F. A. N. Pessôa.

13 de Junho de 1905.

BY THE SAME AUTHOR

"THE REVIVAL OF PHRENOLOGY"

The Mental Functions of the Brain

AN INVESTIGATION INTO THEIR LOCALISATION AND THEIR MANIFESTATION IN HEALTH AND DISEASE

Illustrated with the clinical records of 800 cases of localised brain-derangements and with several plates

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1901

See Press Opinions on next page

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PRESS OPINIONS.

Medical Press:—"We consider ourselves deeply indebted indeed to the author for the mass of instructive evidence which he has collected—with the laborious care of an enthusiast, and the judicious skill of an experienced master—on this very important and very interesting subject. Dr Hollander has also performed a noble duty in this volume, by constituting himself a minister of tardy justice to the memory of the great physician and physiologist whose enthusiastic life labours laid the foundation of our knowledge of the *Functions of the Brain*. . . . The vast series of facts and arguments collected in this volume are far too numerous to be even glanced at within the limits of a review. We must accordingly, recommend all our enquiring readers to make themselves acquainted with its contents. We feel sure that they will be rewarded for their trouble."

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Freiherr von Krafft-Ebing, Professor of Psychiatry in the University of Vienna, in a signed review in the **Neue freie Presse,** says:—"A large scientific work of sound learning. . . . The author's defence of Gall deserves to be read by all who love truth and justice."

Standard:—"Dr Hollander's work has something more than a merely technical interest. It merits careful attention as a serious contribution to a subject of profound importance in which lamentably little progress has hitherto been made."

Daily Telegraph:—"Dr Hollander approaches these problems in a very serious and scientific way, and has undoubtedly contributed a great many new facts to an extremely important discussion in the comprehensive and laborious volume he has just published. That his researches will be welcomed by his brother-scientists is clear from the address delivered at the Glasgow meeting of the British Association by Professor D. S. Cunningham. . . ."

Daily News:—"The sub-title—The Revival of Phrenology—of this large and well-illustrated volume is itself a sign of an important change in opinion. . . . Dr Hollander makes no such map of the organs as is done in the charts of popular phrenologists. But his great book with its hundreds of modern instances, its abundant proofs of the ignorance and bad faith of Gall's antagonists, and its full historical account of his discoveries as to the mental functions of the brain, will certainly lead to a revival and reconsideration of phrenology and its claims."

Daily Chronicle:—"Dr Hollander's work ought to revive the interest in phrenology."

Pall Mall Gazette:—"Dr Hollander enters the arena as the twentieth-century champion of phrenology fully armed for the fray. On the one hand, he has devoted many years to the personal study of the physiology of the brain; while, on the other, he has accumulated an enormous number of authorities who have, directly or indirectly, dealt with the subject. . . . Undoubtedly, the evidence and statements set forth deserve serious consideration by all who are interested in the study of psychology, and especially by those who are responsible for the care and treatment of the insane."

Westminster Gazette:—"It was high time that some competent authority should collect and put on record the general results of recent research into the pathology of insanity. Dr Hollander has, in the volume before us, contributed not a little to this desirable result. . . . We entirely sympathise with Dr Hollander in the protest which he makes against the ridicule that has so undeservedly been cast on Gall and his theories by men who ought to know better. Gall's theory is now vindicated as a sound one, and it is a thousand pities that it has for the last one hundred years been left to quacks and charlatans instead of being adopted as the basis of serious investigation by scientific men. . . . We cannot part with this book without expressing our sense of its great value."

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New Liberal Review:—"Dr Hollander in this work has done yeoman service to make the study of phrenology more popular. . . . We approach the subject with all humility, and do not desire to discuss or criticise his arguments or conclusions—mainly, too, because in our own small way we happen most heartily to agree with him. In this short notice we merely wish to draw the attention of lay readers to a work which will be of as great an interest and a guidance to them as it is to the medical man, to whom the subject appeals from a scientific standpoint."

SCIENTIFIC PHRENOLOGY

SCIENTIFIC PHRENOLOGY

BEING A PRACTICAL MENTAL SCIENCE
AND
GUIDE TO HUMAN CHARACTER

AN ILLUSTRATED TEXT-BOOK

BY

BERNARD HOLLANDER, M.D.

AUTHOR OF
"THE MENTAL FUNCTIONS OF THE BRAIN"

WITH OVER ONE HUNDRED ILLUSTRATIONS

LONDON
GRANT RICHARDS
48 LEICESTER SQUARE
1902

PREFACE

THE author's work on "The Mental Functions of the Brain" has revived the interest in Gall's discoveries and led to many requests for a text-book of a *scientific* Phrenology, written in the light of modern research. In answer to this demand and in order to put a stop to the misrepresentations of some "professors" of the science, the author presents this volume of a theory of Phrenology in a very much modified and altered form. It will be seen that his system of brain-segments has no connection with the *bump*-theory, which is commonly supposed to constitute Phrenology; and that the observations, on which the subject is based, are so simple that anyone can repeat them, and thus convince himself of their correctness, the more so as we are surrounded by material, in fact, cannot get away from it. To satisfy those who may still remain unconvinced, the author is perfectly willing to give a practical demonstration to any representative body desirous of such proof.

Considering that the theories advanced by the

author furnish a key to human character, enabling us to understand ourselves and to apply our knowledge to the education of the young, and to the successful treatment of the criminal and insane, it is to be hoped that those in authority and position will not rest until they have put beyond doubt the truth of these principles.

BERNARD HOLLANDER, M.D.

62 QUEEN ANNE STREET,
CAVENDISH SQUARE, LONDON, W.,
1st July 1902.

CONTENTS

LIST OF ILLUSTRATIONS

SCIENTIFIC PHRENOLOGY

CHAPTER I

WHAT IS THE USE OF A BRAIN?

ALL mental operations take place in and through the superficial grey matter, or "cortex," of the brain. Organic life, nutrition, circulation, excretion, secretion, motion, in fact all vital functions can be carried on without the cortex of the brain; but the manifestation of the intellectual and moral powers, the affections, and propensities or instincts of self-preservation, cannot take place without it. Provided that the cortex of the brain be not affected, all the other portions of the system may be diseased, or separately destroyed, even the spinal cord may become affected, without the mental functions being impaired. Of course if the heart, the medulla oblongata, or some other vital part be injured, death will precede any such experiment. If, on the other hand, the superficial grey matter of the brain becomes compressed, irritated, injured, or destroyed, the mental functions get partially or totally deranged or become wholly extinct. When the compression of the brain is removed, as in the case of an indented skull, or a tumour, or the extravasated blood or accumulated pus

is evacuated, or the cerebral inflammation allayed, consciousness and the power of thought and feeling return.

We think and feel, rejoice and weep, love and hate, hope and fear, plan and destroy, trust and suspect, all through the agency of the brain-cortex. Its cells record all the events, of whatever nature, which transpire within the sphere of existence of the individual, not merely as concerns the intellectual knowledge acquired, but likewise the emotions passed through, and the passions indulged in. We can only manifest our intellectual aptitudes, moral dispositions, and tendencies to self-preservation, through the mechanism of brain with which we happen to be endowed, and according to the sort of experience we have accumulated. Hence though the primitive mental powers and fundamental anatomical parts of the brain of all men are the same, we all vary according to the mental predispositions and brain-types we have inherited and the early education we received. The cerebral mechanism is, by dint of its original structure, apt or otherwise for certain pursuits, moral and animal tendencies, hence our actions are the result of the inherited organic constitution, past education and experiences, and the circumstances which surround us. Grapes will not grow on the thistle, but we can improve or debase the organisation we inherited. There is in every one of us an individuality which we are conscious is not due to training or to circumstances, and which, however these may modify it, cannot be entirely

eradicated. Originality is kept down by transmitted tendencies, which give colour to all our deductions from experience, and, as it were, framed us in the pursuit of knowledge and manifestation of character. We do not all see things alike, nor does nature awaken in all similar tastes and sympathies. Not only is it true that certain persons distinguish themselves at a very early age by extraordinary attainments, but certain manifestations of good or bad temper, and other feelings, occur in very early life, before any adequate cause is apparent. The underlying impulses which shape man's character have in great measure come to him as inheritances of parental virtues or vices, and they are the capital with which he and circumstances have to work, and which, in spite of both, must always impart colour to his every act.

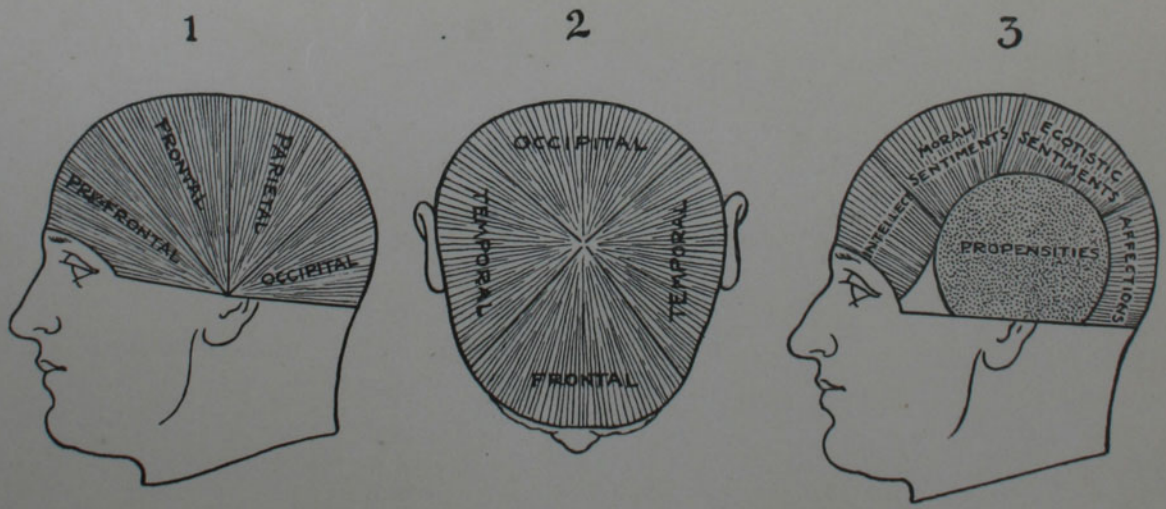
Parents, therefore, who indulge chronically in evil tendencies incur great responsibility. It is not the idea that is inherited, for there are no innate ideas, but the *disposition*. During the process of making new records, that is during the individual life of the brain, its organic memories and inherited habits get revived, and these modify the manner of the new recording.

Though the brain may be represented as a unit yet it contains innumerable centres with afferent and efferent fibres, and fibres which connect them all together, a network of intricate organic paths, along which a stimulus started may travel in countless, but not indefinite, directions. These centres represent

organically every minute detail of knowledge and experience, they register every definite observation and thought, and every process of reasoning with which the individual has at any time made himself familiar ; they represent every sentiment and emotion, every affection and passion, and indeed every one of those mental processes which are needful for the display of what constitutes human character. All the fundamental kinds of psychical activity are carried on in more or less distinct parts of the cerebral hemispheres. There is the same order in the organisation of the cerebrum as in every other organ, the same physiological division of labour, in which all organisation consists. See Plate I for a diagrammatic representation of the direct brain-fibres, radiating from the centre to the circumference.

The brain is more complicated, and the convolutions more distinct and numerous, as we ascend the scale of the animal kingdom. The essential differences obtaining in the encephalic structure correspond to decided differences in its functions, and the complexity of the structure is proportionate to the number of aptitudes and propensities displayed. What can be the purpose of the difference in the organisation of the brain in different animals, unless it be the difference prevailing in relation to the variety of their instincts. If it be admitted that their instincts are hereditary, then it must also be admitted that they are due to some peculiarity in the brain-structure. One species of animals is en-

PLATE I.



DIAGRAMMATIC REPRESENTATION OF THE COURSE OF THE BRAIN-FIBRES RADIATING FROM THE CENTRE TO THE CIRCUMFERENCE.

dowed with mental powers, in which another is deficient, a fact that would be inexplicable, did not each particular cerebral function reside in a particular portion of the brain. Suppose I should enquire of my readers how it happens that certain species of animals are devoid of the sense of smell, or some other sense, whilst they are in full enjoyment of the rest. They would find no difficulty in such a phenomenon. The functions of each sense, I should be told, require a particular apparatus, and certain species may not possess one or the other of them. But, if they admitted only one organ, through which all the senses executed their functions, the absence of one or more in any animal would be inexplicable. Now let the like reasoning be applied to the primitive mental powers, the manifestation of which depends on the brain. There is scarcely any species of animal which does not enjoy certain aptitudes and propensities not to be found in other species. The unwieldy beaver and the nimble squirrel are both admirable architects; the dog, the docile, intelligent and unwearied companion of man, has no skill in building. The horse and bull have not the blood-thirsty propensities of the weasel and the falcon. The sparrow and the turtle-dove do not utter the sweet notes of the nightingale. Sheep live in flocks and rooks form communities; the fox, the eagle, and the magpie, dislike the confinement imposed on them by the care of their young, to which they impatiently submit during some weeks only. The swallow, stork,

fox, etc., are faithful in their attachment to a single mate; the dog, so susceptible of affection, the stallion, and the stag, gratify their desires with the first female of their species which they meet. Thus natural history, from beginning to end, exhibits in each species of animals different propensities and aptitudes. Does not, then, the conclusion necessarily follow that the distinctive propensities and aptitudes of these animals are relative to different cerebral parts? Were the brain the single and universal organ of them all, each animal ought to possess them all indiscriminately. Or if the brain, as some suppose, subserved to the intellect alone, it would be no longer possible to conceive that man is elevated by superior intellectual faculties above all other animals, to a far greater extent than the mere size and weight of the entire brain would warrant. But, if it be supposed that each primitive mental power, like each particular sense, depends on a special cerebral part, it is not only conceivable that any one animal may be destitute of a certain cerebral part possessed by another, but likewise that all animals generally may be lacking in certain encephalic parts with which man is solely endowed.

The intellect, moral sentiments, affections, and propensities are so essentially different, that there must be separate centres for them. No one supposes for an instant that the same bundle of nerve-cells and fibres which is employed in intellectual effort is that also through which the emotion of anger gets manifested.

The mental powers prevailing in every individual of the same species exist in very different degrees; a circumstance only to be explained by the different development of the several parts through which these powers are manifested. The mastiff, bull-dog, pug-dog, grey-hound, etc., are distinguishable from each other, not by their shape only, but also by their individual character, though they all have the character pertaining to dogs generally. Individuals of the same variety likewise differ much from each other, which would be impossible were each primitive quality not dependent on a particular centre. Men possessing first-rate talents of a certain order are sometimes perfectly insignificant in every other respect. Genius is in well-nigh every instance partial, and limited to the exaltation of a few mental powers, which could not be the case were the organ of mind single. Moreover, genius not unfrequently appears at so early an age as to put study or training, as a producing cause, entirely out of the question. No one will deny that it is a natural gift. Have you not noticed that prodigies are quite as childish as other children in everything but the talent by which they are particularly distinguished. In partial idiocy the individual is exceedingly deficient in most of the intellectual powers, and frequently in some of the moral sentiments, and yet may possess a few of them in considerable vigour. Thus an idiot may have a talent for imitation, for drawing, or for music, and be incapable of compre-

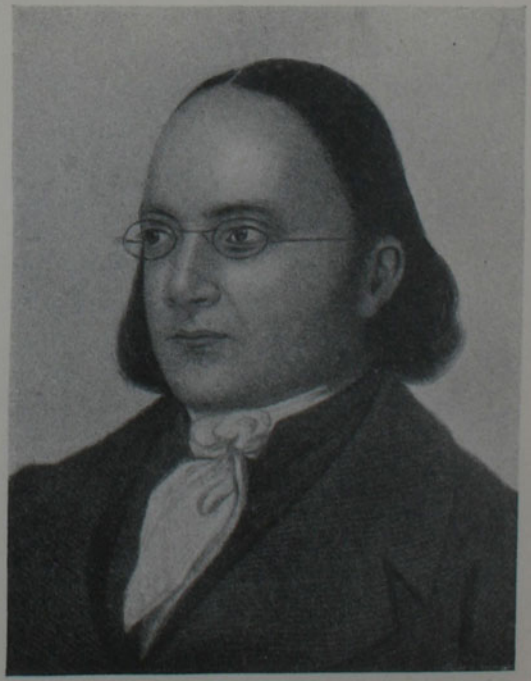
hending a single abstract idea; or he may show a hoarding inclination, a destructive tendency, or the sexual instinct, and yet manifest no other power to any perceptible extent.

Were the brain a single organ, then the innate dispositions of each man would be similar. But if the main and accessory convolutions of the brain be appropriated to different mental powers, then does every modification of character depend on a different degree of development attained by these particular parts of the brain, and their varying degree of activity. There are no two skulls, nor two brains alike in their configuration, nor are the characters of any two individuals found exactly to correspond. Look at Plate 2 and compare the narrow top-head of the rebel-chief Galishwe with the broad upper region of Dr Barth, the missionary.

There is a natural inequality in men. No two are alike in character. There prevails among individuals an infinite variety of intellectual endowment, of moral sentiment, affections, and instincts of self-preservation. The force and order of the impulses differ in every one. Some young folk, though lacking in intelligence, possess an astonishing faculty for learning by heart; others again remarkable for their intelligence have great difficulty in committing to memory. So with grown-up men. One will remember dates, another localities, a third individuals, and a fourth events. One lacks wit and gets angry at all mirth and fun, another is deficient in dignity, another

PLATE 2.

GALISHWE (Bechuanaland Rebel-Chief).



REV. C. G. BARTH, D.D. (Missionary).

dislikes children. One expects to find the enjoyment of life in wealth, another in power, a third in rank, a fourth in fame, while not a few are found to seek it in a mere round of excitement. Some folk are noted for their cruelty, others for their courage, others again for their slyness. Then there are persons who never had any friends and do not want any. Again, a little observation shows us that some men, apart from all training, have a decided capacity for certain pursuits. One man excels in history, another in geography, a third in mathematics. Some become great musicians, others eminent painters, others distinguished poets, or actors. Most of us are wholly devoid in some mental power: some are baffled by arithmetic, some have no skill for drawing, some are a dead-weight at music. Such mental quality is vouchsafed to one and denied to another. Each has a predilection, or a more decided talent, for a particular pursuit. There is, then, in every man something which he does not derive from education, and which even resists all training. We follow the line of least resistance, that is to say, the line along which our most active dispositions and abilities drive us. From his very childhood does a man show the character which will distinguish him in adult years. He is haughty or humble, prudent or careless, affectionate or cold, harsh or kindly, because it is in his nature to be so; in other words, because his brain organisation is so constituted. Every physician should be able to point out these innate capacities and dispositions, and be

capable of planning for instructors rules for each pupil, in order to perfect the good qualities and correct the evil ones, and to put the youth in a state to employ his powers in a manner useful to himself and society at large. Seeing the vast difference there is in the shape of heads, it is surprising that it has hitherto received so little attention. Compare, for instance, the portraits of Fox and Scott, Plate 3.

Education will act on the pupil in proportion to his innate mental powers, it will sharpen his existing aptitudes and dispositions, but it will not supply any new one; it cannot transform a Newton into a poet, nor a Milton into an astronomer. Of course it is not enough to be endowed with special mental powers, to have inherited a particular brain-structure. They must be roused into activity by external impressions, and subsequent exercise and application are indispensable to acquire facility and skill.

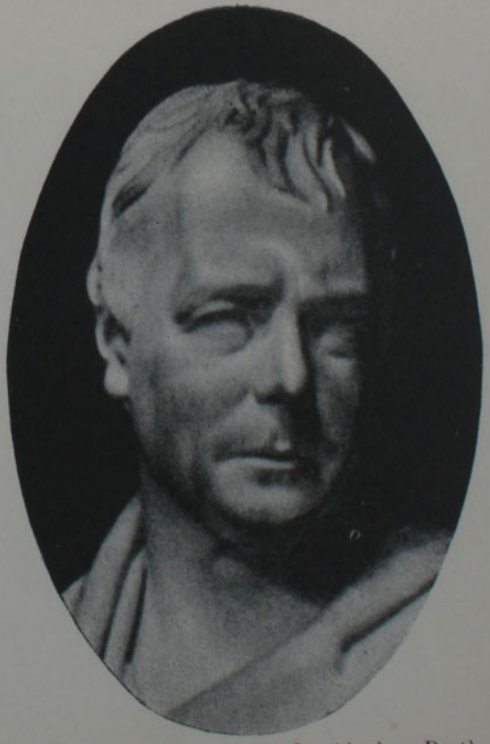
Some of man's primary mental powers take higher range, and some lower, but all are useful and necessary in their proper place. Happiness signifies a gratified state of them all. The gratification of a mental power is achieved by its exercise. To be agreeable, that exercise must be proportionate to the development of the aptitude or disposition; if it be insufficient, discontent arises, and its excess produces weariness. As long as a particular brain-centre contains an abundance of stored up nerve force, it responds pleasurably to a stimulus; if the natural appetite or disposition be too freely exercised, the nerve energy

CHARLES JAMES FOX, 1749-1806 (Statesman).

Notice large perceptive region. He was quick to observe and had a retentive memory.

Notice the breadth of head across the ears. He had a passionate temper, was addicted to vice, and was an invective speaker, using vigour but no adornment.

There was no romance about him, nor would the type of head lead us to expect it.



SIR WALTER SCOTT, 1771-1832 (Author, Poet).

Of immense imagination. Great lover of the romantic.

that keeps it active is used up and it ceases to respond. This is what the voluptuary discovers to his cost. Hence, to achieve complete felicity is to have all the mental powers exercised in the ratio of their respective development.

It is a law of our nature that when a thing has been done once, it is more easily achieved a second time, and with each repetition becomes ever more easy, till at length it grows to be natural and there is an appetite or a craving for it. The force of early habits is such that they generally determine our practice through life, and when once built up and strengthened are seldom if ever to be broken. Hence the necessity for constantly guarding against evil habits and against the practice of indulging the animal nature as opposed to the moral and spiritual; even the first beginning should be guarded against, the one first act that renders the repetition thereof more easy. The aim and purpose of the teacher then should be to render easy the doing of right and the doing of wrong difficult, and by want of practice unnatural and impossible. Whatever makes a good or bad action familiar to the mind renders its performance by so much the easier.

Exercise of mind implies exercise of brain. When any part is exercised, an afflux of blood takes place towards it, attended with heat and increased action; and if this be carried too far, or be persisted in too long, *morbid* excitement will take the place of *healthy*, and derangement of function will follow. A morbid

state of any brain centre may be induced either by causes acting directly upon its function or by causes immediately affecting the substance of which the centre is composed.

The existence of such evidence, as I have adduced in my book on "The Mental Functions of the Brain," to the effect that injury to the head affects one or more of the mental powers, according to the locality on which it was inflicted, while in other respects the individual remains perfectly sound, can only be explained on the principle that the several portions of the cerebral hemispheres have different functions allotted to them. So unregardful have physicians been of this fact that many of them deemed it quite unnecessary to state in their clinical reports in which region of the skull the injury was inflicted. But from the number of cases accurately observed and recorded, it is evident that injury to the brain beneath the parietal eminence, the angular and supra-marginal convolutions, leads to Melancholia in different degrees; that injury at the base of the temporal bone, the middle part of the inferior temporal convolution, leads to a manifestation of irascibility, which may end in Violent Mania, and so on; and that when the effects of the injury are removed in such wise as by lifting up an indented bone, the patient recovers his mental equilibrium. From other cases it becomes apparent that after injury in one particular region the "sense of relation of tones," one of the factors of the "musical faculty," may be lost, while in another region the

memory of figures and power of calculation may disappear, leaving the other intellectual powers normal. These facts have not hitherto been observed sufficiently, but when they come to be so the localisation of mental functions will make rapid advance.

Similarly it has been observed that irritation of the frontal cells is characterised by an acceleration of the intellectual processes of perception, association, and reproduction, giving rise to a rapid flow of ideas; and that softening of the same part leads to dementia, whereas irritation of the parietal, occipital and temporal area affects chiefly the emotions and propensities, often leaving the intellect quite unclouded. That emotional display which is seen after injury or disease of the frontal lobe is merely the weakening of the intellectual control, which leaves the predominant bias of the individual free to exercise itself. In certain forms of poisoning, too, such as by Alcohol, the highest mental powers are paralysed first, thereby depriving a man of the controlling power over his natural tendencies. Hence some intoxicated men get dejected, others gay; some talk foolishly, others are eloquent; some become effusively benevolent, others furiously maniacal, and so on. All these facts point to there being a congeries of centres in the cortex of the brain, not merely for the purely intellectual operations, but also for the emotions and propensities.

Experiments made on the inferior animals by means of electricity can throw no light on the *mental* functions of the brain. It is only possible to observe

those functions which come under the direct observation of the senses, symptoms which are motor in character, and which cannot be traced back to any volitional act of the subject. But if each portion of the nervous system governing movement be an independent local centre of power, it is a fair inference that each portion of the nervous system governing the mental acts is likewise an independent centre of power.

In favour of there being distinct centres in the brain is furthermore the fact of its arterial supply. The frontal lobes are fed by the internal carotid arteries, the parietal and occipital lobes by the basilar artery, the union of the two vertebral arteries. The inosculation in the Circle of Willis I believe to have been overrated. The vaso-motor nerves of these two areas are also differently derived. Those of the posterior area spring from the inferior cervical ganglion, into which run the fibres ascending from the abdomen by the greater splanchnic nerve. On the other hand the carotid arteries derive their vaso-motor supply from the middle and superior cervical ganglia.

Last, but not least, we have the observations of numerous investigators showing that certain regions of the cerebrum are distinguished from other regions by broad differences in structure. Not only does the structure in different convolutions assume to a greater or less extent a variety of modifications, but even different parts of the same convolution may vary with regard either to the arrangement or the relative size of their cells. These structural differences must be

correlated with some difference of function. The group of cells whose function is purely intellectual cannot possibly have the same construction as a group of cells whose function is purely emotional. The two may be united by association fibres, so that one may rouse the other, but the function of each group of cells must be distinct.

Though we may speak of a centre, it is understood that as there are two hemispheres of the brain, every centre is two-fold, and to this fact may be due those few instances in which a particular centre got injured or destroyed without a loss of any mental power being discoverable. This is especially the case in accidents to the right half of the brain, which seems to be less active than the left. Where the two halves are unequal, I have frequently observed that the right represents what the individual is by nature, *i.e.* his inherited organisation, and the left what he has made of it.

The more highly developed the mental powers, the more connected will the various centres of the brain become by means of intricate channels of the freest intercommunication. Though the centres themselves are distinct, all of them are interunited, and the activity of each depends on its relation to the others. It is therefore a mistake to look for a protuberance of brain-matter, or a bump on its outer-covering, the skull. No one centre is competent to manifest itself by itself. Each acts as a portion of the brain to modify the general result of cerebral

action. It is through this solidarity and interdependence that no portion of it can be injured or exhausted without its interfering in some way with the functions of the other portions. There is, however, a great difference between saying that the various brain-parts exert a mutual influence, and saying that each part does not perform its own particular function.

