A vindication of phrenology.

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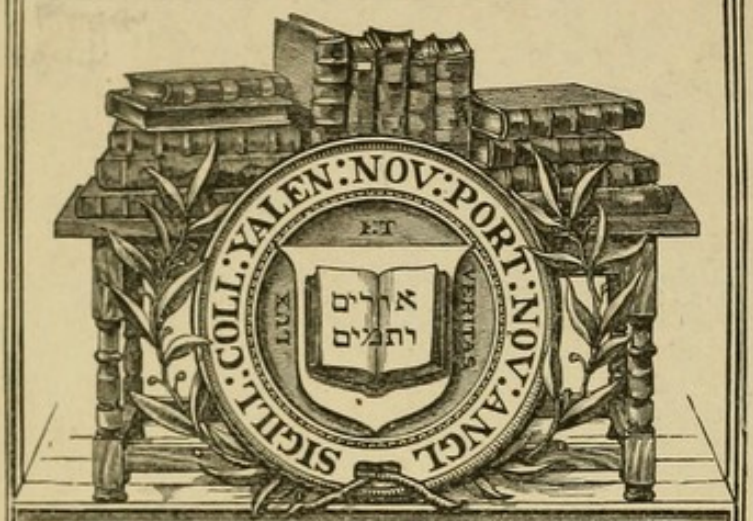
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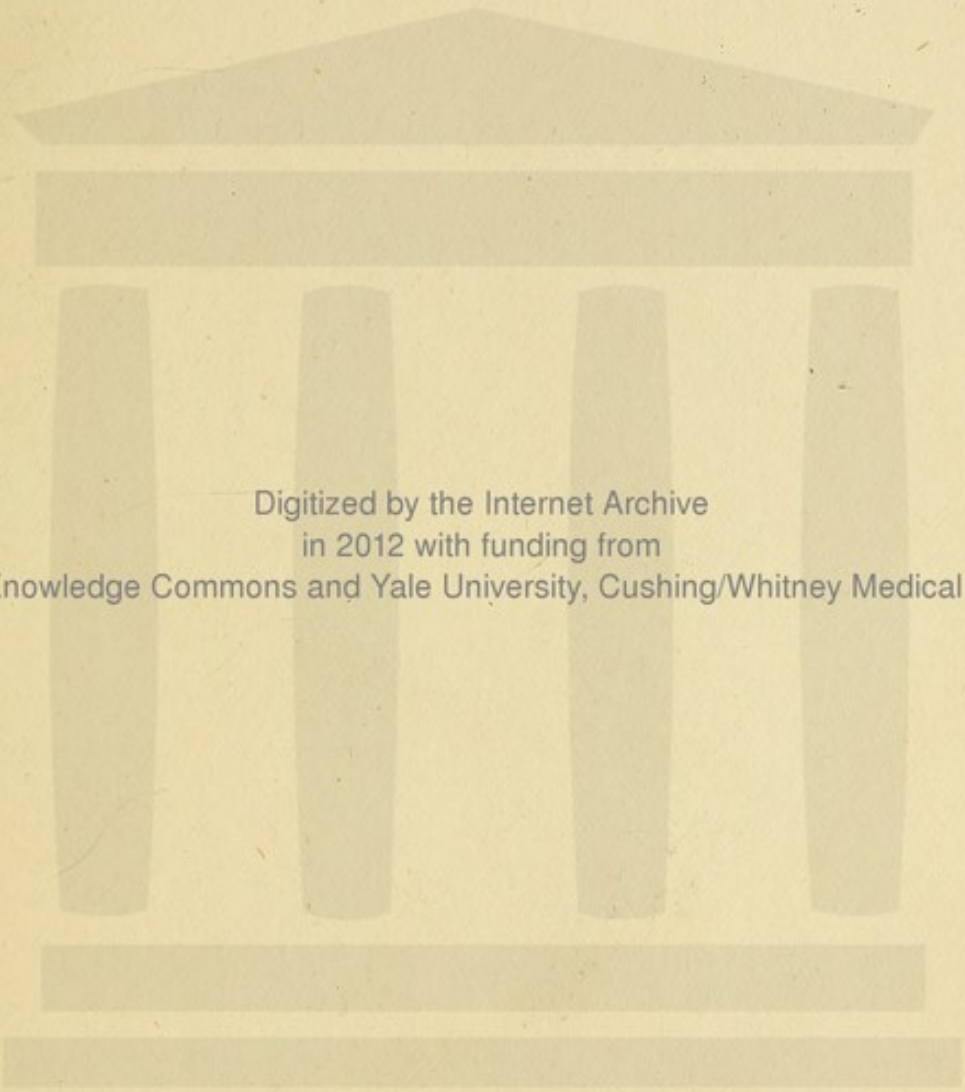
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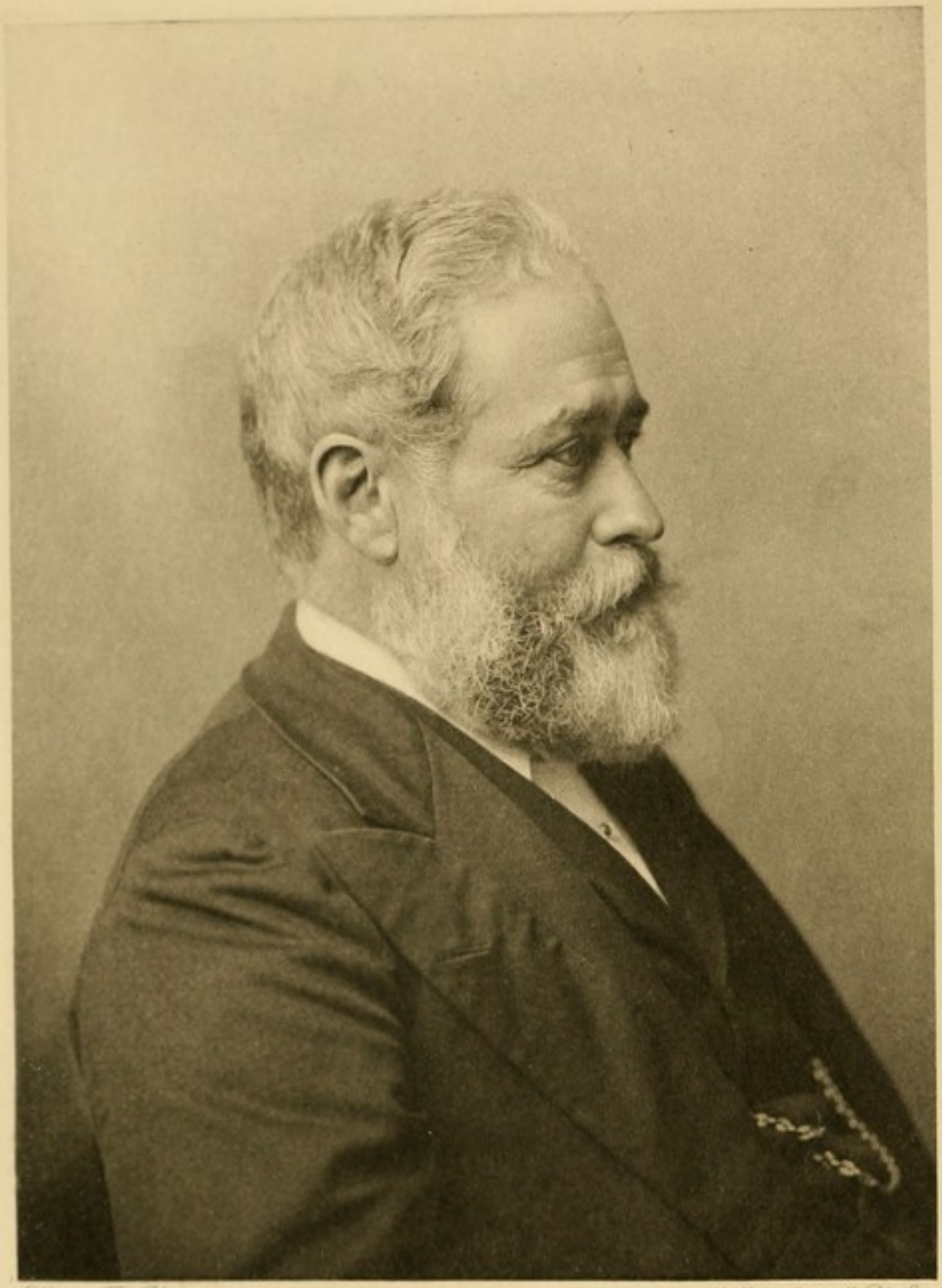
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W. Mattieu Williams

A VINDICATION

OF

PHRENOLOGY

BY

W. MATTIEU WILLIAMS, F.C.S., F.R.A.S.

AUTHOR OF

'THE FUEL OF THE SUN' 'SCIENCE IN SHORT CHAPTERS'

'THE CHEMISTRY OF COOKERY' ETC.

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MEMOIR

Mr. William Mattieu Williams, F.R.A.S., F.C.S., was born in London, February 6, 1820. At fourteen years of age he was apprenticed to Mr. Thomas Street, a well-known Mathematical and Optical Instrument-maker in Lambeth. To the highly skilled practical mechanical and scientific knowledge thus obtained, the several courses of Cantor lectures, which he much later in life delivered at the Society of Arts, owe much of their value. Prior to his apprenticeship to the art and business of Mathematical Instrument-making he had spent his schoolboy days at three schools of the 'Academy for young gentlemen' type, then characteristic of the education of the period. At these schools, to use his own description, he was crammed with the contents of 'Carpenter's Spelling Book,' 'Walkingame's Arithmetic,' 'Lindley Murray's Grammar,' 'Goldsmith's Geography,' and more or less of the 'Eton Latin Grammar,' but he learnt no science at either of the schools, its value as a branch of education being then unappreciated, and its difficulty considered so great as to place it beyond the curriculum of ordinary day-school education. To the combatting, practically and theoretically, of these important educational errors a large part of his life was subsequently most successfully devoted. During his apprenticeship period 'long hours' were the order of the day. He had to work from 7 in the morning until 8 at night; yet he found time to attend the night classes of the then vigorous London Mechanics' Institution in Southampton Buildings, Chancery Lane (now the Birkbeck Institution). This meant a sharp run of a mile and a half after the doing of a long day's work. The London Mechanics' Institution was then—1834—in the heyday of its existence, under the active patronage and assistance of Dr. Birkbeck (President), Lord Brougham, Sir Francis Burdett, Joseph Hume, M.P., Bishop Thirlwall, and other

educational leaders of the time, who with great enthusiasm, sacrifice and ability pioneered the movement of science-teaching and of technical and general education, which like a great wave has gloriously overflowed the whole kingdom, bringing untold good to all, and which he, Mr. Williams, believed was destined to rise until it should ultimately wash away ninety-nine hundredths of all the vice, the misery, the poverty and the disease which it was the misfortune of the average thinker of the time to regard as inseparable from our social system.

Mr. Williams, besides attending the able bi-weekly public lectures given to the members of the London Mechanics' Institution by the ablest men of the time, joined its Mathematical, Chemistry, Natural Philosophy, French and other classes. He also joined the Phrenological class (which was supplied with a very fine and extensive series of phrenological casts) and the Literary Composition and Discussion Societies. These Classes and Societies he attended with great industry and regularity during the whole of his apprenticeship, and finally became, as lecturer and in other ways, an important contributor to their successful working.

The following list of lectures delivered by Mr. Williams to the Phrenological and Literary Composition and Discussion Societies, contained in a series of old printed prospectuses and syllabuses which have recently come to hand, illustrates the width of his interest and his reading in social subjects. The lectures were given during portions of the year 1846-7. The subjects were :—

'On the Relative Character of the French and English.'

'On Constantinople and the Turks.'

'On Dreaming, Phrenologically considered.'

'Would it be advantageous for Railways to become National Property ?'

'On the Difficulties of Phrenological Manipulation.'

'On the Phrenological Doctrine of Responsibility, and its Application to the Treatment of Criminals.'

'On the Functions of the Reflective Faculties.'

'On the National Characteristics of the French.'

'On Direct and Indirect Taxation.'

'Should Political Questions be Discussed at Mechanics' Institutions ?'

'Should Railways become National Property ?'

About this time he was also elected a Member of the Committee of Management of the Institution (London Mechanics') in the working of which he took so active a part. In the interim, however, coming into a sum of money, he went down (1841) and spent about two years at the University of Edinburgh, and had also taken a walking tour of about two years through Europe, spending much time in Switzerland, Italy, Greece and Turkey. While at Constantinople he became much impressed with what he conceived to be the possibilities of the true Turk, whom he regarded as being very unjustly disparaged by the public opinion of the time.

On his return from his European tour, with the intention of combining the profession of Lecturer on Science and Travel with the commercial business of an electrician, an electrical instrument-maker and electrotyper, he opened suitable premises in Hatton Garden, London. But his enthusiastic love of science and general research was destined to become a foe to the habits and forms of attention required in successful commercial business. Many a time friends calling on him late in the evening found him so thoroughly absorbed in pursuing the theory of some practical problem he had succeeded in working out, that he had forgotten, meantime, that he had neither taken dinner nor tea—in fact, had neither taken food nor refreshment since his morning breakfast. During this period he still kept up active connection with the London Mechanics' Institution and still pursued his first love (Phrenology) in science, and still cultivated his strong interest in social, but more particularly educational, progress. He was at this time also not unfrequently called out for days together to lecture at some distance at various Literary and other Institutions, chiefly on subjects connected with his European tour. A favourite subject of these popular lectures was Switzerland, on which he usually delivered a course of six lectures, including, besides its social and historic aspects, its physical geography, geology, and its glacier formation. These he illustrated by an expensive, highly artistic series of diagrams, which he had especially painted for the course. At this time the oxyhydrogen lantern and the photographic slide system of lecture illustration was a practically undeveloped scheme.

But about this period—1846–7—circumstances intervened which entirely changed the current of Mr. Williams' future life. It then became known that Mr. William Ellis, the manager of the Marine Indemnity Society, had made an offer of 1,000*l.* towards the establishing of a school, to be called the Birkbeck School, on the premises of the London Mechanics' Institution, in which school, in addition to the principles of the natural sciences, including chemistry, physics, physiology, etc., the principles of *social well-being*—that is, the principles of *social and political economy*—should form ordinary branches of daily instruction. The Committee of Management, who were unfavourable to the scheme, entirely ignored the generous offer of Mr. Ellis, not even deigning to mention, at any of the general meetings of the members, their having received such offer. The offer having, however, come to the knowledge of a small group of members, consisting of Messrs. David Wm. Mitchell, Mr. Chas. Eason (subsequently the W. H. Smith & Son railway booksellers of Ireland), Mr. W. Mattieu Williams and Mr. Angell, a determination was come to on their part to oppose the Report of the Committee of Management at the next general meeting, unless such report contained full note and acceptance of the same. As anticipated, the Report of the Committee contained no allusion to the generous offer of Mr. Ellis; as was not anticipated, however, the Report for the first time in the history of the Institution was not accepted by the members, but was, in consequence of the omission, sent back to the Committee for reconsideration. A repetition of these events occurred at the next general meeting of members, and thus commenced a revolutionary battle between the old Directors and the Members of the Institution who supported the quartett group just alluded to. The ultimate result, however, was the acceptance of the money offer of Mr. William Ellis and the appointment of a Special Committee, known as the Birkbeck School Committee, by whom the first Birkbeck School was established in July 17, 1848, in the lecture room of the Institution, Southampton Buildings, Chancery Lane, London, to the Headmastership of which Mr. John Rüntz was appointed. Mr. Wm. Ellis supplied most of the money by means of which the school was established, but of the days, weeks and months of time, work and anxiety given to the accomplishment of the result by those at an age to whom

time is even more than money, nothing has been said. The result, as has always been the case whenever society has made a fundamental step in advance, was not accomplished without much bitterness of feeling displayed on the part of the opponents of the scheme, men who had really done much good work in aid of the Institution, but whose minds had not kept pace with the times. Nearly fifty years afterwards, when Mr. Williams was attending a Masonic meeting, he noted a tall elderly gentleman to be frequently looking towards him and observing him attentively. Towards the end of the meeting, the attendance having thinned considerably, this gentleman came up and asked him if he was not the Mr. Williams who nearly fifty years previously had taken such an active part in the affairs of the London Mechanics' Institution. To this enquiry Mr. Williams replied, 'Yes, I am that Williams.' His interrogator thereon remarked, 'I suppose you do not recognise me?' to which Mr. Williams replied he unfortunately had not that pleasure; whereon his interlocutor said, 'I am Mr. ——,' giving the name of one of the ablest and strongest opponents of the Birkbeck School scheme. He said, 'We all thought you and your party were wrong; now I know your party was right and we were wrong.' His interlocutor as he now stood before him was a tall, very gentlemanly man, whose hair was white as snow. During the whole of these years they had never met, but when Mr. Williams knew him in the years gone by he was a man, tall, able, and with locks black as the raven. Such are the changes, physical and mental, which the hand of Time works on man.

The great success of the first Birkbeck School, with its advanced and unorthodox curriculum of daily instruction, due firstly to the orthodox character of the Institution to which it was attached, and secondly to the admirable manner in which the unorthodox scheme of instruction was carried out, quickly attracted, through the Press and otherwise, the attention of all the leading educationists of the kingdom; among others, especially that of George Combe, the great philosopher, phrenologist and educationist of Edinburgh. Mr. George Combe resolved, with the monetary aid of Mr. William Ellis, to establish a school for secular education in Edinburgh on the model of the London Birkbeck School, but with a still more

unorthodox curriculum, inasmuch as to the list of subjects taught at the Birkbeck School was to be added, as an *additional* subject of daily instruction, that of *Phrenology*. Mr. George Combe was most anxious that the principles of Social and Political Economy—really the principles of human well-being —should be taught in his proposed Edinburgh school on the same methods as those on which they were taught at the London Birkbeck School, but he also thought that these fundamental principles could be better taught with the aid of *Phrenology*. Speaking of the importance and method of teaching these subjects, as taught in the Birkbeck School under the Headmastership of Mr. John Rüntz, Mr. George Combe writes after visiting the Birkbeck School:—'In May last we went, accompanied by one of the most distinguished members of the House of Commons, to Mr. Rüntz's school, and for forty minutes listened to a lesson on the subject given by a monitor of 14 years of age to a class of 60 boys, most of whom were younger than himself. Our friend remarked on leaving the room, "One-half of the House of Commons might listen to these lessons with advantage."'

During this period, however, Mr. Williams, in addition to his lecturing and daily business engagements, was much occupied in promoting and advising on various scientific patents, including those of the electric light of that period, a more economical and scientific mode of tanning leather, improvements and extensions in the application of pneumatic arrangements to the affairs of every-day life, improvements in the steam engine, etc.

He also, there being at this time a great demand on the part of the railway companies for the service of the civil engineer, undertook engineering duties in the surveying and plotting out sections of proposed railway lines, a service for which his minute knowledge of the theodolite and the Y level, and their mode of adjustment, particularly fitted him. The thoroughness and minuteness of this knowledge were again shown in his most valuable course of Cantor Lectures 'On Mathematical Instruments,' delivered to the Society of Arts in the winter session of 1878-9. His readiness of resource, his extreme facility of illustration, especially as a lecturer, showed itself in all that he did, as, for instance, when in his 'Through Norway with a Knapsack,' published in 1859, he explains the sea

serpent craze of Norway as due to the phenomenon of aerial refraction, which may be imitated on a small scale by 'holding a red-hot poker before a printed paper.' Had Mr. Williams, with his massive head and great brain power, been a man of less all-round ability and versatility, there is no doubt he would have become a most distinguished man, the facility and the pleasure with which he could pass from one kind of intellectual activity and work to another being detrimental to the cultivation of that one-groove system of work by which reputations are now, for the most part most easily, made. An illustration of this versatility of power was shown during Mr. Williams's stay at Rome, on his foot-tour through Europe. While in Rome he placed himself under an art-teacher and a voice-trainer. Singularly each of these artists strongly importuned him to devote himself to the branch of art in which he was more particularly interested, so promising were his studies both as a painter and a vocalist; and it is a fact that he narrowly escaped, always being passionately fond of music, entering, while in Italy, on the training and career of an operatic artist. He however ultimately returned to London, entering the profession of lecturer and practical electrician, and contributing to the discussion of the various applications of science to the purposes of every-day life carried on in the scientific journals of that time, and taking part, as a member of the Committee of Management, in the conduct of the London Mechanics' Institution.

During his stay in Edinburgh Mr. Williams made the friendship of Mr. George Combe, the well-known philosopher, phrenologist and philanthropist, whose writings and whose lectures on Education, on the treatment of Insanity, on Criminal Jurisprudence, and on most leading social subjects, both in this kingdom and in the United States of America, had produced such a powerful impression on each side of the Atlantic. Mr. George Combe was the first to demonstrate as an all-pervading principle, the exquisite harmony existing between the 'Constitution of Man and External Nature.' He studied man as a physical being, an organised being, and as a social, moral, religious, and intellectual being, and found that in each of these relations he was the subject of *natural law*. Mr. John Morley, speaking in his Life of Cobden of the author of the 'Constitution of Man' (Mr. George Combe), says

few men 'have done better work than the author of the "Constitution of Man." That memorable book, whose principles have now in some shape or other become the accepted commonplaces of all rational persons, was a startling revelation when it was first published (1828)' . . . . 'We cannot wonder that zealous men were found to bequeath fortunes for the dissemination of that wholesome gospel, that it was circulated by scores of thousands of copies, and that it was seen on shelves where there was nothing else save the Bible and Pilgrim's Progress.'

Mr. George Combe, as already stated, determined to establish a secular school in Edinburgh, to be conducted on similar principles and methods of teaching to those pursued at the London Birkbeck School, to the daily curriculum of which, however, was to be added the systematic teaching of *Phrenology*. But the great difficulty now remained, how and whence to obtain a teacher competent in the necessary knowledge, and possessing the natural ability and tact essential to the successful working out of this novel educational problem. Mr. George Combe, fully aware of the strength of the religious prejudice which under ecclesiastical direction opposed itself to all advance in the line of educational progress, regarded the work to be accomplished as one of serious difficulty. Mr. Williams, however, full of enthusiasm and sympathy with the work to be accomplished, cut short the first difficulty by offering himself, much to the delight of Mr. Combe, to undertake the Head Mastership of the proposed school, which now at the instance of Mr. Combe was designated the 'Williams Secular School.' The following extract from a letter, *Edinburgh, Nov.* 1848, *from George Combe to W. Mattieu Williams*, indicates the seriousness with which Mr. Combe regarded the experiment on which they were just about to embark:—'In this city evangelical religion is strong, active, and penetrating; and it uses *all means* to command every class of the inhabitants. It will oppose our school, and vilify it and ourselves by every possible endeavour. Now it is so powerful that scarcely any person of the middle, and none of the upper ranks here will lend his name or countenance to our school, through sheer fear of the theological outcry, although many wish us well. Mr Robert Chambers, for example, is entirely with us in point of

principle and detail, yet in a note which he wrote to me yesterday, he says that we shall fail, and he will not countenance us. This "fear of folk" operates irresistibly in the class of persons from whom you desire to draw the pupils, viz., clerks and superior mechanics. They tremble before their evangelical masters and clergymen. It is therefore a problem whether we shall obtain pupils at all.'

The school however was opened in the Trades' Hall, Infirmary Street, Edinburgh, on Monday, December 4, 1848, under the title of *The Williams Secular School.* Shortly afterwards, in consequence of its rapid increase in numbers, it was removed into the premises, previously known as the Anatomical School of the celebrated Dr. R. Knox, M.D., No. 1, Surgeons Square. It continued doing invaluable model work under the charge of Mr. Williams, until Mr. Williams's translation to the Birmingham and Midland Institute in the year 1854. The school was then discontinued, firstly, because it had largely, as a model school, done the work it was intended to accomplish, the cause of popular education having meanwhile advanced by leaps and bounds; and secondly, because of the difficulty, if not impossibility, of obtaining an adequate successor to Mr. Williams. The Williams Secular School was visited by many of the leading educational thinkers of the time, and was warmly supported by 'The Scotsman' newspaper, which not only gave full reports of the novel and excellent work it was doing, but also published frequent leaders on the subject. During the existence of the school Mr. Williams issued six printed reports, published by Messrs. Maclachlan, Stewart, and Co., of Edinburgh, which, in the words of Mr. William Jolly, one of Her Majesty's Inspectors of Schools in Scotland, were 'admirable and full of excellent educational matter,' and would well repay the attention of all interested in educational work.

JOHN ANGELL.

