ; but it is intelligible enough, and may, I should think, be right.

have a foolish manner (both parents and schoolmasters and servants) in creating and breeding an emulation between brothers during childhood, which many times sorteth to discord when they are men, and disturbeth families. The Italians make little difference between children and nephews or near kinsfolks ; but so they be of the lump, they care not though they pass not through their own body. And, to say truth, in nature it is much a like matter ; insomuch that we see a nephew sometimes resemble an uncle or a kinsman more than his own parent ; as the blood happens. Let parents choose betimes the vocations and courses they mean their children should take ; for then they are most flexible ; and let them not too much apply themselves to the disposition of their children, as thinking they will take best to that which they have most mind to. It is true, that if the affection or aptness of the children be extraordinary, then it is good not to cross it ; but generally the precept is good, *optimum elige, suave et facile illud faciet consuetudo* [choose the best—custom will make it pleasant and easy]. Younger brothers are commonly fortunate, but seldom or never where the elder are disinherited.

VIII. OF MARRIAGE AND SINGLE LIFE.

HE that hath wife and children hath given hostages to fortune ; for they are impediments to great enterprises, either of virtue or mischief. Certainly the best works, and of greatest merit for the public, have proceeded from the unmarried or childless men ; which both in affection and means have married and endowed the public. Yet it were great reason that those that have children should have greatest care of future times ; unto which they know they must transmit their dearest pledges. Some there are, who though they lead a single life, yet their thoughts do end with themselves and account future times impertinences. Nay, there are some other that account wife and children but a bill of charges. Nay, more, there are some foolish rich covetous men, that take a pride in having no children, because they may be thought so much the richer. For perhaps they have heard some talk, *Such an one is a great rich man*, and another except to it *Yea, but he hath a great charge of children* ; as if it were an abatement to his riches. But the most ordinary cause of a single life is liberty, especially in certain self-pleasing and humorous minds, which are so sensible of every restraint, as they will go near to think their girdles and garters to be bonds and shackles. Unmarried men are best friends, best masters, best servants ; but not always best subjects ; for they are light to run away ; and almost all fugitives are of that condition. A single life doth well with churchmen ; for charity will hardly water the ground where it must first fill a pool. It is indifferent for judges and magistrates ; for if they be facile and corrupt, you shall have a servant five times worse than a wife. For soldiers, I find the generals commonly in their hortatives put men in mind of their wives and children ; and I think the despising of marriage amongst the Turks maketh the vulgar soldier more base. Certainly wife and children are a kind of discipline of humanity ; and single men, though they may be many times more charitable, because their means are less exhaust, yet, on the other side, they are more cruel and hardhearted (good to make severe inquisitors), because their tenderness is not so oft called upon. Grave natures, led by custom, and therefore constant, are commonly loving husbands ; as was said of Ulysses, *vetulam suam prætulit immortalitati* [he preferred his old wife to immortality]. Chaste women are often proud and froward, as presuming upon the merit of their chastity. It is one of the best bonds both of chastity and obedience in the wife, if she think her husband wise ; which she will never do if she find him jealous. Wives are young men's mistresses ; companions for middle age ; and old men's nurses. So as a man may have a quarrel to marry when he will. But yet he was reputed one of the wise men that made answer to the question, when a man should marry ?—*A young man not yet, an elder man not at all*. It is often seen that bad husbands have very good wives ; whether it be that it raiseth the price of their husband's kindness when it comes ; or that the wives take a pride in their patience. But this never fails, if the bad husbands were of their own choosing, against their friends' consent ; for then they will be sure to make good their own folly.

IX. OF ENVY.

THERE be none of the affections which have been noted to fascinate or bewitch, but love and envy. They both have vehement wishes; they frame themselves readily into imaginations and suggestions; and they come easily into the eye, especially upon the presence of the objects; which are the points that conduce to fascination, if any such thing there be. We see likewise the scripture calleth envy an *evil eye*; and the astrologers call the evil influences of the stars *evil aspects*; so that still there seemeth to be acknowledged, in the act of envy, an ejaculation or irradiation of the eye. Nay, some have been so curious as to note that the times when the strokes of percussion of an envious eye doth most hurt, are when the party envied is beheld in glory or triumph; for that sets an edge upon envy; and besides, at such times the spirits of the person envied do come forth most into the outward parts, and so meet the blow.

But leaving these curiosities, (though not unworthy to be thought on in fit place), we will handle, what persons are apt to envy others; what persons are most subject to be envied themselves; and what is the difference between public and private envy.

A man that hath no virtue in himself, ever envieth virtue in others. For men's minds will either feed upon their own good or upon other's evil; and who wanteth the one will prey upon the other; and whoso is out of hope to attain to another's virtue, will seek to come at even hand by depressing another's fortune.

A man that is busy and inquisitive is commonly envious. For to know much of other men's matters cannot be because all that ado may concern his own estate; therefore it must needs be that he taketh a kind of play-pleasure in looking upon the fortunes of others. Neither can he that mindeth but his own business find much matter for envy. For envy is a gadding passion, and walketh the streets, and doth not keep home; *Non est curiosus, quin idem sit malevolus* [There is no curious man but has some malevolence to quicken his curiosity].

Men of noble birth are noted to be envious towards new men when they rise. For the distance is altered; and it is like a deceit of the eye, that when others come on they think themselves go back.

Deformed persons, and eunuchs, and old men, and bastards, are envious. For he that cannot possibly mend his own case will do what he can to impair another's; except these defects light upon a very brave and heroic nature, which thinketh to make his natural wants part of his honour; in that it should be said, that an eunuch, or a lame man, did such great matters; affecting the honour of a miracle; as it was in Narses the eunuch, and Agesilaus and Tamberlanes, that were lame men.

The same is the case of men that rise after calamities and misfortunes. For they are as men fallen out with the times; and think other men's harms a redemption of their own sufferings.

They that desire to excel in too many matters, out of levity and vain glory, are ever envious. For they cannot want work¹⁵; it being impossible but many in some one of those things should surpass them. Which was the character of Adrian the Emperor; that mortally envied poets and painters and artificers, in works wherein he had a vein to excel.

Lastly, near kinsfolks, and fellows in office, and those that have been bred together, are more apt to envy their equals when they are raised. For it doth upbraid unto them their own fortunes, and pointeth at them, and cometh oftener into their remembrance, and incurreth likewise more into the note of others; and envy ever redoubleth from speech and fame. Cain's envy was the more vile and malignant towards his brother Abel, because when his sacrifice was better accepted there was nobody to look on. Thus much for those that are apt to envy.