The positions of the centres are not accidental, but are governed by fixed principles. One centre fuses with another, hence neighbouring centres are related in their mental manifestation. Centres are of a higher character, and of later acquisition, in proportion as they occupy a higher locality in the brain. Thus the highest mental powers will be found farthest from the base of the brain, for the rigid base of the skull does not admit of much extension. On the other hand, the vault of the skull remains open in two places at least for some time after birth, and even in later life is still capable of an increased arching to make room for increased brain-mass. The lowest and most indispensable mental powers—for instance, the instincts of self-preservation common to men and animals—will be found at the base of the brain; the highest mental powers, and of later acquisition—for instance, the moral sentiments—are at the top of the head, in the superior part of the frontal convolutions.

CHAPTER II

HOW TO ESTIMATE HUMAN CHARACTER BY THE BRAIN-ORGANISATION

OTHER things being equal, the greatest amount of mental capacity and vigour is allied with the largest quantum of cerebral substance. All observation as regards men and animals proves that the energy of any nervous centre always bears a direct proportion to its bulk, whether absolute or relative. Every organ of our body increases in size in proportion as it is exercised within the limits of its physiological capacity, and this holds good as to the brain as well. With increased mental work the brain will show an increased growth. The measurements of Amadei, Meynert, Sommer, and Peli, show that the cranial capacity is greater in the insane than the sane, the constant mental exercise increasing the size of their brain.

The entire brain may be too small. Thus if we find a circumference from 14 to 17 inches in an otherwise well-proportioned head of a boy twelve years old, we may expect so small a size to be accompanied by a greater or less degree of stupidity or fatuity, more or less complete inability of fixing

the attention on a determinate object, vague sentiments, indeterminate and transitory affections and passions, an irregular train of ideas, speech consisting of broken phrases, or merely of substantives or verbs, as to eat, to walk, to play, etc., blind and irregular instincts, or an almost entire absence of them.

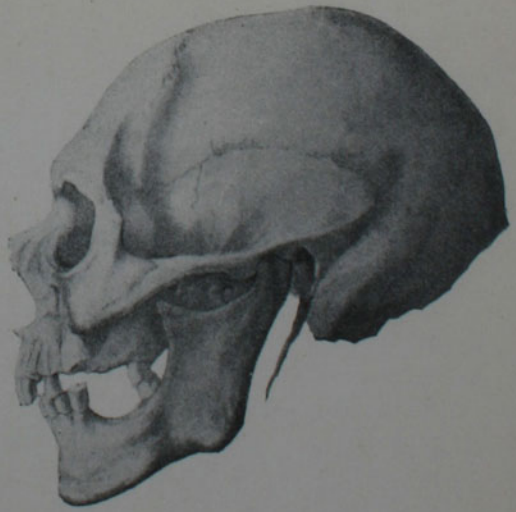
Heads of 18 or 18½ inches in circumference are small, yet if well-balanced are not incompatible with the regular exercise of the intellectual powers. They indicate a pitiful mediocrity, a slavish spirit of imitation, credulity, superstition, that species of sensibility which by a trifle is raised to the height of joy, or plunged in an abyss of tears, a very fallible judgment, an extreme difficulty in discerning the relation of cause and effect, a want of self-control, and frequently, which is a happy circumstance, but few desires. With this degree of development, however, there may exist some marked mental aptitudes — such as a remarkable memory for figures, dates, music, etc., because some cerebral part may be more fully developed.

As a rule, however, when the brain is too small, it is not dwarfed equally in all its parts, but is specially so in the pre-frontal and frontal regions—in those parts which manifest the peculiarly human faculties and sentiments—while the hinder and lower parts of the brain—those which are the seats of the appetites and propensities—are far less affected ; hence also the peculiarly animal look. Compare shape of idiot skull with that of normal skull, Plate 4.

The size of the *entire* head shows the mental *power*

PLATE 4.

SKULL OF A NORMAL MAN,
36 Years of Age.



SKULL OF AN IDIOT,
44 Years of Age.

Notice the frontal development in proportion to the rest of the brain.

only, but not the mental correctness. The town-clock may operate with a degree of power in proportion to its size, and may be heard resounding throughout a whole city, exercising thereby a widespread influence; and yet a small watch may excel it in point of correctness. In likewise a little man with a small head may excel in correctness a big man with a large head, by reason of a more perfect proportion of the several parts of the brain and a better cultivation of his mental powers.

Considering that the mental functions of the brain include not merely intellectual aptitudes and moral sentiments, but also the affections and instinctive tendencies to self-preservation, it is evident that the measure of the absolute volume of a man's brain cannot be taken as an index of his intellectual capacity alone. Prof. KARL PEARSON, in a paper read before the ROYAL SOCIETY on January 23rd, 1902, has used his great mathematical genius to demonstrate by arithmetical tables that there is no correlation of intellectual ability with the size of the *entire* head. This is obvious, for the purely intellectual functions are confined to the frontal, or rather pre-frontal, region of the cortex, which is at best one-third of the entire mass of the brain. Prof. C. S. SHERRINGTON, F.R.S., is therefore also quite correct in his observation, made in his "Lecture on Physiology for Teachers," London, 1901, that the brain may be wide or narrow, deep or flattened, the shape of the *entire* mass will not give any clue to intellectual endowment. No matter

whether the head be large or small, and the brain heavy or light, the *entire* mass will give no clue to the intellectual ability or moral character of the individual. We must compare the relative development of different regions in the same brain to come to a conclusion.

Circumference alone, therefore, as a measure of the skull and its contents is inadequate; for the brain may grow in certain regions without affecting the circumferential measurement. Thus I have three adult female skulls before me, each one has the circumference of 524 millimetres, *i.e.* 20·6 inches, but the cubic capacity of

No. 1 is 1390 cubic centimetres
„ 2 „ 1550 „ „
„ 3 „ 1420 „ „

which shows a difference between skull No. 1 and skull No. 2 of 160 cubic centimetres, or 11·5 per cent. Compare the height of head of Sir Eyre Coote with that of John Wesley, Plate 5.

What we need is the weight and measurement not merely of the entire brain, but of each lobe—frontal, temporal, parietal, and occipital—separately, and even of definite segments of these lobes.

It will be shown that the centres for the higher intellectual operations are entirely separate from the emotional centres, though connected by association fibres. Were this not so, the complete idiot would be also incapable to manifest any emotion, whereas on the

PLATE 5.

SIR EYRE COOTE (1726-1783).

General.
Daring valour.

JOHN WESLEY (1703-1796).

Evangelist and leader of Methodism.
Noted philanthropist, educational and moral reformer.

Notice difference in the height of head.

contrary his emotions are manifested all the stronger from lack of the inhibitory control of reason. The intellect can only appreciate facts but does not supply motives. We act from affection, and think in order to act. The world is governed not by thought but by emotion, and in judging a man we have to ask what are the motives that habitually determined his conduct whatever may be the means his intellect devises for the attainment of his ends.

A one-sided development of the emotions may give rise to prejudices which impede the proper play of intellect, and give rise to a kind of morbid sentimentalism ; but, on the other hand, too great a concentration of the mind on purely intellectual studies may result in starving of the emotions, and rob life of much of its richness and worth. In derangements of the brain the primary disorder usually consists in a tendency to disordered emotional excitement, which affects the course of thought, and consequently of action, without disordering the reasoning processes in any other way than by supplying them with wrong materials. It is not over-study or overwork that causes madness in those disposed to it, but the continuous exercise of the emotions, as is implied by worry, which is likely to lead to mental derangement.

Cephaloscopical investigation has revealed the fact that a high development of a particular region, as compared to the rest of the brain, is associated with special mental powers of which the region in question is the

essential basis. Just as in animals that possess an extraordinary sense of smell there is a relatively enormous development of the olfactory bulbs, so in men whose chief characteristic is an extraordinary degree of purely intellectual power, the pre-frontal lobes will be found remarkably developed as compared with the remainder of the cortex.

The differences in the mental powers of members of the same family arise wholly from the various degrees of development in the different cerebral parts. All normal human brains exhibit the same parts and have the same primary mental powers, but vary in the relative development of the different convolutions, principal and accessory. This relation is infinitely varied, hence the great variety in the character of men and the different degrees of development of the primitive mental powers in the same individual.

When the brain-conformation of several individuals is similar, the talents and dispositions are similar, and when its conformation is different, the mental powers are different. We may always observe that brothers and sisters who most resemble each other have heads similarly formed, and also children whose heads resemble that of one or other parent, manifest the mental qualities of that parent.

An equally-balanced head is a head which exhibits an equal proportion in the relative size of parts, an equal balance in the capability of the parts to execute the functions assigned to them in nature, with no innate tendency in any one particular direc-

tion more than another except that which circumstances may impart.

When only one, or a group, of the mental powers possess extraordinary energy, be it on account of the extra size of the particular centre, or some stimulus imparted to it arising from injury or disease, while the other powers are moderately developed, there will result an aptitude in a particular direction; it may be an intellectual power or a passion, according to its particular situs. See the extraordinary height of head of Oliver Cromwell's Porter, a noted fanatic, and the short distance of the forehead from the ear, as compared with Sir John Herschel, the famous astronomer, Plate 6. If, on the contrary, one or more centres are arrested in their development and remain in a state of inactivity, while others are more favourably developed and active, there results an incapacity in those directions, we get imbeciles in certain mental qualities—for example, Dalton as regards "colour," Macaulay as to "number"—or an absence or feebleness of definite animal desires—such as Kant with his small cerebellum.

When all the mental powers are equally moderate in their development and activity, the feelings and propensities, owing to the fact that they occupy the largest portion of the brain, will be in the ascendant. The enjoyments of such men are those of mere sense and they never distinguish themselves to any noteworthy extent. In this class are found the crowd of commonplace folk, middling in everything, intellect,

feeling, or propensity, so long as external circumstances do not supply some accidental stimulus.

If the quantity of cerebral structure in particular regions be considerable, some related power or quality of the conscious principle will, under ordinary circumstances, be displayed with unwonted energy; and in case of great deficiency in volume of brain in the same region, the corresponding power or quality will in every case be but feebly manifested. Intelligence and mental power depend on the relative balance or development of one part as compared with another. It should also be borne in mind that if there exists a disproportion, ever so small, between the different parts of the brain, it will increase if left unchecked by fitting means. That which is by nature somewhat stronger than the rest becomes through exercise of its function, and through neglect of exercising the functions of the other and smaller parts, far stronger, until it utterly ousts and masters them. Hence any evil tendency that can be accounted for from malformation of the brain, *i.e.* relative disproportion of its parts, should be checked in childhood.

It will be seen then, that we lay great stress on the relative proportion of the several parts of the brain as an indication of mental manifestation. But not in every case where the size and shape of the brain proves favourable will the mental operations get well performed, for there are other things which may impart unusual energy of function or impede the activity of the brain. The digestion, circulation of

PLATE 6.

OLIVER CROMWELL'S PORTER.

A noted fanatic.

The height of the head is out of proportion to the width and anterior development.

SIR J. F. W. HERSCHEL (1792-1871).

Astronomer.

As a boy a prodigy in science.

Compare the length of the forehead from the ear forward.

the blood, or other functions may be out of order, and exert an exciting or deteriorative influence on the brain, however well proportioned. But these are abnormal conditions, which no physician would neglect to take into account when they are found to exist.

Quality is another factor in estimating activity, but not the primary one. It only proves of avail when two or more individuals are compared with one another, and in such case, inasmuch as the brain partakes of the general constitution, its quality can be judged of by the general structure of the body: texture of skin, hair, nails, etc., development of bones, muscles, and so forth. With only one brain of a healthy subject before us, the quality of each part is the same, hence that part which is the largest in quantity will have been the most active.

The method to be adopted is to estimate the relative development of certain parts of the brain. Supposing the temporal region is by far the most prominent in the head. All the parts of the same brain have the same quality, hence if size be a measure of power, then in such head the manifestation of the functions of the temporal lobe will be the most vigorous as compared with the functions of the other lobes. This enables us to judge of the strong and weak points in each head.

A very important factor, however, in estimating activity, is the excitability of the brain and nervous system. Quite normal people vary in this respect according to their temperament and constitution, and this must be our next subject for consideration.

CHAPTER III

BRAIN-ACTION MODIFIED BY THE BODILY CONSTITUTION

WE must study the constitution so as to know the causes which modify cerebral action in every healthy normal being. The constitution even in the normal state varies in each individual, and may vary in the same individual at different periods of his life. There are three chief types that may be distinguished, according to the relative proportion of the different parts which make up the human body. See Plate 7.

1. The one in whom all the nutritive organs are highly active and sound, particularly those of digestion and secretion, and all the absorbent, circulating, and secreting vessels, a type which, from the fact that these "vital" organs predominate over the activity of the muscular and nervous systems, may be styled the "vital" temperament or constitution.

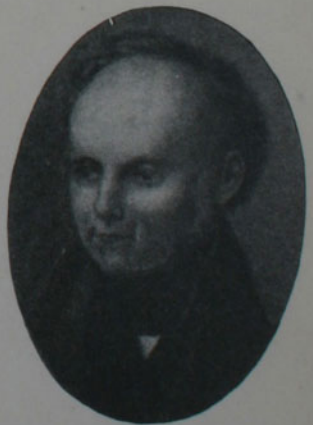
2. The one in whom the bones, muscles, and ligaments, that is the "locomotive" organs for mechanical action, predominate in activity over the nutritive and nervous systems, which may be termed the "motive" temperament or constitution.

3. The one in whom the brain and nervous system

PLATE 7.

WILLIAM GROVES.
"The very essence of a good fellow."
Punch Maker.
President of the "Society of Non-Common Pleas," 1734.
Vital temperament.

LABOURER.
Motive temperament.



C. D. GRABBE (1831-1836).
Poet.
Mental temperament.

predominate in activity over the motive and vital systems, and this may be described as the "mental" temperament or constitution.

This anatomical division of the human constitution was made originally by Alexander Walker, Lecturer on Anatomy and Physiology at Edinburgh, nearly a hundred years ago, and, as is generally the case with new ideas, has remained unnoticed by his own countrymen. My description is taken from some American Authors, Dr Drayton, and others.

These three temperaments have different effects on the brain-activity, accordingly as one or the other predominates.

THE VITAL TEMPERAMENT.—This variety of the human constitution is characterised by a preponderance of the nutritive organs, the organs of digestion, respiration, and circulation, which occupy the great cavities of the trunk. It is marked by a fulness of body, rotundity of the abdomen, plump and tapering limbs, with hands and feet relatively small. The neck is comparatively short and thick, and the shoulders broad and round. The whole body, including head and face, is well covered with adipose tissue. The expression of the countenance is generally lively, frank, and good-natured. For enjoyment there must be abundant vitality in the system. In women this temperament is very general, contributing to their symmetry, plumpness, and agreeable proportions.

Persons of this temperament must be ever doing

something to work off their constantly accumulating stock of vitality, but they generally love play better than hard work. Their motto is *dum vivimus, vivamus;* let us live, while we do live. They are lively, cheerful, amiable, frank, fond of good living, play and sport, have strong social affections and are general favourites. As the man with the vital temperament is more "sufficient for himself," more spontaneously happy, he will, on the whole, be less urged in the way of active pursuit. He will be moved only by some powerful feeling, but then strongly, not like the man with the mental temperament, who overflows in action under slightly impelling motives. He is interested in things present. Such a man is more surrendered to impassioned eloquence than to a mere scientific lecture. He is disposed to take up with an avocation of abiding human interest, politics, or as preacher, critic, and if at all interested in science, it will prove the solace of his retirement. When this temperament is in excess, men may overdo the eating and drinking, and are prone to lapse into irregularities in the way of frivolity and dissipation. However, with high moral principles to restrain and regulate their conduct, they generally lead happy and useful lives, enjoying and promoting enjoyment. Persons of this temperament have a broad base to their brain. See portrait of Groves, Plate 7, and of Fox, Plate 3.

THE MOTIVE TEMPERAMENT.—This variety of

the human constitution is marked by a superior development of the bony and muscular systems. Its characteristics are large bones, strong muscles, prominent joints, and an angular figure, usually associated with more than average height. The shoulders are broad, the facial bones marked, hands and feet large. In persons of this temperament firmness of tissue is characteristic, imparting strength and endurance, with unlimited capacity for hard work, particularly of a physical kind. The facial expression is one of earnestness and determination. In women this temperament is much less frequently met with than in men.

As a rule, those in whom this temperament strongly predominates are distinguished for their force of character, industry and executive ability; they have love of power, are the leaders in active life, observers rather than thinkers. If endowed with good brain-organisation, they are competent to carry out great works; but if possessed by vicious brain-development, they are also capable of great crimes. Their success is by means of energy and perseverance, rather than through forethought or deep scheming. They are men of the field rather than of the cabinet, men with whom to think and to feel means to act. In this temperament the nutrition of the body seems to be drawn chiefly towards the maintenance of muscular action. It may become applied to ends of utility, or be expended on sport and athletic amusement. We see it in the English navvy, the

able-bodied seaman, the porter for carrying heavy weights, as well as in the explorer and the athletic champion. Individuals of this temperament have the crown of the head and the lateral parts adjoining—the motor area of the brain—strongly marked. See portrait of Labourer, Plate 7, and portraits of Prize-fighters, Plates 14 and 30.

THE MENTAL TEMPERAMENT.—This variety of constitution is characterised by a frame comparatively slight, with a head large in proportion to the size of the body. They have an oval or pyriform face, with features delicate and finely moulded, mobile and expressive. The skull is comparatively thin, the hair fine and soft, the eyes brilliant and the voice of a high pitch. The personality is seldom imposing, but may be graceful and elegant. The muscles are small and compact in quality, adapted to rapid action rather than strength. The whole structure is distinguished for its refinement and delicacy. In women who possess this temperament, there is a decided lack of the plumpness that characterises the vital temperament; they may be beautiful, but it is the beauty of delicacy and refinement, rather than the symmetry and grace of physical proportions.

The power of this temperament is dependent upon the brain, and when there is a good degree of vitality to sustain it, the person may exhibit remarkable capabilities, for the reason that in its very nature this temperament indicates a special activity of the mental

PLATE 8.

SCHILLER, 1759-1805 (Poet).

ALFIERI, 1749-1803 (Poet)

Notice height of forehead.

powers. The tendency of persons so characterised is generally towards pursuits that engage the mind rather than the body. It is the literary, artistic and poetic temperament. See portraits of Schiller and Alfieri, Plate 8; of Voltaire, Plate 14; of infant Theologian, Plate 39; and of D.M.S., Plate 41. Such beings are vivacious in all their ways, possess a quick display of feeling and a lively succession of thought. The nutrition of the body flows by preference towards the nervous substance, perhaps placing the muscular and digestive systems below the average, and presenting that not infrequent concomitant of great nervous power—a feeble physical frame. In such beings every excitant applied, everything that can rouse a feeling, volition, or thought, tells with ampler force, and yields a greater return than in other individuals. While a large proportion of the mental element is desirable, because of its endowment of a capacity for intellectual growth, yet its success is likely to contribute to weakness and failure because of an insufficient vital basis. When trials and disappointments occur it is likely to succumb to them. Persons of this temperament have the frontal and pre-frontal regions of the brain prominent.

COMBINATION OF TEMPERAMENTS.—The more frequent combinations of temperament are the following:—

Vital-motive, or *motive-vital* temperament. This is a variety of constitution which qualifies for the

physical work of life. It is not of an intellectual trend. It contributes but little taste for pursuits demanding study. There may exist good application, and with a well-shaped brain practical talent, clear perception, combined with sound judgment, but it is in the out-of-door activities of the world it proves most successful. See portrait of William Joy, Plate 14.

Vital-mental, or *mental-vital* temperament. This is for the most part a happy organisation. It imparts many attractive qualities, especially to women, for with it co-exist warm affections, kindness, amiability, grace, sprightliness, and usually much personal beauty. Men of this stamp, if educated, are fond of public banquets, and are good dinner-table orators, and their wit and social enthusiasm make them welcome on all festive occasions. See portrait of Wilberforce, Plate 15 ; of Queen Victoria, Plate 34 ; Empress Catherine, Plate 36 ; and of Empress Marie Therese, Plate 37.

Motive-mental, or *Mental-motive* temperament. In this variety the mental imparts a refining influence to the motive temperament. A person so constituted is clear-headed and energetic. He goes in for solid, practical things, and is likely to take the lead. It implies a talent for planning and power to carry out successfully. Men having such temperament are wishful to work as well as to think ; in fact they think best while on their feet carrying into effect their enterprises. See portrait of Burton, Plate 12 ; of Paré, Plate 24 ; and of resolute boy, Plate 39.

CHAPTER IV

RELATIONS BETWEEN BRAIN AND SKULL IN NORMAL INDIVIDUALS

THE skull represents for all practical purposes a true measure of the dimensions of the brain in all normal individuals.

The head of a new-born child is from 13 to 14 inches in circumference; those of adults are found to vary from 20 to 23 inches. The cerebral cavity, and hence the whole contour of the head, enlarges in the same proportion as the brain increases in size, and this simultaneous enlargement continues as long as the head grows. This fact sufficiently shows that the cranium yields instantly to the brain, which augments in volume, and as the bones of the cranium until the age of puberty are very thin, about a line in thickness, it follows of course that the external outline of the cranium is precisely similar to the surface of the brain. In children, of whatever temperament, one finds a thin skull and hardly any frontal sinus, hence one can judge of the brain development and the corresponding mental capacities for educational purposes with almost infallible accuracy, and hence teachers need not concern themselves with the difficulties of estimating the brain size

which exist in adults and under pathological conditions, and will be described presently.

Every child is born with a tendency to that form of brain which it afterwards assumes. To allow of this, the brain of the fœtus is not surrounded by any osseous substance, but by a transparent cartilaginous membrane, which becomes osseous simply for the protection of the brain. The forehead, which in a newly born infant is perpendicular, or flattened backward, begins to protrude as soon as its life ceases to be purely vegetative, passed between sleeping and feeding, and it begins to take notice of the external world. As the child observes and begins to reason, the small, narrow, short forehead of the early months dilates in all directions and especially forward ; the frontal bone increases in convexity with the rapidly-growing frontal lobes of the brain, and in relation to the extensive knowledge he now acquires. Later on, these frontal parts get more balanced with the rest of the brain, and the little prodigy resumes his place among ordinary folk.

The inferior part of the occipital bone also undergoes marked changes. The cerebellum is placed in the two occipital fossæ. In the new-born infant it is very slightly developed as compared with the rest of the brain. The cranium is contracted in this region, resembling a truncated cone. The external prominences corresponding to the occipital fossæ are small, flat, and almost imperceptible. The two mastoid processes are still very near each other. But mark the difference in

the boy arrived at puberty. The occipital fossæ are distinctly observable externally by their protuberances. The mastoid processes are much further separated. The posterior base is far larger, and all this because the cerebellum is now more developed as compared with the rest of the brain. Finally, in more mature age, when the cerebellum has acquired its whole development, the prominences corresponding to the occipital fossæ are much larger still, so that the base of the cranium, taken from one temporal bone to the other, equals almost its diameter.

The enlargement we have just described in two situations takes place in like manner when other cerebral parts get more developed, and considering the thinness of the cranium, one can recognise from it with certainty the shape of the brain.

It is hardly possible to determine with exactitude either the period of maturity, or the duration of the mature state of the brain. There are some individuals who arrive much sooner at this state than others do. The brain of most men ceases to grow after thirty, at least perceptibly, but sometimes not till forty. That depends entirely on the degree of mental activity and amount of fresh knowledge acquired. One must bear in mind that the skull is a living substance and that there is a continual process going on of absorption, nutrition, decomposition, and new formation of osseous molecules. Many would have us believe that the brain obeys the inert resistance of the cranium because the latter is the harder, in spite of evidence afforded to the

contrary in the case of hydrocephalic subjects. They forget also that the continual action of nature in nutrition changes and modifies the hardest of substances as easily as the softest parts through the successive apposition of nutritive elements and the re-absorption of those that have remained a long while in the system. The brain is not made for the skull, but the osseous envelope is made to protect the brain; the brain being an object more essential to the end of nature than the skull, the latter should yield to the development of the former, as everything tends to show that it does. It is a general axiom in physiology that it is not from the greater or less consistence of parts, but from their greater or less energetic or continued action, that the changes that are effected in nature depend. But, as of all animal parts the bones and scales are the most inert, they have the least power also to modify and influence the other parts in their forms and development. Wrong conclusions have been drawn from the appearance of the brain when taken out of its osseous box. Then, no longer being supported on all sides, it sinks down and flattens out, though it has filled the cranial cavity completely during lifetime. It may with confidence be said that every segment of the skull represents some particular part of the brain lying beneath it, and that groups of convolutions do modify the shape of the skull, and possess visible representations upon its outer surface. We have nothing to say, however, in defence of *bumps*.

The amount of fluid in the subdural space is only

enough to prevent friction during the movements of the brain.

The difficulty with reference to the frontal sinus has also been much exaggerated. In children one may ignore it altogether; in women a slight allowance will have to be made; and in men the temperament will tell us what sized sinus to expect, a small sinus and thin skull in the mental temperament, a large sinus and thick skull in the motive. Moreover, the following rule will always serve as a good guide. Nature, in forming the bony frame of healthy people, has a uniform mode of working, and uniformity of size is found in all the parts. Hence, if the bones of the arms and legs of a man are strong and thick, his skull will be similarly thick. On the other hand, it may reasonably be inferred that thin bones of limbs indicate comparative thinness of skull. Lastly, the frontal sinus, even when excessively developed, affects only the centre-part of the lowest segment of the frontal lobes, but does not affect the width of that part of the forehead or its length from the ear forward.

After the period of maturity the cranium thickens by degrees, and in the following manner. The bones of the cranium are composed of two solid osseous laminæ, representing the external and internal surfaces respectively; the interval between the two laminæ is filled with a cellular substance, the diplœ. This substance is not of a uniform thickness throughout, so that the two tables are more separated from each other at some places than at others. Thus, then,

although the internal surface of the cranium is exactly moulded on the surface of the brain, from the moment when the cranium has acquired a certain thickness, it cannot be asserted without qualification that its external surface exactly represents the convolutions of the brain. The two tables of the cranium are no longer parallel in their whole circumference. Now, does this want of parallelism between the two tables of the skull in men, whose brain has reached or passed maturity, really prevent one from arriving at a conclusion as to the development of the brain beneath? Were one to feel for "bumps" in the manner of so many ignorant phrenologists, who have to delineate average brains of average characters, serious mistakes would be sure to occur; but medical men have to study extremes only, striking excesses and deficiencies of particular segments or regions, such as may be seen by all the accompanying illustrations. Take the portraits of Mirabeau and Loyola, Plate 9, for instance, where the difference is so well marked that even the untrained observer can see it. Such lack of parallelism between the two tables of the cranium rarely occurs at the top, nor in the squamous area at the sides, and these are in many respects the most important regions. Moreover, when it does occur, the deviation rarely amounts to as much as $\frac{1}{10}$ or $\frac{2}{10}$ of an inch, except at the frontal sinus and occipital protuberance, whereas the differences in the development of particular regions of the head amount to entire inches.

In old age the brain loses its activity and its con-

MIRABEAU (1749-1791).

Statesman, Author, Orator. Keen observer. Unscrupulous. Moral and religious sentiments defective.