In recalling the Birmingham life of my dear friend, the occasion of his introduction to the town should be mentioned. The Birmingham and Midland Institute was projected by a few leading men in Birmingham, Mr. Arthur Ryland no doubt being the originator of the scheme, and one who worked most energetically in its interest for many years.

Immediately after the passing of the Act of Parliament incorporating the Institute, in July, 1854, Mr. Williams was invited by the Council, on the recommendation of Mr., now Lord, Playfair, to become Master of the Science Classes, and on August 17, 1854, he gave an introductory lecture which at once aroused interest, and the 'Birmingham Journal' in commenting on this lecture said: 'All who had the pleasure of hearing the lecture must be convinced that a man of no ordinary ability has come amongst us.' In this lecture Mr. Williams pleaded for the application of science to industry, and pointed out the important future to the workman who became a scientific man. The classes first opened at the Institute were in Physics, Chemistry, and Physiology; but the curriculum soon extended, and an important novel feature in Popular Education was introduced by Mr. Williams in what were so well known in the town as the 'Institute Penny Lectures.'

The first of this series was delivered in the early part of 1856, and attracted large audiences. The first bench was occupied by factory boys immediately the doors opened, and, as intended, many who had their interest in science aroused for the first time, were led to undertake the more serious and systematic courses provided at the Institute. The idea of Penny Lectures led subsequently to the establishment of Penny Classes and Penny Readings, and did much in the direction of popular education. During the time Mr. Williams was in the town the Institute was highly popular, and Birmingham owes much to him for his efforts to spread a knowledge of science among the people.

Mr. Williams had great sympathy for all people under despotic rule, and those who heard his lectures will remember the vehemence with which he spoke when denouncing the Hapsburg and exalting the Swiss nation, which he always held up as a pattern. From this intense sympathy he naturally fell in most readily with the scheme of Orsini for delivering (as Orsini represented) his people from the Austrians and the French. The story of Mr. Williams's connection with Orsini and Pieri is well told by himself in the following extract from 'British Manufacturing Industries—Explosive compounds' (Stanford).

'One of the most fearful implements of destruction in which the fulminate of mercury has been used was the "Orsini bomb" used in Paris with such murderous effect on January 14, 1858. These bombs were ovoid iron shells about four or five inches long, and three or four inches wide, studded around with ordinary gun nipples communicating with the interior containing the charge of fulminate.

'As I was unwillingly concerned in this tragedy . . . I may now reveal a few facts that have not hitherto been made public.

'I was first introduced to Felice Orsini, a highly educated, refined, and courteous Italian gentleman, in the autumn of 1857, and having lived for a while in Italy and witnessed the iniquities of the Austrian, Papal, and Ducal despotisms that crushed the nation, I heartily sympathised with his patriotic yearnings for the liberation of his country. He told me that the people were preparing for a great effort to repel the Austrians and drive the French army of occupation from Rome, but that the search for arms was so rigorous that no ordinary weapons could be imported or held by the Italian patriots. He had therefore invented a new form of stellar gas-burner which could easily be converted into a bomb by simply unscrewing the radiating gas nipples and replacing them by gun nipples, or by making the gas nipples small enough to fit percussion caps. This gas head or receptacle was to be filled with an explosive composition, plugged at the place where it screwed to the gas-pipe, and the nipples armed with caps. It might then be used as a hand grenade to be thrown from house tops and windows among any of the soldiers of the enemy who should attempt to occupy the streets and fire upon the population of an insurgent town.

'But these gas-burner shells were too small for a charge of ordinary gunpowder to produce effective explosion. I suggested the fulminate of mercury in lieu of the powder, and taught Orsini and Pieri how to make it themselves. They also learned how to make fulminate of silver and some other detonating compounds, and proposed to use the dark powder form of silver fulminate as priming for the caps, fearing that the blow produced by the fall of the small bomb would not be sufficient to ignite ordinary caps. I pointed out the danger of placing such caps on the nipples; but Orsini replied that

the sacrifice of a few individual lives was a trifling evil compared with the living death that all Italy was then enduring.

'They never showed me any of the bombs, only described them, and their description indicated a much smaller size than those actually used in Paris. I understood that they would be a little larger than a hen's egg, and suspect that such was the original idea. I still believe that *at first* Orsini really intended them for the purpose he named to me, and that the idea of removing the French army of occupation from Rome by killing the Emperor and causing a revolution in Paris was an afterthought of his own, or a suggestion of Pieri, a crafty sinister man, likely to choose a crooked course of action.

'It was stated at the trial that ordinary caps were used; but I have little doubt they were charged either with silver fulminate or with pure fulminate of mercury. The readiness with which those thrown from so short a distance exploded, and the great care with which Orsini deposited his unthrown shell in the gutter, and wetted it over with the blood from his wound, indicate this. When Orsini and Pieri called upon me on leaving England for the last time, Pieri said they were bound for Ferrara (on the confines of Austrian territory), where the rising was to commence. Orsini said nothing concerning their destination, but informed me that he had prepared a quantity of the fulminate of mercury, and packed it moist in pots as "Dentifrice," or tooth paste, and prepared and labelled it accordingly.

'Orsini in his final confession stated that the English chemist who taught him how to make the fulminate had no knowledge of its intended purpose. This assurance was accepted by the Emperor and the French Police, who gave me no further trouble than that of a few days' secret watching of my movements in Birmingham, which was so delicately conducted that I only discovered it accidentally.'

While in Birmingham, Mr. Williams took an active part in every movement in favour of enlightenment of the people and general improvement in the town. He was extremely active in the movement for the purchase of Aston Hall. He wrote vigorously in the 'Birmingham Journal' in support of a more enlightened policy in the Town Council, especially as regards

making the town a healthier one. He was always to the front in discussions on education, and advocated strenuously the introduction of object-lessons and practical illustrations in school teaching. Looking over a scrap-book containing cuttings from articles by Mr. Williams's pen, I note many which breathe the spirit of even a better technical education than that which has so recently been brought within the range of practical politics.

Shortly before leaving Birmingham Mr. Williams devoted considerable attention to the chemistry and manufacture of paraffin oil, the use of which was at the time rapidly extending. From his knowledge of this illuminant he was appointed manager of the Leeswood Oil Company, and left Birmingham in 1863 for Caergwrle, near Wrexham, a few miles from the seat of the Welsh paraffin industry. On the occasion of his departure an enthusiastic meeting was held at the Institute and a testimonial presented to him by his students and friends.

It was while in Birmingham that Mr. Williams came before the public as an author. His friends were familiar with his genial style of writing from various articles which appeared in 'The Birmingham Journal.' In the summer of 1856 he made a trip to Norway and walked, knapsack on back, through a considerable portion of the country, and on returning his 'Through Norway with a Knapsack' was published by Messrs. Smith, Elder, & Co., and was particularly successful. While in the town a clever pamphlet entitled 'The Intellectual Destiny of the Working Man' was published, in which were brought forward powerful arguments in favour of a manual occupation.

Mr. Williams contributed in 1853 a paper to the Chemical Society on 'An Apparatus for Collecting Gases over Water or Mercury.' The arrangement consists of a bottle fitted with two tubes—much as a wash bottle is fitted; with one of these the generating flask is connected, while the other serves for the escape of the water or mercury with which the bottle has previously been filled. This method of collecting gases on the lecture table has several advantages over the pneumatic trough.

In 1871 he contributed to the same Society a paper on 'Burnt Iron and Burnt Steel,' in which an explanation of

the structure and properties of burnt steel is given 'as the result of suddenly solidifying it from the viscous condition which it attains at a welding heat, thereby imprisoning the carbonic oxide evolved by the oxidation of the carbon. This explanation accords with the fact that burnt steel may be cured as above stated by welding up the cavities, or "toad's eyes," as the workmen call them, which are visible on the fracture of such steel. These, according to my explanation, are the minute bubbles formed by the carbonic oxide suddenly arrested in various stages of evolution or collapse.'

C. J. Woodward.

The process for the distillation of paraffin oil from the shale which Mr. Williams had patented and used at Leeswood was an undoubted success, but the speculation had a tragic ending, for the company had nearly got all the plant down when the American oil springs were discovered and the price of oil reduced to about one-fifth. Unable to compete, the company with many others had to close. During this part of his career his foresight and influence over the working class, to whose social and intellectual advancement he had devoted so much time and energy, was clearly demonstrated, for while strikes and labour riots were going on in the surrounding works, his men worked on, having heard the facts of the case from him, and while the other oil-masters were almost without workmen, during the agricultural harvest season his personal influence was enough to keep his employés at their work.

After the breaking up of the Welsh oil-distilling industry, Mr. Williams went to Sheffield as chemist to the Atlas Iron Works. There he conducted investigations on the manufacture of iron and steel, the effects of impurities in the same, etc. The account of these trials is fully reported by him in his work 'The Chemistry of Iron and Steel Making,' published by Messrs. Chatto and Windus. During some of these experiments he was inconvenienced by his popularity with the workmen, for when he wanted to ascertain the amount of harm done to iron by certain impurities, he could not do so on account of the men using almost superhuman efforts to make a good piece for 'the Doctor,' as they called him.

While at Sheffield, he wrote and published his book 'The

Fuel of the Sun.' It was of this work that some peculiar, though flattering, criticisms were made, for the mathematicians said 'the mathematical part of the theory was correct, but there must be something wrong with the chemistry;' the chemists on the other hand said 'the chemistry was all right, but there must be something wrong with the mathematics.'

In 1870 Mr. Williams moved to the metropolis, where he continued his educational efforts by lecturing at schools. In 1876 he gave what he used to call an object-lesson in geography, when he took a class of his pupils through Norway, an account of which journey is given in his second work on Norway, viz., 'Through Norway with Ladies.' One of the reasons of his coming to London was the failing health of his uncle, the late Mr. Zachariah Watkins, to whose generous aid and judicious encouragement he was greatly indebted in his early struggles for self-education, which he acknowledged in the dedication to Mr. Z. Watkins of the 'Fuel of the Sun.' The two men had been united by the strongest ties of friendship, and the love and respect for each other seem to have been unlimited. For the last twenty years of Mr. Watkins's life they used to dine together on Saturday, and no other engagement for that day was ever made by either of them.

In later years he gave up teaching at schools and almost exclusively devoted his time to scientific writing. His contributions of 'Science Notes' to the 'Gentleman's Magazine,' to 'Hardwicke's Science-Gossip,' 'Knowledge,' 'Iron,' and other English and American scientific magazines, are known to many readers.

His growing family caused him to work hard at his desk, and it is remarkable the amount of matter and the diversity of subjects he wrote upon. It was not until after Mr. Watkins's death, early in 1889, when he was left with an income which freed him from any pecuniary anxieties, that he was able to start, at the age of sixty-nine, the present volume, on a subject that had engaged much of his thought during the whole of his life. Writing in 1889 to Dr. Taylor, the editor of 'Hardwicke's Science-Gossip,' he told him that he could no longer continue his contributions to that journal, as he had to commence his life-work, and that at the age of sixty-nine, and after a battling life. During fifty years he had been collect-

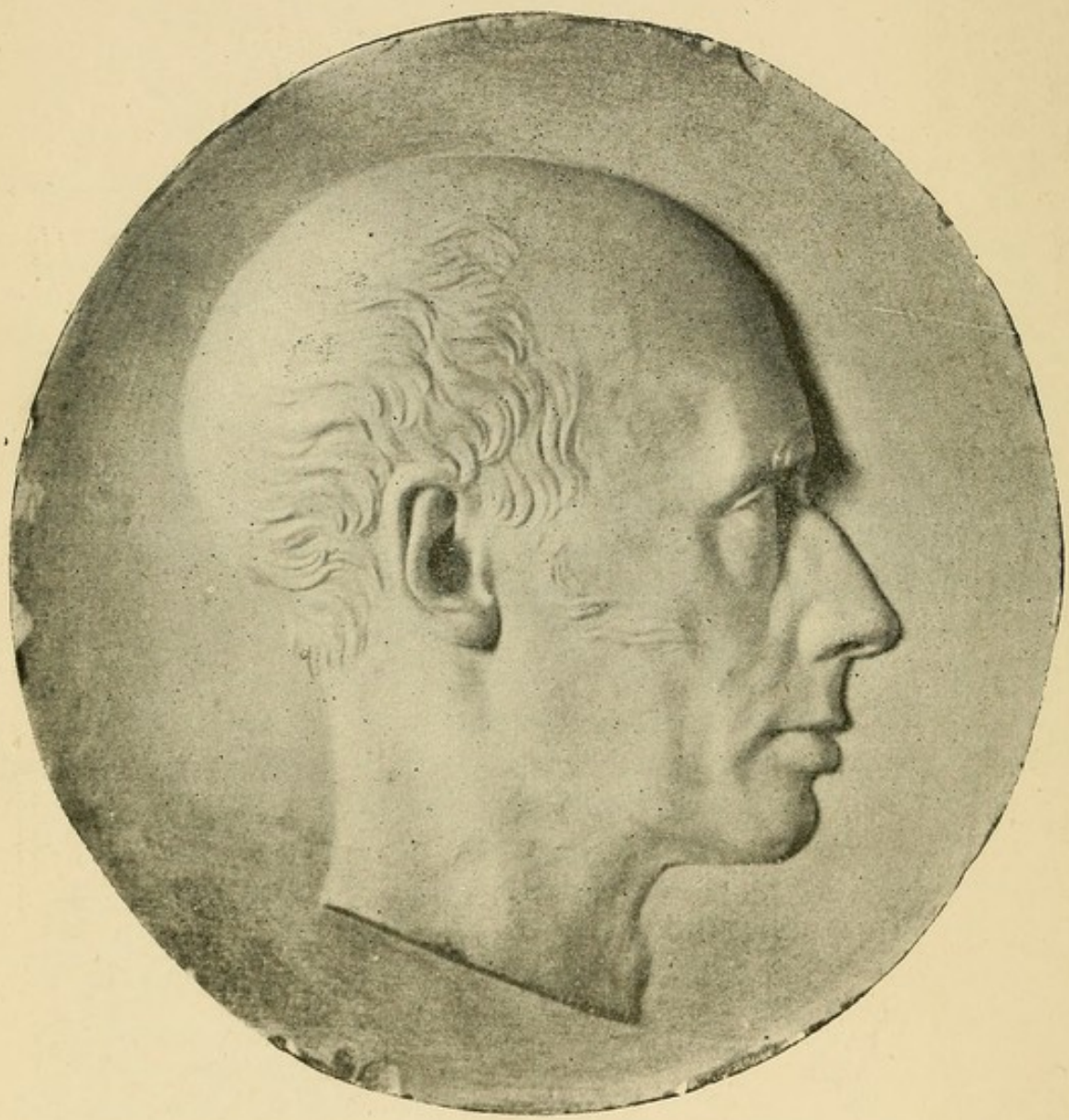
ing material, and on looking over the manuscript we have found parts written so long that the paper is stained with age. He lived long enough to complete the manuscript, and he was reading it through, rewriting some parts, and indexing it, when he died suddenly from cerebral apoplexy on November 28, 1892, at the age of seventy-two. His death is a loss to those who knew him, and to the multitude of those readers familiar with his writings. Mr. Thos. Laurie, writing to his widow, said: 'We have all lost a friend, to whom we were all bound by ties of the highest esteem and affection, and the world has sustained a serious and grave loss. Mr. Williams's position was almost unique, he was the first who swept aside the veil that had been hung up between scientific workers and the reading millions. His clear, truthful, and outlooking intellect at once perceived the vast importance of popularising and spreading a knowledge of the laws by which our physical and social system is created and sustained, and he did this with a perspicacity, untiring diligence, and force, which has earned for him the undying gratitude of millions of his countrymen . . . And all who, like myself, have followed his steps with the love and esteem of disciples, deplore his loss, and will ever hold his memory in respect.'

In presenting this work to the reader I have to beg indulgence for any shortcomings that it may contain on account of its not having had the author's supervision of the proofs, etc.

I must take this opportunity to thank Mr. John Angell for the trouble he has taken in reading through the work and preparing it for publication. Without his valuable assistance I should have despaired of ever bringing it to its present condition. As he had worked for many years with my father, I know any alterations he may have made are such as the author would himself have made.

GEO. COMBE WILLIAMS.

Kew, Surrey.



GEORGE COMBE

A

VINDICATION OF PHRENOLOGY

INTRODUCTION

WHAT IS PHRENOLOGY?

'Dans toutes mes recherches, je me suis proposé le but de trouver les lois de l'organisation et les fonctions du système nerveux en général, et du cerveau en particulier.'—*Gall.*

At the outset of this 'Vindication of Phrenology,' it is absolutely necessary that I define very positively what is this Phrenology that I propose to vindicate.

This necessity is created by the gross misunderstanding of the subject that now so generally prevails, not only among the vulgar, but also, and to about an equal extent, among a shamefully large proportion of the specially learned in the special subjects most intimately connected with it.

A few years ago, when my friend the late R. A. Proctor was lecturing on Astronomy at St. James's Hall, I had occasion to wait for a friend at the entrance, and found myself in the midst of a small outside congregation who were watching the arrival of those who had the privilege of entrance. Among them were two typical specimens of the London costermonger, one apparently a scholar, the other evidently not.

The scholar read the handbill on the door, and when he had completed this exploit the other asked, 'What's on?' The scholar replied, 'A Lecture on Astronomy.' 'What's that?' 'They've got a bloke inside wot reads the stars,' was the learned costermonger's reply.

The general public and the learned people to whom I have

already referred are in a state of mind concerning Phrenology which corresponds with curious fidelity to that of the learned costermonger concerning astronomy. They accept ignorantly and discuss seriously the prevailing popular notion that the phrenologist is 'a bloke wot reads the head.'

So widely diffused is this idea that Phrenology is the art of divining character by head-reading or 'bump-feeling,' that many of my readers may have already assumed from my contemptuous treatment of such delusion that I am about to vindicate some modern substitute for the teachings of Gall, Spurzheim, Vimont, Broussais, Combe, etc., some 'New Phrenology'—some system of cerebral physiology and psychological philosophy based on the muscular convulsions of galvanised monkeys.

I beg to state that my phrenology is the old phrenology of Gall and his scientific followers, the study of which I commenced more than half a century ago and have continued ever since with ever-increasing conviction of the solid truth of the great natural laws it has revealed, and of its pre-eminence as the highest and most important of all the sciences, being the only philosophy of mind that rests upon a strictly inductive basis.

I believe that its general acceptance, its further development and practical application will contribute as much to the moral and social progress of man as the inductive study of the physical sciences has contributed to his physical power and progress; and therefore the best service I can possibly render to my fellow-creatures is to devote the rest of my life to the work of justly reinstating it, of lifting it from the mire into which a combination of bigotry and ignorance, pedantry and quackery, have plunged it—of cleansing it from the foulness due to long contact with these pestiferous agencies, and presenting it pure and undefiled to the contemplation of genuine students of science, in order that they may take up the work of its further evolution.

This phrenology is simply what its name etymologically indicates—*phren*, mind; and *logos*, a discourse: the Science of Mind—but it differs fundamentally from the metaphysics and psychology of the schools. Its basis is the fact that the brain is the organ of the mind, and therefore that mental science must be an exposition of the Functions of the Brain, or, as

Broussais has it, 'La phrénologie est la physiologie du cerveau.'[1]

Gall says in the preface to his latest work ('Sur les Fonctions du Cerveau,' vol. 1, 1822): 'The object of all my researches is to lay the foundation of a philosophy based on the functions of the brain. This philosophy should supply a perfect knowledge of human nature.'

The closing paragraph of the sixth and concluding volume (published in 1825, shortly before his death) tells us that in this philosophy—

> The explanation of the more abstruse phenomena of the moral and intellectual life of man and animals is no longer a game of gratuitous suppositions; the most hidden causes of the differences of character of species, of nations, of sexes, of ages from birth to decrepitude, are made evident; the alienations of the mental functions are no longer subordinated in theory and practice to a vague spiritualism leading to nothing; the mystery of humanity at last becomes known by organology, which composes and decomposes the desires and talents of man fragment by fragment; it fixes our ideas on his destination and the sphere of his activity; it is a fruitful source of most important practical applications in medicine, jurisprudence, morals, education, history, etc.

This is very different from 'bump'-feeling or head-reading; as different as astrological star-reading from modern astronomy.

Phrenology was presented generally to the world by Dr. Gall at the latter part of the last century, and specially to England by his pupil and co-worker, Dr. Spurzheim, in 1815.

While it includes every legitimate means of studying cerebral physiology, its distinctive method, that upon which its most important revelations are founded, is THE STUDY OF THE DEVELOPMENT OF CEREBRAL STRUCTURE IN MAN AND ANIMALS GENERALLY, and THE COMPARISON OF THIS WITH THE EVOLUTION OF MIND.

Incidental to Gall's method of research was a striking physiognomical result. The skull being moulded on the brain, its external form presents a certain degree of correspondence with that of the brain itself. In the human head this correspondence is so close that an expert who is acquainted with

[1] 'Cours de Phrénologie, par J. V. Broussais, Membre de l'Institut, Officier de la Légion d'Honneur, Professeur à la Faculté de Médecine de Paris, Inspecteur, Membre du Conseil de Santé des armées, ex-médecin en chef et premier professeur à l'Hôpital militaire d'instruction du Val-de-Grâce, de l'Académie royale de Médecine, etc.,' 1836.

the general structure of the skull and its inequalities of thickness can, *in normal cases*, determine, within certain limits of approximation, the variations in the development of the cerebral hemispheres by an examination of the skull, or even of the living head. When the excessive or deficient development of any particular region of the brain is great, the consequent modification of the form of the head becomes a very prominent physiognomical feature.[1]

This incidental and superficial outcome of Gall's researches has seriously undermined the sublime edifice of which he laid the broad foundations, and so largely raised the superstructure. The superficiality of the mere excrescence attracted superficial minds, and created a crowd of vulgar superficial disciples, who have become the instructors of an equally superficial set of flippant and pedantic opponents, whose attacks are consequently characterised by profound ignorance of the whole subject which they have presumed to criticise.

Judging from the knowledge of the subject displayed by these gentlemen, the Alma Mater of their phrenological studies must have been an institution similar to that described in the following advertisement cut from the 'Daily Chronicle' of November 5, 1890, and the Professor who 'exclusively engaged' their attention must have been such as he who constitutes the climax of the exclusively engaged performers in this intellectual 'programme.'

ROYAL AQUARIUM.—The PROGRAMME includes:—

ZÆO, the Sensation of the 19th Century. Exclusively engaged.
PAULA, the Reptile Conqueror. Exclusively engaged.
ROCHE'S PACK of 14 WOLVES. Exclusively engaged.
SOLSTONE, the Renowned American Calculator. Exclusively engaged.
HECLAS, in his Sensational Aerial Act. Exclusively engaged.
HESS and LISONT, EXTRAORDINARY SKATERS. Exclusively engaged.
The BEAUTIFUL ASTARTE. Exclusively engaged.
FULLER'S PERPLEXING ILLUSION. Exclusively engaged.
CETA, Remarkable Equilibrist. Exclusively engaged.
Mdme. HATTIE DOWNING, America's Prima Donna. Exclusively engaged.
The SIX SUNBEAMS, Vocalists and Dancers. Exclusively engaged.
The SMALLEST MONKEY PARACHUTIST in the WORLD. Exclusively engaged.
Professor CROSS, PHRENOLOGIST. Exclusively engaged.

[1] This misunderstanding appears to have been increased by the title of the first book that Spurzheim published in this country, The Physiognomical System

I add the following from 'Punch' of September 16, 1887. Gross and outrageous as it appears, it is really no exaggeration. The charlatanism of these poor mountebanks is not a whit more gross, more outrageous or more contemptible than that of the writers and lecturers who attack such wretched fooling, plus other foolery of their own, and ascribe it all to Gall, Spurzheim, and Combe. The mountebanks of the beach are less objectionable: they are not guilty of mendacious libelling.