Concerning those that are more or less subject to envy: First, persons of eminent virtue, when they are advanced, are less envied. For their fortune seemeth but due unto them; and no man envieth the payment of a debt, but rewards and liberality rather. Again, envy is ever joined with the comparing of a man's self; and where there is no comparison, no envy; and therefore kings are not envied

¹⁵ i.e. Matter for envy to work upon: *ubique enim occurrunt objecta invidiæ.*

but by kings. Nevertheless it is to be noted that unworthy persons are most envied at their first coming in, and afterwards overcome it better; whereas contrariwise, persons of worth and merit are most envied when their fortune continueth long. For by that time, though their virtue be the same, yet it hath not the same lustre; for fresh men grow up that darken it.

Persons of noble blood are less envied in their rising. For it seemeth but right done to their birth. Besides, there seemeth not much added to their fortune; and envy is as the sunbeams, that beat hotter upon a bank or steep rising ground, than upon a flat. And for the same reason those that are advanced by degrees are less envied than those that are advanced suddenly and *per saltum*.

Those that have joined with their honour great travels, cares, or perils, are less subject to envy. For men think that they earn their honours hardly, and pity them sometimes; and pity ever healeth envy. Wherefore you shall observe that the more deep and sober sort of politic persons, in their greatness, are ever bemoaning themselves, what a life they lead; chanting a *quanta patimur*. Not that they feel it so, but only to abate the edge of envy. But this is to be understood of business that is laid upon men, and not such as they call unto themselves. For nothing increaseth envy more than an unnecessary and ambitious engrossing of business. And nothing doth extinguish envy more than for a great person to preserve all other inferior officers in their full rights and pre-eminences of their places. For by that means there be so many screens between him and envy.

Above all, those are most subject to envy, which carry the greatness of their fortunes in an insolent and proud manner; being never well but while they are shewing how great they are, either by outward pomp, or by triumphing over all opposition or competition; whereas wise men will rather do sacrifice to envy, in suffering themselves sometimes of purpose to be crossed and overborne in things that do not much concern them. Notwithstanding so much is true, that the carriage of greatness in a plain and open manner (so it be without arrogancy and vain glory) doth draw less envy than if it be in a more crafty and cunning fashion. For in that course a man doth but disavow fortune; and seemeth to be conscious of his own want in worth; and doth but teach others to envy him.

Lastly, to conclude this part; as we said in the beginning that the act of envy had somewhat in it of witchcraft, so there is no other cure of envy but the cure of witchcraft; and that is, to remove the *lot* (as they call it) and to lay it upon another. For which purpose, the wiser sort of great persons bring in ever upon the stage somebody upon whom to derive¹⁶ the envy that would come upon themselves; sometimes upon ministers and servants; sometimes upon colleagues and associates; and the like; and for that turn there are never wanting some persons of violent and undertaking natures, who so they may have power and business will take it at any cost.

Now, to speak of public envy. There is yet some good in public envy, whereas in private there is none. For public envy is as an ostracism, that eclipseth men when they grow too great. And therefore it is a bridle also to great ones to keep them within bounds.

This envy, being in the Latin word *invidia*, goeth in the modern languages by the name of *discontentment*; of which we shall speak in handling Sedition. It is a disease in a state like to infection. For as infection spreadeth upon that which is sound, and tainteth it; so when envy is gotten once into a state, it traduceth even the best actions thereof, and turneth them into an ill odour. And therefore there is little won by intermingling of plausible actions. For that doth argue but a weakness and fear of envy, which hurteth so much the more; as it is likewise usual in infections; which if you fear them, you call them upon you.

This public envy seemeth to beat chiefly upon principal officers or ministers, rather than upon kings and estates themselves. But this is a sure rule, that if the envy upon the minister be great, when the cause of it in him is small; or if the envy be general in a manner upon all the ministers of an estate; then the envy (though hidden) is truly upon the state itself. And so much of public envy or discontentment, and the difference thereof from private envy, which was handled in the first place.

¹⁶ Turn from its course.

We will add this in general, touching the affection of envy ; that of all other affections it is the most importune and continual. For of other affections there is occasion given but now and then ; and therefore it was well said, *Invidia festos dies non adit* [Envy keeps no holidays] : for it is ever working upon some or other. And it is also noted that love and envy do make a man pine, which other affections do not, because they are not so continual. It is also the vilest affection and the most depraved ; for which cause it is the proper attribute of the devil, who is called *The envious man, that soweth tares amongst the wheat by night* ; as it always cometh to pass, that envy worketh subtilly, and in the dark ; and to the prejudice of good things, such as is the wheat.

X. OF LOVE.

THE stage is more beholding to Love, than the life of man. For as to the stage, love is ever matter of comedies, and now and then of tragedies ; but in life it doth much mischief ; sometimes like a syren, sometimes like a fury. You may observe, that amongst all the great and worthy persons (whereof the memory remaineth, either ancient or recent,) there is not one that hath been transported to the mad degree of love ; which shews that great spirits and great business do keep out this weak passion. You must except nevertheless Marcus Antonius, the half partner of the empire of Rome, and Appius Claudius, the decemvir and lawgiver ; whereof the former was indeed a voluptuous man, and inordinate ; but the latter was an austere and wise man : and therefore it seems (though rarely) that love can find entrance not only into an open heart, but also into a heart well fortified, if watch be not well kept. It is a poor saying of Epicurus, *satis magnum alter alteri theatrum sumus* [Each is to other a theatre large enough] ; as if man, made for the contemplation of heaven and all noble objects, should do nothing but kneel before a little idol, and make himself a subject, though not of the mouth (as beasts are), yet of the eye ; which was given him for higher purposes. It is a strange thing to note the excess of this passion, and how it braves the nature and value of things, by this ; that the speaking in a perpetual hyperbole is comely in nothing but in love. Neither is it merely in the phrase, for whereas it hath been well said that the arch-flatterer, with whom all the petty flatterers have intelligence, is a man's self ; certainly the lover is more. For there was never proud man thought so absurdly well of himself as the lover doth of the person loved ; and therefore it was well said, *That it is impossible to love and to be wise*¹⁷. Neither doth this weakness appear to others only, and not to the party loved ; but to the loved most of all, except the love be reciproque. For it is a true rule, that love is ever rewarded either with the reciproque or with an inward and secret contempt. By how much the more men ought to beware of this passion, which loseth not only other things, but itself. As for the other losses, the poet's relation doth well figure them ; That he that preferred Helena quitted the gifts of Juno and Pallas. For whosoever esteemeth too much of amorous affection quitteth both riches and wisdom. This passion hath his floods in the very times of weakness ; which are great prosperity and great adversity ; though this latter hath been less observed : both which times kindle love, and make it more fervent, and therefore shew it to be the child of folly. They do best, who if they cannot but admit love, yet make it keep quarter ; and sever it wholly from their serious affairs and actions of life ; for if it check once with business, it troubleth men's fortunes, and maketh men that they can no ways be true to their own ends. I know not how, but martial men are given to love ; I think it is but as they are given to wine ; for perils commonly ask to be paid in pleasures. There is in man's nature a secret inclination and motion towards love of others, which if it be not spent upon some one or a few, doth naturally spread itself towards many, and maketh men become humane and charitable ; as it is seen sometime in friars. Nuptial love maketh mankind ; friendly love perfecteth it ; but wanton love corrupteth and embaseth it.