IGNATIUS LOYOLA 1491-1556).

Founder of the order of the Jesuits. Impressed by supernatural legends. Given to penitential exercises. Moral and religious sentiments highly developed.

volutions contract and flatten, but there is no void space between the brain and the internal table of the cranium, for the latter thickens as the former recedes. It follows it in its collapse. The outer table then gives what the man has been during the greater period of his life, and the internal table will show what he was at the time of death. In rare cases, in consequence of there not being so much diplœ deposited between the two walls, the outer table follows the inner as well, and the head may thus get smaller, and at death appear very thin. From this it follows, that one can in old men, as a rule, describe what was formerly the shape of the brain, though one cannot, on account of the unequal thickness of the cranium, pronounce with accuracy as to its actual state at the time of examination.

That the skull-bones have the power to adapt themselves to abnormal conditions has been shown by A. B. Drousik, "On the causes influencing the shape of the skull," St Petersburg, 1883, who stated as the result of his experiments on animals: firstly, that the skull-bones increase in thickness in proportion to the diminution of pressure (reduced activity) on the part of the brain from the inner surface; secondly, that an abnormal development of the brain as well as any change in its form influences the configuration of the skull and indirectly of the face.

We have still to refer to the skulls of the insane. When the mental derangement has been of short duration, the cranium may be enlarged in a particular

segment, but often does not offer the least trace of diseased alteration. But when the brain-disease has been chronic, a wasting may take place and the whole brain shrink. In such a case, as in that of advanced age, the internal table of the cranium follows the sinking in of the brain. The bones of the cranium thicken, but they do not become as in old age spongy and lighter, but on the contrary more dense, compact, and heavier, approaching somewhat the texture of ivory. Most idiots have a very thick cranium.

The orbital convolutions as also the base of the temporal and occipital lobes, their development as well as function, will be described further on.

The convolutions on the internal surface of each hemisphere, which are divided by the falciform process, are all prolonged more or less vertically to the surface, and are but a continuation of the superior convolutions in the middle line, having the same functions, so that no part of the brain related to psychical manifestation escapes our observation.

PLATE 10.

ANATOMICAL AND FUNCTIONAL DIVISIONS OF BRAIN.

Frontal Lobe.
- 1. Perceptive Powers. } Intellect.
- 2. Reflective Powers. }
- 3. Ethical Sentiments. } Moral Sense.
- 4. Religious Sentiments. }

Temporal Lobe.
- 5. Instinct of Self-preservation.
- 6*a*. Hoarding Instinct.
- 6*b*. Secretive Instinct.

} Propensities.

Parietal Lobe.
- 7. Sentiment of Fear.
- 8. Egotistic Sentiments.

Occipital Lobe—9. Affections.
Cerebellum—10. Libido Sexualis.

CHAPTER V

THE FRONTAL LOBES

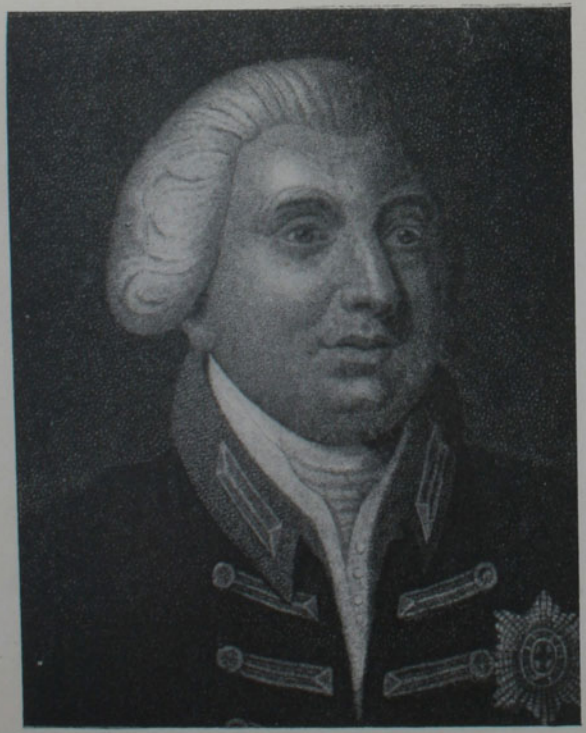
THE frontal lobes in man reach the greatest development in volume as compared to all animals. As we ascend the scale of animal intelligence, so we find that in proportion to the rest of the brain the frontal lobes increase in size, until their surface measures one-third of the entire surface of the brain. The frontal lobes, even of the highest apes, reach in size only those of the lowest microcephalous idiot, and since the other lobes of the brain in man and animals show no such disproportion, we may draw the inference that the frontal lobes contain those centres which are distinctly human, that is the centres for the purely intellectual operations and moral sentiments. That this is so, can be demonstrated on man himself by anyone who cares to use his eyes and observe his fellow-beings.

The greater mass of the frontal lobes, that is the three frontal convolutions, superior, middle and inferior, lie in front of a line drawn from the anterior superior insertion of the ear to the same point on the other side across the top of the head. See Plate 10. Speaking more correctly, it is that mass of brain which lies between a plane held vertically upwards

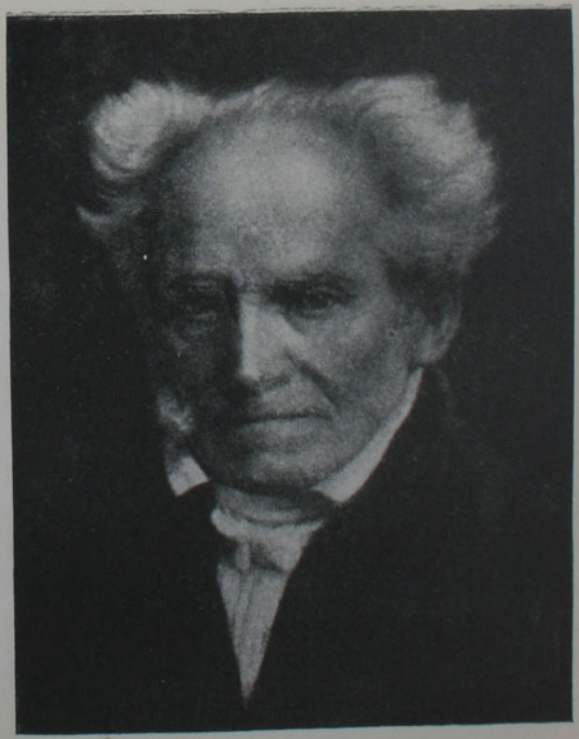
between the two external auditory meatuses and another, held nearly horizontally, from the superciliary ridges at the eyebrows to meet the first plane. If the mass of brain between these two planes and the convex surface predominates greatly over the remainder—if it be relatively very large—one may draw the inference that the manifestation of the superior mental powers, intellectual and moral, in such a man, will be greater than the manifestation of the affections and propensities, and that his animal tendencies will be held in abeyance. On the contrary, if this brain-area be small as compared with the mass of the remaining lobes, then the animal characteristics preponderate over reason and moral sense.

It is not a question of protuberance or depression of the surface of the brain or skull, but it is a question of a correct estimation and comparison of the relative development of brain-masses. Wherever you go and wherever you are, in street or home, public or private assembly, you will be able to verify the above. Men of intellectual and moral eminence, all the world over, of whatever nation or creed, have large frontal lobes. You need not be a philosopher nor a vivisector; you need not be an anatomist nor a physiologist; you need only use your eyes, to confirm this statement. Compare Schopenhauer's portrait with that of George III., Plate 11. Notice also the size of the frontal lobes in the Tramp, Plate 38, and in the Imbecile, Plate 39, as compared with D.M.S., Plate 41.

The more vaulted the frontal bone, the more room



GEORGE III. (1738-1820).



SCHOPENHAUER (1788-1860).
Philosopher.

Compare the reflective regions (upper part of forehead).

for the frontal brain, but do not forget that this represents only one surface. A receding forehead is therefore quite compatible with marked intellectual power if the breadth, height, and depth of the frontal lobes are good. Besides, in a man of the motive temperament the frontal sinus is often much developed, and would give the appearance of a receding forehead.

It matters not whether the entire head be large or small, as long as the frontal area has large dimensions as compared with the rest.

The larger the anterior lobes in proportion to the rest of the brain, the more refined will be the expression of the emotions and even of the passions of man, and the greater control will he be able to exert over them. Let the frontal lobes be arrested in development or destroyed by disease, then the struggle between the lower instincts and the ethical feelings may cease, and instead of a rational man we see a creature given over entirely to the satisfaction of his lower desires.

Allen Starr of New York, who has studied the mental disturbances following disease of the frontal lobes, gives the summary of twenty-three cases in the *American Journal of Medical Sciences*, April 1894. He says: "The form of mental disturbance in lesions of the frontal region does not conform to any type of insanity. It is rather to be described as a loss of self-control and a subsequent change of character. . . . This action of control implies a recognition of the import of an act in connexion with other acts—in a

word, it involves judgment and reason, the highest mental qualities. It seems probable that the processes involved in judgment and reason have for their physical basis the frontal lobes; if so, the total destruction of these lobes would reduce man to the state of an idiot, while their partial destruction would be manifested by errors of judgment and reason of a striking character. One of the first manifestations would be a lack of that self-control which is the constant accompaniment of mental action, and which would be shown by an inability to fix the attention, to follow a continuous train of thought, or to conduct intellectual processes. It is this very symptom that was present in one-half of the cases collected. It occurred in all forms of lesions—from injury by foreign bodies, from destruction by abscess, from compression and softening due to the pressure of tumours—and therefore cannot be ascribed to any one form of disease. It did not occur in lesions of other parts of the brain."

A defective development of the frontal lobes leads to mental and moral idiocy, even though the remainder of the hemispheres has attained to normal growth. I know of no alienist who does not admit this fact.

Anything that irritates the frontal lobes, as for instance inflammation, or the growth of a tumour, causes an increased activity of the mental processes of perception, association and reproduction, in other words, a rapid flow of ideas, and through stimulation of the speech-centre, loquaciousness. The other

lobes of the brain being unaffected and deprived of the control of the intellect, manifestations of the natural feelings and animal spirits occur. The patient knows his surroundings, and many men may fail to recognise in him anything abnormal.

Alcohol weakens the intellect, and by thus lessening the control over the natural impulses gives predominance to the feelings and propensities.

Vivisectors found after destruction of the frontal lobes in dogs and monkeys that the curiosity to observe, which is so marked in monkeys, is lost; that they are not able to receive new impressions, or to remember or reflect on the old; and that, since they can no longer criticise, they become timid and easily excited. All the emotions and propensities remain intact, only increased in activity for want of control, but they show no longer gratefulness, cannot adapt themselves to new surroundings, neither learn anything new, nor regain what they have forgotten. Experiments on animals thus confirm our view that the frontal lobes are the centres of perception and reflection, and the centres for the moral sentiments so far as their rudimentary existence can be demonstrated in the lower creatures, and that they are, in addition, centres of inhibition against the instinctive impulses.

It is to be regretted that the majority of investigators continue to this day to take the circumference of the entire head as a measure of intellectual capacity—notice Prof. Karl Pearson's paper to the Royal Society, January 1902—whereas, according to our doctrine,

the measure of the anterior part alone is an index to the intellectual growth. A friend of the author, Mr James Webb, Headmaster of the Leyton Board School took some simple measurements of all the boys in his school, the result of which bear out the principles which we have laid down in this chapter, and gave rise to some interesting observations.

1. The most intellectual boys average half an inch more anterior than posterior brain ; the least intellectual boys possess half an inch more posterior than frontal brain.

2. Younger but more intellectual boys have not only slightly larger heads, as shewn by the circumference, than older but duller boys in the same class who have been neglected by their parents or have taken longer to reach the same standard, but the ratio between the anterior and posterior measurements in the former is much greater than in the latter.

3. The anterior measurement of the brain in boys, passing up from Standard I. to VII., increases at a greater rate than the posterior measurement in accordance with the increase of their intellectual capacity.

1. The Perceptive Centres.

The frontal lobes may be divided into two parts :— 1. The anterior part which comprises the supra-orbital convolutions and those parts of the three frontal convolutions which lie against the forehead.

2. The superior part, that is the upper and posterior part of the three frontal convolutions, the part which normally is covered by hair. See Plates 10 and 35.

The first part, which is also termed the pre-frontal lobes, is represented by the lowest segment of the brain in front of the ear. If we draw a line from the anterior superior insertion of the ear on one side across the eyebrows to the like spot on the other side, and another line between the same points but across the anterior border line of the hair, which in men who are not bald is just above the frontal eminences, we get in the interspace between these two lines the visible part of the pre-frontal lobes. The forehead, as already pointed out, represents only one wall of this mass. Look at the portraits of Cromwell's Porter and Sir John Herschel, the Astronomer, Plate 6. The foreheads of both are high, but the distance from the ear in one is twice that of the other.

The lower portion of this segment, we shall see, is related to the perceptive range of the intellect; the upper portion to the reflective range, or reason proper.

The perceptive centres are in the supra-orbital convolutions and the anterior ends of the three frontal convolutions. Perception is a complex process. Our various representations, the different impressions made by the senses, would not exist for us without this element which gives them unity and makes them an object of understanding. Perception is then sensation plus intellection. The sensory ideas, whether visual, auditory, tactile, or other, on entering the

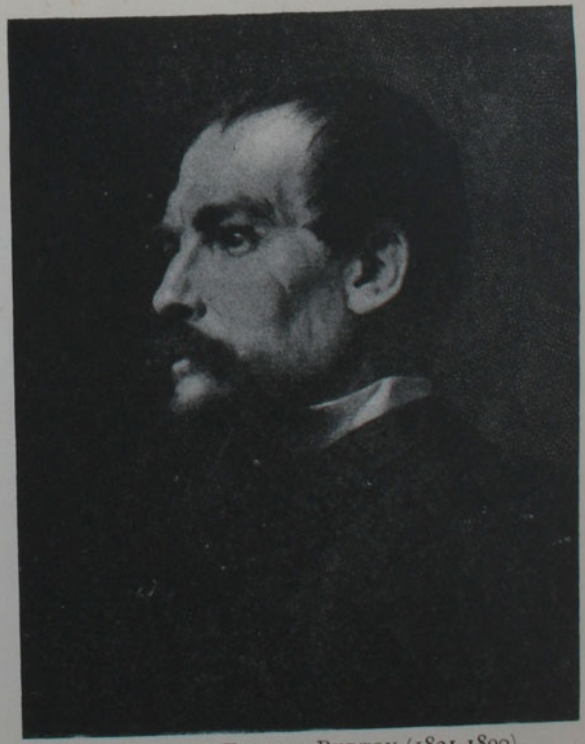
domain of consciousness, are studied in all their relations to self and the external world. The visual centre may *see* an object, but the perceptive centre *looks* at an object and ascertains its significance. Professor Nothnagel related at the Medical Congress at Wiesbaden in 1887 the case of a patient who had embolic softening of both visual centres and got blind in consequence. He could receive no new impressions of sight, but he could still recollect the appearance of objects seen. The utilisation of visual images, therefore, cannot be bound up with the same area, the destruction of which renders the individual blind.

It is beyond dispute that the powers of observation, and of becoming acquainted with what are called phenomena, are the primary faculties of intelligence, and supply the raw material, as it were, for all intellectual exertion. They give retentiveness as well, and supply the material for practical knowledge. They enable the minute observation of individuals and details, whether for purposes of experimental science, or for purposes of fine art, or in the constructions of ordinary industry.

The analysis of the perceptive powers and their detailed localisation will be dealt with in a subsequent work, as also the evidence for the localisation of music and the external signs of the speech-centre. Some of the clinical and pathological observations on this subject have already been published in the author's "Mental Functions of the Brain," but it would delay the acceptance of the main principles set forth in this

THOMAS SYDENHAM, Physician (1624-1689).

Aimed not at hypotheses, but to observe Nature herself.
No speculator.



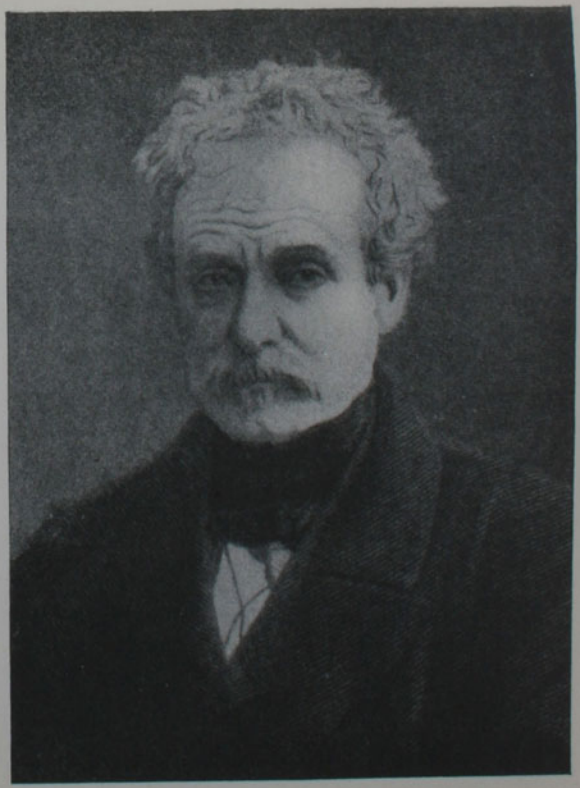
SIR RICHARD FRANCIS BURTON (1821-1890).

Explorer and Scholar. "No one with more *observant eyes*."
Knew not what fear meant. Very firm and self-confident.
Obstinate temper, good hater, overcoming hardships.

Large perceptive regions (lower part of forehead).

LORD CHANCELLOR SOMERS (1651-1716).

Remarkable memory for facts.



FIELD-MARSHAL LORD CLYDE (1792-1863).

Defective memory for abstract statements.

Notice centre region of forehead.

volume were I to obscure the subject by a premature introduction of details. So much, however, can be stated here, that the perceptive centres may be subdivided into two layers :—

1. Those of the orbital convolutions, for the observation of objects and all their attributes—the concrete or synthetic contemplation of beings—their form, size, weight, colour, order, and number, giving rise in accordance with their development to special indications in the region about the eyebrows. Look at the portraits of men noted for their powers of observation, such as Sydenham and Burton, Plate 12 ; Sir Eyre Coote, Plate 5 ; Hunter, Plate 45.

2. Those of the anterior extremity of the frontal convolutions, corresponding to the middle part of the forehead, which is related to the analytic or abstract contemplation, to the observation of active phenomena, giving memory of facts and events. It is this part which is most frequently injured by *contre-coup* in a fall on the occiput or blow in a collision, and causes so often the recollection of all the events of one's own life for several years to be wiped out. Notice portrait of Lord Chancellor Somers as compared with that of Lord Clyde, Plate 13. Notice also the forehead of the boy student, Plate 40 ; and of D.M.S., Plate 41.

2. The Reflective Centres.

The power of reasoning upon the knowledge gained, the power of tracing the relations of cause

and effect, and determining the analogies which subsist among things essentially dissimilar, is the next development. The brain-area which tends to this reflecting and generalising turn of mind, which tends to induction and deduction, to compare and to co-ordinate, is the upper segment of the prefrontal lobes, that part of the forehead which includes the frontal eminences. See Plates 10 and 35.

This brain-area will be found prominent in men whose knowledge rests chiefly on reason, is theoretical, as opposed to practical knowledge, the knowledge of facts of the man of observation. The intellectual capacity that enables a person to excel in some of the abstract sciences is something distinct from the grasp of mind that enables one to master details with the minuteness of a practical workman. The sailor knows how to steer a ship from experience of the act (perception and memory); the mechanical philosopher who never had a helm in his hand could tell from general principles which way to move it (reflection).

When the reflective faculties are affected, wrong conclusions will be drawn from correct or wrong premises. When the error of judgment arises from a preternatural activity of other mental powers without affection of the intellect, there results correct reasoning from false premises.

Two centres of this part are frequently so prominent that their function may be explained at this stage. Persons in whom the central part of this

segment is very large—the area between the two frontal eminences being sometimes so prominent that the eminences themselves quite disappear—will be found to possess an intellect given greatly to inductive meditation, to institute comparisons, and to generalise. This formation is generally found in persons highly critical, and in those fond of metaphors.

On the other hand, when the eminences are the most protuberant parts of the segment which, in itself, is already relatively highly developed, then such person has an intellect given rather to deductive meditation, an intellect which co-ordinates, systematises, and draws consequences.

As a rule, of course, when this segment stands out prominently, the person is so highly intellectual that both forms of meditation may be equally active, but there are exceptions, to wit, the born critic on the one hand, and the philosopher whose mind is in quest mainly for cause and effect.

The distinction between the perceptive and the reflective centres is well brought out by the two cases quoted below, which also confirm our localisation.

Case of imperception. Failure to remember and recognise. HORACE M. ABEL and W. S. COLMAN, *British Medical Journal*, 16th February 1895.

Patient, a railway fireman, slipped from the engine on to an-oil can, the spout of which entered the skull through the cheek and punctured the orbital convolu-

tions and lower part of the right pre-frontal lobes near the middle line. The man's reasoning processes remained orderly; his only mental symptoms were: loss of memory of previous events, of forms, objects, and places. "He could not recognise his wife or his old comrades, and he had also a difficulty in recognising common objects, and their uses." "The whole of his life for twenty years before the accident was wiped out from his memory." On leaving hospital he remembered all but five years of his life and "there was still extreme difficulty in retaining in his memory any passing events." "If he went out for a walk by himself he was unable to find his way back, and often failed to recognise his own house when he was outside, and there was still frequent failure to recognise common objects and their uses." There was, as the authors admit, a condition of "imperception." The man's reason remained perfect, as the spout only reached the middle part of the forehead, but his defective memory supplied him often with false premises.

Case of loss of induction and deduction. WILLIAM ELDER and ALEXANDER MILES, *Lancet*, 8th February 1902.

Patient, a man aged forty-seven years, had a tumour of the left pre-frontal lobe exactly under the frontal eminence, which was swollen.

"As regards the affection of his memory, it appeared to be not so much a blotting out of his past impressions (the lower 'perceptive' segment unaffected, just

the opposite to *Abel* and *Colman's* case) as a want of power of associating memories, of comparing and contrasting them. Lack of judgment, therefore, was a marked feature of his mental condition." He recognised objects and friends. "His emotional condition was a prominent symptom in his case. The loss of his sense of modesty and shame we have also alluded to. These quite evidently point to loss of inhibition and are important symptoms in pre-frontal lesions. . . . Closely allied to this loss of attention was his loss of power of forming a judgment about anything. He could not compare or contrast two things or ideas. . . . His individual memories seemed all right."

The skull was trephined, the tumour was removed, and the patient's symptoms rapidly disappeared.

Let the observer select extreme instances only. Let him fix upon such persons of his acquaintance as display remarkable facility in acquiring knowledge, and yet who at the same time exhibit an utter inaptitude for reasoning on the knowledge attained. Anyone at all accustomed to study the varied phases of the human intellect will be sure to remember some such individuals. Let the lowest segment of the frontal lobes be observed, first only in relation to the entire brain, then in relation to the remainder of the frontal lobes, and lastly to the upper segment of the prefrontal lobes. The length of the inferior region from the ear forwards, and its fulness and prominence just above the superciliary ridge, will

certainly be recognised. The higher portions of the forehead not being developed will impart a receding appearance to the brow.

Now let persons be taken whose intellectual peculiarities are just the reverse, individuals sound thinking and reflective, distinguished for their judgment, yet poor observers, with slender acquirements and but little relish for details in matters of fact. Here the relations in the frontal development will be reversed, in correspondence with the contrast in the mental characteristics. The upper division of the forehead will project, or be at least perpendicular, in opposition to the rapid slope observable in the preceding instance. Notice Voltaire's portrait, and compare it with that of William Joy, Plate 14. Compare the portraits of Schopenhauer and George III., Plate 11. Observe the length of forehead from the ear in Socrates and Democritus, Plate 21.

A convex forehead distant from the ear is a sign of educability, and will be found in promising young pupils; imbeciles have a depressed forehead of short distance from the ear. See Plates 39, 40, 41 and 42.

WILLIAM JOY (1699-1734).

The English Sampson. Performer of surprising feats of strength. Later a smuggler and was drowned. Small reflective region.

VOLTAIRE (1694-1778).

Philosopher, Poet, and Historian. Satirical. Large reflective region.

Notice region of frontal eminences.

CHAPTER VI

THE FRONTAL LOBES (*continued*)

3. The Region of the Ethical and Æsthetical Sentiments

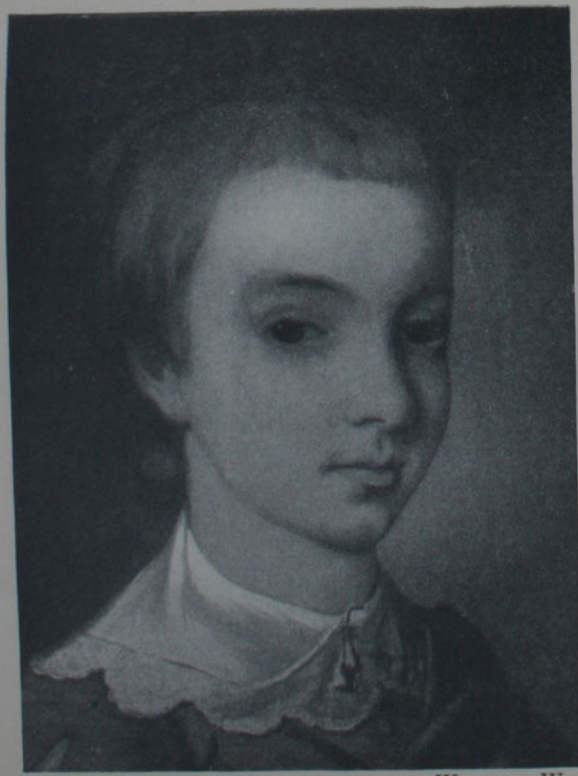
We have so far dealt with two segments of the frontal lobes, a lower perceptive and an upper reflective one. The lower may be considered as the first and fundamental story in the edifice of intellect, and is often found large in animals; the upper and second story is distinctive of man in its high development, and, when really large, becomes almost perpendicular with the lower one. See Plates 10 and 35; also Plate 37.

The next segment to be considered commences at the anterior border line of the hair and extends for an inch or more backward. It is measured, of course, from the ear. Readers should remember, however, that there obtains no definite outline for any centre, but one group merges into the other, and though we are for the convenience of observation considering the segments as if the frontal convolutions were running parallel with them, as a matter of fact the convolutions run at right angles to the segments, and their functions might be grouped in

that direction equally well, and will be so arranged when we come to the analysis of the great groups.

This segment is still more distinctive of man. It is later in acquisition and largest in the best characters of our species. It adds yet another story to the edifice and raises the forehead still higher when highly developed. It is the region of *mental susceptibility*. It is a principle of our doctrine always to study extremes of development for the elucidation of function. We shall therefore take first a very high development of this brain-area, and next a very small development, and compare the two. See portrait of Wilberforce, Plate 15. Notice the two skulls, Plate 22; also portraits of French Revolutionists, Plates 9, 16 and 19.