PHRENOLOGY ON THE BEACH

'PUNCH'

'MOST flourishing institution on the beach is certainly Phrenology. No less than three little platforms, each with a consulting chair, a table, on which stands a meek bust, and a canvas awning overhead, and a row of garden-seats (free) in front. Have long wished to gain insight into this science. Think there certainly is something in it. As a Blazer near me remarks, "Why you'd say cocoa-nuts looked all alike, till you come to see there's differences—and it's the same with 'eds." Cockney tone about this. To find his proper station, I should have to go, I fancy, to Charing Cross, Cannon Street, or Waterloo. Find a Lady-Professor on first platform giving a "delineation" of a live subject—a turnip-headed little boy of three, who sits with his tongue out, under the impression he is at the doctor's. "His self-will is strong," she is announcing in Sibylline accents to his proud parents, "and I should say you would find him very strong-willed. I should check it by curbing his will. Conjugality large, and therefore we may say that he will be fond of his wife and of his home. Self-esteem only moderate. It will be useless to bring up this little boy to any trade or business of a mechanical kind, unless he develops an after-taste for it, which I do not say he may not—far from it. But he has a brain which will fit him for great success in some artistic profession. Give him colours and a brush, and you will see he will immediately commence to paint—likewise draw. Or he has an organ with which he can be a great composer, if you care to develop him that way. Or he would write books or poetry—that would come very easy to him, he would have no difficulty in doing it at all. I think that is all with this subject." Pass on to Professor Podder. Venerable gentleman with dark grey beard, and a certain ponderous playful-

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of Drs. Gall and Spurzheim.' He used the word 'Physiognomical' in its broad German sense, not as used by Lavater, or by ignorant people who confound it with the vulgarism 'phiz,' the face. This is evident from the first words of the book which I have quoted on page 1. The error of title was subsequently corrected by Spurzheim himself, who three years after published practically the same work in Paris, in England and in America under the title of 'Phrenology.'

ness. He has got a subject too—a pretty little impish girl of eight, who is struggling to suppress a fit of the giggles. "This is a thoughtful little one we 'ave here," he says, patting her hair in a fatherly way. "She thinks. Turns over things in her mind. Reflects. Compares. Memory for dates moderate. She will be fond of her home, fond of her parents. She will be capable of passing in an examination—if she takes pains. She finds no difficulty in doing anything that comes easy to her." (*Here the patient giggles.*) "There is one thing I should like to see—a little more Veneration. Where Veneration should be I find a distinct depression. This young lady has a keen sense of the ridiculous. Easily detects what is ridiculous." (*Here the subject breaks into a scream of laughter by way of corroboration.*) "I have done, young lady. Now, we have a nice large audience—I hope some other subject will oblige us by stepping up. We like to see one coming up briskly after another, you know. We don't like to be idle." His eye seems glancing in my direction. Off to hear Professor Skittles. He is a bony, lantern-jawed young man, in velveteen jacket, with a puggaree round his hat. As I come up, he is delineating a lady of portentous plainness, who sits and sniggers with a dreadful bashfulness. "This young lady has a large and powerful brain," he says—"plenty of Wit and Humour, Thoughtfulness and Consideration for Others, Caution, and Memory for Events that impress her strongly. Her Social Brain is large; she is fond of Society, and likes to see others enjoying themselves. Thinks more of others' happiness than her own. We should like to see a little more 'ope." This Professor, I find, enjoys the highest reputation: he measures more, for one thing, and has an Assistant, who enters all the measurements in a ledger, which naturally inspires confidence. The Lady delineator, I also hear, does not think it necessary to measure so much, and is of opinion that Professor Skittles "studies too hard." New subject: quite a typical 'Arry, round back, hock-bottle shoulders, has shambled up, and taken the chair. No forehead nor chin worth mentioning; but, as he removes his hat (which he puts on the bust), a tall crest of yellow hair starts up like a trick wig. Professor measures him solemnly as he sits with a crooked grin. "The measurement of this brain is rather below the average," says the lecturer, forbearingly. "Here we have a brain measuring only eighteen and three-quarter inches. A very tall and narrow head. You would find that this gentleman arrives at his ideas without conscious reflection, or exercise of thought." (*'Arry looks gratified.*) "He takes a strong and deep interest in religious subjects." (*Derisive "Hoo-ror!" from 'Arry.*) "Language strong. He will find no difficulty in putting what he wishes to say into language with considerable fluency, though perhaps not with much variety. Great Firmness and Benevolence. The Moral Brain is large, and your moral standard"—("*My* what?" *interrupts 'Arry, with a suspicious cock of his eye*)—"Your moral standard is high." ("Right!" *says 'Arry, mollified, and séance terminates*). These delineators certainly put things very agreeably. One might get some useful

hints, too. If Professor Skittles could tell me whether I am most poetic, or witty, or dramatic, I should know exactly what to aim at in my Nautical Drama. I have never been able to decide which I love the best—Tennyson, Milton, or Campbell. And, after what he found to say about 'Arry——but it is all so very public, I don't think I *could* bring myself to do it—I will go on . . . I hardly knew exactly how I came here—but here I am on the platform, sitting in the Professor's chair. He is measuring me with a sliding scale, the brass end of which feels cold against my forehead. Curious sensation, as if I was upside down at a Bootmaker's. Sun in my eyes. Tittering from girls on benches in front. A party of Blazers has just come up—I fear in a frivolous spirit. Begin to wish now I had had this done privately.'

The misrepresentations of Gall's great discoveries in cerebral anatomy and physiology began simultaneously with the theological persecution that drove him from Vienna and followed him afterwards. Certain candidates for university appointments in the disposal of which the clergy had influence found it convenient to assert their own orthodoxy by attacking the heretic who dared to promulgate a system of theology and moral philosophy based on the physiology of the brain. Their common trick was to apply to the work of Gall the false name of 'Cranioscopy,' and then perpetrate the further dishonesty of describing his results in accordance with the etymology of this epithet of their own invention.

Thus Rudolphi,[1] after thus applying the epithet, says, 'Cranioscopy has the skull only as the object of its researches,' and 'Cranioscopy has made but a small fortune and merits no more confidence than palmistry.' In reply to this Gall says :—

> My readers know the intention of this cranioscopy talk; it is amusing to observe the obstinacy with which the majority of my adversaries endeavour to reduce all my discoveries on the anatomy of physiology of the brain to a simple cranioscopy. They display by this either their bad faith or their total ignorance of the true object of all my work.

In further exposure of these disgraceful libellers of Gall and Spurzheim, a residuum of whom is still extant in this country, I copy the following, which are Spurzheim's first words in his introduction to the first elementary treatise

[1] 'Grundriss der Physiologie von Karl Asmund Rudolphi.' Berlin, 1823.

published in the English language—that referred to in my note on page 4. He says :—

> This system is commonly considered as one according to which it is possible to discover the particular actions of individuals; it is treated as an art of prognostication. Such, however, is not the aim of our inquiries: we never treat of determinate actions: we consider only the faculties man is endowed with, the organic parts by means of which these faculties are manifested, and the general indications which they present. The object of this new psychological system, therefore, is to examine the structure, the functions and the external indications of the nervous system in general, and of the brain in particular. Thus does this science contribute to the knowledge of human nature.

I might copy similar protestations from the writings of Combe, Vimont, Broussais, and every other scientific phrenologist, but the above are sufficient—in the meantime—to refute the pretensions of the charlatans who pretend to read the characters of *all comers* by a mere examination of their heads, ignoring the obvious fact that character is the product of two factors, viz., the organic constitution of the individual and the circumstances in which he exists and has existed, and that (as I shall show more fully as I proceed) in the majority of cases the circumstances have the most powerful influence.

To further demonstrate the true objects and pretensions of phrenology I add the following translation of the sub-titles of Dr. Gall's last work, 'Sur les Fonctions du Cerveau,' published in Paris, 1822 to 1825, shortly before his death.

Vol. 1, 475 pages.

On the Origin of the Moral Qualities and the Intellectual Faculties of Man, and on the Conditions of their Manifestation.

Vol. 2, 524 pages.

On the Organ of the Moral Qualities and Intellectual Faculties, and on the Plurality of the Cerebral Organs.

Vol. 3, 509 pages.

Influence of the Brain on the Form of the Skull. Difficulties and means of Determining the Qualities and Fundamental Faculties, and the Seat of their Organs.

Vols. 4 and 5, 1,004 pages.

Organology, or Exposition of the Instincts, of the Propensities, of the Sentiments and of the Talents, or of the Fundamental Quali-

ties and Intellectual Faculties of Man and Animals, and of the Seat of their Organs.

Vol. 6, 507 pages.

Critical Review of some Anatomical and Physiological Works, and an Exposition of the New Philosophy of the Moral Qualities and Intellectual Faculties.

The above is a literal translation of the title-pages of the respective volumes of Dr. Gall's own final résumé of his life's-work on the Physiology of the Brain.

The larger work,[1] in which he was assisted by Dr. Spurzheim, includes, in addition to these subjects, a detailed account of the Anatomy of the Brain, Human and Comparative, with special reference to their own great anatomical discoveries.

This simple synopsis of these magnificent works sufficiently indicates the position of those who flippantly and sneeringly describe and discuss phrenology as a system of mere bump-feeling and character-divination ('qui, comme le vulgaire, parlent avec une moqueuse satisfaction, des *bosses*,' etc.).[2] It justifies me in comparing their ignorance both in kind and degree to that of the costermonger who described the astronomer as 'a bloke wot reads the stars.'

There is, however, one element of difference: the ignorance of the costermonger was not combined with pedantic insolence.

[1] 'Anatomie et Physiologie du Système Nerveux en général et du Cerveau en particulier.' Four quarto volumes (1,964 pages) and 1 folio volume of 100 plates, published in Paris, 1810, price 1,000 francs.

[2] Gall, 'Fonctions du Cerveau,' vol. 2, p. 34. On p. 222 of the same volume Gall contemptuously denies the existence of the *bosses des bouffons anti-organologistes*, the 'bumps' of the antiphrenological buffoons.

CHAPTER I

BRAIN AND MIND

As already stated, Phrenology, the science of mind, is based on the assumption that the brain is the organ of the mind. This proposition, that the brain is the organ of the mind, is, therefore, the first that demands our consideration.

When Gall and Spurzheim wrote their first great work, wild and baseless theories still prevailed, even among men of high official scientific standing, concerning 'the seat of the soul,' the residences of the passions, etc. The spleen, the liver, the abdominal viscera, the heart, etc., etc., were credited with intellectual and emotional functions. The pineal gland, being a neat little cone snugly ensconced nearly in the middle of the brain, was selected by some as the seat of the soul.

The founders of phrenology had to seriously and laboriously refute these absurdities, and to show that the brain was something more than a sponge whose function was to attract the humidity of the body, or to temper the heat of the heart.

Gall commenced his lectures at Vienna in 1796, and in 1802 the Austrian Government ordered their cessation, the priests who governed the government regarding his teaching as a dangerous heresy involving a denial of the separate existence of an immortal soul.

Even the philosophers of the period were shocked at his localization of the cerebral functions. Their doctrinal metaphysical soul being one and indivisible, it was deemed sacrilegious to break up the pure entity into different faculties and locate them separately in different parts of the brain.

His devotion to the study of comparative psychology, and his continual reference to the intellectual and moral faculties of animals and their variations, as data in the study of cerebral physiology, was another serious offence. The

following is an example of his manner of treating this subject:—

> My readers, after having seen man so much associated with animals, must be impatient to know what are the moral qualities and intellectual faculties that give to man his immense superiority; what are the qualities and faculties which constitute the essential and distinctive character of humanity.
>
> This question is easily answered by those who still love to believe that animals are mere machines, automatons, deprived of all sentiment, all conscience, all moral and intellectual principle. According to this supposition, man only is furnished with an immaterial substance endowed with will and reason. It is the soul which gives exclusively to man the characteristics of humanity. All further research is thus interdicted as degrading to the dignity of our own species.

It will be easily understood that at the beginning of the century such teaching as this, coupled with keen ridicule of the manner in which the blessed word 'instinct' was made to explain and cover up everything connected with comparative psychology, seriously added to the obloquy induced by his so-called 'materialism.'

Although I need not, at this end of the 19th century, recapitulate the evidences which Gall and Spurzheim so laboriously laid before the world in order to prove that the brain is the organ of the mind, some preliminary explanations and definitions are still desirable.

Some speak of mind as simply signifying intellect, and even limit this signification to the human intellect, as when they discuss the question of 'Mind in Animals,' whether the lower animals possess any mind. I need scarcely add that this is not the sense in which I use the word, or in which it has been used by any scientific phrenologists.

When we say that the brain is the organ of the mind we include all the functions that involve any degree of consciousness.

At the present moment I have a pen in my hand and am writing. I am thinking of the subject on which I write. This of course is an action of the mind. We all agree so far.

But I am also grasping the pen between my thumb and fingers and moving them to shape the letters. In the full phrenological sense of the word 'mind,' these movements are operations involving mental action. The mere grasping of the

pen, though itself mechanical and effected by the mechanical action of the muscles, involves some action of the mind, inasmuch as the muscles obey the mandate of the will. The same applies to every other case of *voluntary* motion of any part of the body.

I feel the resistance of the quill to the pressure I put upon it by my fingers, and I feel the friction of its point upon the paper as I write. I also see the paper and the marks that are made upon it. All these definite sensations are mental operations in the broad sense in which I use the word 'mind.'

Every sensation of which we are definitely conscious is a cerebral action. The stimulus or exciting cause may come from without, but the sensation itself demands for its existence some kind of brain action. If the communication between a limb and the brain is destroyed by cutting or even tying the main nerve trunk, all sensation and *voluntary* motion is destroyed, so far as that limb is concerned. The same of all parts of the body and all the external sense organs.

The brain is more necessary to sensation in any part of the body than is that part of the body itself. Pain is frequently felt in the foot of an amputated leg, or the hand of an amputated arm, and blind men see in dreaming, as we all do, though our eyes are closed.

Further analysis of this act of writing tells us that there is more in it than the actions above described. There is *motive*. I may be writing in order to obtain my daily bread, or in the expectation of fame, or from purely sentimental or philanthropic motives, or from a Donnybrookian desire for controversy. All such desires or sentiments are mental operations in our phrenological sense, and all are manifestations of brain action.

How the brain acts in producing all or either of these mental operations is a profound and absolute mystery. We know that certain conditions, such as free circulation of blood, etc., are necessary for its action, but *how* such a mass of cells, fibres, and blood vessels can generate ideas, sensations, desires, and volitions is a profound mystery, which the phrenologist does not pretend to solve. He only knows the facts, and is absolutely in the dark as to the nature of their origin.

Gall speaks very distinctly on this subject. He says ('Fonctions du Cerveau,' vol. 2, page 28) :—

I have always maintained that we must renounce any attempt to explain the primary causes of any of the phenomena of organic or animal life. I endeavour to determine, not rationally, as some have insinuated, but by the repeated comparison (*rapprochement*) of a great number of facts, the conditions necessary for the production of such and such phenomena in the living organism. The difference between explaining the cause of a phenomenon and indicating the conditions under which it takes place is obvious enough.

The phrenologist is equally ignorant of the essence or nature of mind itself; he only knows its manifestations, as indicated by his own consciousness and the actions of others.

In this respect mental science is in the same condition as physical science. We know that the sun grasps the earth, and the earth grasps the moon, and that earth and moon react on their primaries; that every orb and every particle of the visible universe has a hold on every other, whatever be their dimensions or their distances apart; but we know absolutely nothing of the manner in which this universal grasp of gravitation is communicated through the millions of millions of miles that separate the cosmical particles, or even through the minute distances that separate from each other the things we handle.

We are as ignorant of the essential nature of matter as we are of that of mind. We only know its manifestations, i.e. its action on ourselves, or the effects it produces on our own consciousness. Magnitude, form, hardness, colour, odour, flavour, and the other properties and doings of matter, so far as we know anything about them, are mere sensations. Our knowledge of the existence and the properties of matter is limited by the range of our senses. As I have shown in an essay on this subject,[1] there are fair reasons to conclude that many animals—the lower animals, as we call them—know a great deal concerning the material world of which we are absolutely and necessarily ignorant.

We are in fact in a state of chronic delusion as regards our ordinary sensations. We look skyward and believe that we see a star there, but it is evident that we cannot see that or anything else where we ourselves are not; and in the case of the star it is certainly not where we say we see it. What we do see is the ray of light that left the star long ago, and has been travelling ever since; travelling through space while

[1] *Another World Down Here* ('Science in Short Chapters,' page 39.)

our earth has been rolling and coursing round the sun and flying with him along his greater path.

It is within our brain that the actual vision occurs, but we refer the sensation outwards according to the direction in which the ray was travelling when it entered the eye.

A gun is fired from a fort a mile distant. We see the flash and the smoke, but hear no sound *then*. About four and a half seconds later we hear a report that appears located where we saw the smoke, but we know that no such sound existed there at the time we heard it; it occurred when we did *not* hear it, just before we saw the flash.

The same applies to bodily sensations. We puncture a finger and feel pain. This consciousness appears to reside in the finger, but it really is cerebral, and is referred outwards according to the course of the nerve which communicates the mysterious impulse.

I have already referred to the fact that such sensations may even occur after the amputation of the limb in which they appear to reside.

Even our ordinary acts of muscular volition are commonly associated with delusive consciousness. When we bend our fingers in clenching the fist or making any other such movenent, the work appears to be done *at* the fingers, but such is not the case. The muscles that do this work are situated in the forearm between the wrist and elbow. Everybody knows the position of the biceps muscle and the work that it does when we lift a heavy weight by bending the arm at the elbow, but in spite of such knowledge the effort against gravitation is, according to our irresistible consciousness, made by the hand. In the acts of walking, running, kicking, clenching the jaws, and nearly every other bodily movement, we are similarly misinformed by the associated consciousness.

This out-going or out-reference of our sensations, and consciousness of volition, is a most beneficent illusion. What we require to know for prompt practical conduct is not what is the mechanism or path by which a sensation reaches the brain, but the precise position of the exciting cause; our comfort, and in some cases even the preservation of our lives, depends upon our knowing this instantly. A sudden flinching or withdrawal from a *cause* of injury is what we require to save us from its continuance. If the burnt child felt the

pain within its brain it might cling to the fire bars for protection.

Besides the nerves that communicate with the brain, either by passing directly into the base of the skull, or reaching it by the course of the spinal cord, there is another set which govern the movements that act automatically without our mental consciousness; such as the beating of the heart, the movements of the stomach and intestines that supply vitality to the walls of the viscera and vessels generally. These, sometimes called the *sympathetic system* as distinguished from the *cerebro-spinal system*, lie on each side of the vertebral column. Being more or less independent of the brain, and their healthy functions supplying no mental consciousness, they do not come *directly* within the province of phrenological study.

The italics above should be noted, as this nervous *imperium in imperio* is not endowed with absolute and independent home-rule. It has cords of connection with the spinal cord and brain. Hence the effect of strong emotions on the heart, the stomach and other viscera, and the reaction of dyspepsia on the brain. The nightmare following a heavy supper supplies an interesting physiological study of such interactions.

These and another set of automatic functions known as 'reflex' actions, in which the spinal cord and probably some of the inner or basal portions of the brain most directly connected with it are concerned, constitute a sort of connecting link between the purely vegetative and the truly mental functions of living creatures.

Speaking broadly, i.e. without entering upon minute details, the brain and nervous system generally may be described as composed of two different materials or structures, the 'white' and the 'grey' or 'cineritious' matter. The white is nearly pure white, and fibrous, some say tubular. The grey matter or grey neurine varies in colour, including reddish and brownish tints; is pulpy or jelly-like to the naked eye, but is seen to be cellular and vascular when examined under a good microscope.

Modern physiologists regard the grey matter as the source of power and the white fibres as mere conductors of such power; but Gall and Spurzheim maintained that the grey

matter is the matrix, or, as Cuvier correctly expressed it, '*que la substance grise est l'origine et l'aliment de toutes les fibres nerveuses, et que c'est par son moyen qu'elles se renforcent et se multiplient.*'

When Gall and Spurzheim speak of a phrenological organ they include both the grey and the white matter of that region of the brain in which it is situated, and insist on the principle that the action of both of these together is demanded for the performance of its functions. Spurzheim's own words are, 'Dr. Gall and I suppose that each nervous apparatus is composed of the two peculiar substances, the pulpy and the fibrous, and that both are necessary to produce an instrument adequate to perform a particular function.'

In spite of these explicit statements, the ignorant opponents of Gall and Spurzheim continue to credit them with the assumption that their location of the cerebral functions is limited to the mere cineritious surface of the brain, as in the following from a recent number of the 'Hospital':—

The Phrenologist's 'Coup de Grâce.'—Every dog has his day, and according to Dr. M. A. Starr the phrenologists have had theirs. We confess a lingering affection for the sage-looking little heads marked out in patterns which we see in the windows of these wise men, and recall the modest fee in return for which we received so much information which was amusing, if not valuable. Dr. Starr, in his article in the 'Popular Science Monthly,' says that it is impossible to draw any conclusion from the size or shape of the head as to the extent or surface of the brain, and so as to the mental capacity. It is absurd to judge of the brain surface by either the size of the head or the extent of the superficial irregular surface which is covered by the skull, without taking into consideration the number of folds and the depth of the creases. 'For a little brain with many deep folds may really, when spread out, have a larger surface than a large brain with few shallow folds.'

This subject being of considerable importance, though rather too technical for discussion here, I have stated in Appendix No. 1 of this book some of my reasons for believing that on this fundamental question of cerebral physiology Gall and Spurzheim were right, while their successors have all gone wrong, and will have to turn back and take lessons from the great masters they have so disgracefully ignored.

THE
EVIDENCES OF PHRENOLOGY

CHAPTER II

HISTORICAL EVIDENCE

The primary and just demand of the readers of this Vindication is that it shall present to them the evidences on which Phrenology is founded. It is no easy task to supply such a demand by means of a book, but I will do my best.

The geometrician can demonstrate his science, book-wise, by starting with certain axioms and postulates which we all accept, and then reasoning upon them as the basis of certain propositions which, having proved, he uses as the basis of further reasoning for the proof of other propositions. These again are used in like manner, and thus he proceeds onwards to the limits of the capacity of the geometrical faculties of the human intellect.

The experimental scientist by merely assuming the invariability of natural causation can demonstrate a natural law embracing an infinity of phenomena by merely showing a single experiment, which may be a sample of all corresponding action throughout the universe; or he may describe it in a book, leaving the reader to make the practical demonstration himself.

The metaphysician whose conclusions are based on internal consciousness can reason with his reader so long as he bases his reasoning on mental conditions that are common to both.

But Phrenology, which is a branch of Natural History, a science of observation, demands, like Botany, Geology, etc., practical field-work for its complete demonstration. The student

should go to Nature and observe for himself; books can only tell him where to go, what and how to observe, supplementing this information with descriptions and picture-samples, the accuracy of which he must either reject or accept in pure faith.

If the branch of Natural History is strictly orthodox, and its teacher is a duly ordained professor, there is abounding faith, and the book statements are accepted and used as substitutes for direct observations; but as my subject is not orthodox and I wear neither cap nor gown, a printed record of my own observations and conclusions, or of such other observations and conclusions which I may adopt and recommend for acceptance, is liable to be received with critical scepticism or pedantic derision. I cannot therefore afford to dogmatise, and have no claim upon my readers beyond that which is enforced by a logical exposition of the genuine merits of my subject.

A primary element of evidence is that presented by the manner in which the founder of Phrenology pursued his researches. Was he a dreamer and a theorist, or was he an industrious, patient and reliable observer? Did he well and truly follow the inductive method which has gained such grand results in the physical sciences?

These questions are best answered by presenting to the reader some characteristic examples of his work, in order that a fair judgment may be formed of the manner in which the phrenological localization of the cerebral functions has been determined. The demand for such information is rendered the more imperative from the fact that most of those persons who, in the plenitude of their ignorance, have set themselves up as judges and censors of Phrenology have grossly misrepresented the facts by their flippant allusions to the 'mapping out' of the head by the founders of Phrenology, and thus, either artfully or stupidly, have led their readers into the delusion of supposing that there has existed somewhere—space and time not specified—an ingenious person who has taken up a head or a cast thereof, and has arbitrarily, or according to some preconception, mapped out the subdivisions that are seen upon the ordinary phrenological busts.

Thus, in the 'Gentleman's Magazine' of January 1879, Dr. Andrew Wilson says:—

Now and then in opticians' windows one sees a wondrous china head whose *cubic* capacity is mapped off into *square* inches (*sic*), half-inches, and quarters, of veneration, ideality, comparison, benevolence, and many other qualities of the mind. The contemplation of such a work of art excites within the mind of the ingenuous observer an idea of the literal awfulness of a science which dispenses destructiveness by the inch, and which maps out the bounds of our amativeness by the rule of three.

M. Leuret, physician to the asylum of Bicêtre, states in his book on Insanity (1841) that the limits of the divisions of the brain owe their origin to the vendors of plastic casts.

Now that Phrenology is supposed to be dying, the modern representatives of the animals who in Æsop's fable attacked the sick lion repeat this 'mapping out' insinuation as one of their asinine kicks. My contempt for these insolent carduivora will certainly be shared by all who may be induced by the perusal of the following examples of Gall's mode of working to pursue the subject further.