¹⁷ [See note above, p. 425.]

XI. OF GREAT PLACE.

MEN in great place are thrice servants; servants of the sovereign or state; servants of fame; and servants of business. So as they have no freedom; neither in their persons, nor in their actions, nor in their times. It is a strange desire, to seek power and to lose liberty: or to seek power over others and to lose power over a man's self. The rising unto place is laborious; and by pains men come to greater pains; and it is sometimes base; and by indignities men come to dignities. The standing is slippery, and the regress is either a downfall, or at least an eclipse, which is a melancholy thing. *Cum non sis qui fueris, non esse cur velis vivere* [Where a man feels that he is no longer what he was, he loses all his interest in life]. Nay, retire men cannot when they would, neither will they when it were reason; but are impatient of privateness, even in age and sickness, which require the shadow; like old townsmen, that will be still sitting at their street door, though thereby they offer age to scorn. Certainly great persons had need to borrow other men's opinions, to think themselves happy; for if they judge by their own feeling, they cannot find it: but if they think with themselves what other men think of them, and that other men would fain be as they are, then they are happy as it were by report; when perhaps they find the contrary within. For they are the first that find their own griefs, though they be the last that find their own faults. Certainly men in great fortunes are strangers to themselves, and while they are in the puzzle of business they have no time to tend their health either of body or mind. *Illi mors gravis incubat, qui notus nimis omnibus, ignotus moritur sibi* [It is a sad fate for a man to die too well known to every-body else, and still unknown to himself]. In place there is licence to do good and evil; whereof the latter is a curse: for in evil the best condition is not to will; the second not to can. But power to do good is the true and lawful end of aspiring. For good thoughts (though God accept them) yet towards men are little better than good dreams, except they be put in act; and that cannot be without power and place, as the vantage and commanding ground. Merit and good works is the end of man's motion; and conscience of the same is the accomplishment of man's rest. For if a man can be partaker of God's theatre, he shall likewise be partaker of God's rest. *Et conversus Deus, ut aspiceret opera quæ fecerunt manus suæ, vidit quod omnia essent bona nimis* [And God turned to look upon the works which his hands had made and saw that all were very good]; and then the sabbath. In the discharge of thy place set before thee the best examples; for imitation is a globe of precepts. And after a time set before thee thine own example; and examine thyself strictly whether thou didst not best at first. Neglect not also the examples of those that have carried themselves ill in the same place; not to set off thyself by taxing their memory, but to direct thyself what to avoid. Reform therefore, without bravery or scandal of former times and persons; but yet set it down to thyself as well to create good precedents as to follow them. Reduce things to the first institution, and observe wherein and how they have degenerate; but yet ask counsel of both times; of the ancient time, what is best; and of the latter time, what is fittest. Seek to make thy course regular, that men may know beforehand what they may expect; but be not too positive and peremptory; and express thyself well when thou digressest from thy rule. Preserve the right of thy place; but stir not questions of jurisdiction: and rather assume thy right in silence and *de facto*, than voice it with claims and challenges. Preserve likewise the rights of inferior places; and think it more honour to direct in chief than to be busy in all. Embrace and invite helps and advices touching the execution of thy place; and do not drive away such as bring thee information, as meddlers; but accept of them in good part. The vices of authority are chiefly four; delays, corruption, roughness, and facility. For delays; give easy access; keep times appointed; go through with that which is in hand, and interlace not business but of necessity. For corruption; do not only bind thine own hands or thy servants' hands from taking, but bind the hands of suitors also from offering. For integrity used

doth the one; but integrity professed, and with a manifest detestation of bribery, doth the other. And avoid not only the fault, but the suspicion. Whosoever is found variable, and changeth manifestly without manifest cause, giveth suspicion of corruption. Therefore always when thou changeth thine opinion or course, profess it plainly, and declare it, together with the reasons that move thee to change; and do not think to steal it. A servant or a favourite, if he be inward, and no other apparent cause of esteem, is commonly thought but a by-way to close corruption. For roughness: it is a needless cause of discontent; severity breedeth fear, but roughness breedeth hate. Even reproofs from authority ought to be grave, and not taunting. As for facility; it is worse than bribery. For bribes come but now and then; but if importunity or idle respects lead a man, he shall never be without. As Salomon saith, *To respect persons is not good; for such a man will transgress for a piece of bread.* It is most true that was anciently spoken, *A place sheweth the man.* And it sheweth some to the better, and some to the worse. *Omnium consensu capax imperii, nisi imperasset,* [a man whom every body would have thought fit for empire if he had not been emperor], saith Tacitus of Galba; but of Vespasian he saith, *Solus imperantium, Vespasianus mutatus in melius* [He was the only emperor whom the possession of power changed for the better]; though the one was meant of sufficiency, the other of manners and affection. It is an assured sign of a worthy and generous spirit, whom honour amends. For honour is, or should be, the place of virtue; and as in nature things move violently to their place and calmly in their place, so virtue in ambition is violent, in authority settled and calm. All rising to great place is by a winding stair; and if there be factions, it is good to side a man's self whilst he is in the rising, and to balance himself when he is placed. Use the memory of thy predecessor fairly and tenderly; for if thou doest not, it is a debt will sure be paid when thou art gone; if thou have colleagues, respect them and rather call them when they look not for it, than exclude them when they have reason to look to be called. Be not too sensible or too remembering of thy place in conversation and private answers to suitors; but let it rather be said, *When he sits in place he is another man.*