Those in whom this region is very large are remarkable as being the very impersonation of sensitiveness. They have most lively perceptions of the agreeable; overflow with ecstacy, when others show not the least excitement of feeling; are affected to extreme sorrow or joy by the most trifling occurrences; and are in every way possessed of high susceptibility. They are easily rendered enthusiastic, are readily influenced by the happiness and distress seen in others, and if their other mental organisation does not supply them with counteracting motives, they may act up to the feeling reproduced in them, and hence exhibit kindness, charity and generosity. See portrait of Abbé de l'Epée, and compare it with that of Marat, Plate 16. Being so highly sensitive, they will find pleasure in producing in others feelings which



YOUTH.

OLD AGE.

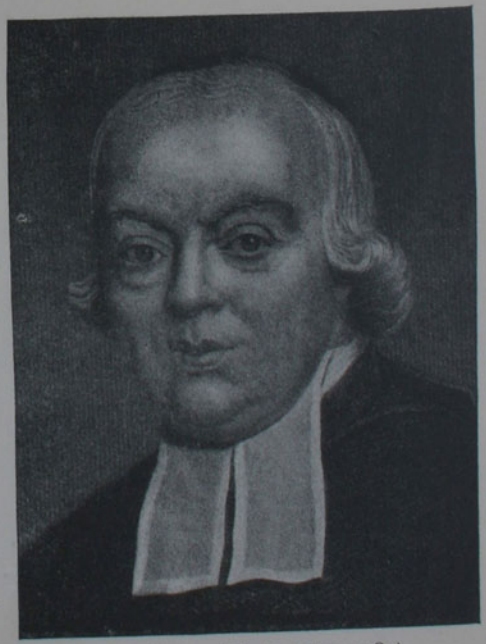
WILLIAM WILBERFORCE (1759-1833).

Philanthropist, Leader of abolition of slavery. Sympathy for all men. Sensible to all claims. Singular charm of character and personal attractiveness. Possessed power of imitation, famous as a mimic.

PLATE 16.

MARAT (1744-1793).

French Revolutionist. Low passions. Absence of moral and religious sentiments. Murdered by Charlotte Corday.



ABBÉ DE L'EPÉE (1712-1789).

Philanthropist and Theologian.

gratify themselves; they thus lead to the increase of happiness.

The generous man does, like every other being, that which suits him best to do, which, on the whole, gives him the most gratification; he gives for the purpose of relieving his own feelings, harrowed by the spectacle of suffering which he witnesses or which he has the power of representing in his mind. His generosity depends on the vividness with which he can realise the sufferings of others and on the energy of the motives, *i.e.* the relative development of other brain-areas — which would counterbalance such an action. The "born" criminal lacks this brain-part. See Plates 31, 37 and 38. He cannot and does not picture to himself the misery he is causing to others, hence there is nothing to arouse compassion, and one factor the less to check his selfishness. There can be no doubt that this region gives rise to the most humane impulses and is the foundation of altruistic sentiment. A departure from altruism and a leaning towards egoism mark some of the early phases of mental affections.

Look at all men you come across who are noted for their fellow-feeling and humanity, you will always find this region prominent. See portrait of John Wesley, Plate 5; or of Wilberforce, Plate 15. The very appearance of such heads carries with it an impression of good nature, while those of contrary characters on the other hand produce instinctive dislike.

Besides the region of the humane impulses (which

probably is confined to that part of the segment which is situated in the superior and middle frontal convolutions), this segment also contains the factors which impart the æsthetic sense, for the lateral parts (situate in the inferior frontal convolutions) are found highly developed in ideal and poetic natures, and small in prosaic and matter of fact folk. See portraits of Heine and Mrs Browning, Plate 17; Schiller and Alfieri, Plate 8. In all these notice the lofty brow and its distance from the ear. See also portraits of Owen and Davy, Plate 48, and the supposed portrait of Shakespeare, Plate 46. Such men tend to elevate and endow with splendid excellence every idea conceived by the mind, and this stimulates the other powers to imagine scenes and objects invested with the qualities it delights to contemplate. Hence do we find this region large—the lateral parts more especially—in all persons endowed with æsthetic sensibility, not only in poets and artists, but also in persons who lack the other powers by which they might give expression thereto. Such persons long for something more perfect than the scenes of mere reality; a plain, unadorned description of things would not satisfy them. They love the ideal and are enthusiasts in whatever direction their natural aptitudes and dispositions lead them. This region then is both *ethical* and *æsthetical*.

This region is very small in criminals, particularly murderers, and in all those lower races of mankind which are known for their barbarous and inhuman dispositions. See Plate 2. Such heads will be

HEINRICH HEINE (1799-1856).
Poet.

ELIZABETH BARRETT BROWNING (1809-1861).
Poetess.

Notice height of sides of forehead.

JOHN SELDEN (1584-1654).

Jurist. Ethical sentiments of the highest order. Most just man. Hospitable, generous, charitable, and humane.

LORD CHANCELLOR BROUGHAM (1778-1868).

Scandalously unjust in his criticisms. Even his friends distrusted him. Unamiable. Sarcastic. Large base, hence irritable temper and easily excited.

Notice ethical region.

LORENZO DE MEDICI (1449-1452).

Statesman, Poet, Man of learning. Great powers of imagination. Kind ruler. Attracted the most famous artists and most learned philosophers to his court.

ROBESPIERRE (1758-1794).

Revolutionist. Absence of ethical instincts. No "benevolence." Government of terror.

Notice ethical region.

found to form right angles at the border line of the hair, unless the reflective region be also small and sloping. Men with this type of head are noted for their callousness and imperturbability. Their torpid feelings can scarcely ever be roused into activity; they are insensible not only to painful but also to agreeable excitements; such words as "delight" or "distress" do not occur in their vocabularies. Physical pain causes them little inconvenience, and they are equally notable for their bluntness of moral perception. The higher susceptibilities, as the sense of beauty, love of the ideal, happiness derived from seeing others pleased, feeling of pity, kindness, charity, does not exist in such natures, especially not when their animal natures are energetic, through a high development of the temporal lobes. Notice, for instance, the chief agents of the French Revolution:—Robespierre, Marat, Danton, Plates 9, 16 and 19. Look at all the portraits in this book, compare the gentle characters with the cruel ones, and you will perceive the differences in their brain-organisation. Compare the portrait of Selden with that of Brougham, Plate 18.

When men in whom these ethical powers are active possess also energetic animal impulses, external circumstances or sudden impulses only will lead them to unjust acts or crimes and then they will feel the most intense remorse, of which the born criminal is not capable, and are likely to give themselves up to the authorities, whether religious or legal, to receive their punishment. Who does not see the difference in the

shape of the frontal heads of Lorenzo de Medici and Robespierre, two Rulers, one the ideal of kindness, the other a type of cruelty, Plate 19?

4. The Religious Sentiments.

A vertical line from one tragus to the other right across the head cuts through the fourth frontal segment. See Plates 10 and 35. The fourth story of the edifice of mind, the region of the religious sentiments, which when large, as it is in the truly devout of all denominations, gives the head on account of its height a perfect dome-like appearance. It is the highest acquisition of human nature and is related to the posterior portion of the three frontal convolutions. The feelings which are included in this category are the feeling of wonder and awe roused by the sublime and vast in nature, the feeling of veneration and reverence awakened by the recognition of an exalted influence and authority, faith and belief roused by appearances for which the intellect can find no natural causes, and the spiritual feeling arising from appearances which suggest a future life. The same feelings in a modified degree inspire reverence for relics of antiquity, historical institutions—see portraits of Gilbert and Buchanan, Plate 49—and give a conservative tendency as opposed to revolutionary reform. Again, the central parts contain the centres for such functions —veneration, spirituality and faith, which aid the ethical sentiments of the adjoining area, and the

HECTOR BOËCE (1465-1536).

Historian. First Principal of King's College, Aberdeen. Always more ready to believe than to doubt. Great fabulousness.

DAVID HUME (1711-1776).

Historian. Sceptic. Atheist. Practical man of business.

Notice the difference in the height of head.

lateral parts contain the centres of wonder and sublimity, which lend aid to the æsthetical sentiments.

Men in whom this region is relatively highly developed are given to contemplating the spiritual state and seldom turn their attention to gross matter and the purely animal pleasures. See plates 2, 5 and 49. When developed in excess of the rest of the brain, the person is inclined to mysticism ; and when perverted or not guided by the intellect, there may be superstition, bigotry, fanaticism, delusions—see portrait of Cromwell's Porter, Plate 6—and a ready belief in ghosts, apparitions, magic and mysterious occurrences. The intellect being less highly developed, it is guided by the stronger impulse and may even be employed to search for arguments to support the credulity. Compare the portrait of Boëce, the ready believer, with that of Hume, the sceptic, Plate 20 ; compare also the portraits of Socrates and Democritus, Plate 21 ; and see Plates 39 and 43.

Men in whom this segment is small tend to be sceptical. They have faith only in their own experience, and think more of an animal existence than of a spiritual life. Compare Mirabeau's portrait with that of Loyola, Plate 9. Criminal heads are usually deficient in this segment.

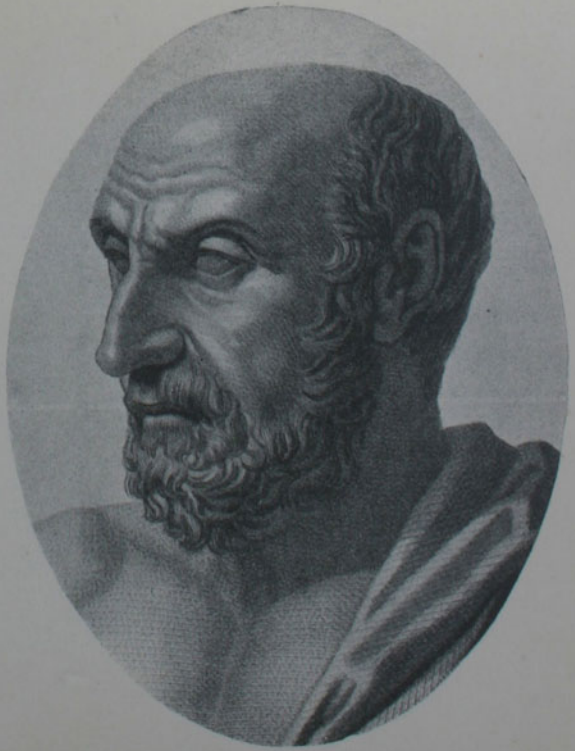
However much the modern intellect trained in strictly scientific pursuits may try to curb the spiritual inclinations, there can be no doubt that the religious sentiment through long generations has become an element of our nature. Even the atheist, as a rule,

experiences its emotions when circumstances arise which appeal to his feelings rather than to his intellect, that is, when he allows his nature free play. Genuine prayer, not the recitation of words learned and repeated parrot-like, is as good for the brain as exercise is for the muscles, and tends to keep the brain in health by preserving the proper balance between the altruistic and egotistic tendencies. I refer to prayers, not for rain when it is dry, or for peace when it is war, but for patience under affliction, for charity, for courage. Prayers for such subjective qualities may, indeed, be said to assure themselves being heard and answered, for by placing the mind in an attitude of patience, or charity, as the case may be, they fit it for the habitual exercise of those functions. A critical analysis of our conduct as in meditation sets the intellectual and moral faculties in ascendence over the animal propensities and thus further strengthens the mind in the right direction. Even a prayer for health in a truly devout person may have a beneficial effect through the increase of nervous energy supplied to the ailing part, in the same manner as suggestion acts therapeutically in many functional diseases and occasionally improves the condition of diseased organic parts. There is a fighting quality in brute-force by which some men get a kind of physical domination, but what is it compared to the sway man can exercise when endowed highly with a moral and spiritual nature.

In the "Mental Functions of the Brain" I have adduced several cases of injury to this part of the brain

SOCRATES (470-399 A.C.).

Philosopher. Pious. Religious region large.



DEMOCRITUS (Born 460 A.C.).

Greek natural philosopher. Sought for the natural laws.
Sarcastic. Atheist. Religious region small.

Compare height of head.

giving rise to diseased activity of the religious sentiment, and cases of destruction as in the celebrated "Gage" or "American Crowbar Case" causing loss of it. The following one (op. cit. p. 295) may be again quoted as typical of hyper-activity of the religious sentiments :—

Case of a clergyman suffering from religious insanity. Patient had neglected his health previously. Sudden outbreak. He had called on a notorious drunkard to convert him to better ways, but was turned out of the house by him. This conduct had such an effect on his already excited feelings, that he rushed into the public square, holding his Bible in the air, and knelt down praying to God to subdue the obduracy of the sinner's heart, and rising up, began most vociferously to exhort people to repentance, for sin had darkened the land, and the judgments of God were coming upon the earth. After much difficulty he was compelled to go home, when he ran up into his bedroom, stripping and washing himself by dashing basins of cold water over his body, and praying most earnestly "that the waters of life he was now washing in would cleanse his soul from all sin." This process he had repeated thrice, and such was the intensity of his convictions respecting his own impurities, that each time he determinedly refused to be dressed in the same clothes, because they were unclean. He died twelve days after the event. The post-mortem examination revealed inflammation and hæmorrhage over the posterior part of both superior frontal convolutions.

I fail to see how electrical excitation or mutilation of brains of animals, and the most minute examinations of the properties of the "Neuron," can ever throw any light on these, the highest mental functions. Let others repeat my observations and watch for clinical cases, as they occur in asylums and hospitals for the insane. This proceeding may be more tedious, but it certainly would be more scientific than to denounce the statements offhand as incredulous without any attempt at investigation.

CHAPTER VII

THE TEMPORAL LOBES

The Instincts of Self-Preservation.

Men, like animals, possess a certain part of the brain which administers to selfish tendencies or propensities, planted in nature because they are necessary for the preservation of the individual. What is the good of an animal's brain unless it is necessary for the manifestation of their instincts, the large size of some of these precludes that the amount of the nervous matter represents the measure of their intellect. But if we admit that animals have instincts which are in relation to certain brain-parts, we must also admit similar unconscious impulses in the human being. Vivisectors have found that after destruction of the frontal lobes the animals so deprived had lost the inhibiting power over their propensities, so that their character changed for the worse. On the other hand after destruction of those areas which represent the temporal lobes in ferocious animals, the latter became quite good-natured.

Labourers, from the nature of their work and the greater struggle for existence, call their animal im-

pulses more into action, and hence require relatively larger temporal lobes, than men of learning. That this is actually the fact was shown by Wagner, whose measurements revealed that the size of the temporal lobes in a labourer is as 30 to 100, the latter figure representing the entire brain-mass, while in men of learning it is as 25 to 100. On the other hand the size of the frontal lobes in men of learning is as 40 to 100, while in a labourer it is only as 36 to 100. This shows that the temporal lobes are not only larger in the labourer than in the man of learning, as 30 to 25, but they are a great deal larger, when we take into account that the frontal lobes are smaller, as 36 to 40, and thus exercising less control, impart to the functions of the temporal lobes greater power.

A large development of the temporal lobes, as shown by great width between and depth of the ears, indicates great strength of the animal passions and of the physiological force of the constitution. Notice the portraits of prize-fighters, Plates 30 and 44. If this breadth is balanced by a proportionate development of the intellectual and moral region, the character is strong, yet attractive. We must never estimate the strength of the animal dispositions by the size of the mass of the temporal lobes alone, but should compare this with the development of the rest of the brain, particularly the size of the entire frontal lobes, the intellectual and moral regions, which inhibit, or at least modify, the manifestation of the instincts originally intended for self-preservation.

If a man lived altogether alone on an island, every impulse of the self-preserving instinct would be right. But when living in society, the advantages of social life can be reaped only when these impulses are held in check by the moral instinct, that sympathetic control whereby a man is prompted to postpone his own good to that of others. For a long time strength, courage, or adventitious tricks decided which was the emergent type, until we reached the stage at which the intellect became in the ascendant. Then it became no longer necessary to rob others for our own preservation, but means were found to enrich ourselves by approved methods; it was no longer necessary to kill our enemies and those who opposed our progress, from the fact that we could overcome them by less painful means. Were there only propensities and intellect, many men would use their intellect for the gratification of their propensities, as animals do, but the evolution of the moral sense in human beings countervailed such tendency. If man is better able to govern his instincts or passions than animals, it does not at all follow that those passions or instincts are more feeble. They are simply more under the control of the understanding.

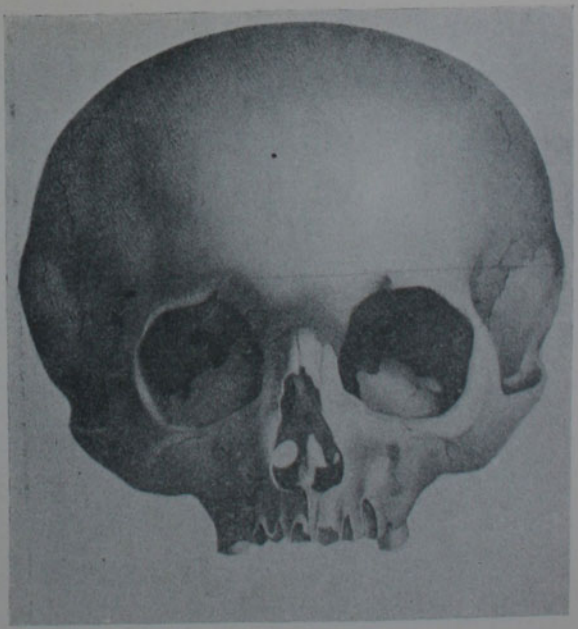
Some skulls are flat in the temporal region immediately over the ears, while in others, this region is prominent and rounded out. This convexity exists precisely in the place where the temporal bones are so thin as to be transparent, and where consequently the cerebral parts beneath show their real dimension.

We must not forget that it is not the augmented curvature alone, but the size the temporal lobes bear to the rest of the brain. Sometimes the skull is perfectly flat in this region, but the opening of the ear is low, giving depth to the temporal lobe, and if the head has not much anterior development, nor height, nor back, it will impress us badly. It is the type of a low man. Compare the skull of the woman-outcast, who was known during life for the depravity of her morals, for cruelty, and a propensity to steal, with the skull of the kind-hearted, benevolent soldier, Plate 22. The former is remarkable for its relative width, and the latter for its relative height.

1. The Lower Segment.

There are two segments of the temporal lobe, see Plates 10 and 35. We shall consider first the lower one, that is the inferior temporo-sphenoidal convolution and base of the temporal lobe. All observations tend to the view that this part is in close relation with the instinct of self-preservation. At the apex thereof, as has been shown in the "Mental Functions of the Brain," several independent investigators—Otto and Hoppe by cranioscopy, Ferrier by vivisection, and Stephen Paget and myself by clinical observation—discovered a centre for hunger and thirst. A branch of the Vagus connects this brain-area with the stomach. The feeling of hunger incites the animal to obtain food. In order to maintain its exist-

Skull of a soldier known for his kindness and benevolence.
Temporal region relatively small.



Skull of a woman outcast known for thieving and cruelty.
Temporal region relatively large.

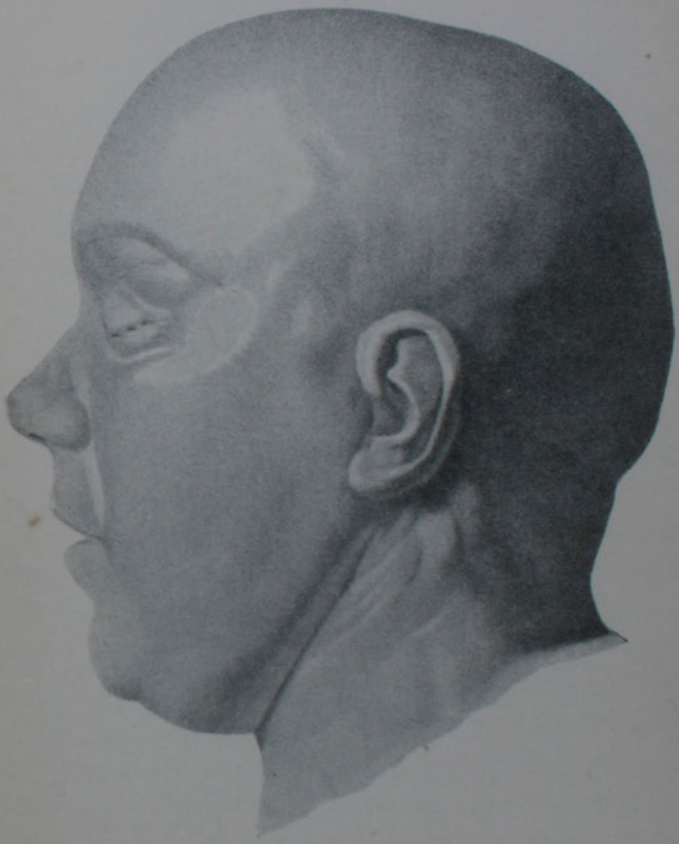
ence it must destroy or kill for food, it must have the desire and strength to overcome its prey. This is the function of the central part of this segment. This instinct being highly essential to carnivorous animals its brain part is highly developed, causing an increased bulging of this region of the skull in ferocious animals. We shall see that this is also the case in all men disposed to violence.

The instinct of self-preservation includes another tendency which appears to be connected with the more posterior portion of this segment. The animal to maintain its existence must be alive to, and able to remove, the dangers by which it is surrounded, and able to inflict injury on its foes. This imparts a combative instinct. That the sight of its foe should rouse an animal's energies to furious rage, whereby spontaneously vascular changes are developed all over the entire body and the strength of every muscle is exalted, is a reflex mechanism of immense preservative value in the struggle for existence. Vivisectors have confirmed our observation, for excitation of this part in animals produces symptoms of rage, such as spitting, lashing of the tail, opening the mouth wide, and making a bound forward, wrathful vocalisation, and retraction of the ear which occurs in all animals before they begin to fight.

The growth of the social and moral instincts amongst civilised races has diminished the ferocity of man from the cannibal and scalping vindictiveness of the savage to the merciful warfare of our own day.

Some men will deny that there can be such an instinct connected with a brain-part, but surely it is not by reason, nor on moral grounds, that we shoot our brothers of another and sometimes even of the same nationality ; even brutes do not kill their own kin. Let us take the middle ages with their destructive warfare and their histories of private strife and bloodshed, and the massacres and assassinations under the cloak of religion, without descending to the animal species at all, we must recognise that there is a disposition in us to fight, not only for the destruction of those who threaten our existence, but for the acquisition of some selfish object, and that bloodshed did not excite the horror then on either women or men, which it does now. The development of the intellect has created a better civil government, an improvement of its laws, so that quarrelsome and unsocial types became rarer, or at least, have found a check to their propensities. No ordinary man, unless suffering from malformation or disease of brain, kills. The murderer, as a rule, will be found to be one with arrested growth of those brain regions whose functions are power of reason, moral feeling, and social affection. When a man of relatively fair intellectual power commits a murder, like the notorious Dr Palmer, see Plate 23, the large animal propensities—as shown by the prominent temporal region —use the intellect for their gratification ; whereas in normal individuals the propensities are the servants of the intellect.

PLATE 23.



WILLIAM PALMER, Murderer.

Notice the depth of the ear giving more area to the temporal lobe, which bulges greatly above and behind the ear. The depth of the ear causes the head to appear high, which it is not.

The intellect in this case was used in the employ of the overactive animal propensities.

The mental powers that will best safeguard one from committing murder is sensibility of character, *i.e.* quick perception and ready sympathy with the sufferings and the wrongs of others. To the murdering burglar and anarchist extreme callousness is a far more necessary article of equipment than a revolver or a bomb. Under ordinary circumstances this propensity, in intimate relation with other mental powers, directed by the intellect and governed by the moral sentiments, gives an impetus and energy to the mental manifestations and is needful to ensure a proper discharge of the duties of life. See John Knox's portrait, Plate 43.

The instinct of self-preservation in man is not limited to the fighting tendency and the exercise of physical resistance, but gives executiveness, efficiency, force to all the other mental powers. It is found in nearly all labourers and in men generally who enjoy hard work. In a moderate development surgeons possess it, and certainly military men, one reason may be why the latter are so liable to frenzy. See portrait of Paré, the surgeon, and compare size of frontal region with that of Thurtell, the cold-blooded murderer, Plate 24. These two portraits illustrate the legitimate and illegitimate use of the same innate power.

Irascibility or anger is the active form of the instinct of self-preservation. Anger is an emotion which gives neither pleasure nor pain. It gives an impulse to inflict injury on the cause of the emotion. Even in young babies the impulse to strike an offending nurse

or beat a toy is strong. The irascibility and impulsiveness of children is undoubtedly instinctive. Discomforts of life make us angry, the protest is particularly strong in children. A hungry man and a man suffering from disorders of digestion get irritable and easily angered; and on the other hand, anger may promote indigestion. This relationship may be explained by the vicinity of the alimentive and irascible centres, and which may further account for the fighting tendency in drunkards.

This region in a normal state and size contributes much to our energy and spirit, enables us to resent and resist, to overcome difficulties, and to find a pleasure in encountering opposition; but unless it prove duly proportionate to the rest of the brain, it produces a very unamiable character, in men the tendency to physical contention, and in women those voluble muscles which afford movement to the tongue may be set violently into action, their speech-centre being excited, and loquacity resulting. Indulgence in feelings of anger and vindictiveness tend to make these subject thereto more and more habitually prone to outbreaks of these vices. They become progressively unable to control their exhibition of wrath, and what to others are mere trifles, in them excites preternatural and fantastic storms of passion. The instinctive fury, the violent and destructive mania of some madmen is only the same mental power acting in excess, as a rule with perfect understanding; there is no delusion or hallucination necessary thereto, and

PLATE 24.

A. PARÉ (1509-1590).
Father of Surgery in France.

JOHN THURTELL (1794-1824).
Cold-blooded murderer. Designed his own gallows.
Body dissected by Abernethy.

Large temporal lobes, balanced in the one case by a high development of the superior frontal region, unbalanced in the other.

it may break out all of a sudden, giving rise even to homicidal impulse. Others become possessed by a chronic feeling of antagonism and discontent, passing their time in scolding, abusing, and stirring up strife.

A man enslaved by such a cruel propensity may still possess the power of subduing it, or of giving it a direction which is not hurtful. See Buchanan's portrait, Plate 49. This power is weakened, however, in an individual in proportion as he has received little education, and when the brain-regions of the superior mental powers are less developed. It is an excessive activity of this same inclination that affords the relish of causing and witnessing pain and the inclination to destroy. In excess, it leads to the love of bullying, cruelty and manslaughter, if the higher intellect is lacking, which should turn the feeling of strength in a right direction, and there is also absent a complete ethical consciousness which should debar misuse of power. There are men whose intellect is not able to set limits to their impulsive feelings. Inward excitement runs unbridled into outward manifestation. Irritable to the highest degree, touched by the slightest impressions, they frequently react in the most passionate way on the most insignificant grounds. The emotion may lead to a total superseding of the intellectual capacity and end by driving them in their utter irresponsibility, into acts of violence and crime.