Francis Joseph Gall was born at Tiefenbrunn, in Suabia, March 9, 1757. His father was a shopkeeper and mayor of the village. His parents were Roman Catholics, and commenced his education with the intention of making him a priest; but, as Dr. Fossati says,[1] 'his natural genius carried him into the country, and into the forests, to make observations on butterflies, insects, birds, and other tribes of the animal kingdom. This spirit of observation was the key that opened to him the way to his future discoveries,' and led him to choose the vocation of a physician in preference to that of a priest. His first step in authorship was made by the publication of the two opening chapters of a work entitled 'Philosophisch-medicinische Untersuchungen über Natur und Kunst im gesunden und kranken Zustande des Menschen' (Vienna, 1791). In 1796 he commenced giving courses of lectures in Vienna, with the result already stated.

During his boyhood he made certain physiognomical observations without having any idea of their origin or signification. They were essentially different from those of Lavater or others to whom we commonly apply the name of physiognomist; they had no connection with facial expression, but appeared at first to be merely curious coincidences. It was not until long afterwards, not until he had become an ana-

[1] Oration pronounced over the tomb of Gall, 27 August, 1828.

tomist, that he had any idea of their dependence upon the conformation of the brain.

The following is his own account of the first of these observations, which I translate from vol. 4, p. 68 of his large quarto work (already cited). It is repeated in 'Les Fonctions du Cerveau,' vol. 5, p. 12 (1823).

> In my ninth year my parents sent me to one of my uncles who was a *curé* in the Black Forest. In order to stimulate my emulation he associated me in my studies with another boy of my own age. I was frequently scolded because I could not learn my lessons as readily as could my fellow-pupil. We afterwards went together to a school at Baden, near to Rastadt. There were about thirty scholars there, and whenever we had any contest in reciting by heart, I always had reason to fear some who, in original composition, only took seventh, or even tenth place. Two of my new schoolfellows even excelled my old comrade in learning by rote. These had large projecting eyes and were nicknamed *bull eyes*. Three years after we went to Bruchsal, and then again some bull-eyed students brought me to grief in contests depending upon learning by heart. Two years later I went to Strasburg, and continued to observe that the students who learned by rote with the greatest facility had large eyes thrust forward (*à fleur de tête*), and some of them displayed in other respects but very mediocre ability.

The reader should understand that at this stage Gall had no idea of any connection between this peculiarity and cerebral development. It was only *after* he had completed the ordinary curriculum of anatomical study that the idea of connecting this protrusion of the eyes with the development of a part of the brain presented itself to his mind, and not until long after that, not until he became an expert in cerebral anatomy, that he proceeded further with his researches in cerebral localization. Referring to this in a retrospective account of these researches, he says:—

> It will doubtless appear singular that it is precisely in reference to this faculty and its organ that my work leaves the most to be desired. But I rely only upon facts. The facts remain immovable, however interpretations of them may be modified.

This last paragraph refers to the difficulty of determining the development of a part of the brain by the protrusion of the eyes. He proceeds to show how in his subsequent anatomical studies he learned that certain convolutions of the brain rest upon the orbit of the eye, and how their abnormal development flattens or even renders concave the ordinary rotundity

which the upper and hinder part of this bony cavity presents to the base of the brain, thus pushing the eye downward and forward; but he also shows that a similar outthrust may be produced by an abnormal development of the fatty cushion behind the eyeball, and how the projection of the eyeball is produced in certain diseases, such as *exophthalmic goitre*, which he describes, though not by this name, which is modern. Also the difficulties presented by varying sizes of the eyeball itself and the protrusion produced by other super and circum-orbital convolutions are discussed in a special chapter, 'Sur les formes de l'œil et sur les causes qui déterminent la diversité de ses formes' ('Fonctions du Cerveau,' vol. 5, p. 5, and vol. 4, p. 64 of the quarto work above cited).

In this, as in every other part of his subject, Gall has refuted by anticipation the sapient objections of his critics, who insolently assume that he and Spurzheim and their pupils require to be taught that the inequalities of the thickness of the skull, of the frontal sinuses, the temporal muscles, etc., etc., interfere with the determination of the shape of the brain by examination of the external form of the head.

I will add one or two more examples of the manner in which Gall obtained the results which have culminated in the so-called 'mapping-out' of the head. The reader should understand that similar histories and similar examples are given in connection with the localization of every faculty. I merely select a few characteristic examples. The following is Gall's history of the discovery of the '*Instinct de la défense de soi-même et de sa propriété; penchant aux rixes; courage* (*Muth, Raufsinn*),' afterwards named *Combativeness* by Spurzheim:—

> I assembled together in my house a certain number of individuals of the lowest classes and of different occupations; I gained their confidence and promoted their candour and loquacity by gifts of money and free supplies of wine and beer. When I had thus brought them into the required state of mind, I induced them to tell me what they knew of each other's character, both of their good and their bad qualities and doings.
>
> Among the varied characteristics which they described, the most prominent, that which had most attracted their attention, was the disposition to quarrel and fight. The most pacific of their comrades were despised as cowards.
>
> The most quarrelsome found great pleasure in narrating to me their exploits, and I was curious to learn whether the heads of these *braves* displayed anything which distinguished them from the poltroons.

I ranged on one side all the *querelleurs*, and on the other all the *pacifiques*, and examined very carefully the heads of both. I found that all the first class had greater breadth of head immediately behind and at the level of the ears than the second. I invited to another séance only the extreme cases of each class, again repeated my researches and found the first results confirmed.

There was no danger here of being deceived by false philosophical theories concerning the origin of our faculties and emotions. The people with whom I was dealing were children of nature unrestrained by education and conventionality, so that their character came out distinctly. Among such people each individual abandons himself without reserve to his inclinations, and thus all his actions bear the direct impress of his organisation, with but little modification by external circumstances.

I thus commenced to presume that the desire for quarrelling might be the function of a particular organ, and therefore endeavoured to find other men recognised as brave, and others recognised as cowards. In the battle with animals (*combat d'animaux*), then still extant in Vienna, was a young champion of extreme intrepidity, who frequently entered the arena to fight alone with furious wild boars or bulls, or any other ferocious animal. I found in him the region already indicated very broad and projecting (*très large et très bombée*). I took a cast of his head and other casts of other champions, in order not to forget the specialities of their conformation. I examined also the heads of some of my own comrades who had been dismissed from their universities on account of their continual quarrels and duels ; one of them especially, who amused himself by frequenting cabarets and chaffing the workmen who came there to drink until they attacked him, when he extinguished the candles and fought with all around, a chair being his favourite weapon. He was a little and apparently weak man, and reminded me of another fellow-student, a Swiss, who at Strasburg amused himself by provoking and fighting with men much bigger and stronger than himself. I visited many schools, and examined the most quarrelsome boys, and also the poltroons, and extended my observations among the families of my acquaintances.

Gall further specifies the case of a pretty young girl who was in the habit of dressing herself as a boy and going out into the street to fight the boys there, and who, even after her marriage, sought every possible occasion of fighting with men ; and another case of a lady of small stature and delicate constitution, who was frequently summoned for thrashing her domestics, both male and female. When stopping at an inn, two drivers (probably in search of servants) entered her room, where she was sleeping alone. She attacked them so vigorously with candlesticks, etc., that they retreated precipitately.

He adds that—

In all these persons I found the part of which I have spoken developed in the manner described, although the forms of their heads differed greatly in other respects.

These observations gave me courage (*m'enhardirent*), and afterwards I began to speak in all my lectures of an organ of courage, as I then called it.

A little later a general died, whose sole reputation was based on his courage and his love of fighting. I found on his skull the same conformation as in the young circus champion.

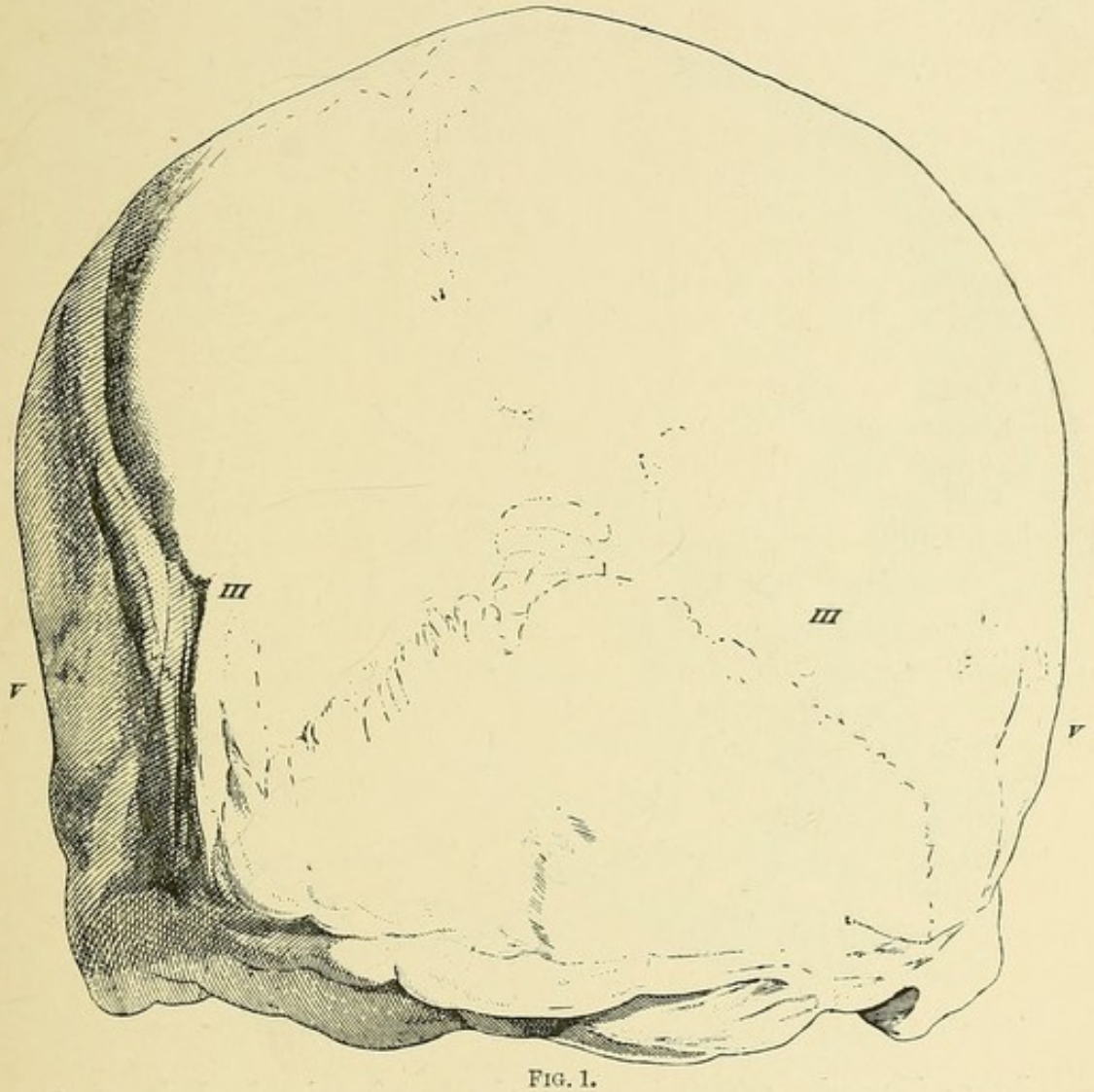


FIG. 1.

This skull is represented in full size in plate 63 of the folio atlas, and is contrasted with that of the poet Alxinger, plate 72, who was so deficient in courage that he was greatly ridiculed for his cowardice.

Figs. 1 and 2 are copies of these. Although the height of the general's skull is less than that of the poet, its width at the part in question is an inch greater.

Then follows, as in the case of every other organ, an essay

on the 'natural history' of the faculty, in which Gall's intimate and extensive knowledge of the habits of all classes of animals is remarkably displayed and made available. This, again, is as usual followed by the pathology or *alienation* of the faculty, and by anatomical details.

I will next take the history of the discovery of the seat of the '*Instinct carnassier; penchant au meurtre,*' which Spurzheim named *Destructiveness*.

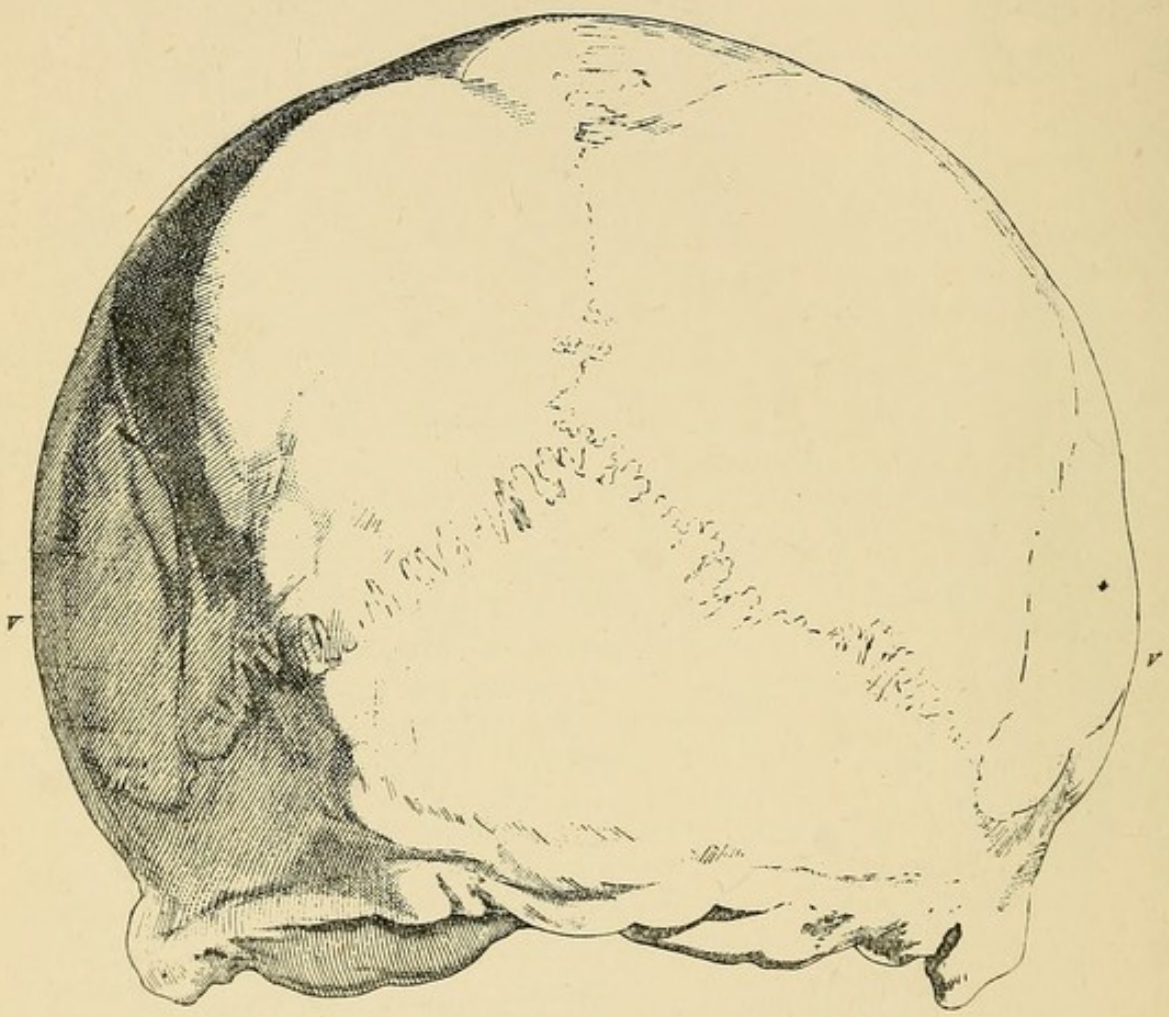


FIG. 2.

In assiduously comparing the skulls of animals I found a characteristic difference between those of herbivora and those of carnivora. I placed specimens of both horizontally on a table, and raising a perpendicular from the external auditory meatus (the opening of the ear) I found that in the herbivora there remained behind this perpendicular only a small portion of the posterior lobes of the cerebellum; consequently the opening of the ear and the petrous portion of the temporal bones (*le rocher des temporaux*) formed in these species the limit of the cerebrum.

On performing the same operation on the skulls of carnivora, I

found that generally the perpendicular cut through nearly the middle of the whole mass of the brain, or at least left a large portion behind it, and that ordinarily the most prominent part of the brain of the carnivora was just above the opening of the ear.

This is shown by the following figures, all copied from

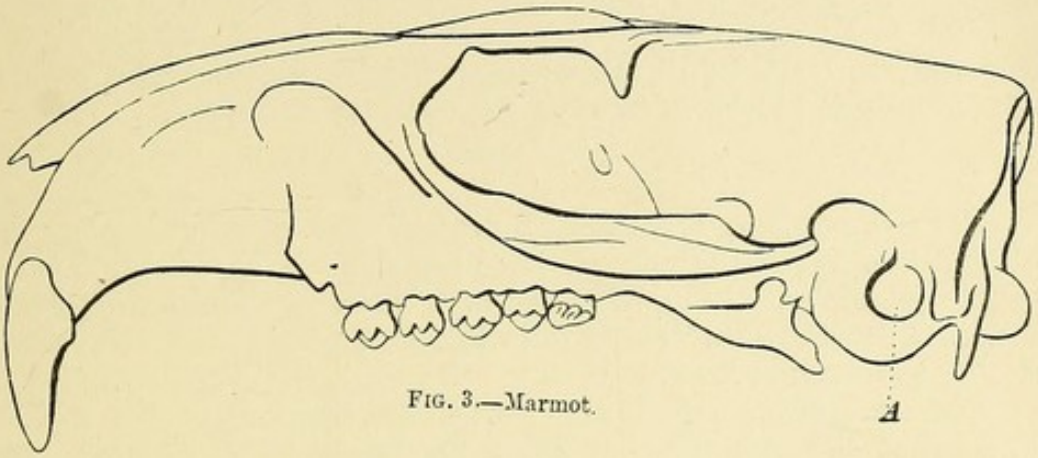


FIG. 3.—Marmot.

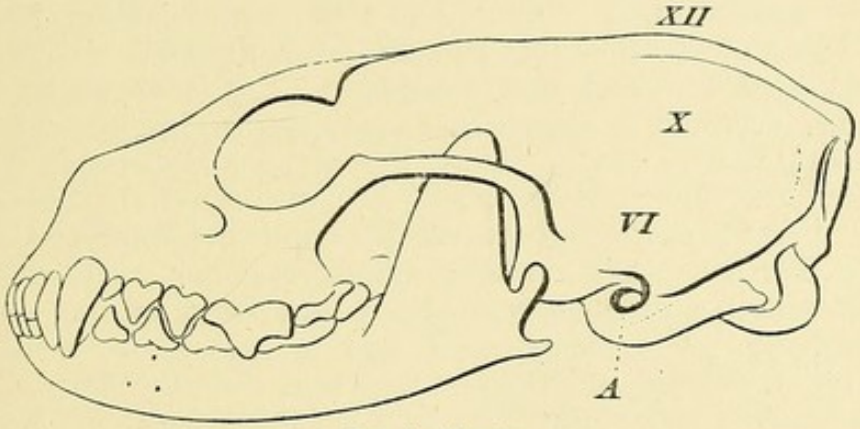


FIG. 4.—Marten.

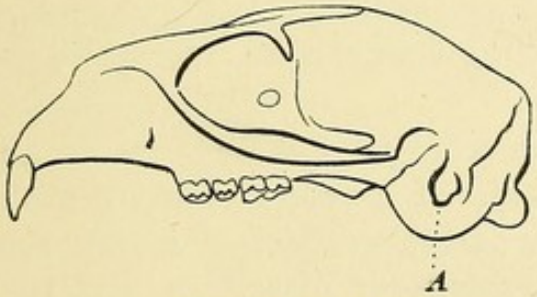


FIG. 5.—Squirrel.



FIG. 6.—Mole.

Gall's folio plate 64. He has about twenty other illustrations of this.

This great difference will be seen and understood by comparing the skull of a rodent marmot, Fig. 3, with that of a carnivorous marten, Fig. 4, also by the difference between a squirrel, Fig. 5, and a mole, Fig. 6. Besides these extremes

of difference, Gall describes and figures many intermediate cases of omnivorous animals, including man and monkeys, showing intermediate structure, and then adds—

I saw then that there exists in the carnivora, above and behind the petrous bone (*le rocher*), portions of brain not existing in the herbivora. I find this difference in birds as well as in the mammalia. In all birds of prey this part of the brain and the skull is protuberant, while in all other species it is shrunken, and the whole of the brain is placed in front of the opening of the ear.

He goes on to say :—

For a long time I contented myself with communicating this observation to my audience without making the least application of it to organology. I showed them only how, by the examination of a skull without teeth, we may tell whether it belongs to a carnivorous or a frugivorous animal.

The skull of a parricide was sent to me, and I set it aside without suspecting that the skulls of homicides could ever be useful to me in my researches ; after this I received the skull of a highway robber who, not content with robbing, had also murdered several persons. I placed these two skulls side by side and examined them frequently, and I was struck with the fact that, though they differed considerably otherwise, both had a remarkable protuberance immediately above the opening of the ear. I found the same protuberance in some other skulls in my collection, and in considering the question of whether this resemblance between two homicides could be the effect of mere chance I was reminded of my observations on the difference of conformation presented by the brain and skulls of the carnivora and frugivora. The carnivora, I said to myself, have the brain excessively developed in the same region as the murderers. Can it be that there is any connection between this part of the brain and the propensity to kill ?

The idea at first appeared to me revolting. But in observing facts and recording the results of my observations I recognise no other law than that of truth.

These observations were accordingly followed up by an extensive examination of the skulls of murderers, many such being available in consequence of the practice of giving the bodies of criminals to medical schools for dissection, and the subsequent preservation of their skulls in anatomical museums.

Gall greedily availed himself of these, and visited gaols, etc., where violent criminals were detained. Besides this he collected a fearful amount of evidence as to the existence of a propensity to kill and torture. These details are too horrible to reprint, but are interesting as illustrating the single-minded perseverance of the remarkable man who collected them, and

his rigid adherence to the principles of inductive science in concluding that the '*Instinct carnassier: penchant au meurtre (Wurgsinn)*' is one of the primitive faculties of man and animals.

The publication of this induction naturally increased the bitterness of the persecution to which he was subjected for his so-called 'materialism.' He was accused of justifying murder.

Subsequently Gall's views of the function of this part of the brain were softened down, and murder was regarded as the abuse or exaggerated action of an otherwise useful and necessary impulse. Spurzheim in his first English work named it *Destructiveness*, and Dr. Weir has subsequently (1840) shown good reasons for regarding its primary function in the human being as the impulse or propensity to *overcome*, and its legitimate application the overcoming of evil of all kinds ('Phrenological Journal,' vol. 13, p. 29), destruction of the evil-doer being one of the means to that end.

It was well for science that Gall left these theoretical considerations to be worked out by his successors, and that he so stubbornly adhered to the facts with which he was acquainted. Had the collections of skulls which he visited and examined contained as many specimens of energetic reformers and philanthropists as of criminals, his generalisation would doubtless have been modified. Had he examined the skull of Martin Luther, for example, he would have found as much of the '*instinct carnassier*' region there as in some murderers, and he might have thus anticipated the modern phrenological conclusion that this part of the brain supplies a most important element of energetic character absolutely necessary in every work of life involving either a physical, moral, or intellectual struggle.

It is curious to note how the idea that destructiveness is a wicked propensity has survived, in spite of all that has been written and spoken by Gall's successors (notably Combe) in elucidation of the primary principle of Phrenology, that we have no propensities or faculties of any kind that are bad or vicious in themselves; that all are useful, and all are necessary to true virtue; that vice is the misuse of these.

Gall, at first, made a similar mistake in concluding that the propensity to steal—'*Penchant au vol (Hang zu stehlen)*'—was an innate elementary instinct. But this error, like every other mistake that he made at first, arose purely from his rigid

adherence to facts, his stubborn refusal to cook or amend or modify his statements of fact in order to fit them to preconceived theories, and his proud defiance of popular prejudice or the dogmas of authority.