XII. OF BOLDNESS.

It is a trivial grammar-school text, but yet worthy a wise man's consideration. Question was asked of Demosthenes, *what was the chief part of an orator?* he answered, *action: what next? action: what next again? action.* He said it that knew it best, and had by nature himself no advantage in that he commended. A strange thing, that that part of an orator which is but superficial, and rather the virtue of a player, should be placed so high, above those other noble parts of invention, elocution, and the rest; nay almost alone, as if it were all in all. But the reason is plain. There is in human nature generally more of the fool than of the wise; and therefore those facilities by which the foolish part of men's minds is taken are most potent. Wonderful like is the case of Boldness, in civil business; what first? Boldness: what second and third? Boldness. And yet boldness is a child of ignorance and baseness, far inferior to other parts. But nevertheless it doth fascinate and bind hand and foot those that are either shallow in judgment or weak in courage, which are the greatest part; yea and prevaileth with wise men at weak times. Therefore we see it hath done wonders in popular states; but with senates and princes less; and more ever upon the first entrance of bold persons into action than soon after; for boldness is an ill keeper of promise. Surely as there are mountebanks for the natural body, so are there mountebanks for the politic body; men that undertake great cures, and perhaps have been lucky in two or three experiments, but want the grounds of science, and therefore cannot hold out. Nay you shall see a bold fellow many times do Mahomet's miracle. Mahomet made the people believe that he would call an hill to him, and from the top of it offer up his prayers for the observers of his law. The people assembled; Mahomet called the hill to come to him, again and again; and when the hill stood still, he was never a whit abashed, but said, *If the hill will not come to Mahomet, Mahomet will go to the hill.* So these men, when

they have promised great matters and failed most shamefully, yet (if they have the perfection of boldness) they will but slight it over, and make a turn, and no more ado. Certainly to men of great judgment, bold persons are a sport to behold; nay and to the vulgar also, boldness has somewhat of the ridiculous. For if absurdity be the subject of laughter, doubt you not but great boldness is seldom without some absurdity. Especially it is a sport to see, when a bold fellow is out of countenance; for that puts his face into a most shrunken and wooden posture; as needs it must; for in bashfulness the spirits do a little go and come; but with bold men, upon like occasion, they stand at a stay; like a stale at chess, where it is no mate, but yet the game cannot stir. But this last were fitter for a satire than for a serious observation. This is well to be weighed; that boldness is ever blind; for it seeth not dangers and inconveniences. Therefore it is ill in counsel, good in execution; so that the right use of bold persons is, that they never command in chief, but be seconds, and under the direction of others. For in counsel it is good to see dangers; and in execution not to see them, except they be very great.

XIII. OF GOODNESS AND GOODNESS OF NATURE.

I TAKE Goodness in this sense, the affecting of the weal of men, which is that the Grecians call *Philanthropia*; and the word *humanity* (as it is used) is a little too light to express it. Goodness I call the habit, and Goodness of Nature the inclination. This of all virtues and dignities of the mind is the greatest; being the character of the Deity; and without it man is a busy, mischievous, wretched thing; no better than a kind of vermin. Goodness answers to the theological virtue Charity, and admits no excess, but error. The desire of power in excess caused the angels to fall; the desire of knowledge in excess caused man to fall: but in charity there is no excess; neither can angel or man come in danger by it. The inclination to goodness is imprinted deeply in the nature of man; insomuch that if it issue not towards men, it will take unto other living creatures; as it is seen in the Turks, a cruel people, who nevertheless are kind to beasts, and give alms to dogs and birds; insomuch as Busbechius reporteth, a Christian boy in Constantinople had like to have been stoned for gagging in a waggishness a long-billed fowl¹⁸. Errors indeed in this virtue of goodness or charity may be committed. The Italians have an ungracious proverb, *Tanto buon cheval niente*; So good, that he is good for nothing. And one of the doctors of Italy¹⁹, Nicholas Machiavel, had the confidence to put in writing, almost in plain terms, *That the Christian faith had given up good men in prey to those that are tyrannical and unjust*. Which he spake, because indeed there was never law, or sect, or opinion did so much magnify goodness, as the Christian religion doth. Therefore, to avoid the scandal and the danger both, it is good to take knowledge of the errors of an habit so excellent. Seek the good of other men, but be not in bondage to their faces or fancies; for that is but facility or softness; which taketh an honest mind prisoner. Neither give thou Æsop's cock a gem, who would be better pleased and happier if he had a barley-corn. The example of God teacheth the lesson truly; *He sendeth his rain, and maketh his sun to shine, upon the just and unjust*; but he doth not rain wealth, nor shine honour and virtues, upon men equally. Common benefits are to be communicate with all; but peculiar benefits with choice. And beware how in making the portraiture thou breakest the pattern. For divinity maketh the love of ourselves the pattern; the love of our neighbours but the portraiture. *Sell all thou hast, and give it to the poor, and*

¹⁸ The Latin translation has, more correctly, *adeo ut (referente Busbequio) aurifex-quidam Venetus, Byzantii agens, vix furorem populi effugerit, quod avis cujusdam rostri oblongi fauces inserto baculo diduxisset*. The bird was a goat-sucker, which the goldsmith ("homo alioqui ridiculus") fastened over his door with wings spread and jaws distended. The story will be found in Busbechius's letter from Constantinople, p. 179 of ed. 1633.

¹⁹ These words are omitted in the translation; no doubt as likely to give offence at Rome. The Italian translation has "quel empio Nicolo Macchiavello".

follow us : but sell not all thou hast, except thou come and follow me ; that is, except thou have a vocation wherein thou mayest do as much good with little means as with great ; for otherwise in feeding the streams thou driest the fountain. Neither is there only a habit of goodness, directed by right reason ; but there is in some men, even in nature, a disposition towards it ; as on the other side there is a natural malignity. For there be that in their nature do not affect the good of others. The lighter sort of malignity turneth but to a crossness, or forwardness, or aptness to oppose, or difficilness, or the like ; but the deeper sort to envy and mere mischief. Such men in other men's calamities are as it were in season, and are ever on the loading part : not so good as the dogs that licked Lazarus' sores ; but like flies that are still buzzing upon any thing that is raw ; *misanthropi*, that make it their practice to bring men to the bough, and yet have never a tree for the purpose in their gardens²⁰, as Timon had. Such dispositions are the very errors of human nature ; and yet they are the fittest timber to make great politiques of ; like to knee timber, that is good for ships, that are ordained to be tossed ; but not for building houses, that shall stand firm. The parts and signs of goodness are many. If a man be gracious and courteous to strangers it shews he is a citizen of the world, and that his heart is no island cut off from other lands, but a continent that joins to them. If he be compassionate towards the afflictions of others, it shews that his heart is like the noble tree that is wounded itself when it gives the balm. If he easily pardons and remits offences, it shews that his mind is planted above injuries ; so that he cannot be shot. If he be thankful for small benefits, it shews that he weighs men's minds, and not their trash. But above all, if he have St. Paul's perfection, that he would wish to be an *anathema* from Christ for the salvation of his brethren, it shews much of a divine nature, and a kind of conformity with Christ himself.