The most striking manifestation of the destructive impulse I have come across was in a little girl aged five years who had homicidal impulses. The mother—a

well-known society lady—who consulted me about the child, did not tell me what was wrong with her, but knowing of the special studies I have pursued, she asked straight out: "I want you to tell me if there is anything wrong with the brain-organisation of my little girl, and if so, what is it a sign of?" In the case of a boy, inspection of the head might have sufficed, but the girl's locks made it necessary to feel the shape of the cranium. All was normal, but for two egg-shaped developments of the temporal bone symmetrical over both ears, giving the sensation of thinness and being hot to the touch. Had this pathological condition existed on one side only, an injury would have been the first cause to think of, but no injury could be so symmetrically inflicted. In accordance with my theory, I described that the child might have fits of bad temper in which it was likely to destroy anything, and even be a danger to its playmates, that it would act thus impulsively without provocation, and possibly have no recollection of its acts. The mother sent the child out of the room and confirmed my statement by a long history of its misdeeds, against which all punishment and other possible remedies were of no avail. Further questions elicited the fact that bad temper was hereditary in the family, that the child started early with animal diet and was given meat to excess, that its fits occurred an hour or so after her mid-day meal, that during her attacks she could not be trusted to be left alone because of the destruction she caused, and of her attacks on the other

children, but that the rest of the day she was perfectly normal, indeed an amiable little girl, as I was able to convince myself. I gave directions for the applications of icebags to the side of the head, allowed only a milk diet for some time to come, prescribed for the proper regulation of the excretions, and advised hygienic measures, with the result that the child recovered completely, is now mentally normal and has no trace of abnormality in her skull.

A similar case of excessive bulging of the temporal bone, but only on the right side, is reported by WARREN L. BABCOCK, *State Hospital's Bulletin*, New York, January 1896. F.C., female, aged 31, single, destructive and criminal in character. During childhood already she showed irritability on slight provocation, and when angered would fly into a passion, become destructive and greatly overwrought. But it was only at the age of 18 that she had the first serious outbreak, and for several weeks lost entire control over her mischievous and perverse tendencies. During another attack she threatened her parents with a knife, broke dishes and furniture, and was a menace to the family safety. She was also a pyromaniac, having on one occasion set fire to her father's residence. She had been in hospital and was subject there to paroxysms of fury and destructiveness in which she attacked fellow-patients. When quiet for some time she was released, but had to return again.

Professor BILLROTH of Vienna reported in the *Chirurgische Klinik*, 1871, the case of a man who

received a kick from a horse on the head, which was found at his death, four years after, to have caused softening of the cortex, of the size of a crown piece, on the under surface of the right temporal lobe. No other lesion. The only symptoms noticed by the friends was a mental change, great irascibility.

Professor VON BERGMANN of Berlin reports a very similar case (*Volkmann's Hefte*, No. 190), only with worse manifestations, so as to require restraint, in a workman after a fall from a scaffold.

A. SPANBOCK records a curious case in the *Neurologisches Centralblatt*, 1895. Spielmann, a boy of fourteen, from his infancy had uncontrollable propensities. The older he grew the more dangerous he became. He thrashed his fellow-pupils and had to be constantly watched to keep him from destroying things, or throwing stones at some one. His deeds brought him frequently before the police courts, to the great annoyance of his family. He told falsehoods and had a tendency to steal. The parents consulting Dr Spanbock, he discovered an injury to the temporal bone above the right ear. He trepanned the bone. When the patient recovered from the operation and left the hospital seventeen days after, there was no improvement mentally, on the contrary the strait-jacket had once to be used. Yet in the course of some months a gradual improvement took place, and after a year the patient behaved properly, did not disturb anybody, showed no inclination for breakage or destruction, insulted no one, but became

a useful member of his family. He now showed higher moral feelings, and was even able to blush, which he had never done before.

A highly interesting case of tumour which was found post-mortem to occupy the medullary substance of the temporal lobe is reported by A. HUGHES BENNETT in *Brain*, April 1878. Miss A., a young lady, aged sixteen, had always been a naughty child, who took a special delight in annoying and playing mischievous tricks on her companions and relatives. She was renowned for mutinous conduct and had got the reputation of being extremely cunning and wilful. She was taken to several medical practitioners on account of symptoms of temporary blindness and deafness, but was thought to be malingering, and declared to be merely "hysterical." Four months later she rapidly got worse and had attacks in which she shouted, cried, threw herself about, struck the nurse and alarmed the household. On the third day she became delirious, totally blind and deaf and getting gradually weaker, she died on the twenty-fourth day. This case shows how useful it would be for physicians to be fully acquainted with our doctrine.

A very similar case, also mistaken for hysteria, was reported by ALEXANDER BRUCE in *Brain* for July 1883. L.M. aged 45, unmarried, previously a nurse, some two years before consultation became of an excitable disposition, grew selfish and irritable, and so passionate as to be almost unbearable. She had a normal interval of about a month, when she

again began to be excitable; quarrelsome, and screaming at night so loud as to alarm the household. She was seen by two physicians who were of opinion that her case was one of hysteria, and recommended her to go to the country for a time, where another doctor saw her who advised treatment by "firmness with kindness." Two months later she was paralysed, but still thought "shamming." She was removed, however, to the infirmary, where she died the following month. The autopsy revealed a tumour at the base of the brain which pressed on the left temporal lobe and the pons.

I have not found in medical literature a single case of irascibility with disease limited to the parietal lobe, though you may get "agitated" melancholia; nor a single case of melancholia with disease limited to the temporal lobe, excepting that particular form of melancholia in which the patient thinks himself persecuted and in which the disease extends from the parietal lobe to the adjoining part of the posterior temporal region.

The under surface of the temporal lobe being divided by only a thin partition from the internal ear, disease of that organ is liable to spread to it, and hence the frequency of irascibility with its disease, and the disappearance of the mental symptoms after treatment of the ear complaint. Dr BOUCHUT in the *Gazette des Hôpitaux*, Paris, 30th October 1877, gives two cases of boys with violent mania and homicidal impulses, due to ear disease.

Even a box on the ear, presumably through concussion of the temporal lobe, is often followed by an irascible disposition, frightful rage and ungovernable fury, of greater intensity and duration than the insult would warrant.

In the "Mental Functions of the Brain," I have published 350 cases (with post-mortem records, unless recovery took place) of injury or disease limited to this region producing all degrees of irascibility and violent mania, even homicidal impulses.

CHAPTER VIII

THE TEMPORAL LOBES (*continued*)

2. THE UPPER SEGMENT.

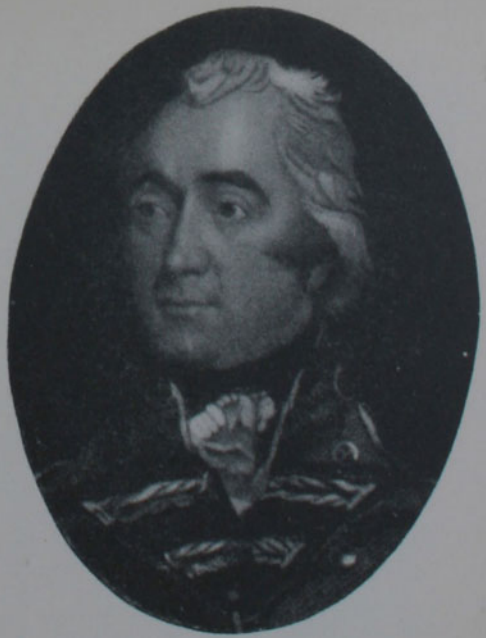
THE upper segment of the temporal lobe may be subdivided into an anterior and posterior portion, the functions of both of which are related to the instinct of self-preservation. See Plates 10 and 35.

The anterior part—over the temple—which is above the centre for the nutritive instinct, is found prominent, compared to the rest of the brain, in those in whom the hoarding tendency is large. It originated when animals found it useful not to have at all times to hunt for food, which may be scarce at certain periods, and began to store up things for use. Thus was developed a tendency to make provision for the future. Man not only stores up provisions for winter, but he acquires property of all kinds for all his life and for his posterity. The brain-area in question only gives the tendency or habit, but not the *ability*, unless combined with intellect and other requisite qualities. It imparts the love of possession. Property may be acquired honestly or dishonestly, that depends on the organisation of the rest of the brain. A child will

WARREN HASTINGS.
1732-1818.

Governor-General of India.

Hoarding instinct large. Notice the relative size of the upper and anterior portion of the temple. Determined, resolute character. Upper parietal region prominent.



FRANCIS RAWDON, Marquis of Hastings.
1754-1826.

Commander-in-Chief and Governor-General of India.

Hoarding instinct small. Sides of head perfectly flat. Habitually extravagant.

appropriate what does not belong to it; it seizes everything.

A curious contrast of large and small hoarding tendency is furnished by the two Indian Administrators: Warren Hastings and Rawdon Hastings, see Plate 25. The former, though it is said that he acquired no riches, was charged with corruption, and his portrait shows him to have been very prominent in the anterior temporal region, where the latter, whose characteristic was reckless extravagance, was perfectly flat. Pitt, too, who was known for his lack of economy, shows a similar flatness of the temples, see Plate 27.

Persons with a relatively high development of the anterior temporal region, not out of proportion to the rest of the brain, are not grasping, but conservative and economical as regards property, and take good care of everything which they possess. They waste nothing, but they are not necessarily selfish or very eager in the pursuit of wealth. A man may be a thief without love of property, and he may be moral and yet grasping. There are many rogues who are not very acquisitive and who readily part with what they have stolen; that is to say, they are dishonest but not selfish; and there are many avaricious men who are sternly honest. Cupidity, greed and avarice are caused by general selfishness combined with this propensity. Penuriousness is caused by this tendency being active in a timid or weak man. Theft is caused by this tendency being active in an ignorant or depraved mind.

In Asylums Kleptomania is of most frequent occurrence in imbeciles, general paralytics and epileptics. As a rule idiots and imbeciles steal without reflection, and merely to satisfy their animal instinct. They will purloin whatever takes their fancy. Sometimes they display a considerable amount of ingenuity and low cunning in their methods of procedure. Acts of stealing occur in the initiatory stages of general paralysis and sometimes in the later stages as well. The patient steals under the delusion that everything he sees belongs to him. They appropriate all sorts of articles, hoard and conceal them, and immediately afterwards lose all recollection of them. Theft may also be the unconscious act of an epileptic.

In the "Mental Functions of the Brain" I have described 16 cases of localised brain-lesions with manifestations of Kleptomania. Interesting is the one by Professor LOMBROSO, recorded in the *Archivio di psichiatria*, Torino, 1882.

The man in question fell, when a boy 8 years of age, from a height on to a stove, and injured his left temple. He lost his left eye through the accident, and the temple bulged for ever afterwards. He grew up a rich citizen and was renowned for his sordid avarice. When 64 years old he was accused of theft. He had kept a set of burglary instruments, by means of which he robbed not only his own servants, whom he frequently changed, but the guests whom he invited to his house and entertained there. Lombroso very

correctly declared that his injury when a youth had caused changes in the brain which produced these morbid inclinations.

A very similar case came before me. A young bank-cashier, aged 24, consulted me about his frequent impulses to appropriate money when unobserved, which he found more and more difficult to resist. He was of an exemplary moral character, of good parentage, and feared very much the consequences. On inspection of his cranium I saw a scar on the left temple, which on pressure proved to be tender. Patient explained that he fainted one day, when a boy of 11, and in the fall injured his head against an iron bar. This scar was left and it often hurt him when using a hard brush for his hair. I advised patient to change his position to one where he was not constantly in touch with money and was sure to have no opportunity to gratify his impulse should it arise. This the patient did, and although occasionally tempted when property is carelessly left about, he is conscious of his mental defect and by attention and firm will he is able to control his impulse.

When still a student of the subject I saw, at the house of a friend, a chambermaid with a brain organisation which made me think that she was not over-honest. I was eager to test my knowledge and the truth of Gall's observation, so I asked my host to be allowed to speak to the maid. In as gentle words as I could find I told her I should like to know, since her head indicated a disposition to theft, whether she had

ever taken anything. I feared a volley of abuse for this daring indiscretion, but was, while joyful to get such a verification of the phrenological truth, much surprised at the maid's prompt and definite reply: "Only when I am hard pushed. I would never rob a mistress who treats me kindly."

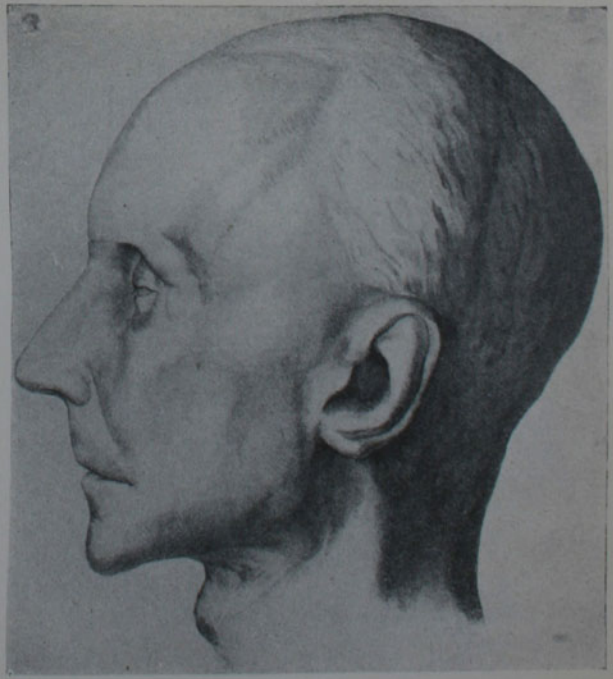
Though in those days my faith was frequently shaken by the arguments of phrenological opponents, I could relate numerous incidents like the above which encouraged me to proceed with my enquiry.

The posterior part of the superior segment of the temporal lobe is also connected with the instinct of self-preservation. Animals had to protect themselves against their numerous enemies to prevent being themselves destroyed, hence arose a tendency to concealment, which was also found useful in approaching their own prey, and a feeling of suspicion. Suspicion is a protective instinct and hence a necessary mental quality. It is a propensity to conceal intentions by acting indirectly and cunningly. When moral education is deficient it leads to falsehood and deception. Being related to the upper and posterior part of the temporal lobe it gives width to that part of the head. Notice the portraits of the two great masters of deception, Machiavelli and Talleyrand, Plate 26. Also Palmer's head, Plate 23.

While usually the greatest width of the head is just above the ears, in very secretive persons it is just behind that region.

A person with this brain part relatively small is

MACHIAVELLI (1469-1527).



PRINCE TALLEYRAND (1754-1838).

Two Statesmen, masters of deception.

Notice development of upper and posterior temporal region.

disposed to be open, direct and frank in his manners and conduct. When excessively large it leads to cunning and trickery. The lower animals, particularly the wild ones, make use of innumerable arts for procuring food and escaping from their enemies. A thief who is secretive will prefer to steal where some skill is necessary, and is delighted and amused afterwards with detailing all the means he has used in arriving at his end. Women who enjoy intriguing have this cerebral part relatively very prominent. Persons with this part largely developed, and the moral region, which should give a love of truth, deficient, are likely to be reserved, secretive, insincere, and of a jealous disposition. A person jealous or suspicious may reason quite correctly, but he will misinterpret actual occurrences in accordance with the state of his feeling. When this state has lasted some time and the false ideas are habitually dwelt upon, they become realities to his consciousness. The higher mental faculties sustain no disturbance, only the judgments rest on false premises. If the premises are conceded, then is the conclusion perfectly correct, and we ourselves could conclude no differently, if we agreed to those premises.

Physicians should read the forty-five cases of disease of this limited region, all suffering from mania of suspicion, set forth in the "Mental Functions of the Brain." The proximity of the internal ear accounts for hallucinations of hearing being so frequent in the delusions and mania of suspicion and persecution—

they are generally of a threatening nature—and also explains why this same morbid mental state may arise when ear disease spreads to the temporal lobe. It is also a well-known fact that deaf people are particularly subject to ideas of suspicion and persecution.

Dislike, jealousy and hate are due to a morbid state of this brain-area which is intermediate between the region of the affections, the occipital lobes, the lesion of which it will be shown gives rise to grief, and the lower segment of the temporal lobe, a lesion of which may lead to manifestations of violence and destruction. There is thus both an anatomical and physiological relation. On the one hand the feelings of jealousy and hate are analogous to grief, whitening the skin, reducing the glandular secretions, and depressing the vitality; on the other hand they keep the body in a peculiarly explosive condition, so that violent paroxysms of anger suddenly burst forth at a touch. The brain-area involved is anatomically connected with the inferior parietal lobule, lesion of which gives rise to Melancholia, as we shall see in the next chapter, a fact which explains why melancholic patients, when the disease descends downwards on the cortex, develop a mania of persecution, accusing others of being the perpetrators of their misery.

The following cases might be quoted in support of our localisation :—

EDWIN GOODALL, *Lancet*, 10th December 1898. Male patient, 29 years of age, previously healthy,

and without hereditary tendency, received a kick from a horse in the posterior temporal area about the region of the mastoid process, which rendered him unconscious and caused him to bleed from the left ear. After coming round he developed marked delusions of suspicion and exhibited violence, so that he had to be transferred to Hanwell Asylum. A month after admission the delusions of suspicion ceased and patient became rational. There was a considerable scar over left mastoid process. Patient was discharged three weeks later and a month after discharge reported himself well and at work.

J. T. ESKRIDGE, *Journal of Nervous and Mental Disease*, June 1889. J. P., male, aged 30, had a purulent discharge from the right middle ear after typhoid fever. Six weeks after he became irritable and suspicious of the people in the room. He developed delusions that the physician and attendants were trying to kill him, and cursed them accordingly. Patient was trephined and a large abscess cavity emptied, but he died on the fifth day. Post-mortem, pus was found on the petrous portion of the temporal bone with meningeal inflammation around.

A similar case, but one which recovered, is the following. W. RHYS WILLIAMS, *Lancet*, 28th April 1877. Charles D. C., 26, married, suddenly became violent, noisy and swearing. He said he saw devils. Six months after admission it was noticed that he had a profuse purulent discharge from the left ear. He said he had this for months past. Slowly a

large puffy swelling formed over the left mastoid process and spread up over squamous portion of temporal bone, but the patient was sullen and dangerous and would not allow its examination. He fancied the doctors wanted to injure him. The following month the abscess was opened, and patient became sane at once.

Several cases of recovery after operation are recorded by G. BURCKHARDT, *Allg. Zeitschrift für Psychiatrie*, 1891. This is one. B. B., 37 years old, a widow, was melancholic and had delusions of persecution and heard insulting voices against which she defended herself. An operation was performed, removing the posterior part of the superior and middle temporal convolutions. She lost her delusions of persecution completely, and went home, but her hypochondriacal melancholy (seat in parietal lobe) persisted and she probably committed suicide, as she was found drowned one day in the river.

CHAPTER IX

THE PARIETAL LOBES

1. The Emotion of Fear.

The lower segment of the parietal lobe, that is the inferior parietal lobule, is anatomically connected with the posterior part of the temporal convolutions, and so is its function. See Plates 1, 10 and 35. The struggle of different species of animals for existence would expose, especially the weak, to continual danger. The knowledge of past dangers would make them cautious, and also cause them to fear their enemy. Hence they use their intellectual powers in conjunction with the emotion of fear and keep a look-out. Thus do they develop foresight. This brain-area—especially the supra-marginal and angular gyri, underlying the parietal eminence—is most developed in those animals and those men that are timid, apprehensive, and disposed to take every precaution, to prevent future trouble and danger. The emotion of fear has its object in nature to make the animal withdraw itself from danger. This must happen automatically or else it is useless. There is often no time for reflection. Without the emotion of fear

animals would not have apprehended danger. That the voice of a dangerous oppressor should depress an animal's energies to fear, diminishing the vascular tone, and producing a death-like appearance, must have been originally of huge preservative value in the struggle for existence. An animal having suffered frequent frights develops fear. Fear is the chronic form of fright. From it developed a propensity to watch for coming difficulty and trouble, to avoid danger, and to restrain present gratification when it may prove thereafter injurious. In excess, it produces hesitancy and irresolution, when a bold, decided course is required ; and when deficient, carelessness and recklessness are often manifested. The skulls of herbivorous animals are wide across the parietal bones. Those of carnivorous animals are wide across the temporal bones. Women are broad across the parietal eminences, and men across the temporal bones.

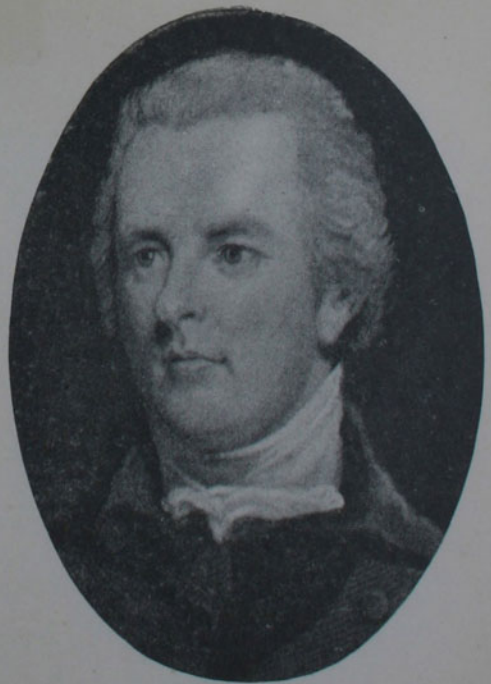
Patients in whom this brain-region is in excess are often troublesome. If the physician calls often, they say : "Bad sign that." If he does not call often, they charge him with leaving them to suffer and die. If the physician listens to their complaint with a serious air, the patients draw from it the most dismal horoscope. If he appear calm and rather anxious to leave, they charge him with inattention and indifference.

Persons in whom this brain-region is highly developed, when in poor health, are liable to hypochondriasis. They have apprehensions concerning their health, suffer greatly, and may even fear death

PLATE 27.

EDGAR ALLAN POE (1809-1849).

Poet. Melancholiac.
Notice width of head across lower parietal area.



WILLIAM PITT (1759-1806).

Statesman. Much in debt; lacked economy. Sanguine speculations. Temper rarely ruffled. Head high in parietal region, but narrow across lower parietal area and temporal bones.

itself, but on other subjects they may converse cheerfully and rationally. The melancholiac, as a rule, views all things through a gloomy medium, and not his health only. See Poe's portrait, and compare it with that of the sanguine Pitt, Plate 27.

Fear is the basis of morality amongst many uncultivated people. They do not steal because they fear the gaol, and they do not murder because they are afraid of the gallows. It is already a moral advance when a man has large domestic affections, and will not steal, not because he fears gaol, but because it would give pain to his mother, wife or sister. He is a higher being, though not that lofty moral being that we described in a previous chapter.

A child with little moral sense but large fear may out of dread of punishment avoid telling falsehoods, until with years the habit of speaking the truth has become a second nature.

The tendency to fear and to employ the intellect to take precaution has been very unequally allotted to the different individuals of our species. In some it is so much in excess that with the slightest misfortune they fall into despair and think life no longer worth living. Undoubtedly, everything that has produced a distaste for life, or reduces a man to extreme despair, may become a cause of suicide. Loss of fortune, or of honour, the prospect of a cruel or ignominious death, the destruction of domestic happiness, want of strength to support physical or moral ills, sometimes even the contagion of other examples of suicide, very

often a miserable hereditary constitution, and many other circumstances, may determine an individual to take away his own life. Frequently we can tell the motive by the general brain organisation, but at present we want to limit our reflections to that kind of suicide which is the sequel of abnormal development or of disease of the brain, recognised or unrecognised during the lifetime of the sufferer, and due to the morbid manifestation of the particular disposition under consideration. A person who is predisposed to the emotion of fear has his mind filled with sinister forebodings, especially if his general health be at the same time low, or one of the above factors increase the nervous excitability. At least 75 per cent. of all cases of suicide manifested some time before the fatal act a gloomy and anxious temper, but often these symptoms get overlooked. Look at Chatterton's portrait, and compare it with Nelson's, who knew no fear and lacked caution in his private affairs, Plate 28. The increased anxiety is due to a hyper-excitability of the nerve-centre in question, which in its turn interferes with the action of the other cerebral parts, so that the patient finds no longer satisfaction in his usual pursuits and occupations, becomes restless, sleepless at night, or has his sleep disturbed by disquieting dreams, and so on. They become an annoyance to their immediate surroundings, then imagine that they are neglected, treated unjustly, or are despised. Or else they think themselves a burden to others, and do not communicate to others their desperate situation.

THOMAS CHATTERTON (1752-1770).

Poet. "A sad wag of a boy." Committed suicide. Preferred solitude, locking himself up in an attic. At eight, insatiable reader. Fatalistic lines on suicide. Grave in manner. Notice the fine anterior frontal region and its distance from the ear, as well as the width of head across the parietal eminences.

LORD NELSON (1758-1805).

Admiral. No fear. No caution, as shown in his relations with Lady Hamilton.

Friends are often surprised at the rational, well planned measures of these patients for the accomplishment of their purpose, or at the sudden execution of their project, oftentimes directly after some kind of recreation, in which they seemed to take quite an active part.

The causes ordinarily charged with determining suicide are only the exciting but not the predisposing ones. The storm has been brewing long before; jealousy, unsuccessful love, loss of property, the clamours of creditors, the tortures of conscience, and all other motives have, generally speaking, only given the final thrust at an edifice whose ruin has been long impending. There are daily millions of people who bear with cheerfulness, disappointment, loss of wealth, loss of husband, wife, children, friends, of health, character, or social position. They do not dream of suicide. It is a particular predisposition that makes the man, who has committed a crime, end his life rather than be convicted and reform afterwards. The genuine criminal does not seek death; the love of life is a distinguishing characteristic of convicts. See skull of female who committed suicide from over-sensitiveness, being wrongfully accused of theft, Plate 29. The temporal region is relatively small, hence she possessed not enough animal energy to stand up for her innocence.

We cannot infer from an excessive development of the central parietal area that such or such a person will commit suicide, but we can tell that if this part be not proportionate to the rest of the brain, he will

have a tendency to extreme anxiety, apprehension and terror from inadequate causes; will be disposed to frequent depressions and melancholy; and with these tendencies, given external circumstances such as loss of fortune, honour, or whatever is valued most by the individual, he is likely to turn his thoughts to the advisability of suicide. Many a patient who was sent to me with a general description of "depressed spirits" or "nervous system run down," on getting into sympathetic touch with him, confessed the idea of suicide with a flow of tears. Mental science has been so much left to speculative philosophers, that the public is too slightly initiated to recognise and estimate the importance of slight aberrations from the normal. All aberration is a disease, though not necessarily insanity in the legal sense, with which our lunacy specialists have to deal.

In "The Mental Functions of the Brain" I have given 150 cases of injury, inflammation, growth of tumour, hæmorrhage, and other affections limited to the inferior parietal lobule, with manifestations of varying degree from slight increase of mental anxiety to acute Melancholia and tendency to suicide. Several mental specialists of our day have made similar observations, but Dr AUGUSTE VOISIN, in a paper on the "Tendency to Suicide," read before the Academy of Medicine, 8th August 1882, has investigated the matter more fully than any other specialist, and agrees that this tendency is related to the parietal lobe. He has published so many

PLATE 29.

Skull of a Female Servant, who committed suicide from over-sensitiveness, when wrongfully accused of theft.