I cannot refrain, even at the risk of wearying some of my readers, from quoting some part of his account of the discovery of this organ from the third volume of his large quarto work and vol. 4 of 'Les Fonctions du Cerveau' :—

> The rough subjects that I collected in such large numbers in my house often accused each other of thefts, or, as they called them, *chiperies*. They displayed a special pleasure in pointing out to me the *chipeurs*, who stepped forward, quite proud of their cleverness. What struck me the most was that some of the fellows exhibited a great aversion to theft; they would rather suffer hunger than share the spoil of their comrades' robberies. The *chipeurs* sneered at such outrageous folly.
>
> At another large assembly I divided my visitors into three classes—one the *chipeurs*, one those who held theft in aversion, and a third those who appeared to regard it with indifference. On examining their heads I found that the most inveterate *chipeurs* had an elongated prominence extending from the organ of cunning to the external boundary of the superior arch of the orbit; I found, on the contrary, this region flattened in those who manifested an aversion to theft. Every time I assembled fresh visitors these observations were confirmed. In those who were indifferent this region varied—was sometimes more, sometimes less prominent, but never so prominent as among the avowed thieves.
>
> Could such observations fail to suggest to my mind the idea that the propensity to steal is a natural product of human organisation? All the subjects of my observations were absolutely infants of Nature, left entirely to themselves. They were all uneducated, and therefore one could only regard their actions as the result of their organisation. Those who expressed the strongest aversion to theft were often just those who were the most completely uneducated. To what can we attribute the difference in the conduct of these young people, of whom the wants and the surroundings were the same, and who had under their eyes the same examples?
>
> I was physician to an institution for deaf-mutes. We there received pupils from the age of six to fourteen years without any preliminary education. M. May, a distinguished psychologist, was then director of the establishment. M. Venus, the master, and myself made careful observations on the primary moral condition of the children. Some had a decided propensity to steal; others displayed not the smallest inclination to do so.
>
> The majority of those who committed thefts on entering were cured in the course of about six weeks; there were others who gave much more trouble, and some that were quite incurable. Severe punishments were inflicted on these; they were confined in a sort of house of correction, but it was all in vain.

In all these young people my first observations were confirmed, in a manner the more striking from the fact that their propensity to steal was more active and more invincible. Here, again, education counted nothing; from the moment they entered the institution their wants, their instruction, and the examples before them were the same. I was therefore again forced to conclude that the propensity for theft is not an artificial product, but is natural to certain human beings, is inherent in their organization.

As before, I made casts in plaster of the heads of these determined thieves in order to have under my eyes a greater number of examples for comparison.

At the same time there was in the gaol a boy of fifteen years of age, who from his tender infancy had stolen in spite of the most severe punishments. Recognised as incorrigible, he was condemned to perpetual imprisonment.

A drawing of the skull (full-sized) of this unfortunate victim is shown in Gall's folio atlas, plate 26.

Two citizens of Vienna who had always led an irreproachable life became insane. From that time they displayed an extraordinary propensity to steal. They stole everything that came to hand in the asylum and robbed each other. In both the cerebral region in question was largely developed.

These cases show that men with average intellect may, in a state of mental health, conquer the evil impulse generated by certain organs; but they prove also that the propensity to steal resides in a particular cerebral region; for an impulse which, independently of all others, may become so powerful as to render the individual incapable of resisting the commission of the acts to which it impels must come from a part of the brain independent of the other parts.

These facts induced me to follow up the natural history of the propensity to theft.

This is followed by a chapter on this branch of Natural History, from which I make the following extracts:—

Victor Amadeus, first King of Sardinia, habitually pilfered from all around him trifles of small importance.

Saurin, a pastor of Geneva, though a man of high principle in other respects, continually succumbed to an irresistible propensity to steal. In another case the victim, finding himself from early age a victim to this propensity, entered the army, hoping to be restrained by the severity of military discipline; but continuing to steal, he was condemned to be hanged. Escaping this he studied theology, and became a capuchin. His propensity followed him to the cloister, but as he only stole trifles there, and carried them to his cell, he became understood and tolerated. A government officer in Vienna had a curious mania for stealing kitchen utensils. He hired two rooms in which he stored them, but neither sold nor used them.

The wife of Gaubius, the celebrated physician, had an irresistible

propensity to steal when shopping. The same was the case with the Countesses M—— of Wesel and J—— of Frankfort. Madame de N—— had been brought up with special care, and her brilliant abilities ensured her a distinguished position in society. But neither her education nor her fortune saved her from her desire to steal. Lavater tells of a physician who never visited his patients without stealing something portable. His wife every evening searched his pockets and there found keys, scissors, thimbles, knives, spoons, buckles, etc., which she returned to their owners. Moritz in his 'Magasin pour la Psychologie empirique' describes in detail the history of a thief who, when dying, stole the snuff-box of her confessor. Dr. Bernard, then physician to the King of Bavaria, told us of an Alsatian who was a confirmed thief, although rich and not avaricious. After many severe punishments he was placed in the army by his father. There he continued stealing, and was finally condemned to be hanged. The son of an eminent *savant*, though distinguished by his talents, robbed his parents, brothers, and sisters, his servants, fellow-students, and professors. He was severely punished, and finally placed in the army. The almoner of a regiment of Prussian cuirassiers often stole the handkerchiefs of officers on parade. His general, who esteemed him highly, ordered everything portable to be put out of his reach.

A number of other similar cases are narrated, including the inmates of prisons and lunatic asylums. All that Gall had an opportunity of examining displayed a great development of the part of the brain as described.

After pointing out the universality of theft in all nations and in every stage of human progress, as proved by the elaborate laws enacted for its prevention and punishment, and the multitudes that have been condemned, he adds:—

These facts and these cases of irresistible propensity to steal, and I could add an unlimited number, compel the lovers of truth to admit that there exists an innate propensity to steal. The philosophy that fears the avowal of this conclusion must be silent before the facts that all ages have presented, and which are continually repeated in our own days. All the reproaches that have been hurled against my doctrine on account of my discovery of this desire to steal have not prevented me from speaking of it publicly.

The naturalist must never sink so low as to profane the sanctuary of truth by yielding to fear, or perpetrating conventional hypocrisy.

I have conducted the reader thus far on the road which Nature has opened to myself, but I can easily imagine that in doing so I have caused him to share the painful feelings that I have suffered myself. In all the other qualities of man we may discover a necessary object, and a beneficent institution. Here we behold a natural propensity which stands in direct opposition to social order.

Subsequently Gall discusses the theory, now universally admitted by phrenologists, that this propensity to steal is an abuse of the natural and necessary desire to acquire and accumulate personal property.

I have quoted the above so far in detail in order to show the rigidly inductive character of Gall's method of research. Looking back upon it in the light of subsequent progress, the position taken by Gall in reference to this propensity has an appearance of crudity and narrowness; but when we consider the magnitude of the task in which he was engaged, and the peculiar danger to which he was exposed of fitting his facts to preconceptions, to metaphysical theories, to current codes of morality, to theological dogmas, etc., it will be understood that this stern and obstinate adherence to matters of fact pure and simple was the quality which above all others was demanded in the man who was to lay the foundations of a truly inductive system of moral science, based rigidly and exclusively on the demonstrable physiology of the brain.

The pitiful failure of all other attempts to establish any approach to a reliable fabric of mental science has been mainly due to the continual interference of the *à priori* conceptions of the multitude of mutually contradicting writers on the subject.

The following is from vol. 3 of 'Fonctions du Cerveau,' p. 416 :—

> In comparing with indefatigable perseverance the various forms of heads, I observed that in the heads of most women the superior part of the occiput projected backwards more than in the heads or skulls of men.
>
> This is illustrated by drawings.
>
> As this outthrust of the superior part of the occipital bone is manifestly produced by the brain, it follows that the subjacent part of the brain is, in most cases, more developed in women than in men. The idea therefore was naturally suggested that this part of the brain is the material instrument of some faculty or quality that is manifested more strongly in women than in men.
>
> But what is this quality or faculty?
>
> During many years I formed various opinions concerning this difference of form between the heads of women and men, and successively rejected them all. In conferences with the auditors of my lectures I expressed my embarrassment in reference to this subject. I noticed that the heads of monkeys had a remarkable resemblance to those of women in this respect, and therefore concluded that the part of the brain under this prominence, pro-

bably was the organ of some quality or faculty that both women and monkeys possessed in a high degree. Many times I carefully reviewed all the qualities and faculties that I knew to be possessed by monkeys, and at last, at a moment of favourable state of mind (*de disposition d'esprit favorable*) I was struck in the midst of a lecture with the idea that it might be the love of their offspring that these animals manifest so remarkably. Impatient to compare at once the skulls of male animals in my collection with those of females, I requested my audience to go, and I found that between the male and female animals generally there exists the same difference as between man and woman. This ray of light, this idea, appeared the more plausible from the position of this part of the brain so near to that of the instinct of propagation.

After discussing the philosophy of the subject and the various theories that have been offered in explanation of maternal affection, he describes some of the cases he observed. Thus out of twenty-nine cases of infanticides which he and Spurzheim examined, twenty-five had this part of the brain very feebly developed. As circumstances in some of these cases overpower natural affection, these numbers are such as may be expected.

They found this part of the brain more fully developed in some nations than in others; most remarkably in negresses, among whom infanticide is a crime almost unknown.

Among other cases mentioned by Gall is one of a woman dangerously ill in the Grand Hospital of Vienna, and whose illness was complicated by a peculiar delirium. She maintained that she was about to give birth to six children. On hearing of this Gall asked for her head in case of death. It was sent to him, and he retained it in his collection. The skull is represented life-size in Gall's folio atlas, plate 60, a reduced copy of which is shown here, Fig. 7.

He describes other cases of young maiden ladies who insanely believed themselves to be enceinte, and proclaimed their belief with great exultation. Also of a man who laboured under the same delusion and expected twins. All presented excessive development of this part of the brain.

As a test or *experimentum crucis* he says, 'Let anyone bring to me, immersed in water, the fresh brains of any two adult animals, one male and the other female, and I will in every case distinguish the sexes.' [1]

[1] This immersion in water is rendered necessary by the distortion which occurs when a brain is taken from the skull and placed on any ordinary

The following is Gall's account of his discovery of the organ of imitation :—

One day I was conversing with a friend on the subject of varying forms of heads, when he told me that his own was very peculiar. He directed my hand to the superior-anterior part of his head. I found in this region a considerable protuberance in the form of a segment of a sphere, and behind this a depression, a channel, which on each side descended towards the ear. Up to this time I had never observed a similar conformation. This man had a remarkable talent for imitation. He imitated the bearing, the gestures,

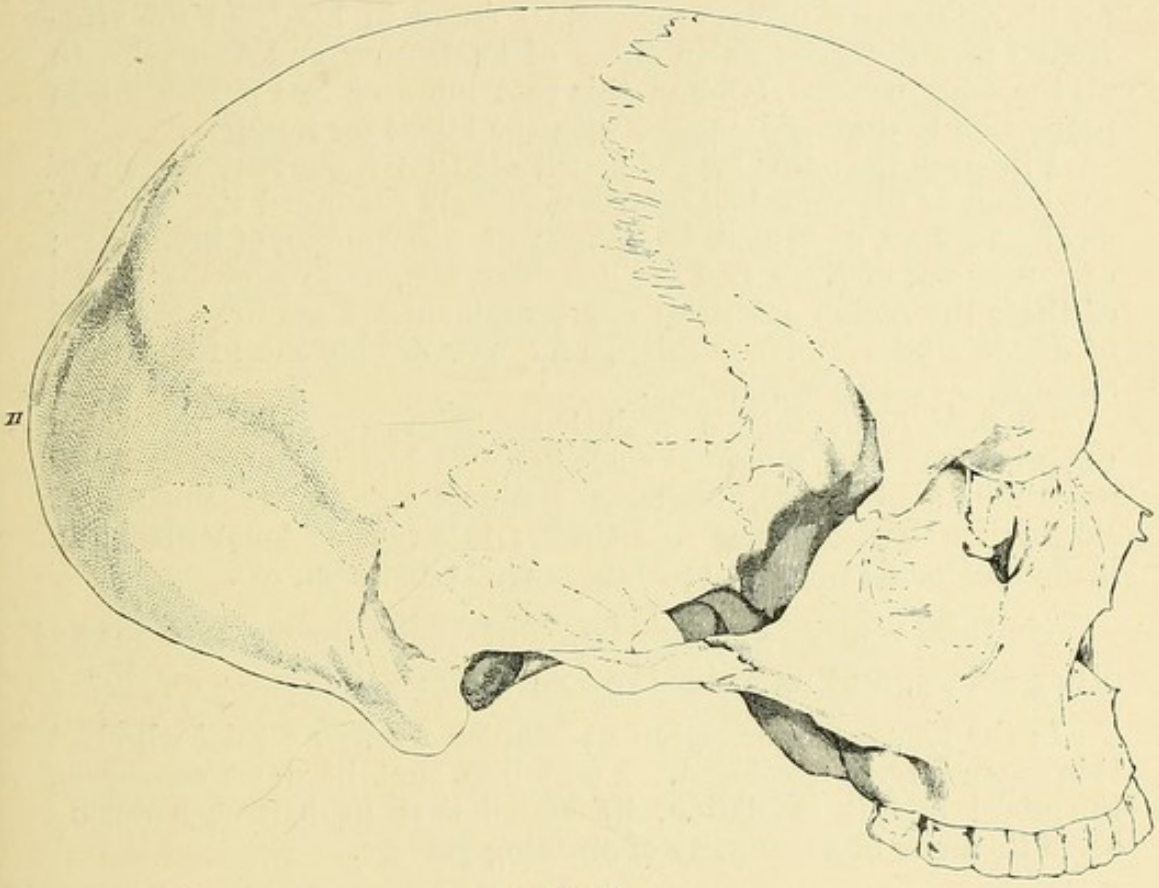


FIG. 7.

the voice, etc., of various people so accurately that it was easy to recognise the person imitated.

I hastened at once (*je courus*) to the institution of deaf-mutes, to examine the head of the pupil Casteigner, who had been only six weeks in the establishment, and had, from the time of his entering, attracted our attention by his marvellous talent for mimicry. One *Mardi gras*, when a little play was performed in the theatre of the establishment, he imitated so perfectly the gestures, the walk, etc., of the director, the inspector, the physician, the surgeon of the

surface in air. It sinks by its own weight, becomes flattened down vertically, and spreads out horizontally to an extent that renders its original form very difficult to determine.

establishment, and above all some women, that it was impossible to mistake them. This exhibition was the more amusing as no part had been assigned to the new comer, and his education had been absolutely neglected previously. To my great astonishment I found the superior-anterior part of the head quite as protuberant as in my friend Annibal.

Can it be, I asked myself, that this talent for mimicry is a fundamental faculty having a special organ ?[1] I therefore sought all possible opportunities for multiplying my observations, I visited families, schools, etc., and examined the heads of those who displayed any remarkable talent for mimicry. At this time M. Marx, secretary to the Minister of War, had obtained a great reputation for his acting at a private theatre. I found in his head the same frontal protuberances as in those of Casteigner and Annibal. In all the other persons I found this part more or less prominent in proportion to their endowment with the talent for mimicry.

I inferred that this faculty constituted an important portion of the talent of the comedian, and accordingly examined the heads of our best actors, of Müler, de Lange ; of Brockmann, of Schraeder ; of Baumann, of Koch and her daughter, etc., and found that in all of these the region described was prominent. I acquired the head of Jünger, poet and comedian, and now use his skull for demonstrating the organ of mimicry.

In subsequent travels with Spurzheim we found the same organisation in all the great comedians we had the opportunity of examining : in Ifland, Madame Bethmann, and Nagelmann at Berlin ; in Ochtenheimer at Leipzig ; in Kruys at Amsterdam ; in Madame Brede at Bremen ; Manteufel, Talma, etc., etc.

He then refers to the portraits of Shakespeare and many other actors, and narrates the following :—

In the House of Correction at Munich we saw a thief who had this organ largely developed. I told him that he was a comedian. Surprised by this revelation, he stated that he had been during some time one of a company of strolling players.

I am tempted to give further examples, as Gall describes in detail the circumstances that led to his discoveries and a number of cases, illustrating all of them by some of the 318 lithographic engravings of his great folio atlas of plates, many of which are life-size.

But I must conclude this section of my subject by taking

[1] To some of us this surprise of Gall may appear strange ; but at this time he had not yet fully emancipated himself from scholastic delusions concerning the primitive faculties of the human mind, the ' attention,' ' perception,' ' association,' ' memory,' etc., of the metaphysical schools. We are at the present day insensibly influenced by his researches, by the popular Phrenology which confirms common sense in demanding special faculties for the actor, the artist, the musician, the poet, the mathematician, etc., etc.

another example, one in which he followed a different method from that described in the preceding. In these, as the reader has seen, he first observed a peculiar conformation of head, and then looked for the peculiarity of mind which accompanied it.

In the case I am about to quote he first inferred the probable existence of a particular faculty, and then selected cases in which the faculty was strongly manifested, and examined the heads of these people to find, if possible, the seat of its cerebral organ.

In Chapter xxvi., vol. 5, of 'Les Fonctions du Cerveau' he says:—

> God and religion have been at all times such objects of importance to man that all that can be said on the subject appears to be exhausted. There are no ideas on these matters, from gross superstition to atheism, that have not been advocated and disputed. According to some philosophers man's terror, excited by the great phenomena of Nature, has created the belief in an all-powerful cause, and thus the doctrine of the existence of a God is the result of human fear, and an artifice of legislators to govern men through such fear, by means of imposture and superstition.

After further statement of such views he adds:—

> Desiring to treat this noble subject as a naturalist and a physiologist I set myself the task of examining whether man, by means of his organization, has been prepared for a belief in an independent intelligence, in God; and for religious sentiments and religious observances.

Then follows a section entitled 'History of the discovery of the Religious Sentiment as a fundamental faculty, and of its organ,' as follows:—

> We were ten children in the house of my father; my brothers, sisters, and myself received the same education, but our faculties and our inclinations were very different. One of my brothers from infancy had a great inclination for devotion. His toys were church vases, which he made himself, chasubles and surplices, which he made of paper. He prayed and said mass continually, and when unable to go to church he occupied himself at home in ornamenting and gilding a wooden crucifix. His father intended him for a merchant, but at the age of twenty-three, having given up all hopes of studying for the church, he ran away from home and became a hermit. Then at my urgent request (*ma prière*) my father allowed him to study, he took orders, and spent the rest of his life in devotion and mortifications.

He then proceeds to describe his observations in schools and colleges which led him to conclude that the great differences of religious sentiment displayed, irrespective of education, must be due to an innate faculty or disposition, and continues :—

> Having arrived at the conclusion, I examined the form of the heads of persons distinguished for their devotion. I visited churches of all sects, and specially observed the heads of those who prayed with the greatest fervour or were the most absorbed in pious contemplation.
>
> I was struck, at first, by the circumstance that the most fervent devotees I had seen were usually bald-headed. Then I asked myself what connection can there be between baldness and devotion? Women are rarely bald, and yet they are the most devoted of devotees. Then I observed that bald-heads were frequently much elevated at the summit of the crown. After a considerable number of further observations I was convinced that the majority of devotees had this conformation of head, and then I visited convents and made observations on the heads of monks, always taking especial care to obtain information as to their moral character. My previous observations were confirmed by these examinations. I made similar researches on the forms of heads of other ecclesiastics, and was especially struck with the difference of conformation among many ex-Jesuits. Those still addicted to devotion had heads greatly elevated at the summit.
>
> I remarked the same conformation in the portraits of saints and ecclesiastics distinguished by their zeal in religious observances.
>
> The ancient artists represented high priests with such elevated heads.

A large number of cases of religious monomania are described. These were patients confined in the asylums visited by Gall for the purpose of studying the conformation of heads accompanying the different forms of mania. He found the region above described very largely developed in all these. Some are very curious, such as that of a young man in whom this was combined with excessive destructiveness. In his delirium he threatened to cut the throats of all who refused to profess the Catholic religion, though he himself was a Protestant.

But I must not enter upon these details, my main object here being to show Gall's mode of proceeding—how Phrenology was built up by its founder on a firm inductive basis—and to refute the insolent mendacity of those who have dared to assert or insinuate that phrenologists have arbitrarily 'map-

ped out' the head in order to produce the result displayed in the works of Combe, etc.

The gradual building up of the now accepted cerebral localization is shown by Gall's minute and detailed history of every discovery he made, and this progressive chronicle is confirmed by the published notes of the auditors of his early lectures. These notes fix certain stages of Gall's progress, and prove beyond the reach of disputation that his localization of the cerebral functions was the progressive result and accumulation of long-continued observations.

The following are some of such early publications, those of which I have been able up to the present time to collect copies or particulars :—

'Exposition of the Doctrine of Gall,' by Froderip (3rd Edition, 1802).

'Quelque chose sur la Physiognomie,' by Martens (Leipzig, 1802).

'Exposition critique de la Doctrine de Gall, avec quelques particularités concernant son Auteur,' by Walther (Zürich, 1802).

'Exposition de la Doctrine de Gall sur le Cerveau et le Crâne, suivie des Remarques de M. Hufeland sur cette Doctrine,' by Bischoff (Berlin, 2nd Edition, 1805).

'La Doctrine de Gall sur les Fonctions du Cerveau,' by Blaede (Dresden, 2nd Edition, 1805).

An article on Gall and his Researches in 'The Medical and Physical Journal,' vol. 4, p. 50 (1800).

Another article in the same Journal, vol. 14, p. 327, by Dr. Arneman (1805).

Another in the March number 1806, vol. 15, p. 201.

Two articles in the July number of 'The Edinburgh Medical and Surgical Journal' (1806).

'Lettre de Charles Villiers à Georges Cuvier sur une nouvelle Théorie du Cerveau par le Docteur Gall' (Metz, 1802, 8vo., pp. 84).

In further refutation of the continually repeated 'mapping out' falsehood, I present the reader with exact copies, on reduced scale, of Gall's own delineations of the stage of cerebral localization which he and Spurzheim had reached in 1810. They are from plates 98, 99, and 100 of the folio atlas of their quarto work already described.

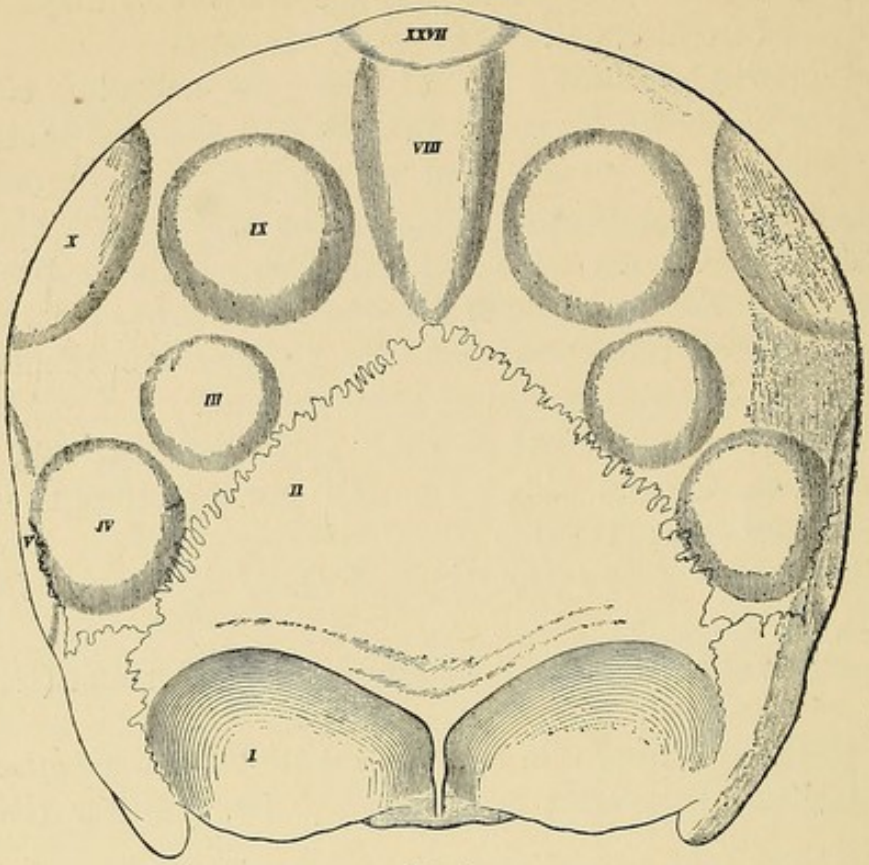

XXVII
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FIG. 8.