XIV. OF NOBILITY.

WE will speak of Nobility first as a portion of an estate ; then as a condition of particular persons. A monarchy where there is no nobility at all, is ever a pure and absolute tyranny ; as that of the Turks. For nobility attempers sovereignty, and draws the eyes of the people somewhat aside from the line royal. But for democracies, they need it not ; and they are commonly more quiet and less subject to sedition, than where there are stirps of nobles. For men's eyes are upon the business, and not upon the persons ; or if upon the persons, it is for the business sake, as fittest, and not for flags and pedigree. We see the Switzers last well, notwithstanding their diversity of religion and of cantons. For utility is their bond, and not respects. The united provinces of the Low Countries in their government excel ; for where there is an equality, the consultations are more indifferent, and the payments and tributes more cheerful. A great and potent nobility addeth majesty to a monarch, but diminisheth power ; and putteth life and spirit into the people, but presseth their fortune. It is well when nobles are not too great for sovereignty nor for justice ; and yet maintained in that height, as the insolency of inferiors may be broken upon them before it come on too fast upon the majesty of kings. A numerous nobility causeth poverty and inconvenience in a state ; for it is a surcharge of expense ; and besides, it being of necessity that many of the nobility fall in time to be weak in fortune, it maketh a kind of disproportion between honour and means.

As for nobility in particular persons ; it is a reverend thing to see an ancient castle or building not in decay ; or to see a fair timber tree sound and perfect. How much more to behold an ancient noble family, which hath stood against the waves and weathers of time. For new nobility is but the act of power, but ancient nobility is the act of time. Those that are first raised to nobility are commonly more virtuous, but less innocent, than their descendants ; for there is rarely any rising but by a commixture of good and evil arts. But it is reason

²⁰ That is, I suppose, without openly professing it. The Italian translation introduces the word *palesemente* : " et con tutto ciò non hanno palesemente nei loro giardini à tal proposito l'albero di Timone".

the memory of their virtues remain to their posterity, and their faults die with themselves. Nobility of birth commonly abateth industry; and he that is not industrious, envieth him that is. Besides, noble persons cannot go much higher; and he that standeth at a stay when others rise, can hardly avoid motions of envy. On the other side, nobility extinguisheth the passive envy from others towards them; because they are in possession of honour. Certainly, kings that have able men of their nobility shall find ease in employing them, and a better slide into their business; for people naturally bend to them, as born in some sort to command.

XV. OF SEDITIONS AND TROUBLES.

SHEPHERDS of people had need know the calendars of tempests in state; which are commonly greatest when things grow to equality; as natural tempests are greatest about the *Equinoctia*. And as there are certain hollow blasts of wind and secret swellings of seas before a tempest, so are there in states:

— Ille etiam cæcos instare tumultus
 Sæpe monet, fraudesque et operta tumescere bella.
 [Of troubles imminent and treasons dark
 Thence warning comes, and wars in secret gathering.]

Libels and licentious discourses against the state, when they are frequent and open; and in like sort, false news often running up and down to the disadvantage of the state, and hastily embraced; are amongst the signs of troubles. Virgil giving the pedigree of Fame, saith *she was sister to the Giants*:

Illam Terra parens, irâ irritata Deorum,
 Extremam (ut perhibent) Cæo Enceladoque sororem
 Progenit.

As if fames were the relics of seditions past; but they are no less indeed the preludes of seditions to come. Howsoever he noteth it right, that seditious tumults and seditious fames differ no more but as brother and sister, masculine and feminine; especially if it come to that, that the best actions of a state, and the most plausible, and which ought to give greatest contentment, are taken in ill sense, and traduced: for that shews the envy great, as Tacitus saith, *conflata magna invidia, seu bene seu male gesta premunt* [when dislike prevails against the government, good actions and bad offend alike]. Neither doth it follow, that because these fames are a sign of troubles, that²¹ the suppressing of them with too much severity should be a remedy of troubles. For the despising of them many times checks them best; and the going about to stop them doth but make a wonder long-lived. Also that kind of obedience which Tacitus speaketh of, is to be held suspected: *Erant in officio, sed tamen qui mallent mandata imperantium interpretari quam exequi* [ready to serve, and yet more disposed to construe commands than execute them]; disputing, excusing, cavilling upon mandates and directions, is a kind of shaking off the yoke, and assay of disobedience; especially if in those disputings they which are for the direction speak fearfully and tenderly, and those that are against it audaciously.

Also, as Machiavel²² noteth well, when princes, that ought to be common parents, make themselves as a party, and lean to a side, it is as a boat that is overthrown by uneven weight on the one side; as was well seen in the time of Henry the Third of France; for first himself entered league for the extirpation of the Protestants; and presently after the same league was turned upon himself. For when the authority of princes is made but an accessory to a cause, and that there be other bands that tie faster than the band of sovereignty, kings begin to be put almost out of possession.

Also, when discords and quarrels and factions are carried openly and audaciously, it is a sign the reverence of government is lost. For the motions of the greatest persons in a government ought to be as the motions of the planets

²¹ So in original. One of the *thats* should of course be omitted.

²² The Italian translation omits the name of Machiavel, and says only *un scrittore*.

under *primum mobile* ; (according to the old opinion), which is, that every of them is carried swiftly by the highest motion, and softly in their own motion. And therefore, when great ones in their own particular motion move violently, and, as Tacitus expresseth it well, *liberius quam ut imperantium meminissent* [unrestrained by reverence for the government], it is a sign the orbs are out of frame. For reverence is that wherewith princes are girt from God ; who threat- eneth²³ the dissolving thereof ; *Solvam cingula regum* [I will unbind the girdles of kings].

So when any of the four pillars of government are mainly shaken or weakened (which are Religion, Justice, Counsel, and Treasure), men had need to pray for fair weather. But let us pass from this part of predictions (concerning which, nevertheless, more light may be taken from that which followeth) ; and let us speak first of the Materials of seditions ; then of the Motives of them ; and thirdly of the Remedies.

Concerning the Materials of seditions. It is a thing well to be considered ; for the surest way to prevent seditions (if the times do bear it) is to take away the matter of them. For if there be fuel prepared, it is hard to tell whence the spark shall come that shall set it on fire. The matter of seditions is of two kinds, much poverty and much discontentment. It is certain, so many overthrown estates, so many votes for troubles. Lucan noteth well the state of Rome before the civil war :

Hinc usura vorax, rapidumque in tempore fœnus,
Hinc concussa fides, et multis utile bellum

[estates eaten up by usurious rates of interest, credit shaken, war a gain to many].