Notice the curvature of the relatively large parietal bone and the convexity of the posterior region. Compare with it the temporal region, which is relatively small, hence she possessed not enough energy to stand up for herself and fight for her innocence.

cases of inflammation and hæmorrhage limited to this area and followed by symptoms of Melancholia, varying in degree, that it is surprising they should have escaped the notice of the reviewers of foreign medical literature.

Of all the examples given by me, the greatest sensation was caused by my showing that those surgeons who recognised the locality of the disease were able to benefit their patients by trephining at that spot, *i.e.* the central parietal area. As several letters from correspondents testify, they had hitherto accepted, as the text-books on insanity teach, a special form of mental derangement resulting from injury, so-called traumatic insanity, whereas my evidence shows there is no such single form, but that the mental derangement varies according to the area of the brain affected by the injury, and that this is further proved by the large number of recoveries subsequent to local treatment. Dr W. B. Fletcher, an American surgeon, reports six cases of successful operations for Melancholia.

Tumours growing under the parietal eminence, that is the central parietal area, are accompanied by symptoms of Melancholia. To give only one example. Sir WILLIAM BROADBENT, in the *Lancet*, 21st February 1874, gives the case of Clara C., aged 36, a widow, earning her bread as a needle-woman, well nourished, but rather pale and having a sad expression. She was particularly intelligent, but greatly distressed, highly nervous, apprehensive,

low-spirited, and often gave way and wept. The emotional depression continued till her death, when two small gummata were found under the parietal eminence, depressing the right supra-marginal lobule.

The following is a case of localised hæmorrhage. Dr W. JULIUS MICKLE, *Journal of Mental Science*, January 1880.

A soldier, aged 35. He was depressed and apathetic, sat by himself, never spoke unless previously addressed, sighed occasionally, and took no apparent interest in his surroundings. He was suicidal. The expression was one of sadness and misery. The obstinacy of the patient as to the taking of medicine and food was a source of much difficulty. The post-mortem examination revealed a false membrane (organised remains of hæmorrhage), size of a five-shilling piece, symmetrically placed just opposite the parietal eminences in both parietal lobes, which were eroded.

Another observation which has escaped notice hitherto is that symmetrical atrophy of the parietal bones, which are most common on the tuberosities, are accompanied by melancholic states of mind.

Modern physicians have noticed so-called psychical blindness in affections of the brain-area in question. "Psychically" blind patients can see, but what they see conveys no impression to their mind. My experience has been that such patients frequently show symptoms at the same time of emotional depression if not actual Melancholia, like the case reported by Sir WILLIAM MACEWEN in the *Lancet*, 11th August 1888.

Vivisectors have shown that electrical excitation of the corresponding brain-area in animals produces an expression of fright, and its destruction causes loss of fear, and imperception of danger.

Irritation of this brain-region produces irritation of the vaso-motor nerves, and these increase the tension of the arteries and the blood-pressure. The mental states related to this part—fear, fright, anxiety—similarly cause rise of blood-pressure ; thus from the average of 152 mm. Hg. in normal man, the blood-pressure will rise to 160 mm. Hg. and even to 180 mm. Hg. according as these mental states increase in intensity. A profuse shedding of tears relieves the blood-pressure and relieves also the mental state. This is the reason why grief and anxiety can be worked off by a good fit of crying. The absence of any such external manifestation of these emotions gives them a much greater influence upon the course of thought, and upon the bodily state of the individual. Those who really "die of grief" are not those who are loud and vehement in their lamentations and weep the most, for their sorrow, however vehement and sincere while it lasts, is commonly transient.

2. The Governing Group of Mental Powers, or Egotistic Sentiments.

It is desirable at the present stage of our knowledge to take the remainder of the parietal lobe, *i.e.* the superior parietal lobule and both the central con-

volutions together. See Plates 10 and 35. In another volume we propose to divide this area and analyse the group of mental powers connected therewith.

This brain-area, which corresponds largely to the crown of the head, includes also a large portion of the sensory-motor area. The sensations which it conveys are not those of the internal organism, but the sensations of the voluntary system and the æsthesia of the skin. It gives the feeling of well-being, a sense of natural happiness, which excites to motor-activity, to active movements of limbs and voice. These centres highly developed, fill a healthy being with spontaneous energy and give him self-reliance. A person insufficiently developed in this direction will energise less, have a feeling of dependence, and lack self-reliance. I choose to term this group of feelings, the *governing* group, giving love of power, resolution and independence. Notice portrait of resolute boy, Plate 39.

In a normal state this is the area of voluntary energy. Notice portraits of prize-fighters, Plates 30 and 44. Men of action require it. With a high development is accompanied self-reliance. Men with a tenacity of purpose and firmness, and a belief in their own powers are large in this region. The feeble, undecided, and dependent, are small in this region; they look to others for energy, advice and opinion. The self-reliant man straightens every muscle of his body, the dependent and humble man has all his

JOHN BROUGHTON (1705-1789).

JAMES FIGG (died 1734).

Two famous Prize-fighters.

Notice the roundness of the head in the upper parietal region and the broad base,

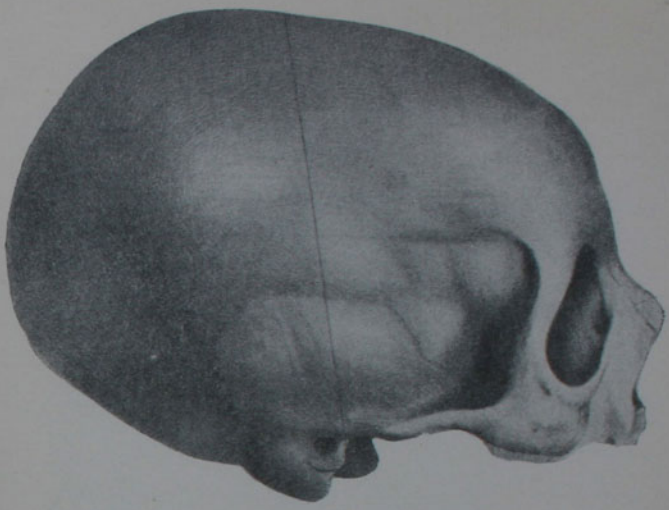
muscles relaxed. The former has all his limbs extended and his shoulders elevated, the latter has his limbs flexed, and stoops. A man exercising his authority holds his head erect and firm, and puts his foot firmly on the ground. This self-reliance imparts a resolute character, not easily influenced by others; the helpless man lacks constancy, for his actions will depend on the influence of others, his conduct is therefore not uniform. A man relatively large in this region shows love of power, independence, and a desire to command. If perverted it may lead to stubbornness, obstinacy, disobedience, self-conceit.

A person having meagre self-reliance and a considerable tendency to fear, is likely to suffer from an acute sensibility as to the effect of his conduct on other minds; he will be afraid to incur their displeasure. Over-sensitiveness is a frequent cause of melancholia.

The active man manifests power. A man with the sensory-motor area in high healthy activity will manifest mental elation and high spirits, which no amount of good fortune or good management can impart to others. Some people can sustain a high flow of enjoyment under an accumulation of troubles. In youth the sensory-motor centres are at their best period; then we enjoy life and possess a flow of good spirits. The illusions of hope are only destroyed when pleasure gets blunted. Emotional exaltation is invariably accompanied by great motor activity. A gay and hilarious fellow, whether sane or insane, is constantly

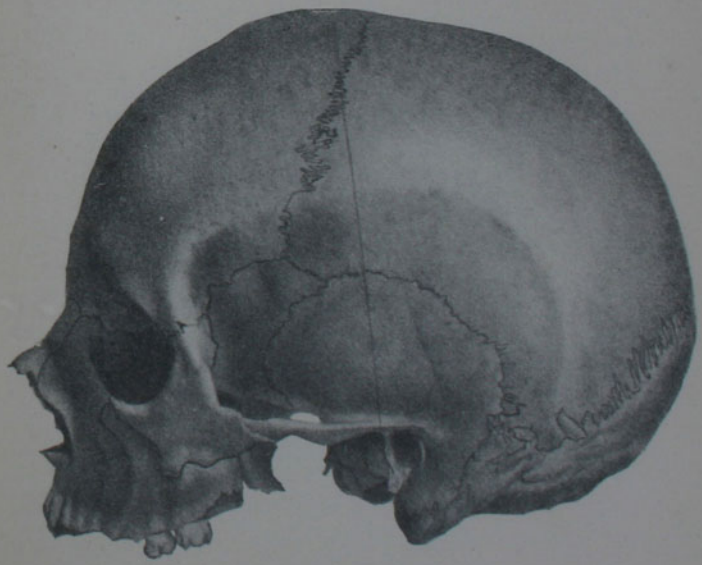
in motion, not only his limbs, but also his vocal organs. Moreover, with the pleasurable sensation, motor activity, and emotional exaltation, goes an increased self-consciousness. Such a man easily becomes obtrusive.

A person with this brain-area relatively large is well satisfied with himself no matter what his intellect, personal talents, birth, or fortune; he does not envy a king. On the other hand, those small in this region, though gifted by nature, clever, rich, and high-born, will be remarkable for their humility. See skull of devout and humble person and compare it with the skull of the determined murderess, Lecouffe, Plate 31. A person with a rather large expansion of the crown of the head governs others, whether he be a genius or a fool, he likes to govern, and, moreover, believes himself capable of governing. He will talk to people about his talents, wealth, aristocratic connections, and readily exaggerate so as to impress others with his own importance. We see this so frequently in the exalted insane. The sane man may act up to his statement, but I have never seen the insane man do so. A minute after exaggerating his wealth a patient may beg for something to eat, or while declaring himself to be a king, humble himself the very next moment. His desire is to impress others, hence when he, for instance, owns horses, he does not own six or sixty, he owns six hundred or some thousands. These patients have a sense of well-being, are not conscious of the seriousness of their disease, and their cheerful-



LECOUFFE, a criminal woman, executed in Paris for murdering her benefactress.

Region of moral sentiments defective. Posterior temporal region and upper parietal region relatively large.



Skull of a disinterested, good-natured, *highly devout* woman, no remarkable for her intelligence, and lacking in self-assertion and firmness.

Upper parietal region sloping.

PLATE 32.

LARCENY.—Two previous convictions.

Destructive, vicious. Fanciful high notions. Delusional exaltations.

RAPE.—Nine previous convictions for assault.

The back of the head ought to have been photographed, but judging by the width, there should be a large Cerebellum.

Low-minded, sullen, obstinate, violent, threatening. Delusional exaltations.

Notice the high upper parietal region, together with the broad base of head.

ness and gaiety is the very opposite to the melancholiac. Notice the portraits of the two criminals suffering from delusional exaltation, Plate 32. In addition to the great width in the temporal region, you will observe a large expansion of the crown of the head.

Here is a case typical of this class:—

Dr MAGNAN—*Brain*, 1879, p. 562. M. L., housekeeper, aged 45, had a satisfied, contented air. She stated in a childish manner that she had much money, that she could make beautiful boots, that she was very clever, that she was very pretty and had lovely eyes. The post-mortem examination revealed an elongated tumour compressing the upper two-thirds of the posterior central convolution.

Here is another case recorded by BARTON and GAYTON in the *British Medical Journal*, 12th September 1891.

A woman, aged 39, married, whilst running up some stairs, knocked her head against the top of the doorway. Patient developed exalted ideas of wealth, delusions as to possessing carriages and horses, etc. The seat of injury, which gave much pain and headache, was selected for operation, namely one inch to the right of the middle line, and one inch behind the coronal suture. A fortnight after operation patient began to improve, and from that time made a steady recovery. The delusions and headache were both cured.

CHAPTER X

THE OCCIPITAL LOBES

The Affections.

The posterior or occipital lobes, see Plates 10 and 35, will be found to correspond in development with the degree of affection and attachment a man or woman possesses. It seems to contain the centres which form the constituent elements of the human affections; the enduring love of parent to offspring, necessary for the maintenance of the species, especially when these are so limited as they are in the human species, and from which probably developed the attachment of husband and wife, brother and sister, friend and friend, forming the foundation of social life. Huschke, Welcker, Richter, Broca, Cunningham, Weisbach, Sir James Crichton Browne, etc., have all recorded their observation that the posterior lobes are more highly developed in women than in men, and indeed, one rarely sees a straight back to the head, so common in men, amongst women. It is not a question of coiffure, for one of the distinctions of male and female skulls is this occipital development; moreover, it has been ascertained by careful measurements that

women have more length of brain posterior to the fissure of Rolande than men, who again have more brain anterior to it.

The superior part of the occipital bone will be found curved outwards in females more than in males. There is a greater convexity of the head behind the parietal bones. Amongst animals it is particularly noticeable in monkeys, see Plate 33. When anatomists set forth that the posterior lobes are entirely wanting in the lower animals, and found this assertion upon the fact, that the hemispheres of the brain do not extend backward so as to overlap the cerebellum in the same way that they do in man, they should have some regard to the circumstance of their bodies being in the horizontal position, which demands such an accommodation as shall fit them for it, and furthermore to the difficulty of defining the anterior border line of the occipital lobe in the brains of animals.

Gall declared that he had examined the crania of birds from the smallest to the largest, and of mammalia from the mouse to the elephant, and had found throughout that in females the part in question is more developed than in males. "Let any one present me," he continues, "with the fresh brains, in water, of any two adult animals of the same species, the one male and the other female, and I shall distinguish the two sexes without being deceived. In the male the cerebellum is larger and the posterior lobes smaller; in the female, on the

contrary, the cerebellum is smaller and the posterior lobes, or the convolutions belonging to these functions, are larger and more especially longer."

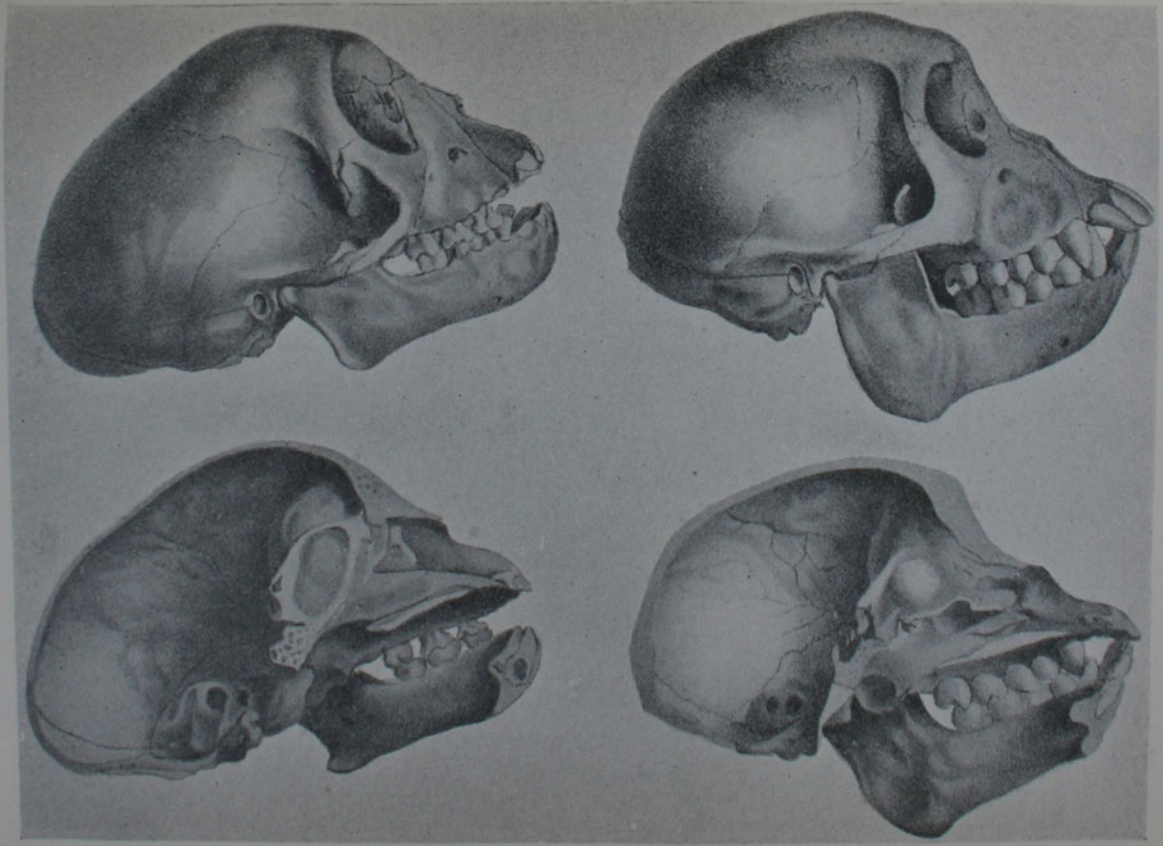
It has been noted by independent observers, that softening of the occipital convolutions is followed by "emotionalism"—as, for instance, by hæmorrhage into the vicinity of the pons—and loss of power over muscles that express the affective states. (*Journal of Mental Science*, April 1879.) Those who regard the occipital lobe as the centre of sight, I would remind, as *Huschke* of old, and recently *Ferrier*, have done, that love, and the tender feelings, and grief, are expressed by the eyes, and apart from the mimicry of the eye, in which all affections are most vividly reflected, weeping is the best of all proofs.

The form of melancholia which may be located in the occipital lobe is the one which arises from the feelings located there, such as the grief of a parent at the loss of a child, the sorrow we feel at the loss of a husband, wife, or friend, etc.

A case by an independent observer fully bearing out our theory is the following :—

Dr H. BERGMANN, *Zeitschrift für Psychiatrie*, vol. iii.

Ernestine S., 27 years of age, of a moral character and very romantic nature, fell in love and was carried away by her vivid love-imagination and pure devotion, to which the practical lover not only did not respond but in the end married another girl. Notwithstanding this fact, her love, though he was gone,



FEMALE. Two Monkey Skulls and their appearance on section. MALE.

Compare the distances from opening of ear to occiput.

continued true to him, and she would sit all day sighing for him and whispering his name. Her mind was only occupied with thoughts of love. She died. At the post-mortem examination the only peculiarity that was found was the prominence of the occipital lobe, which projected fully an inch beyond the cerebellum.

It may be objected that a mother does not love her infant because she has prominent occipital convulsions, but loves her child because it makes, or has made, her happiness. She loves it because it is part of herself, because it is part of a man who is, or has been, dear to her. She loves it because it resembles her, or at least she thinks so. She loves it because it is her creation. She loves it from the pride she has in being a mother. She loves it from the dangers she has been exposed to on its account, from the pains it has caused her. She loves it because it is feeble and requires her aid. She loves it because she has felt it within her and because she has heard proceed from its lips the sweet sound of mother. She loves it, finally, from duty, from virtue, from habit, if you will, when there have not prevailed other reasons sufficiently powerful. Surely none of these causes, though they are additional factors in human beings, would explain the tenderness of animals for their offspring. Let any one examine the hearts of tender parents and let him read there whether their love for their children is determined by such artificial motives, if they can possibly do otherwise than love them. Do

we not find examples of this tender love in the most degraded individuals, in the most savage natives, in a word, under circumstances where most of the motives above mentioned do not exist? The love of offspring is inherent in animal and human natures and is one of the instincts for the protection of the race, and as it is hereditary, it must have a special centre in the brain. How often do we not see women, who have never desired or never been able to become mothers, adopt the children of others, and bestow upon them the most tender cares? And in the absence of children in their circle, do not old spinsters nurse domestic animals with a tenderness which often oversteps the boundaries of reason. Besides, there have been many instances of females, condemned to celibacy or sterility, attempting to steal children.

Those who see in the brain only an organ of intellect, but not of sentiments and propensities, will not be able to explain this natural impulse, for no intellectual combination could produce it.

There are women with the back part of the head as straight as a board. Fortunately for them this is usually concealed by the way the hair is arranged. In such a case it is highly probable we have to deal with an indifferent mother, and if in addition she have a relatively prominent temporal lobe as well, we may draw the interference that she probably will be a cruel mother, or at least easily annoyed with her children. Take such a woman, with a flat occipital region, with little or no love for her offspring, who is without edu-

cation, and having none of those motives which religion and morality afford, who is single and becomes a prey to an unfortunate love, then having yielded to the desires of her lover, he abandons her and she must fear contempt and misery. If a woman, thus situated, feels within her the fruit of her love, she is likely either to destroy it before it comes into the world or she will probably forsake it the moment it is born. If unfortunately she have other criminal impulses as well, she may destroy the child with her own hand.

Gall found in twenty-nine women who had committed infanticide, the occipital lobes feebly developed in twenty-four. But it is not the want of development in this part which determines mothers to commit infanticide, but that mothers thus defectively organised —destitute of the love of offspring—are less able to combat, and yield sooner than others to any unfortunate circumstances which lead up to a commission of the crime, because they are not endowed with that lofty sentiment which, in the heart of a good mother, would victoriously revolt against a similar attempt. *Lombroso*, *Benedikt*, and *Näcke*, found short heads and flat occiputs in female criminals, and in the "Mental Functions of the Brain," I have given several cases of morbid affection of this region, of which I may be allowed to repeat one bearing out the above statement of both occipital and temporal lobes being involved in the case of infanticides.

DAVID FERRIER, *West Riding Lunatic Asylum Medical Reports*, 1874.

N. B., housewife, aged 44. "She had not altogether lost affection for her relatives, but had become very irritable, and on one occasion was about to throw one of her children into the fire. She had also struck her other children repeatedly in a manner previously unusual to her." There was found post-mortem, a remarkable belt of inflammatory disease, resulting in wasting and softening, involving the superior tier of occipital convolutions and the adjacent temporo-sphenoidal area.

A woman in whom this love for offspring is strong, however well and pleasantly she may be united in marriage, cannot find happiness in her union if she is not a mother. An estimable husband is without doubt a precious treasure for such a woman, but nothing in her eyes approaches the happiness of having children. Let the nurse neglect, but for a few instants, to return with the beloved infant, and the alarmed imagination of the tender mother depicts to her a thousand perils, which threaten it. In the moment of imminent danger, where is the hero whose courage equals that of a mother? How many women, who lead a very wretched life with their husbands, still bless their marriage ties for the sole reason that they have children! Too active attachment frequently leads to the spoiling of children.

Of course, a mother need not love all her children equally well. She often has a preference for one or the other. But the same holds good with reference to the other instincts. All dishes are not equally agreeable to the gourmand; all music does not please

equally well every musical ear; every woman does not inspire every man with desires and love.

With large affections, all the other mental powers work for its gratification. Thus a loving mother will work for her children and deny herself many a pleasure in order that she may feed and clothe and properly train her little family.

When the boy takes after his mother he usually has a larger occipital lobe and manifests stronger affections. There are boys who cannot tear themselves away from their mother even when grown up. When the daughter takes after her father, the back portion of her head is less long and less curved than her mother's, and her affections—unless they were strong in her parent—will be more governed by reason and the other mental powers. In this way Nature balances the types, otherwise the difference between male and female brain-organisation would become more marked with each generation.

When you see a man with a long occipital lobe protruding in the central part just above the occipital protuberance, but with a small cerebellum, he probably inherited a tender love for children from his mother, but is not ardent in the particular function which the cerebellum manifests. Such men are able to console themselves with an apparently very philosophical resignation for the loss of a beloved wife, whilst the death of a child may plunge them in profound and lasting grief. The sterility of their wife occasions despair in them, and often this circumstance is sufficient to induce

them to treat with disregard a companion, who is very estimable in all other respects.

I have dwelt chiefly on the parental attachment, but this is only one of the functions of the brain-part in question. A person with the posterior segment of the brain relatively largely developed, so that the head produces a large curve from ear to ear above the occipital protuberance, may be said to possess "affection" in general. Notice portraits of Queen Victoria and Prince Consort, Plate 34. See also portrait of Frederick, Duke of York and Albany, Plate 47. There is not only parental and conjugal attachment, but attachments to home and friends. We are not going to analyse these for the present. In women, not only is the attachment to offspring, but also the attachment to friends much stronger than in men. Whoever has gained the friendship of a woman is sure of the success of the affair in which she serves him. Men are much more easily discouraged in similar circumstances. How often do we find heroic devotion in a woman who sees threatened with imminent dangers a husband, whom indiscretion has perhaps a thousand times betrayed. No sacrifice is too great for a woman in serving her friend. When the life of her brother, husband, or father, is at stake, she penetrates prisons, and will cast herself at the feet of her sovereign.

Those persons who have relatively small occipital lobes are lacking in tender emotion, wanting in affection, and are apt to be stiff and formal. A man,

QUEEN VICTORIA (1819-1901).

PRINCE CONSORT (1819-1861).

Large occipital regions, as seen by the length of head from the ear backwards.

thus organised, may have a high sense of duty and sound moral instinct, and provide all accessories and even comforts for his wife and children, yet as a husband and father he will prove a failure. His wife would exchange all that duty for just a little genuine feeling, and a spontaneous display of warm affection would render his children far happier.

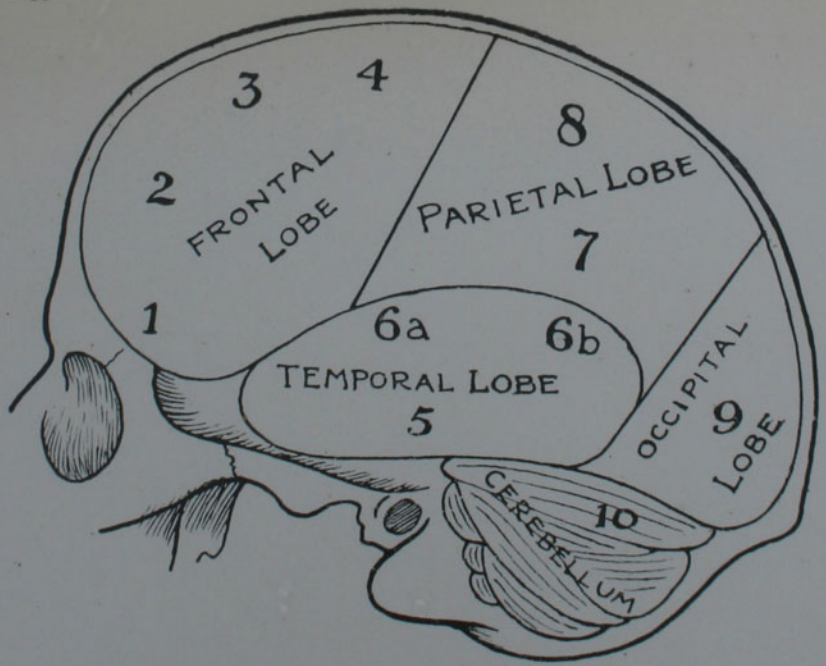
CHAPTER XI

THE CEREBELLUM AND LIBIDO SEXUALIS

In the "Mental Functions of the Brain," I have adduced one hundred cases in support of the view that the hemispheres of the cerebellum are the centres of sexual desire, the most primitive animal instinct. In a future edition I propose adding at least thirty more cases, many of recent date, observed by physicians of great repute, who albeit unacquainted with Gall's theory, have simply recorded their observations without recognising their significance. For position of Cerebellum, see Plate 35.