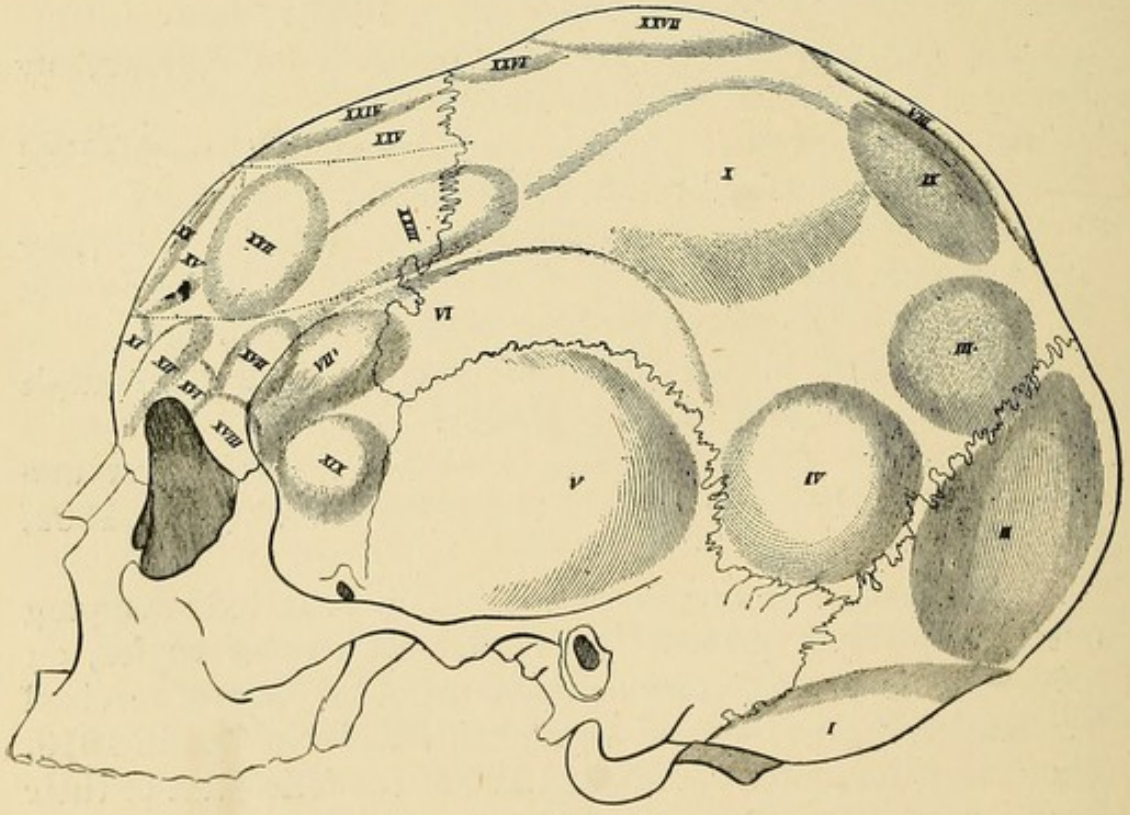

XXVII
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FIG. 9.

In reference to these he makes the following remarks :—

During a long time past I have marked on skulls the form and situation of the organs that I have discovered. Afterwards I began to observe to what extent these localities of the skull corresponded with the subjacent parts of the brain. One may imagine my joy and my astonishment when I found that the forms of each of these external marks were exactly such as must be produced by the development of the brain at the part below them. When the protuberance is the segment of a sphere it covers convolutions that are curved spirally as at the organ of construction. When the external marking is conical or pyramidal, the convolutions below

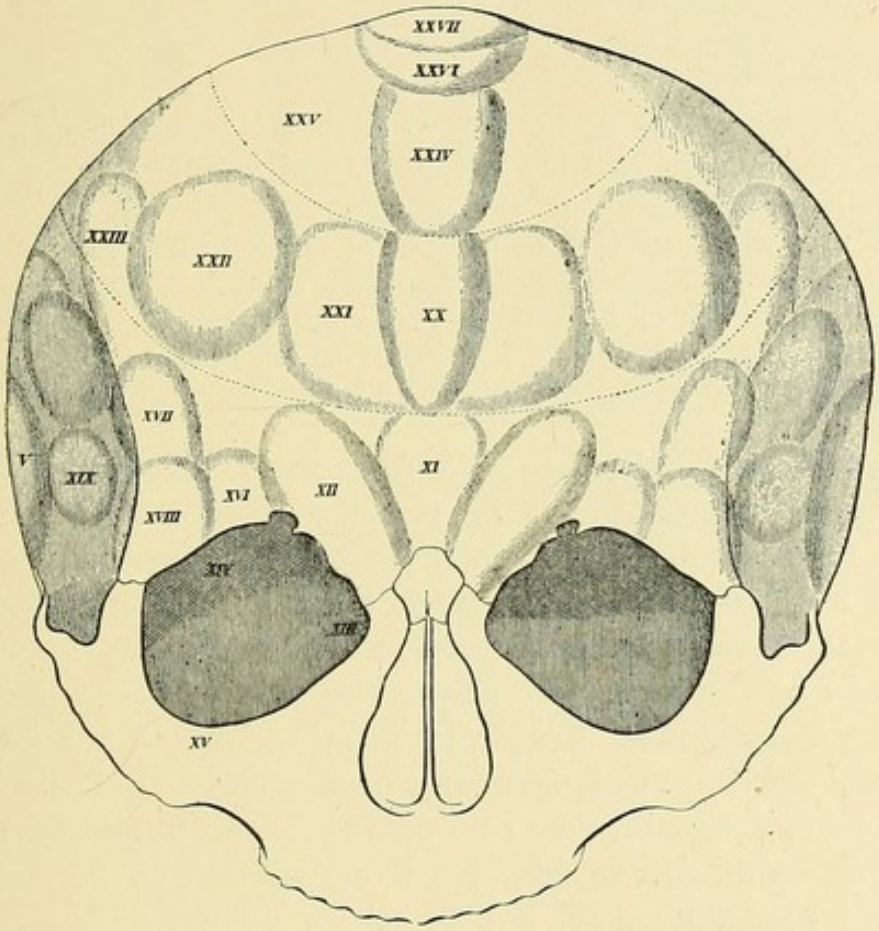


FIG. 10.

wind in conical or pyramidal fashion (*serpentant en cône ou en pyramide*) like the organ of the relation of sounds to which they give birth. Sometimes the external mark is simple, sometimes double, according as the corresponding organs of the two hemispheres are in contact or at a distance from each other. The same occurs relatively to the direction of the organs, whether perpendicular, horizontal, oblique, from front to back, or from above to below.

I will now conclude this Chapter with a few personal particulars concerning the founder of Phrenology. In 'Les Fonctions du Cerveau' Gall says of himself:—

I have spent more than thirty years in accumulating facts, both physiological and pathological, concerning both men and animals. All who have followed our courses of lectures and have read our books are astonished at their immense numbers. I have never stated a physiological proposition without supporting it by a multitude of facts.

Further on he adds :—

I should have filled whole volumes on each organ had I permitted myself to state all the individual cases and experiences upon which the location of each is founded, and that furnished subsequent confirmation of such location.

And in vol. 3, p. 169 :—

I have done that which I call upon my adversaries to do, I have devoted myself entirely to observation, waiting with patience and with resignation the results which it furnished. I have limited my work to the collection of facts, and to note the circumstances under which I observed them. I have carefully restrained my desire to explain these observations, fearing that otherwise I might allow my judgment to be seduced by my own ingenuity, instead of faithfully following the instructions of Nature.

Spurzheim was less severe and more deductive. He had not passed through the same ordeal as that which had confronted Gall on his psychological initiation, and which had taught him to be so extremely cautious. Gall's dread of theorising or hasty generalization was excessive.

He is, so far as I can learn, the only scientist that has denounced reasoning as perfidious. In his 'Fonctions du Cerveau,' vol. 3, p. 206, speaking of his early work, he says: 'Je ne me suis jamais laissé conduire par le raisonnement, ayant appris de bonne heure combien il est perfide, et de combien d'erreurs plausibles il est la source.'

To Spurzheim we are indebted for the introduction of Phrenology to this country. His English works were largely circulated at a time when we were far less versed in continental languages than at present. He was the teacher of both the Combes and the other Scotch phrenologists that have so worthily followed him. In consequence of this, the great merits and remarkable personality of Gall are less known than they should be, and hence I dwell more particularly upon them, and also add the following from a communication to the 'Birmingham Journal' :—

A VISIT TO DR. GALL

Most of us find some amusement in tracing on Fancy's tablet the portrait of a person of whom we have heard much, and particularly after we have read many of the works of an author, but with whom we have had no personal acquaintance. It generally happens, however, that our portrait is not correct when we compare it with the original. Thus it was with myself. I found Dr. Gall (in 1826) to be a man of middle stature, of an outline well proportioned; he was thin and rather pallid, and possessed a capacious head and chest. The peculiar brilliancy of his penetrating eye left an indelible impression. His countenance was remarkable; his features strongly marked and rather large, yet devoid of coarseness. The general impression that a first glance was calculated to convey would be, that Dr. Gall was a man of originality and depth of mind, possessing much urbanity, with some self-esteem and inflexibility of design.

After presenting my letters of introduction to him at seven o'clock in the morning, he showed me into a room, the walls of which were covered with bird-cages, and the floor with dogs, cats, etc. Observing that I was surprised at the number of his companions, he observed, 'All you Englishmen take me for a birdcatcher; I am sure you feel surprised that I am not somewhat differently made to any of you, and that I should employ my time talking to birds. Birds, sir, differ in their dispositions, like men; and if they were but of more consequence, the peculiarities of their characters would have been as well delineated. Do you think,' said he, turning his eyes to two beautiful dogs at his feet which were endeavouring to gain his attention, 'do you think that these little pets possess pride and vanity like man? We will call both these feelings into action,' said he. He then caressed the whelp, and took it into his arms. 'Mark his mother's offended pride,' said he, as she was walking quietly across the chamber to her mat; 'do you think she will come if I call her?' 'Oh yes,' I answered. 'No, not at all.' He made the attempt, but she heeded not the hand she had so earnestly endeavoured to lick but an instant before. 'She will not speak to me to-day,' said the doctor.

He then described to me the peculiarity of many of his birds, and I was astonished to find that he seemed familiar also with their dispositions.

I was delighted with his conversation; he seemed to me to take a wider view in the contemplation of man than any other person with whom I had ever conversed. During breakfast he frequently fed the little suitors, who approached as near as their iron bars would permit. 'You see they all know me,' said he, 'and will feed from my hand, except this blackbird, who must gain his morsel by stealth before he eats it; we will retire an instant, and in our absence he will take the bread.' On our return we found that he had secreted it in a corner of his cage. I mention these otherwise uninteresting anecdotes, to show how much Dr. Gall had studied the peculiarities of the smaller animals.

After our breakfast he showed me his extensive collection, and thus ended my first visit to the greatest moral philosopher that Europe has produced; to a man, than whom few were ever more ridiculed, and few ever pursued their bent more determinately, despite its effects; to a man who alone effected more change in mental philosophy than perhaps any predecessor; to a man who suffered more persecution, and yet possessed more philanthropy, than most philosophers.

Birmingham, Sept. 19, 1828.

Dr. Elliotson says:—

I have seen Dr. Gall, seen much of him, and had repeated conversations with him on phrenological points, and on the history of his discoveries. He lectures in Paris, to a class of above one hundred, at the Athénée Royale. His course consists of sixty or seventy lectures, and he spends several days in dissecting. When at the end of the hour he asks whether he shall proceed, the audience applaud violently, and he often continues two and upwards of three hours. Dr. Gall ranks high in Paris; he is a physician to ten ambassadors—has great practice—is considered a savant—and bears himself, and lives handsomely, like a gentleman.

Gall's head is magnificent; and his countenance, dress, and manner, with the depth, continuousness, liberality, and simplicity of his remarks, show you that you are in company with a profound philosopher—a perfect gentleman—and a most kind-hearted friend. He is perfectly free from affectation or quackery; *pursues truth only, regardless of all consequences; and has sought it at an immense expense, and free from all interested motives. He knows the importance and reality of his discoveries; and though perfectly modest and simple, forms the just estimate of himself that posterity will form, and feels secure of immortality.* I advised him to write some popular work, but he objected; said he had written for the studious only—for those who desired to understand the subject thoroughly; that he had composed a work for posterity, and must leave to others the occupation of writing for loungers. It was delightful to see the good old man every day sitting on his sofa or sitting up in bed (for he was ill at the time), surrounded by his friends, all listening to him, while he spoke knowledge in the most amiable manner, attending to every question, and allowing some more voluble, though not less admiring than the rest, to interrupt him, patiently resuming his arguments when they had finished. He is incessantly meditating and observing; telling them that much remains to be done, and mentioning points upon which he wishes them to make observations, for the purpose of solving various difficulties.

He acquired no mean reputation as a physician, as well as a writer and philosopher; and, independent of the respect shown him by all parties, he realised from his profession a handsome fortune. His skill as a physician may be inferred from the following fact. In the year 1820 a gold medal was presented to him, executed by M. Barre, an eminent artist in

Paris, by order of Count Potosky, a rich Polish nobleman, who took this method of expressing his deep gratitude to Dr. Gall, who had cured him of an old and dangerous malady, for which he had in vain consulted the best medical men in Paris. On one side of the medal is the head of Dr. Gall, an admirable likeness; and on the other is Esculapius, standing at the bedside of the patient, chasing away with one hand the birds of darkness, and crushing a frog, the symbol of ignorance, under his right foot. Behind Esculapius is an altar, with a skull placed upon it, to denote the particular kind of study to which Dr. Gall was devoted.

The following is the testimony of that distinguished German physician and physiologist, Dr. C. W. Hufeland :—

> It is with great pleasure and much interest that I have heard this estimable man himself expound his new doctrine. I am fully convinced that he ought to be regarded as one of the most remarkable phenomena of the eighteenth century, and that his doctrine should be considered as forming one of the boldest and most important steps in the study of the kingdom of Nature.
>
> One must see and hear him to learn to appreciate a man completely exempt from prejudices, from charlatanism, from deception, and from metaphysical reveries. Gifted with a rare spirit of observation, with great penetration, and a sound judgment—identified, as it were, with Nature—becoming her confidant from a constant intercourse with her—he has collected, in the kingdom of organised beings, a multitude of signs and phenomena which nobody had remarked till now, or which had been only superficially observed. He has combined them in an ingenious manner—has discovered the relations which establish analogy between them—has learned their signification—has drawn consequences and established truths, which are so much the more valuable that, being based on experience, they emanate from Nature herself. He ascribes his discoveries solely to the circumstance of his having given himself up ingenuously and without reserve to the study of Nature—following her in all her gradations, from the simplest results of her productive power to the most perfect. It is an error, therefore, to give this doctrine the name of a system, and to judge of it as such. True naturalists are not men to form systems. Their observations would not be sufficiently accurate if they were prompted by a systematic theory, and realities would not square with the various limits of their notions. Hence the doctrine of Gall is not, and cannot be, anything except a combination of instructive natural phenomena, of which a part consists at present only of fragments, and of which he makes known the immediate consequences.

CHAPTER III

GALL'S DIAGNOSIS OF CRIMINALS

The impossibility of expressing on paper the evidences of a science of observation like Phrenology was stated at the beginning of the preceding chapter. As I cannot present to the reader the actual heads of such a multitude of human beings and animals generally as those which Gall observed, I am again compelled to adopt another device for doing approximately that which cannot be done fully.

Dealing with a purely inductive science I cannot do better than follow the teachings of Bacon. He told us that we must first observe isolated facts as they occur, and prepare a history of the phenomena; these observations should not only include the facts that spontaneously offer themselves, but also special facts obtained by selection or experiment. Having carefully examined these, they are to be collated and compared in order to induce, to lead together, the detached or isolated data, and thus to form groups of facts that correspond in such wise that a multitude of facts may be expressed in a single proposition; the result of such induction being a great general fact or natural law.

The examples of Gall's work supplied in the last chapter show how he did this, and how severely he did it, even when it clashed with his own preconceptions, with the idolatries described by Bacon, with the *idola tribus*, with the *idola specus*, with the *idola fori*, and with the *idola theatri*, all of which so formidably confronted Gall, and all of which he treated with such ruthless iconoclasm.

The general facts, the natural laws or inductions of Gall are, that certain parts of the brain perform certain mental functions, and that the energy with which these functions are performed by individuals is, *cæteris paribus* (other conditions equal), proportioned to the size of these parts of the brain.

Bacon demanded that when such a general law is propounded it should be tested by what he called an *experimentum crucis* or *instantia crucis*, a crucial experiment or crucial example.

The force of such experiment or example is greatly increased if it is prophetically performed or selected. As an illustration of this I will take the celebrated *experimentum crucis* of Torricelli.

His metaphysical predecessors knew that if air be pumped out or otherwise removed from any enclosed space, and an opening be subsequently made into that space, the surrounding air will rush into it. They explained this in their customary scholastic fashion by an aphorism:—'Nature abhors a vacuum.'

Torricelli maintained that it was a simple case of inflow due to the pressure of the air outside, and that such pressure is proportionate to the height and consequent weight of the atmosphere. In order to measure this pressure or weight of air, he closed a long tube at one end, filled it with mercury, and then inverted it with its open end downwards and dipping into a cup of mercury. The column of mercury in the tube fell to a height of nearly 30 inches, leaving a vacuous space above, in spite of Nature's abhorrence.

This and other experiments with other liquids led him to the conclusion that the weight of a given column of air was equal to that of a similar column of mercury nearly 30 inches high, or a column of water 13 times higher.

This was disputed, and an *experimentum crucis* was suggested. If the height of the column of mercury was determined by the height and consequent pressure of the atmosphere, that column of mercury should be shortened if the height of the atmosphere above it were diminished. Torricelli predicted accordingly that if his tube were carried up a mountain the mercury would fall proportionately to the height to which it was carried, as in making such an ascent some portion of the air is left below.

It was carried up accordingly, and the prediction of Torricelli was exactly fulfilled.

Gall's inductions admit of a similar test. If his localization of the cerebral functions is correct, and if the particular quality or faculty which he assigns to a particular part of the

brain varies in energy with the development of this region, crucial experiments may be made by taking cases of extreme development and comparing them with conduct; or still more strikingly, by asking the phrenologist to predicate the result of such development, and then ascertaining whether the history of the case accords with such predications.

This has been frequently done, under well-devised conditions, with the most satisfactory results.

But here, perhaps, the reader will refer to other parts of this book and accuse me of inconsistency, seeing that I there said so decidedly that no sound phrenologist pretends to predicate character by mere examination of the heads of people taken at random; the reason for this being, as I stated, that two factors are concerned in the formation of character, viz., organisation and the circumstances of life.

I here repeat this most emphatically, and also repeat that the relative weight or potency of these two factors varies immensely. In some cases organisation overpowers circumstances, in others mere circumstances are all-powerful.

This overwhelming potency of circumstances occurs with people having average cerebral organisation—average heads—and as these constitute the majority of human beings, the ideas, the habits, the general course of life, i.e., the characters, of the majority are determined by their surroundings.

The crucial experiments to which I refer were not made upon such average people, but upon *abnormal* people, such as criminals, monomaniacs, etc., and, moreover, something *was* known of the leading circumstances of the lives of these people, such as the fact of their being in a gaol or in an asylum.

The popular notion that connects Phrenology with the exploits of the professional character-reader is so widely diffused that many of my readers may still suppose that I am preaching a phrenological heresy in repudiating him.

To remove this mistake I quote the following words of the founder of Phrenology from 'Les Fonctions du Cerveau,' vol. 1, p. 309:—

> Birth, social position, education, laws, usages, and religion exert the greatest influence on the occupations, on the mode of action of the organs, and upon the moral character of man. It would therefore be rash to conclude that the actions of an individual respond simply to the predominant features of the cerebral organisation.

When we see the organ of tune and the organs of the mechanical arts greatly developed, we may affirm that the individual has a strong disposition or talent for music or for the mechanical arts, that in his youth he was more successful in these directions than were his fellow-pupils with corresponding opportunities, and that probably in after-life he would occupy himself with these as recreations; but I could not say that he is actually a musician or a mechanician.

If it is a question of propensities capable of leading to injurious actions or violations of law, I abstain from judging, because I admit that sane and reasonable men are in a condition, by the exercise of higher motives and the result of good habits, to govern these propensities, or to employ them in a legitimate manner. For these reasons *I do not examine heads in reference to social affairs*, especially when there is no instruction to be obtained thereby.[1]

What follows leads me directly to the crucial experiments, the *instantiæ crucis*, that I am about to quote as fair evidence. Gall goes on to say :—

In a prison, on the contrary, the risk of error is much smaller. I can there by the inspection of a highly developed organ, the abuse of which has led to crime, pronounce with safety on the nature of the crime. In the first place it is on account of some delinquency that the individual is imprisoned, and secondly we know that man when excited by strong propensities, if he is not restrained by powerful motives, usually abandons himself to his natural inclination. Therefore one has abundant reason to suppose that the delinquency for which he is under punishment is that for which his organisation indicates the most decided disposition. It is true that in some cases the force of circumstances may drive a man to the commission of acts for which he has otherwise no specially strong disposition. We often meet with thieves and murderers in whom the organs impelling to theft or murder have not acquired an extraordinary development. In these cases the malefactor has been influenced by others, or impelled by poverty, by jealousy, by insult, by quarrels, or other unhappy occurrences. We are rarely deceived when dealing with determined malefactors, those who from childhood have manifested their evil dispositions or inclinations. In such the development of the organ is evident. If the features, the gestures, the general bearing, language, etc., indicate defective education, if the rest of the brain is unfavourably organised, it almost invariably happens that the actions are in accordance with the unhappy organisation.

[1] It should be specially remarked that Dr. Gall here repudiates ordinary character-mongering, even more decidedly than I have so far; he repudiates it even where there is a decided predominance of certain cerebral regions. My denunciations have been mainly applied to the monstrous charlatanism of those who pretend to gauge the character of all comers, including of course the average people.

The apologetic tone in which he introduces an account of his visits to the prisons of Berlin and Spandau ('Fonctions du Cerveau,' vol. 6, p. 476) shows that Gall only supplies such an account as supplementary, and in accordance with the above-stated qualifications. He says:—

> The reader will pardon me if independently of the evidence that I have furnished in favour of organology, in treating the special fundamental forces, I state the results of experiments made in the presence of a large number of persons who accompanied us in prisons, etc. I do this from a desire to neglect nothing which may encourage the lovers of science to study the functions of the different parts of the brain.

With the same intent and subject to the same limitations I submit the following to the readers of this book. It is from Nos. 97 to 98 of 'Freimüthige.' It was also reported by M. Demaugeon in his 'Physiologie intellectuelle,' Paris, 1806, and by Chevenix.

> Dr. Gall having manifested a desire to visit the prisons of Berlin, both for the purpose of seeing their interior arrangements and for adding to his experiences by observations on the heads of the prisoners, it was arranged that he should commence on April 17, 1805, in the presence of the directors and superior employés of this establishment (the State prison of Berlin), the inspectors of the criminal deputation, of councillors Thürnage and Schmidt, of assessors Mühlberg and Wunder, of the superior councillor of medical inspection, Welper, of Dr. Flemming, of Professor Wildenow, and several others.
>
> Dr. Gall being instructed concerning the general rules of the establishment, the party proceeded to the criminal prisons and the workshops, where they found about two hundred prisoners, whom Dr. Gall was allowed to examine without being told anything concerning their crimes or their characters.
>
> The greater proportion of the prisoners being thieves, it was to be expected that if Gall's doctrine were true the organ of theft should as a general rule be found predominant among them. This proved to be the case. The heads of all the thieves resembled each other in presenting a width and prominence in that part of the temple where the organ is situated, with a depression above the eyebrows, a retreating forehead, and skull flattened towards the top. These peculiarities were perceptible at a single glance, but the touch rendered still more striking the difference between the forms of the skulls of robbers and of those detained for other causes. The peculiar shape of the head generally characteristic of thieves astonished the party still more when several prisoners were arranged in line; but it was never so strikingly displayed as when, at the request of Gall, all the youths from 12 to 15 years of age who were

imprisoned for theft were collected together; their heads presented so nearly the same configuration that they appeared like offspring of the same stock.

With great ease Dr. Gall distinguished confirmed thieves from those less dangerous, and in every case his diagnosis agreed with the result of the proceedings of their trial. The heads in which the organ of theft was found the most pronounced was that of Columbus, and among the children that of little H., whom Gall advised to be kept in confinement for life as utterly incorrigible. The judicial proceedings showed that both had manifested an extraordinary propensity for theft.

On entering one of the prisons, where all the women excepting one presented a predominance of the organ of theft, and all at the same employment and in the same dress, Gall asked why this exceptional one was there. He was told that she was not a criminal, but an inspectress of the work. In like manner he distinguished others who were imprisoned for other crimes than theft.

Several opportunities occurred of seeing the organ of theft combined with other largely developed organs. In one prisoner it was joined with benevolence and veneration, the latter particularly prominent. This prisoner was questioned, and expressed great horror of thefts accompanied by violence, and manifested strong religious disposition. He was asked which he thought the worse, to ruin a poor workman by taking all he possessed or to steal from a church without harming any one? He replied that it was too revolting to rob a church, and that he could never resolve to do so.