This same *multis utile bellum* is an assured and infallible sign of a state disposed to seditions and troubles. And if this poverty and broken estate in the better sort be joined with a want and necessity in the mean people, the danger is imminent and great. For the rebellious of the belly are the worst. As for discontentments, they are in the politic body like to humours in the natural, which are apt to gather a preternatural heat and to inflame. And let no prince measure the danger of them by this, whether they be just or unjust : for that were to imagine people to be too reasonable ; who do often spurn at their own good ; nor yet by this, whether the griefs whereupon they rise be in fact great or small : for they are the most dangerous discontentments where the fear is greater than the feeling : *Dolendi modus, timendi non item* [Suffering has its limit, but fears are endless]. Besides, in great oppressions, the same things that provoke the patience, do withal mate the courage ; but in fears it is not so. Neither let any prince or state be secure concerning discontentments, because they have been often, or have been long, and yet no peril hath ensued : for as it is true that every vapour or fume doth not turn into a storm ; so it is nevertheless true that storms, though they blow over divers times, yet may fall at last ; and, as the Spanish proverb noteth well, *The cord breaketh at the last by the weakest pull*.

The Causes and Motives of seditions are, innovation in religion ; taxes ; alteration of laws and customs ; breaking of privileges ; general oppression ; advancement of unworthy persons ; strangers ; dearths ; disbanded soldiers ; factions grown desperate ; and whatsoever, in offending people, joineth and knitteth them in a common cause.

For the Remedies : there may be some general preservatives, whereof we will speak : as for the just cure, it must answer to the particular disease ; and so be left to counsel rather than rule.

The first remedy or prevention is to remove by all means possible that material cause of sedition whereof we spake ; which is, want and poverty in the estate. To which purpose serveth, the opening and well-balancing of trade ; the cherishing of manufactures ; the banishing of idleness ; the repressing of waste and excess by sumptuary laws ; the improvement and husbanding of the soil ; the

²³ That is, holds it out as a threat. A manuscript copy of this Essay in an earlier form has, "who threateneth the dissolving thereof as one of his greatest judgments".

regulating of prices of things vendible ; the moderating of taxes and tributes, and the like. Generally, it is to be foreseen that the population of a kingdom (especially if it be not mown down by wars) do not exceed the stock of the kingdom which should maintain them. Neither is the population to be reckoned only by number ; for a smaller number that spend more and earn less, do wear out an estate sooner than a greater number that live lower and gather more. Therefore the multiplying of nobility and other degrees of quality in an over proportion to the common people, doth speedily bring a state to necessity ; and so doth likewise an overgrown clergy ; for they bring nothing to the stock ; and in like manner when more are bred scholars than preferments can take off.

It is likewise to be remembered, that forasmuch as the increase of any estate must be upon the foreigner (for whatsoever is somewhere gotten is somewhere lost), there be but three things which one nation selleth unto another ; the commodity as nature yieldeth it ; the manufacture ; and the vecture, or carriage. So that if these three wheels go, wealth will flow as in a spring tide. And it cometh many times to pass, that *materiam superabit opus* ; that the work and carriage is more worth than the material, and enricheth a state more ; as is notably seen in the Low-Countrymen, who have the best mines above ground in the world.

Above all things, good policy is to be used that the treasure and monies in a state be not gathered into few hands. For otherwise a state may have a great stock, and yet starve. And money is like muck, not good except it be spread. This is done chiefly by suppressing, or at the least keeping a strait hand upon the devouring trades of usury, ingrossing, great pasturages, and the like.

For removing discontentments, or at least the danger of them ; there is in every state (as we know) two portions of subjects ; the nobless and the commonalty. When one of these is discontent, the danger is not great ; for common people are of slow motion, if they be not excited by the greater sort ; and the greater sort are of small strength, except the multitude be apt and ready to move of themselves. Then is the danger, when the greater sort do but wait for the troubling of the waters amongst the meaner, that then they may declare themselves. The poets feign, that the rest of the gods would have bound Jupiter, which he hearing of, by the counsel of Pallas, sent for Briareus, with his hundred hands, to come in to his aid. An emblem, no doubt, to show how safe it is for monarchs to make sure of the good will of common people.

To give moderate liberty for griefs and discontentments to evaporate (so it be without too great insolency or bravery), is a safe way. For he that turneth the humours back, and maketh the wound bleed inwards, endangereth malign ulcers and pernicious imposthumations.

The part of Epimetheus mought well become Prometheus, in the case of discontentments ; for there is not a better provision against them. Epimetheus, when griefs and evils flew abroad, at last shut the lid, and kept hope in the bottom of the vessel. Certainly, the politic and artificial nourishing and entertaining of hopes, and carrying men from hopes to hopes, is one of the best antidotes against the poison of discontentments. And it is a certain sign of a wise government and proceeding, when it can hold men's hearts by hopes, when it cannot by satisfaction ; and when it can handle things in such manner, as no evil shall appear so peremptory but that it hath some outlet of hope : which is the less hard to do, because both particular persons and factions are apt enough to flatter themselves, or at least to brave that they believe not.

Also the foresight and prevention, that there be no likely or fit head whereunto discontented persons may resort, and under whom they may join, is a known, but an excellent point of caution. I understand a fit head to be one that hath greatness and reputation ; that hath confidence with the discontented party, and upon whom they turn their eyes ; and that is thought discontented in his own particular : which kind of persons are either to be won and reconciled to the state, and that in a fast and true manner ; or to be fronted with some other of the same party, that may oppose them, and so divide the reputation. Generally, the dividing and breaking of all factions and combinations that are adverse to the state, and setting them at distance, or at least distrust, amongst themselves,

is not one of the worst remedies. For it is a desperate case, if those that hold with the proceeding of the state be full of discord and faction, and those that are against it be entire and united.

I have noted that some witty and sharp speeches which have fallen from princes have given fire to seditions. Cæsar did himself infinite hurt in that speech, *Sylla nasciviv literas, non potuit dictare* [Sylla was no scholar, he could not dictate] : for it did utterly cut off that hope which men had entertained, that he would at one time or other give over his dictatorship. Galba undid himself by that speech, *legi a se militem, non emi* [that he did not buy his soldiers, but levied them] : for it put the soldiers out of hope of the donative. Probus likewise, by that speech, *si vixero, non opus erit amplius Romano imperio militibus* [if I live, the Roman empire shall have no more need of soldiers] : a speech of great despair for the soldiers. And many the like. Surely princes had need, in tender matters and ticklish times, to beware what they say ; especially in these short speeches, which fly abroad like darts, and are thought to be shot out of their secret intentions. For as for large discourses, they are flat things, and not so much noted.