The lateral lobes of the cerebellum are the centres of the libido sexualis. The potentia sexualis depends on certain pelvic organs and the lumbar centre of the spinal cord. The lateral lobe of the cerebellum is situate in the occipital fossa, externally visible in an arch between the occipital protuberance and the mastoid process just behind the ear. The greater the size of the cerebellum, the deeper the fossæ, and the more prominent these arches, the larger the surface for attachment of the muscles, making the nape of the neck rounded, large and thick. See portrait of Empress Katherine, Plate 36. When the

PLATE 35.



CRANIO-CEREBRAL RELATIONS.

1. Perceptive Powers. } Intellect.
2. Reflective Powers. }
3. Ethical Sentiments. } Moral
4. Religious Sentiments. } Sense.

5. Instinct of Self-preservation. }
6a. Hoarding Instinct. } Propensities.
6b. Secretive Instinct. }

7. Sentiment of Fear.
8. Egotistic Sentiments.
9. Affections.
10. Libido Sexualis.

KATHERINE II. (1729-1796).

Empress of Russia.

Notice the posterior-inferior development of head.

cerebellum is small, the distance between the two mastoid processes is narrow, hence the ears lie close together, and the nape of the neck is flat and depressed. The rule, so often mentioned, should also be here observed, namely, that the size of the cerebellum must be calculated in relation to the size of the entire brain. Taken in such relation, the cerebellum in infants, up to the age of puberty, is small. Both Meynert and Nothnagel have observed that the cerebellum increases in size according as one ascends the scale of life; and even when the cerebrum has reached its absolutely highest weight, the cerebellum continues to grow, and represents most definitely the scale of age of rising and declining manhood. It is relatively largest in man, whose sexual activity is not as in the case of animals confined to the heat periods. Castration in early infancy appears to prevent its full development; on the other hand, the cerebellum has been found frequently of excessive size in offenders against morality, and diseased in persons suffering from satyriasis or nymphomania.

When the cerebellum is too little developed, as in the case of Kant, Newton and Charlotte Corday, it gives rise to indifference to or even aversion from the other sex. When too much developed, on the contrary, its function degenerates into a propensity towards salacity and all its excesses. Normally, when combined with higher powers in a virtuous mind, it is the foundation of true love and matrimonial attach-

ment. In a vicious mind it conduces to licentiousness.

We often deal harshly with people who possess, by their organisation, strong impulses and are surrounded by temptations. It is easy to be virtuous when you happen to be so organised as that you have no inclination, and when you have never been tempted. A born Eunuch deserves no credit for being a celibate, nor is a person constitutionally predisposed to nymphomania to be regarded as an outcast should she fall a victim to the tempter.

In the "Mental Functions of the Brain" will be found recorded the experiments of seven different physiologists who were able to excite the pelvic organs in question by irritation of the cerebellum. *Brown-Séquard* supported Gall's view and so did *Dr Carpenter*, otherwise an opponent of Phrenology, according to *Henry Power's* edition of the "Human Physiology," London, 1881. *Henry Head* (*Brain*, 1894) finds that the pain and tenderness in disease of ovaries and testes is referable to the occiput, thereby confirming the observation made by the Ancients.

WILLIAM P. KROHN observed sexual incompetency and ataxia in a cat whose cerebellum was subsequently found uniformly atrophied. A careful histological description is given. (*Journal of Nervous and Mental Disease*, October 1892.)

BONVILLE BRADLEY FOX records a case in the *Journal of Mental Science*, July 1891, of a man, 31

years of age, previously with strong amative inclinations, who just before his marriage received a bad blow in this region, with the result that he lost not only the libido but also the potentia sexualis to such an extent that he became incompetent to fulfil the matrimonial claims, and his marriage proved a failure.

A similar case was recorded by Dr CARPENTER, whose subject committed suicide on his wedding day in consequence, *Human Physiology*, 1881.

J. W. PLAXTON, *Journal of Mental Science*, January 1890, describes the pathological appearance of the right hemisphere of the cerebellum in a patient who had made carnal assaults on females in presence of others.

In children manifesting premature sexual desires, the cerebellum has been found prematurely developed, and local applications to the occiput were of great therapeutic value. One such case came before me. The girl had all the signs of puberty when ten years of age, and in the subsequent five years was a source of trouble to her parents. She took to conversation and conduct of an amorous character and committed such offences with boys and girls that she had to be expelled from school. Another case was that of a boy, five years old, with extraordinary appearances and symptoms, who died of tumour of the cerebellum. No physician should neglect to observe the cerebellar development, and keep inflammatory disease and tumour of the cerebellar hemispheres in mind, in all cases of premature puberty, or excessive, or

perverted manifestation of the amatory propensity. Surely 130 cases, similar to those quoted, deserve consideration, notwithstanding the evidence, apparently to the contrary, of those who by their manner of expression manifest a bias against Gall and have rashly committed themselves against his theory. This is not the place for going fully into the question, which is one for physicians only. As regards the cranioscopical test, however, this can be applied by anyone, the development of the cerebellum being easily observed externally.

Dr FELIX VOISIN, who afterwards became famous through his Institution for idiots and imbeciles, whom he instructed on phrenological principles, relates in his book, "De l'homme animal," Paris, 1839, how the Governor of Toulon Prison, M. Reynard, tested him once by making him select 22 men condemned for rape amongst 350 other prisoners—forgers, robbers, murderers. The Governor retired to his office and Dr Voisin in company of a committee of four physicians and without uttering a single word began to inspect the 372 heads placed at his disposal. Every time he found an individual with a large broad convexity at the nape of the neck he made him go out of the ranks and took his number. As soon as he had 22 he did not stop to examine the rest, but rushed to M. Reynard's office. This accounts for the fact that he had discovered only 13 of the men actually convicted of rape; of his other 9, however, the Governor wrote: "I can attest that they are

all of licentious character, and for a long time have been noted in my prison for being, in this respect, the objects of a most watchful surveillance, and that consequently the configuration of their heads has not deceived M. Voisin in regard to the violence of their particular passion."

Dr LÉLUT, who has written a book with a view to abolish phrenology, takes note of the test, yet does not seek to discredit it.

CHAPTER XII

MORALITY AND THE EXTENT OF OUR LIBERTY

THE child is the physiological result of the parental nature, moral as well as physical. It is impossible to breed children of a type different from their parents, although outside influences largely co-operate to mould the subsequent character. When a child does not in its character resemble either parent or grandparent, we have to look for such originating causes as accidents to fœtus or child, or the effects of disease, producing an arrest or exaggeration of some one characteristic or group of dispositions. No child calls himself into life, nor chooses the period, climate, or nation, in which he shall be born; no child determines the manners, customs, laws, forms of government, religion, prejudices or superstitions, with which he shall be surrounded from the moment of his birth; no child can determine to have good or delicate health, to be a male or female, to have a certain temperament, or definite inclinations or talents; no child can determine the prudence or folly of his instructors, the baneful or useful examples set before him, the influence which external circumstances shall have over him, his condition or that of his parents,

or the sources of stimulation which his passions and desires shall experience. His ideas come and go, and he cannot by an act of will free himself from certain thoughts; other thoughts may displace them, but not through the will, but by a certain ill-understood power of association. The good man will draw good ideas and inclinations from the good treasure of his organisation, and the wicked man evil things from the evil treasure of his organisation. Since, then, we are born and brought up unequally, the man who is endowed with strong physical powers and mental force has no more right to plume himself on their possession, as if they were acquirements due to his voluntary energy and perseverance, than need the man to whose lot has fallen physical and mental poverty, be ashamed of his misfortune as if he had had the option of becoming by voluntary effort a Hercules or a Solomon. Thus it is useless to feel humiliated on account of our weakness or imperfection. As temporal advantages are distributed unequally and without any respect of persons, so do we inherit from our parents good or evil dispositions, physical strength or weakness, which are thus determined for us and not by us.

We cannot change the inherited organisation nor the results following directly from it. Moreover since our surroundings, at least in early youth, are not of our choosing, we have no control over the impressions produced by them on our nervous centres. As it is impossible not to feel hungry when the

stomach is in a certain condition, so is it impossible not to feel definite desires, tendencies and dispositions, whether for good or for evil, when particular brain-centres are in a state of excitement.

The mental powers which are active in us give us desires, and the gratification of these desires affords us pleasure. The greater the strength and activity of any mental power, the greater the pleasure attending its exercise. Thus the miser gratifies his tendency of saving coins and feels happy in adding pound to pound, but not in sitting down to spend the fortune so acquired. The pleasure of the money ends with the effort expended in making it. In like manner, the generous man gives for the purpose of relieving his own feelings harrowed by the sight of suffering. His charity is prompted by the desire to relieve or to gratify his own feelings. He can realise vividly the suffering of others and this causes him pain, whereas in the uncharitable man the associated ideas with regard to suffering are not pronounced. Both act in accordance with their own organisation. Both follow the line along which their most active mental powers urge them, which is the line of least resistance.

When acting under the impulse of desires more or less imperious, without choice or will, man experiences a feeling of satisfaction associated with the accomplishment of his desires, and which is more or less keenly felt in proportion to their intensity. It is this sense of satisfaction which misleads the individual and induces the belief that in this case he is acting with

freedom. Thus he thinks he acts with freedom when he walks erect, although his organisation compels him to do so. The man agitated by jealousy and the desire of revenge, and he whom the desire of love is consuming, consider themselves free so long as they feel satisfaction from the achievement of their desires. When the storm calms down, they change their tone and acknowledge that they were carried away by the impulse of passion. We are often entirely strangers to every notion of a sensual longing; but scarcely has an object excited the brain-centres than without the least desire to gratify the sensual impulse one does experience the desire of possessing what one would an instant before have disdained, and one deems to have determined in perfect freedom of mind. Animals are supposed to act from instinct, and are deemed not to be free; yet they act without feeling any restraint. Like human beings, they experience the pleasure following the accomplishment of their desires. There is no freedom then, as regards the existence of desires, but it is a wrong inference to conclude that will and actions are equally devoid of freedom, for will implies the decision, the determination, resulting from the examination and comparison of several desires or motives.

The more numerous the impelling motives the freer the individual. In addition to the propensities and aptitudes which man possesses in common with animals, he is competent to distinguish truth from error, justice from injustice; to compare the present with the past and read the future; to seek and discover the connec-

tion of cause and effect; he is imbued with the feeling of shame and decency, has sympathy and compassion, and can determine the duties he owes to others. His inner organisation, language, tradition and education secure him an abundant source of knowledge and furnish him with an infinitely larger number of motives than animals ever can have. Aided by reason, he compares ideas and sensations, weighs their relative worth and is able to fix his attention on determining motives. From these operations result *decision*. It is this decision, the result of reasoning and comparison of motives, which is properly willing.

A man's reason may prove contrary to his desires. The senses get excited and the individual feels an inclination to yield to the impulse, but so long as his reason continues normal he weighs consequences. Manifold motives in accordance with his refined organisation act in his mind, and their force or number determine his acts. Thus it is that a man obtains the power of willing to do precisely the reverse of what his desires would have led him to effect. It is such freedom which renders the individual a moral being, and which imparts to his actions moral purpose and responsibility.

In one individual sensual pleasure will form a compelling motive outweighing all others; in another, though such motive be strong, ambition and the love of power may form an attraction powerful enough to overcome it. A third man is of such a disposition that the mere sight of suffering moves him to its alle-

viation with a force that no other motive power can withstand. Now inasmuch as a multiplicity of motives always surround us in social life, it follows that conduct is dependent rather on the capacity of the mind to be actuated by a particular motive than on the nature of the motives in themselves. Thus in human conduct the dominant factor is the degree of affinity prevailing between the inner nature and the external motives. But his inner nature mainly depends on heredity. Birth will, in great measure, determine among ourselves whether our disposition be inclined to idealism in morality or to a lofty self-respect, or to the daily round of unquestioning duty, or to mere impulses of sympathy as natural occasions arise; or whether it will have no morality whatever save such as the law and the policeman compel; or whether it may possibly have not even that sordid description. With some folk the highest morality consists in following the rules of respectable society. In their eyes the best and most virtuous man is he who strictly obeys the laws of his country, follows rigidly the religion of his fathers, educates his children after the manner of his community, and regards his native country as the best in the world. Hence comes it that persons who have no idea beyond what their immediate surroundings evolve are said to lead a blameless life and to be invested with every virtue. On the other hand, exceptional men of genius and those of literary and scientific aims, who have more brain than is prompt to act in a simple reflex manner, but who do not

conform to all the customs of society, are stigmatised as reprobates. Watch how many people say, think, feel, and do the same things in the same way day after day like so many automatic machines, and how very few have the impulse to get off the beaten track of thought and feeling in which all the others tread contentedly all their lives through.

Will power is the capacity of being so powerfully attracted by one motive as that other motives dwindle into insignificance. Suppose a man capable of being strongly attracted by more than one motive; should they pull him one way, and prove active through a large portion of his life, they make him seem only of stronger will; but should their influence lie in opposite directions, no matter how strong each of them may prove, they will produce the semblance of an irresolute being.

Small minds exhibit at times a will power that leads them on to success, for they are capable of being almost entirely absorbed by the one unchanging motive. Larger minds often fail of success by reason of a want of persistency in pursuit owing to the varied play of manifold motives, each capable of exerting a strong influence on a richly endowed nature. All individuals do not enjoy moral liberty to the like extent. We have seen that all motives are founded either in our own mental constitution or dependent on external circumstances. The more limited our innate powers are, the fewer motives will they furnish us to achieve good, or to avoid evil; and the more the intellectual

powers and moral sentiments predominate over the propensities, the more will these latter be counterbalanced when their tendency results prejudicially. Hence a man of great intellect possesses more liberty than an ordinary individual; and the more reason descends towards idiocy, the more does moral liberty go on decreasing.

The second source of our motives resides in external circumstances. A man who has but few wants will be less tempted than a man who is involved in misery. An individual formed and cultivated by education, moral training and religion, and who rightly apprehends the laws and duties of society, will have far ampler motives within his grasp than he whose heart and mind have been surrendered to ignorance and brutality.

It follows, then, that a man's moral liberty depends on conditions which he does not determine for himself. Consequently, sin should be regarded as a misfortune, rather than as an act of wilful transgression; and vice should be an object of pity and compassion, not of loathing and hatred. The moral and virtuous man may rejoice in his own favoured disposition and thank heaven for not having allotted him any of those tendencies and passions, and for not having placed him among such unfortunate circumstances as might have forced him to seek his happiness in the misery of others.

This knowledge should produce in us a greater tendency to indulgence towards others and should dispose us to close our hearts against hatred, while opening them to the principle of a humane and mild governance.

CHAPTER XIII

THE PSYCHOLOGY OF CRIMINALS AND THE PREVENTION OF CRIME

It is unfortunate that the notion is still so much prevalent that all persons are equally good by nature, and might be equally good actually, had they but the will to be so. We have shown plainly enough that men are born with all degrees of moral capacities and incapacities, and some of them wholly lacking in that regard, just as they are born with all degrees of intellectual endowment, and some of them with none whatever. A man may be an idiot morally, as well as intellectually. We have also shown that there are in man propensities which under certain circumstances, that is by over-excitation, without the guidance of intellect and moral power, may produce evil inclinations and give rise to injurious acts. Let the admirers of the excellence of the human species reflect why in all ages, and all countries, robberies and murders have been committed; and why neither education, legislation, or religion, the prison, hard labour, or the wheel, has yet been able to extirpate these crimes. In Queen Elizabeth's time, out of every thousand persons born five were actually hanged, as a matter of recorded

statistics, yet it did not eliminate crime. Do criminals rob and murder for the sole pleasure of exposing themselves to punishment, and without any temptation? Supposing we allow it to be education, and not nature, that produces vicious tendencies, the difficulty still remains the same, because education does not depend upon him who receives it; and education never would develop either good or evil inclinations, were not their germs previously existent in human nature.

What is a typical criminal? A habitué born in crime, born into crime, and whose vocation is crime by a physical and psychical proclivity, is a man in whom the selfish tendencies predominate over the moral and religious sentiments and altruistic motives, and whose intellectual powers instead of inhibiting such tendencies are employed to further them and to supply means for their gratification; moreover such men are usually not influenced by domestic affections, and much too insensible to the esteem of others to be prevented from committing crimes. Hence we find the skull of a typical criminal to be largest in its bi-temporal diameter, short in its pre-frontal and frontal segments, and frequently also short in the posterior segment. See portraits, Plate 38. It is therefore not a question of a "bump" for thieving or murder, but there is a general conformation of the head which characterises the born criminal. His covetousness, exercise of strength, and other animal impulses, harmonise with the relatively large development of the temporal lobe as compared to the arrested growth of the rest of the brain.

The relative weakness of his intellect is indicated by the deficiency of the pre-frontal lobes and the ethical imbecility by the deficiency in the superior part of the frontal lobes. Notice portrait of Elizabeth Canning and compare it with that of the Empress Marie Therese, Plate 37. They are not influenced as a rule by ties of family relationship, hence the occipital lobes usually share in the general deficiency, particularly in female criminals in whom the cerebellum is frequently left uncovered, and while some may combine they have really no social bond, for each only trusts himself. The relative size of the temporal lobes accounts for their irritability of temper shown in prison and the frequency of violent mania amongst the criminal insane. The reports of the Commissioners for Prisons also bear out our statement that a deplorable number of criminals are intellectually imbecile or weak-minded. Of course there are criminals with great intellectual powers. These are the clever rogues, who know how to escape the law; in prison are only the failures.

Dr W. NORWOOD EAST, Deputy Medical Officer of His Majesty's Convict Prison, Portland, has published in the *Journal of Mental Science*, October 1901, the results of observations made on 100 convicts in regard to physical and moral sensibility. Control observations were made on 10 normal men. He found that criminals are less susceptible to pain than the normal man. Of all sane criminals *moral* sensibility is least developed in the professional class, who have been apprenticed to crime from early youth, and continue

MARIA THERESE (1717-1780).
Empress of Austria.

ELIZABETH CANNING (1734-1773).
Malefactor.

Compare the ethical regions.
Notice the lofty forehead of the one and the low forehead of the other.

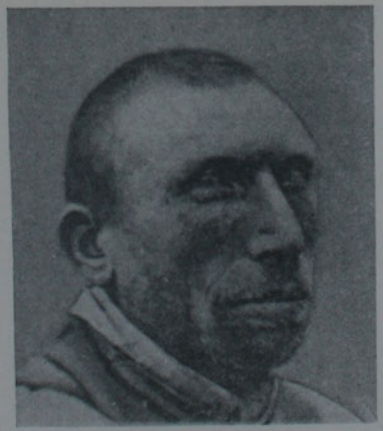
PLATE 38.

1.

TRAMP (60 years of age), committed for arson.

Notice the defective frontal region, no depth to it.

2.



IRISH PIG-DRIVER, committed for rape and manslaughter.

Mental weakness with active animal propensities. Whole head small, but temporal region large.

3.

BURGLAR.

Notice relative size of temporal region.

in crime year by year. The influence of education on moral or physical insensibility appears to be unimportant. The least degree of moral and physical sensibility is exhibited by criminals who have been given to rape, sexual assaults, bestiality and arson. See portraits, Plate 38. Sensation is generally found to be impaired in the criminal, and the mind to be lacking in ideas of the *social* kind, and hence most commonly the criminal is characterised by his moral incapacity and insensibility. The moral insensibility is shown by the frequent recommittals of the habitual criminal and the apparent absence of all remorse. Only those men and women whose active animal propensities are governed as a rule by sound moral sense will, when having committed wrong for once, feel the torture of conscience in the loneliness and darkness of the night, and be afflicted with those terrible dreams which are alleged to shake nightly the guilty soul. No! the habitual criminal is a moral imbecile. His conscience is not strong enough to torture him. See portrait of Thurtell, Plate 24. According to the evidence of night-watchers of prisoners, he sleeps as soundly as the rural cottager, the simple peasant, or the most innocent in the quiet homes of social men. Repentance is rare. The criminals who do sincerely repent are those who have been drawn into crime through imprudence, an unfortunate fit of passion, poverty and sore need, or from other very pressing external circumstances. If, for instance, a dishonoured and abandoned mother, in an instant of wild despair, lays

a trembling hand on her child and deprives it of life, its innocent blood will always be present before her eyes, and poison every moment of her existence. When the fatal concurrence of circumstances has passed, the milder inner feelings will become active. This is what usually occurs in the case of crimes committed in a fit of passion. After the event a total contradiction is manifested between the natural sentiments and the act committed, and this contradiction is what constitutes repentance, or the natural conscience.

Men have always regarded violent affections and passions as extenuating motives when their impetuosity, excluding premeditation and sometimes even consciousness, has led on to criminal action. But it is not always that the strongest sensations burst out most suddenly. It often happens that, although the storm is raging in the mind, external circumstances may retard the outburst. He, who is moved by fierce anger, often succeeds in restraining it, but the mind and body are more strongly agitated than if it were allowed to take its free course. The harrowing feeling of shame may result from having suffered injustice; despair may spring from an acute sense of injured honour; the unceasingly renewed torments of jealousy no less darken the mind of man than do the sudden attacks of a more impetuous affection or passion. The deeper a painful sentiment, and the longer it corrodes the mind, the more does it weaken the powers, and violently agitate the soul. An atrocious resolve [adopted during such state should

be regarded, under many circumstances, as the effect of the strongest emotion, and as the consequence of impaired health and perverted judgment. And indeed, if it be suicide, we condone the offence as committed "during temporary insanity," but if it be murder the man is hanged.

He who is drawn into crime as the outcome of a disproportionate brain-organisation in which the area of the propensities is overwhelming, will rarely experience a natural repentance. In such a being, the propensities which lead on to evil are predominant; they make up his real character. All his acts consequently are in harmony with his whole being, and the calm of his mind is but rarely disturbed by them.

This view of man's depravity may naturally displease those persons who dream only of the dignity of the human species. But observe closely the usurer, the libertine, the villain, and you will see that each of them is happy only in proportion as his desires get satisfied, and some may, with glee and vanity, recount to you their deeds, without forgetting the most insignificant details and the particular mode they adopted in committing them. Calculate how many among them have been recommitted, and you will be easily convinced how few have repented of their doings.

It must not be assumed, however, that because these characteristic brain-types are present in criminal natures, that a being so constituted must necessarily commit crime. The question here is only as to a

predisposition, just as we say, that people with a narrow chest have a predisposition to tuberculosis, or children of insane parents have a predisposition to insanity. It must always depend on opportunity, social factors, and on a number of other conditions, as to whether a nature predisposed to crime will actually become a criminal, and the clearer we are as regards the psychological and anatomical marks by which the disposition may stand revealed, the more surely shall we prevent crime by education and due vigilance. Society is to blame for tolerating the glaring deficiencies of the educational system, whereby the opportunity of moulding the hereditary vitiated organism in the direction of its better nature has been neglected at the most critical period of life. The modern doctrine of judicial punishment is evidently in a wrong condition, because it always sets free criminals whose relapse is certain, and thereby allows them to commit crimes anew. Of what importance then must it not be if the study of the brain, skull, and the living head offers us the prospect of determining, at least, in a portion of the cases, with scientific clearness, *when a relapse may be looked for.*

In prison, errors are less likely to occur, and one may, from the general configuration of the head, disproportionate in certain segments, pronounce with sufficient confidence on the nature of an offence, and distinguish the innocent from the guilty. We may, of course, come across a man under trial, who was urged by fortuitous circumstances to an act for which

he feels in himself no very strong propensity. A man may become a malefactor by seduction, misery or unbridled passions, such as jealousy, resentment, quarrelling, or some other unfortunate occurrence, especially when stimulated by alcohol. There can be no deception, however, when the question relates to incorrigible malefactors, or persons who, from childhood, have manifested evil dispositions or criminal propensities. In these, the development of the head is evident, see Plate 38. In case of an educated individual the judgment cannot be so certain, and no one who has not had long experience should attempt to give an opinion.

A practical application of the principles of the phrenological theory to the diagnosis of the character of convicts by one of the most renowned exponents of his day may be of interest.

GEORGE COMBE visited the Penitentiary in Dublin, 29th April 1829, accompanied by a large number of independent gentlemen, eager to see a demonstration of the phrenological truths which were still new at that time. Mr Combe requested that any ten or twelve convicts who were just near might be introduced. This was done. They were seated on a form, and Mr Combe pointed out that the region for the animal propensities at the base of the brain was larger, and those of the moral sentiments at the vertex of the head, relatively smaller in the heads of the convicts, than in those of the visitors present. Mr Combe then inspected more minutely the brain-

organisation of these convicts and put his opinion in writing, the Governor of the Penitentiary did the same, and herewith follows the result. I have retained Mr Combe's old phrenological terms, but with the theories advanced in this book a more scientific delineation could be given.

Male Convict No. 1.

GEORGE COMBE.—This boy has large acquisitiveness and secretiveness. He probably has been a thief, but the development of the moral area is considerable. He may be much improved by moral and religious education.

GOVERNOR'S REPORT.—G. K. This boy's conduct has been almost invariably correct since his confinement. He was convicted of larceny, along with his brother, and I have no doubt was led into it by his brother's conduct and importunities.

Male Convict No. 2 (Brother of No. 1).

GEORGE COMBE.—In this individual those brain-areas are large which make him cautious, secretive, and acquisitive; he has a good intellect; not combative nor destructive; is not conscientious and is deficient in the moral sentiments in general. He has the dispositions of a thief, but he will scarcely have the courage to steal in his own person.

GOVERNOR'S REPORT.—J. K. This young man's conduct has been generally correct since his confinement; but I apprehend that this is occasioned as

much by cautiousness of disposition, good looking to, and fear of correction, as from any good qualities he may possess. I have learned from another prisoner now in confinement, that his influence led his brother (No. 1) into the perpetration of several small felonies. His habit was to commit small thefts, and, having deposited the stolen goods with other persons, by cunning and ingenuity to throw on them the imputation of the theft. He is intelligent, and apt to learn. He was once very anxious to be sent to Botany Bay, from a conviction, as he stated, that, when discharged from hence, he would be guilty of fresh crimes. He was convicted of larceny.

Male Convict No. 3.

GEORGE COMBE. — This boy is acquisitive and secretive, has large brain-centres for reasoning and imitation, but is very deficient in conscientiousness. He has the talents and dispositions of an expert swindler.

GOVERNOR'S REPORT.—P. K. This is in almost all respects a very bad boy ; he is addicted to swearing, lying, gambling and every kind of meanness and duplicity. He has very considerable intellectual powers, and exercises them only to do wrong, whenever he can do so with impunity. He was convicted of sheep-stealing.

Male Convict No. 4.

GEORGE COMBE.—This individual possesses a very

large development of the brain-area for the propensities, he is combative, destructive, secretive and acquisitive, with decidedly deficient moral sentiments. The base of the brain is broad, and the coronal surface narrow. He is a bad subject ; his dispositions are to cruelty and falsehood, and it will be extremely difficult to amend him.

GOVERNOR'S REPORT. — E. A. is mean and treacherous—will betray any of his fellow prisoners to serve himself. I have not the least hopes of his reform, on the contrary am persuaded that he is incorrigible. His crime was larceny.

Male Convict No. 5.

GEORGE COMBE.—Enormously destructive, secretive and acquisitive : deficient in moral sentiments. He would be a fearful thief and cruel.