Gall was especially requested to examine the heads of prisoners implicated in the murder of a Jewess which had taken place in the preceding year. In the principal murderer, Marcus Hirsch, he found a head which, besides indicating a low type generally, presented nothing further remarkable excepting great development of the organ of perseverance. His accomplice Jeanette Marcus had an extremely vicious conformation of brain, the organ of theft being greatly developed, also that of destructiveness (then named by Gall the organ of murder). In the female servants Benkendorf and Babette he found great want of circumspection, and in the wife of Marcus Hirsch an insignificant form of head. All this was in perfect accord with the evidence concerning the characters of the prisoners presented at the trial.

He was next shown the prisoner Fritze, suspected of having killed his wife, although he still stoutly denied it. Gall found the organs of secretiveness and firmness largely developed, qualities which his interrogator had found him to manifest in the highest degree.

In the tailor Maschke, arrested for fabricating false money, and whose mechanical genius was shown in the execution of his crime, Gall found, without knowing for what he was imprisoned, the organ of constructiveness (or 'mechanical art') much developed, and a

head so well organised that he several times expressed his sorrow at the fate of the man. The truth is that this Maschke was well known to have combined much kindness of disposition with his great mechanical skill.

On entering another prison Gall at once recognised the great development of 'constructiveness' in a man named Troppe, a shoemaker who, without any apprenticeship, applied himself to making watches and other mechanical objects, and obtained a living thereby. On examining him more closely Gall found the organ of imitation (then called 'pantomime') largely developed; a correct conclusion, seeing that the crime of Troppe was that of having extorted a considerable sum of money by personating the character of an officer of police. Gall stated that he must certainly have amused himself when young by playing tricks of personation, which he acknowledged. When Gall said to the visiting party, 'If this man had fallen among comedians he certainly would have been an actor,' Troppe, astonished at the accuracy of Gall's description of his dispositions, stated that he had been some time (six months) member of a strolling company of actors, a fact that had escaped the judicial interrogatory.

Gall found that the head of the unhappy Heisig, who when drunk stabbed her friend, was of good conformation, excepting that there was a deficiency of 'caution,' or great rashness. He remarked in several other prisoners full development of 'language, colour and number,' in perfect accordance with the manifestations: some of the first spoke several languages; those with large 'colour' were fond of showy clothes, flowers, paintings, etc.; and those with 'number' large displayed facility in mental calculation.

On Saturday, April 20, a party accompanied Dr. Gall to Spandau. Among these were the Privy Councillor Hufeland, the Councillor of the Chamber of Justice, Albrecht, the Privy Councillor Kols, Professor Reich, Dr. Meyer, and many others. Observations were made at the House of Correction on 270 heads, and at the Fortress on 200 heads. The majority of these were thieves who presented more or less exactly the same form of head as that of which the prisons of Berlin had supplied a model. Altogether, the prisons of Berlin and Spandau had thus offered to the researches of Gall a sum total of about 500 thieves, most of them guilty of repeated offences, and in all it was easy to verify the form of skull indicated by Gall as denoting this unhappy propensity, and it was evident from the discourse of the majority of them that they felt no remorse for their crimes, but on the contrary spoke of them with a sort of internal satisfaction.

The morning was spent in examining the House of Correction and its inmates, the most remarkable of whom were submitted in the Hall of Conference to the particular observation of Gall, sometimes one by one, and sometimes in groups. The combination of other organs with that of theft was also noted here.

In the head of Kunisch, a notorious thief who worked as a carpenter in Berlin, and who, with accomplices, had committed

many burglaries, Gall found at first glance the organs of calculation and the mechanical arts (number and constructiveness) very prominent, and although the organ of theft was strongly developed Gall exclaimed, 'Here is an artist, a mathematician, and a good head; it is a pity that he is here;' observations of remarkable accuracy, as Kunisch is so skilful in mechanical work that he has been appointed inspector of the spinning machinery, the repairing of which is entrusted to him. Gall asked him if he could calculate, to which he replied, 'How could I invent or construct a work without having first calculated the details?'

The head of an old woman who was imprisoned a second time for theft presented the organs of theft, of *théosophie* (veneration) and love of offspring very highly developed, especially the last. When Gall asked her the cause of her detention she replied that she had committed theft, but that every day she fell upon her knees to thank God for bringing her to the prison, for she saw in this how many were the miraculous doings of Providence, for she had nothing so much at heart as her children, whom she could not bring up properly; but since her imprisonment they had been taken to the Hospital for Orphans, where they received a good education, such as she had not otherwise the means of giving them.

Deficiency of caution was frequently combined with prominence of the organ of theft. This was the case with the woman Müller, of Sulzburg, whose skull presented a very remarkable prominence of the organ of ambition (love of approbation), which, according to Gall, degenerates into vanity in narrow-minded persons. She denied that she was fond of dress, but her companions insisted that she was very vain, and was careful about nothing but her dress.

In one prisoner the organ of *hauteur, source de l'orgueil* (self-esteem) was united with that of theft. 'Is it not the case,' said Gall to him, 'that you always sought to be first and to distinguish yourself, even when a small boy, and to take the lead in all games?' Albert confessed that it was so, and it is a fact that he is still distinguished by assuming a command over the other prisoners, and by his insubordination. When a soldier he could only be forced to submit to discipline by severe punishment, and now he only escapes one punishment to fall into another.

Here, as at Berlin, Gall distinguished at first glance the prisoners who were not thieves.

Among others brought before him was Regine Doering, an infanticide imprisoned for life. This woman differed from other infanticides in showing no remorse for her crime. Gall at once directed the attention of Dr. Spurzheim to this person, asking him if she had not the same form of head and the same propensity to murder as his gardener at Vienna, Mariandel, whose chief pleasure consisted in killing animals, and whose skull now serves to illustrate the organ of murder in his lectures. This organ was found equally prominent in Regine Doering, and the back part of the head, in the region of philoprogenitiveness, was absolutely flattened. This accords exactly with the character of this criminal, as indi-

cated by the evidence at her trial; she had had several children, and somehow secretly got rid of them, and recently had exposed and murdered one already four years old. She escaped capital punishment because the evidence was vague and incomplete.

One of the company of visitors was a distinguished musician, upon whom Gall had incidentally pointed out one of the forms of development of the organ of music, which consists of a projection above the external angle of the eye. When Kunow appeared before him Gall said, 'Hold! here is the other form in which the organ of music shows itself; it is here, as in Mozart, a pyramidal elevation extending to the upper part of the skull.' Kunow at once acknowledged that he was passionately fond of music, which he had acquired with facility, and the gaol register showed that this prisoner was an amateur who had spent his fortune, and recently proposed to give lessons in music at Berlin. He was imprisoned for criminal sensuality, the propensity for which was visibly indicated to all by the shape of the back part of his head.

After dinner the party went to the Fortress, where the Commandant, Major de Beckendorf, had the prisoners drawn up in line and presented to Dr. Gall. Here, again, the organs of cunning and theft were visibly predominant, and in some cases displayed so strikingly that at a glance the thief could be distinguished from other criminals. Raps, in whom the organ of theft was very conspicuous, was the first to fix the attention of Gall, who found at the same time large organs of *meurtre et de la bonhomie* (destructiveness and benevolence). The justness of these observations was rendered very striking by the fact that Raps, having strangled a woman in order to rob her, turned back before leaving the house in order to loosen the rope from compassion, and thus saved the woman's life.

He afterwards examined young Brunnert, in whom he found large development of the organs of theft, of *cosmognose* (locality), mechanical skill and pride. Brunnert had committed many robberies, and was confined in several prisons, from which he escaped; he was always a wanderer, deserted from the army, and was frequently punished for insubordination, and was now awaiting sentence for rebellion. He was a skilful mechanician, and showed some exquisitely finished works in pasteboard, executed in prison under very unfavourable circumstances.

The organ of calculation was prominent in some cases, and in each was verified by its accompaniment with a corresponding facility for mental arithmetic.

Two peasants, father and son, who were among the thieves, were remarkable by presenting a form of head quite different from the others. Gall examined them and found the organ of pride (*hauteur*) remarkably prominent. He said, 'These two are unwilling to be governed; they wish to be their own masters, or to resist anything like subordination.' It was found on inquiry that the cause of their detention was insolence to their superiors.

An old soldier among the prisoners had the organ of theft very

prominent. It was not, however, for theft, but for insubordination, that he was confined in the Fortress. On further inquiry, however, it was discovered that he had been punished several times previously for theft.

This visit having taken place and having been reported in 1805, the old names of the organs '*vol*,' '*meurtre*,' etc. are used, and in translating I have generally used them. The free use of these two, theft and murder, or *instinct carnassier*, supplies one of the sources of the persecution to which Gall was subjected at this period; but no amount of such persecution, no amount of odium, no preconceptions of his own prevented him from stating plainly, directly and truthfully the results of his researches. In Chapter ii. I have described the history of his discovery of these organs and what followed.

As regards 'destructiveness' I should add that the French word '*meurtre*' is not quite correctly translated by our English word 'murder.' The French word is applied to the act of killing, and does not necessarily imply criminal killing; it includes that most fascinating recreation of people who are called 'sportsmen,' the wholesale or slashing slaughter of 'big game.'

As the reader may desire to see an illustration of the form of head which Gall pointed out to the visitors as characteristic of these criminals, I copy one of his plates where destructiveness is marked 6, acquisitiveness 8, and secretiveness 9.

The following history of this skull, which I translate from vol. 4 of 'Fonctions du Cerveau,' p. 239, is interesting. It illustrates a peculiar form of blindness to which opponents of Phrenology are sometimes liable.

> The physician of the prison of Graetz, in Styria, sent me a case filled with skulls. In unpacking them I was so much struck at the sight of one very large in the anterior temporal region that I exclaimed: 'Mon Dieu, what a skull of a robber!' In the letter of advice sent me by the physician he stated that 'the skull marked xxx. is that of an incorrigible female thief,' but he could not find in it the protuberance that I had designated the organ of theft.

Among the curious cases observed by Gall in prisons were some thieves with large benevolence who distributed the produce of their theft among the poor, and felt such repugnance

to injure individuals that they only robbed churches and other public institutions. In the *Sklavenhaus* prison of Copenhagen he and Spurzheim saw Pierre Michel, an incorrigible and excessively cunning thief, who only stole in order to relieve the poor, and another at Vienna who '*par bonté*' only robbed churches.

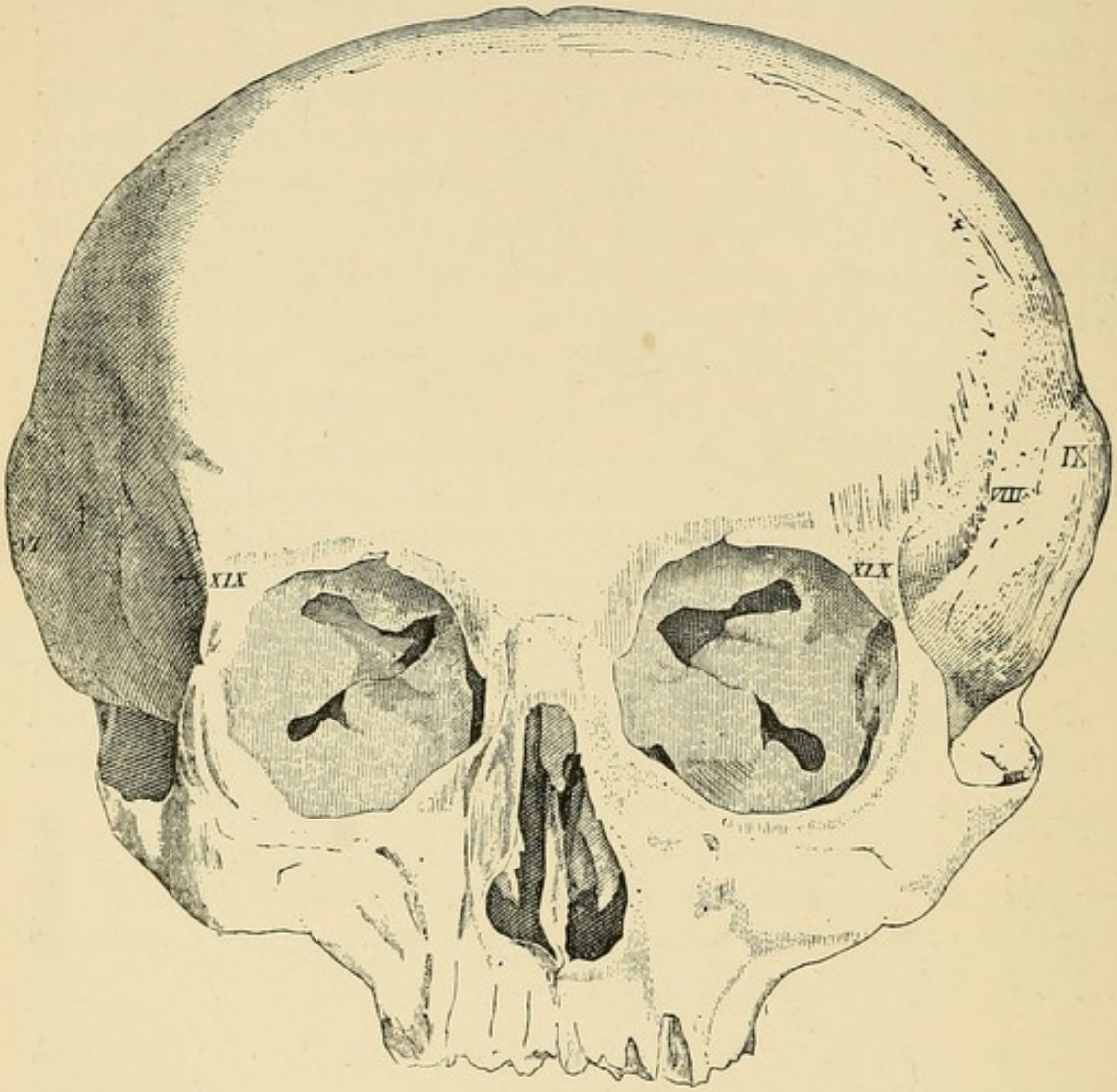


FIG. 11.

At Chaillot Gall saw a young man of weak intellect who had founded several chapels. M. Danécy and others who accompanied Gall were astonished when he pointed out the great development of acquisitiveness ('*sens de la propriété*,' as Gall named it in 1823), as they had only heard of the young man's extreme piety; but on further inquiry they learned that he was a consummate thief, and had even stolen some of

the utensils which he provided for the chapels he founded.[1] Gall adds that 'these modifications are infinitely multiplied, and it is by means of my knowledge of the reciprocal action of the organs one upon another that I have so often astonished those who have accompanied me in my visits to houses of correction.'

[1] Protestant readers should be reminded that the chapels referred to are not separate buildings, but side recesses of a Catholic church, and that the founding here referred to probably means merely the furnishing of such.

CHAPTER IV

VISITS OF PHRENOLOGISTS TO PRISONS AND ASYLUMS

My introductory remarks to the preceding chapter apply equally to this, which supplies a few other similar crucial experiments, but nevertheless I repeat that such evidence as they afford is simply incidental, and introduced here because capable of being described in writing.

In submitting such evidence my position is similar to that of the astronomer who points to Halley's prediction of the return of the comet bearing his name, or to the predictions of Adams and Leverrier which led to the discovery of the planet Neptune, as evidences of the truth of Newton's theory of gravitation.

Such examples are not required by those who are able and willing to follow the reasonings in the 'Principia;' neither are these examples of successful phrenological predictions required by those who are able and willing to read the book of Nature by repeating the observations of Gall and his scientific followers.

The following account of Mr. Combe's visit to Newcastle Gaol on October 28, 1835, was published in the 'Edinburgh Phrenological Journal' of December 1, 1835, with the approbation of all who assisted in the experiment:—

> On Wednesday, October 28, 1835, Mr. Combe, accompanied by the following gentlemen, visited the gaol: viz.
>
> Dr. George Fife, assistant-surgeon to the gaol (who is not a phrenologist),
> Benjamin Sorsbie, Esq., alderman,
> Dr. D. B. White,
> Mr. T. M. Greenhow, surgeon,
> Mr. John Baird, surgeon,
> Mr. George C. Atkinson,
> Mr. Edward Richardson,
> Mr. Thomas Richardson,
> Mr. Wm. Hutton, and
> Captain Hooke.

Mr. Combe mentioned that his chief object was to show to such of the gentlemen present as had attended his lectures in Newcastle the reality of the fact which he had frequently stated, that there was a marked difference between the development of brain in men of virtuous dispositions and its development in decidedly vicious characters, such as criminals usually are; and that the moral organs generally are larger in proportion to the organs of the animal propensities in the former than in the latter; and he requested that a few striking cases of crime might be presented, and that the heads of the criminals should be compared with those of any of the gentlemen present, indiscriminately.

This was done, and Dr. Fife suggested that it would be further desirable that Mr. Combe should write down his own remarks on the cases before any account of them was given, while he himself should, at the other side of the table, write down an account of their characters according to his knowledge of them, and that the two statements should then be compared. Mr. Combe agreed to this request and the following individuals were examined :—

P. S., aged about 20.—*Mr. Combe* wrote as follows : Anterior lobe well developed; intellectual powers are considerable. The organ of imitation is large, also secretiveness; acquisitiveness is rather large. The most defective organ is conscientiousness. Benevolence and veneration are large. The lower animal organs are not inordinate. My inference is, that this boy is not accused of violence; his dispositions are not ferocious, or cruel, or violent; he has a talent for deception, and a desire for property not regulated by justice. His desires may have appeared in swindling and theft. It is most probable that he has swindled; he has the combination which contributes to the talent of an actor.

Dr. Fife's Remarks : A confirmed thief: he has been twice convicted for theft. He has never shown brutality, but he has no sense of honesty. He has frequently attempted to impose on Dr. Fife; he has considerable intellectual talent; he has attended school, and is quick and apt; he has a talent for imitation.

T. S., age 18.—*Mr. Combe* wrote : Destructiveness is very large; combativeness, secretiveness, and acquisitiveness are large; intellectual organs fairly developed; amativeness is large; conscientiousness rather moderate; benevolence is full, and veneration rather large. This boy is considerably different from the last. He is more violent in his dispositions; he has probably been committed for assault connected with women. He has also large secretiveness and acquisitiveness, and may have stolen, although I think it less probable. He has fair intellectual talents, and is an improvable subject.

Dr. Fife's Remarks : Crime, rape [1] . . . No striking features in his general character; mild dispositions; has never shown actual vice.

[1] The particulars not suitable for publication.

J. W., aged 73.—*Mr. Combe's Observations:* The coronal region is very defective; veneration and firmness are best developed; but all are deficient. Cautiousness is enormously large; the organ of combativeness is considerable, and amativeness is large; there are no other leading organs of the propensities inordinate in development; the intellect is very moderate. I would have expected to find this case in a lunatic asylum rather than in a gaol; and I cannot fix upon any particular feature of crime. His moral dispositions generally are very defective; but he has much caution. Except in connection with his amativeness and combativeness, I cannot specify the precise crime of which he has been convicted. Great deficiency of the moral organs is the characteristic feature, which leaves the lower propensities to act without control.

Dr. Fife's Remarks: A thief, void of every principle of honesty; obstinate, insolent, ungrateful for any kindness. In short, one of the most depraved characters with which I have ever been acquainted.

Note by Mr. Combe: I have long maintained that where the moral organs are extremely deficient, as in this case, the individual is a moral lunatic, and ought to be treated as such. Individuals in whom one organ is so large as cautiousness is in this old man, and in whom the regulating organs of the moral sentiments are so deficient, are liable to fall into insanity if strongly excited, owing to the disproportion in their cerebral organs. It is common to meet with such cases in lunatic asylums; and as the criminal law has gone on punishing this individual during a long life (for he has been twice transported) and met with no success in reclaiming him, but left him in gaol under sentence for theft at seventy years of age, I consider these facts as a strong confirmation of my opinion that he ought to have been treated as a moral patient from the first.

I add one more narrative of a similar visit from the 'Phrenological Journal,' vol. 12, p. 261, leaving the editor, Mr. Hewett Cotterel Watson, to speak for himself in introducing it:—

The following notes on the heads of persons confined in the Glasgow Bridewell are copied from the 'Glasgow Argus' of October 29 last (1839); to which newspaper they are communicated in a letter (also copied below) under the signature 'W. W.,' the initials, it is presumed, of Dr. W. Weir. The object of reprinting them here is twofold: first, they are so many confirmations of the phrenological location of the mental faculties; and secondly, the perusal of such reports affords a useful lesson to young phrenologists in the art of mental analysis, or that of suggesting probable traits of character. Let us, however, warn the readers of this journal against the besetting sin of American phrenologists—that of predicting *actions*, which Mr. Barber obviously leans to.

It may also be remarked that the third, fourth, and fifth cases were those of persons rendered notorious through the newspapers, and that Mr. Barber had enjoyed full opportunity to know the

particulars of them, having been some months in this country. We allude to this, solely because a captious objector might deny Dr. Weir's remark, that 'Mr. Barber could not possibly have had' any idea of the persons.

His own word is probably the best evidence that he was ignorant of who or what they were.

To the Editor of the 'Glasgow Argus.'

Sir,—Having lately accompanied Mr. Barber on a visit to the Bridewell of this city, I made a few notes of what occurred during his phrenological examination of the prisoners, which I now hand you for insertion in the 'Argus.' Mr. Barber is a stranger here, having lately arrived from the United States, where he has long resided. He is a medical man, a member of the Royal College of Surgeons, London, and has devoted much attention to Phrenology. He has lectured on that science in various parts of the United States and in Canada, and intends giving a course here in a few weeks. He was pupil and intimate friend of Spurzheim.

The following account will be interesting to all phrenologists, and, as it contains facts only, it cannot offend any of your readers.

I am, &c., W. W.

October 26, 1838.

In examining the younger prisoners from ten to sixteen years of age, it was observed, as a general feature in the shape of their heads, that the *coronal region*, the seat of the moral feelings, was depressed and flat; in many cases it was also narrow; hence the portion of the brain in that division of the head was small. The anterior lobes of the brain, the seat of the intellectual powers, were, in most cases, poorly developed, in some instances approaching to idiocy. At the same time the organs of secretiveness and acquisitiveness were mostly large, or *very* large, the former in several cases being the most largely developed of the two. Conscientiousness and the higher sentiments were generally small. All these boys were uneducated. Some of them could not read, and none of them could write. For the most part they were thieves. In a few cases the theft had been accompanied by housebreaking, but in the youngest boys the crime was generally that of pocket-picking. A few were of the class of coiners or utterers of base money.

The following are a few of the most remarkable instances where the character was predicted from a very short and cursory manipulation of the head by Mr. Barber:—

1. A boy apparently about sixteen years of age. Fine open countenance, but with a somewhat wild and eccentric stare; forehead full, large blue eyes, temperament sanguine, nervous, very little educated, and that little obtained in Bridewell. Mr. Barber said, 'Here are pretty good intellectual powers—moral region, however, is shallow.' Conscientiousness and firmness very deficient;

perceptive organs good, particularly language, which is rather larger; combativeness and destructiveness little above moderate, but acquisitiveness and secretiveness large. This boy is probably a great thief. He will be of rather an obliging disposition, his temper mild, certainly not violent. He will learn easily, and might still improve through good education and moral example. Has probably been confined for theft. This is not a lad who would be likely to commit murder or do any violent action.

Mr. Brebner, the governor of Bridewell, said, 'This boy is clever and obliging, gives us no trouble, learns everything very easily, is a good steady worker, and has been six times confined here for theft. I am very doubtful if he will ever give up his thieving propensities.'

The boy himself said he was determined to behave better in future, that he would work and not steal. He added that he would much rather work at any time than be idle.

2. A girl, apparently about fourteen years of age, intelligent and good-looking, active temperament, principally nervous, with a little of the sanguine. Mr. Barber said, 'Here is a long head, but with a narrow moral region, sloping away at the sides, so as to give the head a *shelving* appearance. Conscientiousness very deficient; secretiveness and acquisitiveness very large, particularly the former; intellectual powers good. This girl will be a most expert thief. She will contrive her schemes well, and execute them well. Whatever she does, good or bad, she will do it cleverly. She will very likely never get better. Her good intellect will only render her more expert at evil practices, and her superior sentiments are so decidedly deficient that little hope can reasonably be entertained of her reformation.

The governor said, 'This girl has been frequently confined for theft. She is very dexterous at cutting away ladies' reticules, picking pockets, etc. She slips silently into shops, and very cunningly picks up whatever she can see around her. She is cunning, and can tell a very plausible story; could impose on most people. Her brother is also a thief. The two lay their schemes together. He picks a quarrel with people on the street, and while they are thus engaged, she dexterously picks their pockets. She is very cunning, clever, and expert.