Lastly, let princes, against all events, not be without some great person, one or rather more, of military valour, near unto them, for the repressing of seditions in their beginnings. For without that, there useth to be more trepidation in court upon the first breaking out of troubles than were fit. And the state runneth the danger of that which Tacitus saith ; *Atque is habitus animorum fuit, ut pessimum facinus auderent pauci, plures velent, omnes paterentur* [A few were in a humour to attempt mischief, more to desire, all to allow it]. But let such military persons be assured, and well reputed of, rather than factious and popular ; holding also good correspondence with the other great men in the state ; or else the remedy is worse than the disease.

XVI. OF ATHEISM.

I HAD rather believe all the fables in the Legend²⁴, and the Talmud, and the Alcoran²⁵, than that this universal frame is without a mind. And therefore God never wrought miracle to convince atheism, because his ordinary works convince it. It is true, that a little philosophy inclineth man's mind to atheism ; but depth in philosophy bringeth men's minds about to religion. For while the mind of man looketh upon second causes scattered, it may sometimes rest in them, and go no further ; but when it beholdeth the chain of them, confederate and linked together, it must needs fly to Providence and Deity. Nay, even that school which is most accused of atheism doth most demonstrate religion ; that is, the school of Leucippus and Democritus and Epicurus. For it is a thousand times more credible, that four mutable elements, and one immutable fifth essence, duly and eternally placed, need no God, than that an army of infinite small portions or seeds unplaced, should have produced this order and beauty without a divine marshal. The scripture saith, *The fool hath said in his heart, there is no God* ; it is not said, *The fool hath thought in his heart* ; so as he rather saith it by rote to himself, as that he would have, than that he can thoroughly believe it, or be persuaded of it. For none deny there is a God, but those for whom it maketh that there were no God. It appeareth in nothing more, that atheism is rather in the lip than in the heart of man, than by this ; that atheists will ever be talking of that their opinion, as if they fainted in it within themselves, and would be glad to be strengthened by the consent of others. Nay more, you shall have atheists strive to get disciples, as it fareth with other sects. And, which is most of all, you shall have of them that will suffer for atheism and not recant ; whereas if they did truly think that there were no such thing as God, why should they trouble themselves ? Epicurus is charged that he did but dissemble for his credit's sake, when he affirmed there were blessed natures, but such as enjoyed themselves without having respect to the government of

²⁴ [I.e. the "Golden Legend".]

²⁵ In the edition of 1612, it stood, "all the fables in the Legend and the Alcoran". The Italian translation omits the Legend, and has only "tutte le favole dell' Alcorano".

the world. Wherein they say he did temporize ; though in secret he thought there was no God. But certainly he is traduced ; for his words are noble and divine : *Non Deos vulgi negare profanum ; sed vulgi opiniones Diis applicare profanum* [There is no profanity in refusing to believe in the Gods of the vulgar : the profanity is in believing of the Gods what the vulgar believe of them]. Plato could have said no more. And although he had the confidence to deny the administration, he had not the power to deny the nature. The Indians of the west have names for their particular gods, though they have no name for God : as if the heathens should have had the names Jupiter, Apollo, Mars, etc. but not the word *Deus* ; which shews that even those barbarous people have the notion, though they have not the latitude and extent of it. So that against atheists the very savages take part with the very subtlest philosophers. The contemplative atheist is rare : a Diagoras, a Bion, a Lucian perhaps, and some others ; and yet they seem to be more than they are ; for that all that impugn a received religion or superstition are by the adverse part branded with the name of atheists. But the great atheists indeed are hypocrites ; which are ever handling holy things, but without feeling ; so as they must needs be cauterized in the end. The causes of atheism are, divisions in religion, if they be many ; for any one main division addeth zeal to both sides ; but many divisions introduce atheism. Another is, scandal of priests ; when it is come to that which St. Bernard saith, *Non est jam dicere, ut populus sic sacerdos ; quia nec sic populus ut sacerdos* [One cannot now say, the priest is as the people, for the truth is that the people are not so bad as the priest]. A third is, custom of profane scoffing in holy matters ; which doth by little and little deface the reverence of religion. And lastly, learned times, specially with peace and prosperity ; for troubles and adversities do more bow men's minds to religion. They that deny a God destroy man's nobility ; for certainly man is of kin to the beasts by his body ; and, if he be not of kin to God by his spirit, he is a base and ignoble creature. It destroys likewise magnanimity, and the raising of human nature ; for take an example of a dog, and mark what a generosity and courage he will put on when he finds himself maintained by a man ; who to him is instead of a God, or *melior natura* ; which courage is manifestly such as that creature, without that confidence of a better nature than his own, could never attain. So man, when he resteth and assureth himself upon divine protection and favour, gathereth a force and faith which human nature in itself could not obtain. Therefore, as atheism is in all respects hateful, so in this, that it depriveth human nature of the means to exalt itself above human frailty. As it is in particular persons, so it is in nations. Never was there such a state for magnanimity as Rome. Of this state hear what Cicero saith : *Quam volumus licet, patres conscripti, nos amemus, tamen nec numero Hispanos, nec robore Gallos, nec calliditate Pœnos, nec artibus Græcos, nec denique hoc ipso hujus gentis et terræ domestico nativoque sensu Italos ipsos et Latinos ; sed pietate, ac religione, atque hac una sapientia, quod Deorum immortalium numine omnia regi gubernarique perspeximus, omnes gentes nationesque superavimus* [Pride ourselves as we may upon our country, yet are we not in number superior to the Spaniards, nor in strength to the Gauls, nor in cunning to the Carthaginians, nor to the Greeks in arts, nor to the Italians and Latins themselves in the homely and native sense which belongs to this nation and land : it is in piety only and religion, and the wisdom of regarding the providence of the Immortal Gods as that which rules and governs all things, that we have surpassed all nations and peoples].