GOVERNOR'S REPORT.—A. M. This boy came to me with a very bad character, which he has fully justified. His intellectual powers are of a high order, and he exerts them to the utmost to do all the mischief in his power. He is without truth and probity, or good feeling of any kind. He invents stories with reference to acts in which he has been engaged. I think when he becomes a man, he will be a most dangerous character, and yet I fear he must be soon thrown back on society, as he is an orphan from Scotland without a single friend to look after him. His crime was larceny.

Female Convict No. 6.

GEORGE COMBE.—This woman is cautious, secretive and acquisitive and very deficient in conscientiousness.

GOVERNOR'S REPORT.—M. M. This woman is, in my opinion, worthless, and not likely ever to be reclaimed. She is utterly destitute of truth, and abounds in low craftiness and cunning. She was convicted of larceny, and will probably pursue a course of theft.

Female Convict No. 7.

GEORGE COMBE.—Brain-areas for destructiveness, secretiveness and acquisitiveness very large; conscientiousness deficient.

GOVERNOR'S REPORT.—M. G. This girl, I fear, is very deficient in moral character. She was for a considerable time looked upon as superior to most of her fellow-prisoners, and treated accordingly; but was discovered, on being placed in trustworthy position, apt to betray her trust, and to show a disposition to pilfer, to aid others in pilfering, and to justify herself by false statements of facts. She was committed for larceny, and will, unless attended to by her friends, probably take to courses of impurity.

Female Convict No. 8.

GEORGE COMBE.—This woman has large brain-areas for acquisitiveness, secretiveness, wonder, and imitation; but she has also the largest development of the moral organs of any whom I have examined.

My impression is, that she would not commit crime in ordinary circumstances, and that there is diseased or irregular action of the brain.

According to the GOVERNOR'S REPORT too long to reproduce here, this woman was judged too favourably by Mr Combe. But it was confirmed by the physician of the Penitentiary that her passions arose subsequently to a confinement, that there was organic brain-disease, and that according as the symptoms got better or worse, she manifested more or less violence. She was convicted of larceny.

Female Convict No. 9.

GEORGE COMBE.—This woman has very large destructiveness, secretiveness and acquisitiveness, with deficient conscientiousness. She is a bad subject, and will with difficulty be amended.

GOVERNOR'S REPORT.—A. B. Generally well-conducted, though there are exceptions occasioned by temper, as she is highly irritable, and is, when excited, frightfully furious and vindictive. Though correct in her ordinary demeanour, I fear she is not to be reclaimed. Convicted of grand larceny.

Female Convict No. 10.

GEORGE COMBE.—This is a better subject than the last. She is gentler and less coarse. She would probably swindle. By education she will be greatly improved.

GOVERNOR'S REPORT.—B. L. This girl has been

unusually well-conducted, is prepossessing in her manner and appearance, docile, and anxious to receive instruction. I was very anxious to learn Mr Combe's opinion of her, and much gratified to find that it exactly coincided with that I had previously formed. She was convicted of stealing bank notes.

Male Convict No. 11.

GEORGE COMBE.—This is a tolerably good subject, and something may be made of him.

GOVERNOR'S REPORT.—P. T. This young man's conduct since his admission has been generally correct. His disposition would seem to be of a gentle character, and I should be surprised to hear that he ever committed any flagrant crime. From a general meanness of character he might be guilty of petty thefts. His crime was larceny.

Here is afforded a practical demonstration of the truth and usefulness of phrenology by a scientific man. Opponents may argue that this was so long ago that it would be difficult to verify all the details. Well, if a really representative and impartial Committee were to interest itself in this question, moved by a conviction that phrenological theories, if true, would prove of benefit to humanity, the author is willing to undergo any similar test, and thus place beyond doubt the truth of the doctrine, which though admittedly still imperfect, he has been able to verify in the main points from day to day during the latter half of his life.

CHAPTER XIV

THE RECOGNITION AND TREATMENT OF THE EARLY STAGES OF INSANITY

GRIEVOUS are the mistakes which mature men and women often inflict on the young, but equally grievous are the mistakes which the mature often inflict on themselves. Men, knowing nothing of their own brain and mental constitution and failing to appreciate the thinness of the line which divides the normal mind from the abnormal, the sane from the insane, throw themselves into mental strifes and contentions for which they are as little fitted mentally as they are physically fitted to move mountains.

No one for a moment entertains a doubt that delirium and furious mania are affections of the brain, and our remedial agents are consequently directed to that organ; but when the same organ is attacked with a slow, insidious, chronic disease indicated often only by a slight alteration in the temper and feelings, a slight perversion of the moral sentiments or affections of the sufferer, men seem loth to admit the existence of any disease of the brain at all, and therefore trifle with the patient till he becomes afflicted with confirmed insanity. In the slightest derangement of vision, our

attention is immediately directed to the condition of the eye or its appendages; we never think of withholding our remedial agents till the disease has reached a certain degree of severity; we attack it at its very commencement, and by doing so save the patient from irremediable organic disease of the eye. It is the same with respect to diseases of lungs and heart. Incipient symptoms are directly supposed to indicate an affection of either of these organs, and remedies are had recourse to accordingly. But as regards insanity, a disease most undoubtedly originating in consequence of a derangement in some part or parts of the brain, we allow the incipient symptoms to pass by unattended to, chiefly on account of that false physiological psychology which teaches that the brain has only a relation to the intellect, and we treat the moral sentiments, affections and propensities, just as if they were independent of cerebral centres, and owing to such neglect the patient sinks into confirmed and sometimes incurable cerebral disease.

What greater service can the theories taught in this book render, than to make men so far acquainted with the constitution of their own minds, as to show them the necessity of seeking assistance in the earliest dawning of mental aberration? The slightest departure from a healthy condition of the brain giving rise to deranged mental manifestations ought to be looked upon as insanity. We talk of incipient gastritis, enteritis, or pleuritis — inflammation of particular parts of the body—without waiting till

that inflammation has arrived at a certain degree of activity.

In forming our estimate of the condition of the patient's mind, it is important to be well acquainted with the natural mental qualities and propensities of the individual as indicated by his brain organisation. It is perfectly evident that an individual may become insane, whatever be the form of the brain, just as any one with the best constitution may become sick. But just as there are dispositions to other maladies founded in the constitution, so there are dispositions to mental disease. Everyone knows that a contracted, flat, narrow chest is indicative of a tendency to consumption. In like manner exterior signs exist which enable us to judge not only of dispositions to insanity in general, but to a certain kind of mental derangement.

Suppose that the cerebral part, which we have seen so prominent in persons endowed with active moral and religious sentiments, were so excessively developed, as compared with the rest of the brain, that its activity were not counterbalanced by the activity of the other mental powers. In such case one might have to fear that the sufferer would become a prey to pious extravagances.

Suppose that the parietal lobes in their inferior parts were in excess as compared with the rest of the brain, one should have to fear melancholia.

Suppose that the temporal lobes were in excess as compared with the remaining brain-mass, one

should fear violent or homicidal mania, and so on.

Give to the brain more than the brain can bear, and it will become deranged. Over-exertion in youth, worry and anxiety in after-years—the pressure of want, the struggle to maintain appearances, the concealment of grief, the bitter pangs of envy and jealousy, disappointed hope, smothered affection, the constant wear and tear of petty annoyances, so petty often that the most provoking thing about them is to feel their littleness; and yet further still, all those strange emotions which often conflict so fiercely with thought and supply the motives of our actions; those mysterious alliances we have with a world we cannot perceive, but which in some form or other make up the religion of our life; all these, in undue order, or with extreme force from without, or by reason of some undue susceptibility within, disturb the growth and nutrition of the brain, derange the relation of its parts, upset the harmony of function, and result in an unsound mind.

There may exist no primary disorder of the intellectual powers, and the insanity may essentially consist in a tendency to disordered emotional excitement, which affects the course of thought, and consequently of action, without disordering the reasoning processes in any other way than by supplying wrong materials to them.

Frequently there is only one class of feelings or impulses which acquire a settled domination over

the whole character, and cause every idea with which they connect themselves to be presented to the mind under a wrong aspect. Some one particular tendency may acquire a dominance over the rest, either from an extraordinary exaggeration of such tendency, through disease of its centre, whereby it comes to overmaster even a strongly exercised volitional control, or, on the other hand, from a primary weakening of the volitional control, disease of the frontal lobes, which leaves the predominant bias of the individual free to exercise itself. Thus a man may become a melancholiac from injury or disease of the parietal centres, however little developed they may be; or else from injury or disease of the frontal lobes, when the parietal area was highly developed previously. Injury or disease limited to any other region of the brain will not produce melancholia.

The diseased part, producing an exaggerated tendency to a certain mental condition, may modify the course of thought by habitually presenting erroneous notions anent the subjects to which the disordered feeling relates, as the basis of intellectual operations. It may thus give rise to fixed beliefs palpably inconsistent with reality. Such delusions are not attributable to perversions of the reasoning processes, but originate from the perverted emotional state. This gives rise in the first place to a misinterpretation of actual occurrences in accordance with the prevalent state of the feelings; but when the disorder has lasted some time, ideas which the

imagination at first presents under a very transient aspect are habitually dwelt upon in consequence of the interest with which they are invested, and become at last realities to the consciousness of the individual, simply because he has not brought them to the test of actual experience. When the mind has once surrendered itself to the dominance of such erroneous ideas they can seldom be dispelled by any process of reasoning, for it results from the very nature of the previous habits of thought that the reasoning powers have got weakened, and that volitional control, through want of exercise, can no longer be exercised ; and consequently, although a vigorous determination to get rid of the ideas—which are felt to be erroneous—and to repress the emotional tendencies—whose exaggeration is the essence of disorder—in other words, a strong effort of self-control, may prove effective in an early stage of this condition ; yet, when the wrong habits of thought have become enrooted, little can usually be done by way of bringing direct influence to bear upon them.

Idiocy and imbecility are due primarily to developmental arrest ; the born criminal frequently to malformation ; and derangement of the mental powers, *i.e.* insanity, to disease of one or more psychic centres in the brain. Insanity, from the physician's point of view, should apply to any condition manifesting deviations from the normal psychic functions. The morbid state of a mental power does not differ radically from the normal, but is only an exaggera-

tion or reduction of some of its elements. Were men to consult their physicians as soon as they observe the slightest deviation from their habitual dispositions, we should need far fewer madhouses, and save to the state many a useful citizen.

My own experience has been that a man in the earliest stages of mental change may often be helped by hypnotic suggestion. We can thereby strengthen the volitional control which he exercises over his thoughts and feelings, and are enabled to remove his delusion. No deep hypnosis is required for the end in view; on the contrary, one must keep the patient in a state in which one can impress on his mind sound reasons and effective arguments. It is remarkable how the patient will act subsequently in the waking state, will reason with himself and control the impulses which arise in him at intervals more and more lengthened until they disappear completely. The most essential factor is that the patient must have complete confidence in his physician, and this is generally obtained by showing him how completely one does understand his nature by his brain-organisation and is able thoroughly to sympathise with his mental trouble.

Another effect which one can produce by hypnotic suggestion is, that one can give rest to those parts of the brain which are in too great activity; and if this seems impossible, one gets the entire brain to rest by sending the man into a sound refreshing sleep for such length of time as is deemed beneficial. It appears strange to me that this necessity for brain rest has

hitherto received but little or no attention. The physician knows well that in kidney disease he must rest the kidneys and allow their functions to be performed by other parts of the body; he knows that a diseased stomach must receive no food, at least no solid one; yet we shut up the man with brain-disease in an asylum as if to give him more liberty to dwell on his delusions and to give full range to his morbid thoughts, until his brain becomes completely disordered. The asylum should be the home for incurables. And since the very earliest stages of mental derangement in any case do not come under the legal definition of "insanity," it is all the more desirable that we should have properly equipped hospitals for the "cure" of mental derangements, with a large visiting staff, a hospital open to all physicians qualified to treat such disease or wishing to study it.

Some of our greatest lunacy-specialists of the past generation were phrenologists, and I could name half-a-dozen gentlemen to-day, present or past superintendents of asylums, who are disciples of Gall, but for some reason—perhaps not to wound the susceptibilities of their colleagues—do not openly advocate the views I have expressed in these pages. It is not for them that I append the following account of the practical value of these theories in the diagnosis of certain forms of insanity, but for those who know little or nothing of this important subject.

On the 20th April 1829, George Combe visited the Richmond Lunatic Asylum in Dublin, in the presence

of Dr Crawford, the Head-Physician; Dr Cumming and Dr Mollan, the Assistant-Physicians; and the two Governors, Major Edgeworth and Mr Grace; these five gentlemen to test the application of the phrenological theories to lunacy and the accuracy of Mr Combe's diagnosis—who, it should be mentioned, was a lawyer, and not a medical man. Dr Crawford had previously written down the characteristic features of several cases of insanity, and Mr Combe was by an inspection of their heads to diagnose the particular form of mental derangement from which they were suffering. The hair of the patients was worn short, which facilitated the observation. Mr Combe, who had never before been submitted to a like test, explained the principles on which he would proceed. He first wrote down his opinion of each case, and then explained it to his audience and let them see for themselves, after which Dr Crawford's and his notes were compared. It would lead too far to give the entire notes here as they were published; the points of diagnosis merely are submitted.

MALES.

1st Patient.

GEORGE COMBE.—The sentiments of *wonder* giving in the state of disease morbid notions of supernatural agency and inspiration and *self-esteem* are the most highly developed and are probably the leading sources of the alienation. The reflective region and the *speech-centre* should be very active.

Dr CRAWFORD.—Patrick Lynch, aged 42, a cooper,

suffering from *religious pride.* Fancies himself inspired and endowed with omnipotence; hallucinations of visits from heaven; great flow of language in a style quite superior to his rank of life.

2nd Patient.

GEORGE COMBE.—This is the worst head I ever saw. Combativeness and Destructiveness are fearfully large, and the moral organs altogether very deficient. I am surprised that that man was not executed before he became insane.

Dr CRAWFORD.—E. S., aged 34. Total want of moral feeling and principle, great depravity of character, leading to the indulgence of every vice, and to the commission even of crime. A scourge to his family from childhood; turned out of the army as an incorrigible villain; attempted the life of a soldier; repeatedly flogged; has since attempted to poison his father.

3rd Patient.

GEORGE COMBE.—The sentiments in excess in this patient are Self-esteem and Firmness.

Dr CRAWFORD.—Joseph Dowling, silk weaver, aged 29. Suffering from high pride. An emperor. Very overbearing.

4th Patient.

GEORGE COMBE.—The combination here is very bad, the animal organs greatly preponderating; Destructiveness is the largest.

Dr CRAWFORD.—George Bailey, clerk, aged 39. Mania. Very violent, pugnacious and destructive, sullen and morose.

5th Patient.

GEORGE COMBE.—It is difficult to point out the leading features of this case. The areas for the religious sentiments, particularly wonder and for imagination, present an unusual appearance, corresponding to malconformation. Destructiveness also very large.

Dr CRAWFORD.—Christopher Edmundson, clerk to a merchant, aged 47. Suffering from religious mania. Fancied himself Jesus Christ, imagines now that his body is inhabited by the spirit of another person; was a clerk and methodist, and gave up his employment to go about preaching and working miracles. At times irritable and violent.

6th Patient.

GEORGE COMBE.—The sentiment of fear and conscientious feeling in excess with the feeling of hope small, will predispose him to melancholy.

Dr CRAWFORD.—George Brady, servant, aged 37. Suffering from melancholia. Great timidity of disposition. Fancies he was accused of theft, and has constant apprehension of punishment, either human or divine. A variety of hallucinations on this subject. His master, to whom he was butler, was robbed, and although the thief was discovered, this occasioned his mental derangement.

7th Patient.

GEORGE COMBE.—Sentiment of fear and suspicion large, hope deficient. This is another case of melancholy.

Dr CRAWFORD.—Matthew Mulligan, aged 39, cabinetmaker. Suffering from melancholia and religious despondency. Very silent, uncommunicative, suspicious and morose. Anxious about the fate of his family.

8th Patient.

GEORGE COMBE.—I feel a difficulty in pointing out particular centres in this case, but have marked those that seem most likely to determine his character. Combativeness, Self-esteem, Wit, Hope and Imagination.

Dr CRAWFORD.—James Petit, shopkeeper, aged 32. Intermittent mania. Very violent, combative and brutal. A high opinion of himself. Fancies he has great riches. Has a good deal of humour, by the excitement of which his violence is easily subdued.

9th Patient.

GEORGE COMBE.—The leading centres in this case are wonder, which diseased gives morbid fancies of the supernatural, and Destructiveness.

Dr CRAWFORD.—Thomas Fogharty, a marine and tailor, aged 39. Monomania, with the singular delusion of his being the Almighty. Says that he had no beginning and is never to die; that he can bestow immortality on whom he chooses; is very

irascible, and threatens those who offend him with hell-fire and brimstone.

10th Patient.

GEORGE COMBE.—The combination here is that which is described in the works of Phrenology as leading to melancholy and suicide.

Dr CRAWFORD.—Bryan Duff, collector of minerals, aged 31. Melancholia. Deepest dejection. Silent, morose, inactive. Attempted suicide, and to destroy his own child.

11th Patient.

GEORGE COMBE. — This is a head proportionally developed with no part in excess or deficient. Animal region and sentiment of fear may be marked largest.

Dr CRAWFORD. — Michael M'Evoy, aged 28. Melancholy. No delusion. Is gradually recovering.

12th Patient.

GEORGE COMBE.—Combativeness and Destructiveness *very* large, veneration (one of the religious sentiments) and firmness large.

Dr CRAWFORD.—R. J. C., aged 34. Intermittent mania. During the paroxysms he conceives himself to be Jesus Christ, and is the most furious, treacherous and dangerous patient in the institution. Is very athletic and muscular, and not easily restrained.

FEMALES.

13th Patient.

GEORGE COMBE.—The sentiment of self-esteem is here by far the most prominent.

Dr CRAWFORD.—Jane Hall, aged 48. Monomania of Pride. Queen of France.

14th Patient.

GEORGE COMBE.—Her love of approbation is out of all proportion. This sentiment when very large gives ambition.

Dr CRAWFORD.—C. C., aged 30, suffering from Monomania. An air of great self-importance. Fancied herself entitled to a fortune. Is very vain of her person. Her mind appears constantly engaged in great plans. She was domineering in her family.

15th Patient.

This was a failure, and George Combe explained that some part of the brain may be diseased without any external indications. The part may be inflamed, there may be hæmorrhage, or growth of tumour.

16th Patient.

GEORGE COMBE.—Strong attachments, sentiment of fear large, very conscientious, and little hope. This combination may lead to melancholy.

Dr CRAWFORD.—Eliza Nelson, aged 40. Melancholy after the death of her husband.

17th Patient.

GEORGE COMBE. — Marked by Self-esteem and Destructiveness.

Dr CRAWFORD.—J. H., aged 41. Monomania with pride. Attempted her husband's life with a knife from jealousy, and also threatened to destroy her children.

18th Patient.

GEORGE COMBE.—Animal region and self-esteem large but uncertain about wonder—the sentiment of the supernatural, which is probably large.

Dr CRAWFORD.—Susan Gallaher, aged 23. High religious excitement with pride. Imagines that the welfare of the people of her country depends upon her; that she has received revelations from heaven, informing her of a conspiracy against their lives and property. Very excited, destructive, requiring coercion.

19th Patient.

GEORGE COMBE.—Self-esteem and destructiveness large.

Dr CRAWFORD.—Alice Mooney, aged 30 years. Fancies she has plenty of money. Occasional maniacal paroxysms.

20th Patient.

GEORGE COMBE.—Nothing very remarkable.

Dr CRAWFORD. — Ellen M'Aveeny, aged 28. Puerperal mania.

21st Patient.

GEORGE COMBE.—The characteristics of this head are self-esteem and love of approbation as one combination, and constructiveness, imitation and sense of the beautiful as another. Destructiveness large.

Dr CRAWFORD.—Ann Kelly, aged 37. Monomania of pride. Imagines she is Napoleon. Very irascible, but easily calmed by a little praise. Dresses partly as a man, has made herself trousers and a highly ornamented cloak with simple threads. Will never wear a cap.

22nd Patient.

GEORGE COMBE.—The leading characteristics are: Libido sexualis and love of children. There is an asymmetry about the latter brain-area. Sentiment of fear moderately marked.

Dr CRAWFORD.—Aurelia Thomas, aged 34 years. Great anxiety after her children. Fancied that they were starving outside the house, and that she heard their cries, and insisted constantly upon her food being taken to them. Disappointment, after seduction, the supposed cause of her illness.

23rd Patient.

GEORGE COMBE.—Largest organ is Destructiveness. No other very remarkable.

Dr CRAWFORD.—Mary A. O'Neil, aged 35. Mania, high excitement, and very destructive, requires constant restraint; very abusive and passionate.

There is nothing extraordinary in what George Combe has done. It was acknowledged in his time. To give only a few examples, Dr Conolly, the founder of the modern treatment of lunacy, wrote: "I am convinced that attention to the form of the head will often enable the practitioner to form an accurate prognosis in cases of mental disorder." Sir Jas. Coxe, Commissioner in Lunacy, was a phrenologist, and so was Dr W. A. F. Browne, father of Sir Jas. Crichton Browne, also a Commissioner, who wrote: "In the exercise of my profession I have been enabled, by the aid of phrenology, to be of essential service in directing the education of the young as a protection against nervous disease, and in removing or alleviating the various forms assumed by insanity in the mature. Insanity can neither be understood, nor described, nor treated, by the aid of any other philosophy." Sir William C. Ellis, Physician to the Hanwell Asylum, candidly owned that until he "became acquainted with phrenology he had no solid basis on which he could ground any treatment for the cure of the disease of insanity."

CHAPTER XV

THE BRAIN-ORGANISATION AND MENTAL CHARACTERISTICS OF WOMEN

WOMEN'S brains differ from men's, not merely in the adult stage, but even in the fœtus. The brain of woman, taken as a whole, is smaller than that of men. It weighs on an average 5 ounces less, has $\frac{1}{10}$ less surface area, and measures an inch less in circumference. But it differs also in its various parts. The lighter weight of the female brain is not due to neglect of the education of women in past ages, for a female brain of savages is likewise lighter than that of the male.

Women have smaller frontal lobes than men. It has been shown as the result of observations made on both educated and uneducated males and females, that in educated and uneducated alike the brain of the male has comparatively greater volume in the anterior part of the cranial cavity than the brain of the female, and that education, as regards both sexes, tends to enlarge the volume of the anterior part of the brain. The average surface area of the frontal lobes in men is 15,000 square mm., compared to 13,000 square mm. in women, which indicates roughly $\frac{1}{7}$ less. We

see then that the anterior region, which is involved in the higher intellectual operations, is larger in man than in woman by $\frac{1}{7}$.

The parietal area in women is also less, being 28,000 square mm. in men and 26,400 square mm. in women, that is $\frac{1}{17}$ less. But if we compare the parietal to the frontal area, we find it 28:15 in man, and 26:13 in woman, which figures show that in woman the parietal region is more prominent, and the frontal region in man. In harmony with other observers the author found greater width across the parietal eminences.

Numerous observers as, for instance, HUSCHKE, RÜDINGER, PASSET, GARNER, BROCA, etc., have found in accordance with the above figures that there is more brain in front of the central fissure in man, and more behind the central fissure in woman. Moreover, in woman the cerebellum is more completely covered by the occipital lobe, and it is this additional posterior length—in the region of the affections—confirmed, in addition to the above mentioned observers, by WELCKER, RICHTER, WEISBACH and CUNNINGHAM, which makes woman long-headed. 73 per cent. of female skulls are dolichocephalic.

The *average* woman, then, has less intellect and more feeling—a kinder and more affectionate heart—than man, a truth long recognised and now proved anatomically. Having less frontal lobe, woman has also less control over the manifestation of her feelings, and objects and events coming before her mind appeal more easily to her emotions than to matter-of-fact reason.

Women's brains are narrower than men's, on account of the smaller development of the temporal lobes, the centres of the selfish instincts so necessary in man in the struggle of existence. Hence the cranial roof predominates over the cranial basis (Welcker). The female head being narrower and somewhat shallower in the basilar region, woman has less of the criminal passions to antagonise her moral nature and affections. See Robert Garner, *Journal of Anatomy and Physiology*, 1881, who also confirms other anatomical statements contained in this chapter.

Moreover, several experimenters have shown that the posterior part of the brain, the parieto-occipital region, has a special connection with the sympathetic nervous system, and through it with our unconscious vegetative life. Whereas the cerebro-spinal nervous system supplies all the muscles and organs over which we have *voluntary* control, and is specially connected with the anterior half of the brain, which is larger in man, the sympathetic or ganglionic nervous system supplies all *involuntary* muscular fibres and visceral organs, and is connected with the posterior part of the brain, which is larger in woman. It is through this ganglionic system of nerves that we feel that our emotions have their seat not in our heads, but in our bodies. According to the greater supply of sympathetic nerves that go to a visceral organ, the greater is the liability to emotional disturbances.

Women require a larger supply of sympathetic nerves than men; firstly, because of their mammary

glands, and secondly, because of their sexual organs being concealed in the pelvis, and having more functions to perform.

It is due, in part, to this more elaborate sympathetic system that women feel more keenly the emotional side of our mental life. Their affections are deeper, they are more subject to fear, more promptly roused to joy and sorrow, and their grief is more intense. This increased susceptibility renders them easily moved to tears by trivial circumstances.

Let this emotional state get unstable, and we have a person readily weeping, readily laughing, one moment angry, another in ecstasy; in one word, a hysterical person. Hysteria is probably due to a hyperæsthesia of the ganglionic nervous system, and has been referred since ancient times to certain pelvic organs; not that necessarily the disease is there, but these organs form part of a reflex-arc to the brain-centres by means of that system. The posterior lobes of the brain being sensory areas, will account for the anomalies of sensation so frequent in hysteria. Characteristic for the hyperæsthesia of the sympathetic is the feeling of fainting and threatening death which such women experience. The will and self-consciousness, the ego, seem to disappear, and through this paralysis of the will, or inhibitory fibres, the reflex excitability of the spinal cord and medulla is much increased.

We moreover know that hysteria is most frequent in women of the upper classes of the civilised races, in

whom emotionalism is intensified, at the expense of reason and self-control, by injudicious training in childhood, and the subsequent pampering that ill suits them for the trials of life. Modern women are less subject to this affection than their grandmothers were, for their out-door life, and greater activity in general, strengthen the cerebro-spinal nervous system, which in many respects acts inhibitory to the sympathetic.

The sympathetic system influences the circulation. Innumerable nerve filaments are sent off by it and distributed to all the ramification of the blood-vessels, acting on them by increasing or diminishing the calibre of these canals in which the blood flows. Hence do women blush so readily. Blushing is most perceptible in the face because of the large supply of capillary vessels to the skin of the face, and it is most frequent at the time when the pelvic organs assume their function, that is at puberty, when the reflex-arc between these organs and the brain becomes established.

We have seen that women, on an average, are less intellectual than men, because of their smaller frontal lobes, and that they are more emotional—

1stly, because, in consequence of the smaller frontal lobes, they can exercise less control over their emotions ;

2ndly, because their brain is more developed posteriorly, *i.e.* in the region concerned with the manifestation of emotions ; and

3rdly, because of their more elaborate sympathetic