XVII. OF SUPERSTITION ²⁶.

It were better to have no opinion of God at all, than such an opinion as is unworthy of him. For the one is unbelief, the other is contumely : and certainly superstition is the reproach of the Deity. Plutarch saith well to that purpose : Surely (saith he) *I had rather a great deal men should say there was no such man at all as Plutarch, than that they should say that there was one Plutarch that would eat his children as soon as they were born ; as the poets speak of Saturn.* And as

²⁶ This Essay is omitted in the Italian translation.

the contumely is greater towards God, so the danger is greater towards men. Atheism leaves a man to sense, to philosophy, to natural piety, to laws, to reputation; all which may be guides to an outward moral virtue, though religion were not; but superstition dismounts all these, and erecteth an absolute monarchy in the minds of men. Therefore atheism did never perturb states; for it makes men wary of themselves, as looking no further; and we see the times inclined to atheism (as the time of Augustus Cæsar) were civil times. But superstition hath been the confusion of many states, and bringeth in a new *primum mobile*, that ravisheth all the spheres of government. The master of superstition is the people; and in all superstition wise men follow fools; and arguments are fitted to practice, in a reversed order²⁷. It was gravely said by some of the prelates in the council of Trent, where the doctrine of the schoolmen bare great sway, *that the schoolmen were like astronomers, which did feign eccentrics and epicycles, and such engines of orbs, to save the phænomena; though they knew there were no such things; and in like manner, that the schoolmen had framed a number of subtle and intricate axioms and theorems, to save the practice of the church.* The causes of superstition are, pleasing and sensual rites and ceremonies; excess of outward and pharisaical holiness; over-great reverence of traditions, which cannot but load the church; the stratagems of prelates for their own ambition and lucre; the favouring too much of good intentions, which openeth the gate to conceits and novelties; the taking an aim at divine matters by human, which cannot but breed mixture of imaginations: and, lastly, barbarous times, especially joined with calamities and disasters. Superstition, without a veil, is a deformed thing; for as it addeth deformity to an ape to be so like a man, so the similitude of superstition to religion makes it the more deformed. And as wholesome meat corrupteth to little worms, so good forms and orders corrupt into a number of petty observances. There is a superstition in avoiding superstition, when men think to do best if they go furthest from the superstition formerly received; therefore care would be had that (as it fareth in ill purgings) the good be not taken away with the bad; which commonly is done when the people is the reformer.

XVIII. OF TRAVEL.

TRAVEL, in the younger sort, is a part of education; in the elder, a part of experience. He that travelleth into a country before he hath some entrance into the language, goeth to school, and not to travel. That young men travel under some tutor, or grave servant, I allow well; so that he be such a one that hath the language, and hath been in the country before; whereby he may be able to tell them what things are worthy to be seen in the country where they go; what acquaintances they are to seek; what exercises or discipline the place yieldeth. For else young men shall go hooded, and look abroad little. It is a strange thing, that in sea voyages, where there is nothing to be seen but sky and sea, men should make diaries; but in land-travel, wherein so much is to be observed, for the most part they omit it; as if chance were fitter to be registered than observation. Let diaries therefore be brought in use. The things to be seen and observed are, the courts of princes, specially when they give audience to ambassadors; the courts of justice, while they sit and hear causes; and so of consistories ecclesiastic; the churches and monasteries, with the monuments which are therein extant; the walls and fortifications of cities and towns, and so the havens and harbours; antiquities and ruins; libraries; colleges, disputations, and lectures, where any are; shipping and navies; houses and gardens of state and pleasure, near great cities; armories; arsenals; magazines; exchanges; burses; warehouses; exercises of horsemanship, fencing, training of soldiers, and the like; comedies, such whereunto the better sorts of persons do resort; treasuries of jewels and robes; cabinets and rarities; and, to conclude, whatsoever is memorable in the places where they go. After all which, the tutors or servants ought to make diligent inquiry. As for triumphs, masks, feasts, weddings,

²⁷ That is, reason is governed by practice, instead of practice by reason. *Argumenta practica succumbunt, ordine perverso.*

funerals, capital executions, and such shows, men need not to be put in mind of them; yet are they not to be neglected. If you will have a young man to put his travel into a little room, and in short time to gather much, this you must do. First, as was said, he must have some entrance into the language before he goeth. Then he must have such a servant or tutor as knoweth the country, as was likewise said. Let him carry with him also some card or book describing the country where he travelleth; which will be a good key to his inquiry. Let him keep also a diary. Let him not stay long in one city or town; more or less as the place deserveth, but not long; nay, when he stayeth in one city or town, let him change his lodging from one end and part of the town to another; which is a great adamant of acquaintance. Let him sequester himself from the company of his countrymen, and diet in such places where there is good company of the nation where he travelleth. Let him upon his removes from one place to another, procure recommendation to some person of quality residing in the place whither he removeth; that he may use his favour in those things he desireth to see or know. Thus he may abridge his travel with much profit. As for the acquaintance which is to be sought in travel; that which is most of all profitable, is acquaintance with the secretaries and employed men of ambassadors: for so in travelling in one country he shall suck the experience of many. Let him also see and visit eminent persons in all kinds, which are of great name abroad; that he may be able to tell how the life agreeth with the fame. For quarrels, they are with care and discretion to be avoided. They are commonly for mistresses, healths, place, and words. And let a man beware how he keepeth company with choleric and quarrelsome persons; for they will engage him into their own quarrels. When a traveller returneth home, let him not leave the countries where he hath travelled altogether behind him; but maintain a correspondence by letters with those of his acquaintance which are of most worth. And let his travel appear rather in his discourse than in his apparel or gesture; and in his discourse let him be rather advised in his answers, than forward to tell stories; and let it appear that he doth not change his country manners for those of foreign parts; but only prick in some flowers of that he hath learned abroad into the customs of his own country.

XIX. OF EMPIRE.

It is a miserable state of mind to have few things to desire, and many things to fear; and yet that commonly is the case of kings; who, being at the highest, want matter of desire, which makes their minds more languishing; and have many representations of perils and shadows, which makes their minds the less clear. And this is one reason also of that effect which the Scripture speaketh of, *That the king's heart is inscrutable*. For multitude of jealousies, and lack of some predominant desire that should marshal and put in order all the rest, maketh any man's heart hard to find or sound. Hence it comes likewise, that princes many times make themselves desires, and set their hearts upon toys; sometimes upon a building; sometimes upon erecting of an order; sometimes upon the advancing of a person; sometimes upon obtaining excellency in some art or feat of the hand; as Nero for playing on the harp, Domitian for certainty of the hand with the arrow, Commodus for playing at fence, Caracalla for driving the chariots, and the like. This seemeth incredible unto those that know not the principle that *the mind of man is more cheered and refreshed by profiting in small things, than by standing at a stay in great*. We see also that kings that have been fortunate conquerors in their first years, it being not possible for them to go forward infinitely, but that they must have some check or arrest in their fortunes, turn in their latter years to be superstitious and melancholy; as did Alexander the Great; Dioclesian; and in our memory, Charles the Fifth; and others: for he that is used to go forward, and findeth a stop, falleth out of his own favour, and is not the thing he was.

To speak now of the true temper of empire; it is a thing rare and hard to keep; for both temper and distemper consist of contraries. But it is one thing to mingle contraries, another to interchange them. The answer of Apollonius to Vespasian is full of excellent instruction. Vespasian asked him, *what was Nero's*