3. An old man who had murdered his wife, having given her a blow when intoxicated. Mr. Barber, who was accidentally told of his crime, said, 'The brain appears disturbed, perhaps in a diseased state. The higher sentiments are by no means deficient here. Conscientiousness and veneration are very fairly developed, and cautiousness is large. This man will feel great remorse for his crime. He has enough of the *good* in his mental constitution to give himself much uneasiness now. He will be always brooding over his crime, and will very probably, at some future period, show symptoms of insanity.

The governor said, 'His remorse of conscience is very great.

When he came here first, after his trial, he would not believe that he had been sentenced only to be transported. He thinks he will be tried again, and will lose his life. He is always saying in a desponding tone, "They will not let me off." He sometimes appears nearly insane.'

The man himself said he was furious mad when he got drink.

4. A woman, apparently between twenty and thirty years of age. Temperament lymphatic; countenance dull and heavy-looking; intellectual region poorly developed; moral region average; small philoprogenitiveness; large destructiveness; and very large love of approbation. After a few minutes' examination of the case, Mr. Barber said, 'I wish to ask a question about this woman. From the small size of philoprogenitiveness, and large destructiveness, if she should ever have an illegitimate child, I should not be surprised if she were to murder it; at least she might be tempted by circumstances to do so.'

This woman had been tried at Glasgow, and condemned to be executed for throwing her child into the Paisley canal. The sentence was afterwards commuted into imprisonment. It is scarcely necessary to say that Mr. Barber could not possibly have the least idea of such a case being in Bridewell. Indeed, he had just arrived in Glasgow, and his visit to the prison was entirely accidental and unpremeditated.

5. As connected with the subject of this visit, I may mention that, on the same morning, I showed Mr. Barber the cast from the head of the woman Jeffray, lately executed here, merely saying, 'What do you think of this head?' He had never seen it before. After examining it for a minute or two, he said, 'This is a regular criminal head—a decidedly bad head. There is no doubt a good forehead; but it is so deficient in the moral region, and so large in the animal compared with the moral, with large secretiveness and destructiveness, that I certainly think it is the head of a criminal.' I said it was. He added, 'From her cautiousness and large secretiveness, and the other combinations I have mentioned, and since you tell me she is a criminal, then I would say she is probably a *poisoner*.' Jeffray was executed at Glasgow for poisoning a man and a woman. At the time of the execution of this woman, the rumour, as usual, was, that the head had *puzzled the phrenologists* —that benevolence was large, destructiveness small, and so on. This has been said of every noted criminal for many years back. The fact with regard to Jeffray is, that the cast shows such a deficiency of the moral sentiments compared with the lower propensities as we very seldom meet with, even in criminals; and the inference drawn by Mr. Barber is just what would have been made by any experienced phrenologist accustomed to manipulation.

The following, from the 'Bath Herald' of February 13, 1841, may be added to the preceding:—

Wednesday morning Mr. Barber, in company with a magistrate and several other gentlemen, made a visit to this prison (the Bath Gaol). Mr. Barber examined the heads of a number of the prisoners in the presence of the parties before referred to, and of the gaoler and turnkey. We forbear, for obvious reasons, to mention the names of the prisoners; but the gaoler and turnkey were referred to in the cases that will be mentioned, after Mr. Barber's examination of each head. Necessarily a few only are selected :—

No. 1.—Mr. Barber pointed out the large size of acquisitiveness and secretiveness, the small size of conscientiousness, caution and hope; firmness and self-esteem were large. *Inference:* Mr. Barber thought this boy might have been often committed, and was gloomy and desponding in his character—the organisation found in notorious thieves.

Every specification mentioned confirmed by the gaoler and turnkey.

No. 2, aged 12 years.—A large head; active temperament; intellect large. The moral region in this head was fairly developed, but very inferior in size to acquisitiveness, secretiveness and amativeness. Mr. Barber intimated that his plans for theft would be contrived and distinguished by address and cunning, and that the size of his head and intellect would give him a lead in iniquitous practices.

The gaoler stated that he was the leader of a gang of boys, that his skill and cunning were marked, and it was found that he was addicted to other vices connected with his organisation, which had been particularly pointed out by Mr. Barber.

No. 3, aged 10 years.—A superior head to No. 1. A funny character, and capable of being reformed.

His tendency to fun and tricks confirmed by the gaoler.

No. 4.—A fair intellect, good-natured and funny; acquisitiveness large; cautiousness and conscientiousness small; very capable of reformation.

Every particular confirmed by the gaoler and turnkey. Committed for the first time.

No. 5.—Mr. Barber requested to express his opinion of this character as violent, ruthless, sanguinary, and probably incorrigible.

Stated by the gaoler as a most dangerous character, and from whom he should expect personal violence more than any other person in the prison.

Many other heads were examined. It was shown as a general fact, applicable to a large majority of the cases, that the organs of self-esteem and firmness, acquisitiveness and secretiveness were large; conscientiousness and caution, and the reflective organs decidedly small. *In every case examined the gaoler and turnkey confirmed Mr. Barber's opinion*, with the exception of one notorious character, in whom, however, the organ of conscientiousness was small, but whose

career was ascribed by Mr. Barber and two other phrenologists who were present to the dominating influence of circumstances.

Those present at this examination were struck with the importance of Phrenology as furnishing an efficient means for a classification of prisoners, founded on their respective developments; and great regret was expressed that the corrigible and incorrigible, as estimated by palpable differences of organisation, should not be separated from each other. Speaking on grounds of probability, the differences in the above respect were great in several instances, and it appeared that among about thirty individuals, two or three classes might be formed requiring differences of discipline, and especially of association with each other.

Here is an eminently practical example of phrenological examination of criminals [1] :—

When the male convicts, 148 in number, were assembled for transportation on board the ship 'England' in Spring 1826 under the charge of Dr. Thompson, a navy surgeon, Mr. De Ville was induced to go on board and examine the whole gang. The experiment was suggested by Mr. Wardrop, surgeon, of London. Dr. Thompson was not previously acquainted with Phrenology. Mr. De Ville furnished him with a distinct memorandum of the inferred character of each individual convict, and pointed out the manner in which the dispositions of each would probably appear in his general conduct on the passage. The *desperadoes* were all specifically noted and a mode of treatment to prevent mischief suggested. One man in particular was noted as very dangerous, from his energy, ferocity and talent for plots, and profound dissimulation. His name was Robert Hughes.

The history of the voyage is minutely detailed in Dr. Thompson's Journal, deposited in the Victualling Office; and by the politeness of Dr. Weir, of that office, we were, in compliance with our request, not only immediately presented with the Journal, but permitted to take extracts and publish. From different parts of a log of four months we extracted the following:

May 9.—Convicts disposed to be disorderly; read to them my authority to punish, and threatened to act upon it if they did not conduct themselves in a more orderly manner.

May 16.—Same complaint, and difficulty to get them to keep their berths and clothes clean.

May 20.—Punishment by flogging for plundering and violently assaulting each other.

May 30.—Symptoms of mutiny among the convicts.

May 31.—Received a letter from W. E. Taylor, requesting me to send for him as soon as possible, as he had something to communicate privately of the utmost importance. I immediately sent for him, when he informed me that John George Munns had that morning come to him at the hospital very early, before he or the

[1] 'Phrenological Journal,' vol. 4, p. 468.

other convicts were out of bed, and told him privately that there was a conspiracy formed to murder him (W. E. T.) to prevent his giving any alarm, and then to murder me and all who would not assist them to secure the ship and run her into South America. That ROBERT HUGHES and Thomas Jones were at the head of it, and it was their intention to carry it into effect the first time the ship was in a squall. In consequence of this information the following memorandum was given by me to W. E. T. in the form of a protection to be shown to such men as he could trust. *Mem.*—'Dr. Thompson will thank W. E. Taylor and other well-disposed men to be on their guard, and, if possible, to get such evidence as will enable Dr. T. to act against the malcontents. Dr. T. promises protection and his best services with the Governor of New South Wales to such men as may appear to him to deserve it.' Some of the soldiers had heard in prison what induced them to expect soon to be employed against the convicts. This they reported to Dr. Thompson.

June 1.—Hughes, for assaulting Daniel Dean, was secured and double-ironed under a sentry. Munns applied for protection from being strangled or assassinated, as was threatened. He gave the names of those principally concerned: Robert Hughes (always the first), Thomas Jones, William Brown, James Hawkes, and James Norman. Jones gave himself up, observing he was not the first bullock that had been sold, and hoped that he would have a fair trial. He was double-ironed and handcuffed. Brown, Hawkes and Norman were all handcuffed and placed under the sentries. Other arrangements followed for safety. Crew armed with cutlasses, etc.

September 29.—Landed at Sydney. Court of inquiry.

The evidence at the trial showed that 'the facts of the conspiracy and the depravity of the intended murderers were proved beyond all doubt, and that the share each person had in the matter was in very close accordance with the notandum of character affixed to each name by Mr. De Ville. Hughes was especially marked by him as a person capable of ruthless murder and deep-laid plots.'

Extract from a letter of G. Thompson, Esq., Surgeon of the Ship 'England,' to James Wardrop, Esq.

Sydney, October 9, 1826.

I have to thank you for your introduction to Mr. De Ville and Phrenology, which I am now convinced has a foundation in truth, and beg you will be kind enough to call on Dr. Burnett, whom I have requested to show you my journal, at the end of which is Mr. De Ville's report, and my report of conduct during the voyage; and likewise to the deposition against some of the convicts, who you, with your usual *tactus eruditus*, discovered would give me some trouble during the voyage, and I think the perusal will make you laugh, as they were going to rip up the poor doctor like a pig. De Ville is right in every case except one, Thomas Jones; but this man can neither read nor write, and being a sailor, he was induced to

join the conspiracy to rise and seize the ship, and carry her to South America, being informed by Hughes, the ringleader, that he would then get his liberty.[1] Observe how De Ville has hit the real character of Hughes, and I will be grateful to De Ville all my life; for his report enabled me to shut up in close custody the malcontents, and arrive not a head minus, which, without the report, it is more than probable I would have been.

All the authorities here have become Phrenologists, and I cannot get my journals out of their offices until they have perused and re-perused De Ville's report.

Another set of crucial instances is afforded by monomaniacs. One of the results of phrenological research has been to show that when a particular region of the brain is inordinately developed the result may be genius, crime, or monomania, according to the part of the brain in question and the constitution and surroundings of the individual.

The reader should understand that there is a great difference between monomania and general insanity (general mania, or general dementia). The latter is due to general disease or decay of the brain, while monomania is due to disease of a special region.

In an asylum we see many poor creatures walking about looking on the ground, or vacantly forwards or upwards, who are incapable of giving rational replies to questions, or originating any rational discourse. Their physical health may be feeble or moderately robust, while others display wild incoherent general excitement, either continuous or periodical. These are cases of general cerebral disease.

Besides these there is another very different class; men and women who appear quite rational, who often suggest to the uninitiated visitor that they are cruelly imprisoned. He may talk with them for a few minutes or for an hour or more without detecting any mental aberration, but when a particular subject is started they betray their condition.

A typical case is narrated of a man under judicial examination as a lunatic who baffled all the efforts of the judge to discover his insanity, when the counsel suggested a further examination on the following Friday at 2 P.M. The judges

[1] There is another probable reason for the greater influence of Hughes upon Jones as a fellow-conspirator. Their names indicate that both were Welshmen, and if so they could communicate safely in a tongue unknown to those around them.

ruled accordingly, when the subject of inquiry earnestly pleaded for some other day, 'any day but Friday.' On this being refused he explained the impossibility of his attendance, as he had a sacred engagement to dine with the Virgin Mary every Friday at that hour.

It is evident that if the phrenological localization of the organs of the mental faculties is correct, and its simple explanation of this long-standing puzzle is sound, a competent phrenologist should be able to give a fairly approximate indication of the nature or class of delusion in decided cases of monomania, or at least in a large majority of such cases; that is, with the exception of cases where local injury has produced the partial insanity.

Here again I must protest against confounding such tests with the random examination of the heads *of all comers;* for the monomaniac has an abnormal development, overpowering the influence of ordinary circumstances, and the phrenologist finding the patient in an asylum and knowing him to be a monomaniac has the preliminary indications which I insist upon as necessary for the determination of character by examination of the head.

Mr. Combe's Visit to the Newcastle Lunatic Asylum.

(*From the 'Edinburgh Phrenological Journal,'* vol. 9, p. 520.)

Mr. Combe inspected the asylum on October 16, 1835, and was permitted to examine the heads of a few of the pauper patients: the higher classes of patients are never seen but by their friends. In the following cases the form of insanity appeared clearly related to the predominance of certain organs in the brain. The remarks were furnished by Mr. Mackintosh (the surgeon superintendent), *and were written down before Mr. Combe's arrival.*

Men.

R. W.—Mr. Combe pointed out that the intellectual organs are small, and that *Self-esteem* and *Love of Approbation* are greatly predominant.

Remarks by Mr. Mackintosh: 'Monomania, religious—ruling hallucination, he is Christ.'

J. N.—*Mr. Combe:* The animal organs are large; *Cautiousness and Destructiveness* are predominant Hope small, and coronal region in general flat and deficient.

Remarks by Mr. Mackintosh: 'Suicidal[1]—great misery—hypochondriacal fancies predominate—a bad character.'

J. M.—*Mr. Combe:* The temperament is bilious, nervous, and lymphatic. The intellectual organs are fully developed; Veneration, Firmness, Self-esteem, and Concentrativeness are all very large, particularly Veneration and Concentrativeness.

Remarks by Mr. Mackintosh: 'Monomania, the Messiah—a Jew by proselytism—England to be subdued by the Jews—he their leader—much bloodshed—perfectly sane and tractable on all other subjects.'

L. J.—*Mr. Combe: Acquisitiveness* is enormously large in left hemisphere, and large in right.

Remarks by Mr. Mackintosh: 'Monomania, wealth.'

R. B.—*Mr. Combe: Love of Approbation* is predominantly large.

Remarks by Mr. Mackintosh: 'Monomania, pride.'

On inquiry, Mr. Combe was satisfied that the characteristic feature was vanity. Pride and vanity are frequently confounded by persons who are not aware of their different origins.

C. S.—*Mr. Combe:* The intellectual organs are large, particularly in the superciliary ridge. *The organ of Number is predominantly large,* strikingly depressing the external angle of the eye.

Remarks by Mr. Mackintosh: 'Dementia—love of arithmetic and accounts—perpetually employed in figuring.'

When his hands were confined, he used the tip of his tongue and saliva to write figures on the walls. It bore marks of excoriation from this practice when Mr. Combe saw him.

Women.

M. D.—*Mr. Combe: Cautiousness and Destructiveness are excessively large; Hope extremely small;* the coronal region in general deficient.

Remarks by Mr. Mackintosh: 'Great misery—suicidal monomania.'

E. H.—*Mr. Combe: Wonder* predominantly large in the left hemisphere, and large in the right.

Remarks by Mr. Mackintosh: 'Spiritual influences.'

[1] 'A large development of cautiousness combined with much destructiveness predisposed to self-destruction. Cautiousness does not produce suicide as a specific act; but the sentiment, when stimulated to excess by disease of the organs, gives rise to intense melancholy, anguish, and anxiety, and by rendering life extremely miserable, indirectly prompts to this result. Hence the fact that the best of men, and those in whose external circumstances no adequate motive can be found, are sometimes led to that fatal deed.' Combe: 'System of Phrenology,' vol. 1, pp. 375–6. Further, on p. 445, he adds: 'When hope is very deficient, and cautiousness large, a gloomy despondency is apt to invade the mind; and if destructiveness be strong, the individual may resort to suicide in order to escape from woe.'

These were the leading cases of strongly marked peculiar hallucinations. Some of the other patients had become insane from injuries of the brain, such as blows and concussion; others manifested general dementia without particular hallucinations, and Mr. Combe explained that in such cases it was not to be expected that the *form* of the brain should afford an index to the features of the disease.

The foregoing report was submitted by Mr. Combe to the perusal of Dr. Smith and Mr. Mackintosh, and it met with their approbation. Mr. Mackintosh expressed his regret that he had not made his notes more full, but at the time when he wrote them he had no idea of their being intended for publication.

The reader should note that in these instances the phrenological diagnosis is totally different from the platitudes of the trading character-monger, who usually fills up his sheet with such revelations as:

> Your temper is rather variable when you are thwarted, and when unjustly treated you are liable to become very angry, and even revengeful; but you are kind and amiable to all who treat you well. You are fond of your friends and prefer your own children, if you have any, to those of other people. You are not avaricious, but appreciate the value of money, and are desirous of making a good income. You have a good opinion of yourself and like to be appreciated by others.

and so on with twaddle that applies to 95 per cent. of the any-bodies who are their customers. Here and there they get an abnormal case, and with the smallest modicum of skill are easily able to make a 'hit.'

Mr. Combe might have examined ten thousand lunatics without meeting such a case as that of C. S., and therefore the probabilities against mere coincidence in his diagnosis are proportionate.

Mr. Combe's Visit to Dunstane Lodge Asylum.

(*From the 'Edinburgh Phrenological Journal,'* vol. 9, p. 521.)

On October 21, 1835, Mr. Combe, accompanied by—
Dr. D. B. White,
Mr. T. M. Greenhow, surgeon,
Mr. William Hardcastle, surgeon,
Mr. W. A. Mitchell, editor of 'The Tyne Mercury,'
Mr. William Hutton, and
Captain Hooke,
visited the asylum kept by Mr. Wilkinson at Dunstane Lodge, two and a half miles from Newcastle. Mr. Wilkinson is not a

phrenologist. Mr. Combe explained that, in cases of decided monomania, the character of the insanity generally has a perceptible relation to the development of the brain, and with the view of showing that this is the case, he proposed to examine the heads of a few of these patients, and to write down his observations on them before any information was given of the particular affections under which each laboured. In pursuance of this purpose, the following patients were introduced, examined, and commented on :—

Patient J. F.—*Mr. Combe's Observations:* The organs of Self-esteem and Firmness are predominant; but those of Wonder, Secretiveness, and Acquisitiveness are also large. The character of the insanity will be self-esteem, and probably cunning and theft.

Mr. Wilkinson's Remarks: 'He proclaims himself to be the Great God, and entertains a high esteem of his person and strength. He pilfers and picks up little articles whenever he can lay his hands on them.'

Patient W. A.—*Mr. Combe's Observations:* The cerebellum is very large; the whole region of the animal propensities is large; Cautiousness approaches to the very summit of the head; Conscientiousness is extremely deficient; and altogether the coronal region, which manifests the moral sentiments, is very deficient. The intellectual organs are not defective. Concentrativeness is rather large. The natural character will be bad; the dispositions low; and the love of women will probably be the characteristic feature of his insanity.

Mr. Wilkinson's Remarks: 'When brought here, he attacked the men in consequence of the women being out of his reach; when restrained he was like a raging bull, and actually bit off part of his own thumb after he found that he was mastered. A very low and brutal character.'

Patient J. M.—*Mr. Combe's Observations:* Large cerebellum; Acquisitiveness and Secretiveness are large; the coronal region is flat, and the intellectual rather small. The predominant propensities are amativeness, cunning, and the tendencies to pilfer. The irregularities of the head are not striking, and the features should not be strong.

Mr. Wilkinson's Remarks: 'He is a thief; the leading characteristic is his tendency to steal.'

Patient J. A.—*Mr. Combe's Observations:* The predominant organ is Acquisitiveness; the coronal region is deficient; the intellectual organs are well developed; Wonder on one side is very large, while it is deficient on the other. He will manifest a tendency to steal. He will be intelligent, and probably he may have notions connected with spirits or supernatural agency.

Mr. Wilkinson's Remarks: 'This is a case rather of general insanity than monomania. He has had several aberrations. His present tendency is to fall on his knees and worship, and then to break out in singing and declamation.'

Patient R. M.—*Mr. Combe's Observations:* He has very large Combativeness and Destructiveness; the organs of Hope and Conscientiousness are deficient; Imitation is very large; the intellectual organs are also large, giving general talent. The character will be very violent, and the expressions of his countenance dark and dreadful. He has probably attempted suicide. He will have great power of expressing his feelings by natural language, that is by countenance and gestures.

Mr. Wilkinson's Remarks: 'He has a general talent for all kinds of mechanical work. He is extremely violent, and has a great talent for imitation. His countenance is fearfully expressive when he is excited.'

Patient H. C.—*Mr. Combe's Observations:* He has large Combativeness and enormous Self-esteem; his Firmness is very large, and also Philoprogenitiveness; Imitation and Intellect are large. He will manifest extreme conceit of himself, with great determination. He will possess a great tendency to make provoking pretensions, and to oppose. He will have a great talent for Imitation, and strong powers of natural language.

Mr. Wilkinson's Remarks: 'This exactly describes the character. He believes himself to be a king; he is prone to imitate; he is opinionative and fond of children.'

The following is from Dr. Andrew Combe's 'Observations on Insanity,' pp. 105–111:—

The influence of predominant development in giving a predisposition to disease in the organ is very manifest on comparing a number of monomaniacs, or patients deranged on one point, with each other; for, as a general rule, the deranged faculty or feeling will be found to correspond with the most highly developed organ, and no one who has made accurate observation can have failed to notice the coincidence. Even in general mania I have almost invariably found the mental disorder taking its character from the functions of the predominant organs. As illustrations of this principle, Dr. Gall was in the habit of showing the skull of a man in whom the cerebellum was enormously large, and the chief feature of whose alienation was to believe himself to be the husband of six wives; and he also possessed the skull of a woman in whom the organ of philoprogenitiveness was extremely large, and who, in her ravings, fancied herself pregnant with five children. Dr. Spurzheim mentions having seen many similar cases, and I have myself observed several, both in the Salpêtrière of Paris and in the hospitals of this country, and, even in acute cerebral disease, I have in several instances seen the consequent mental affection consist in an exaggeration of the character indicated by the predominant organs. But, although this is the general rule, it must never be forgotten that a small organ *may be* in a state of morbid

activity when a larger one is sound, and that a large organ may be in a state of atony, and its function be altogether in abeyance, as happens daily with the brain, considered as a whole, in the opposite states of delirium and dementia.

After the preceding observations were written an interesting confirmation of their accuracy occurred in the course of a visit to the Richmond Lunatic Asylum in Dublin, by Mr. G. Combe, in April, 1829, when, in the presence of—

Dr. Crawford, assistant-physician,
Mr. Grace, the Moral Governor,
Major Edgeworth, Governor of the House of Industry,
Dr. Cuming, assistant-physician to ditto, and
Dr. Mollan,

Mr. Combe examined a number of the patients, and pointed out to these gentlemen the peculiarities of cerebral organisation which each presented, and with which he expected the features of lunacy would, as a general rule, be found to correspond. It was impossible to imagine a more conclusive experiment; for Dr. Crawford had previously written down the characteristic symptoms, and Mr. Combe had never seen or heard of any of the patients before they were ushered into the room, and therefore, as he wrote down his remarks in presence of the above-mentioned gentlemen *before* Dr. Crawford's notes were consulted, he of necessity drew his inferences entirely from their cerebral configuration; and yet, although it was the first time Mr. Combe had made the attempt, the results, as will presently be seen, harmonised completely with the principle I have been explaining.

In the majority of instances the mental faculties, the organs of which were in most ample endowment, were those chiefly deranged; while, in a few cases, they afforded little or no clue to the character of the insanity. In the following extract from the original communication (which I recommend to the notice of the reader, who will find it published in the 'Phrenological Journal,' vol. 6, p. 81) the words printed in italics are those which Mr. Combe underlined at the time as most likely to characterise the mental affection; and the accuracy with which they correspond to Dr. Crawford's statements, *previously* written down, and therefore also beyond suspicion, is very remarkable, and worthy of attention.

The first patient was Patrick Lynch.

MR. COMBE'S REMARKS.

Patient's name, Lynch.

Largest organs.—Self-esteem, Wonder, Causality, Language and Combativeness.

Also large.— Amativeness, Philoprogenitiveness, Concentrativeness, Acquisitiveness, Love of Approbation and Firmness.

Full.—Veneration.

Deficient. — Conscientiousness.

Mr. Combe said that he considered *Wonder*, which, when diseased, gives notions of supernatural agency and inspiration, and *Self-esteem* as probably the leading sources of alienation in this case; that Causality and Language should also be conspicuously manifested.

DR. CRAWFORD'S REMARKS.

Patrick Lynch, aged forty-two, a cooper. Two and a half years ill; married, and has children.

Monomania. — *Religious pride*, with vivid imagination and the highest degree of excitement, requiring restraint; *fancies himself inspired and endowed with omnipotence;* frequent hallucinations; *visits from heaven*, etc.; *great flow of language in a style quite superior to his rank in life;* drinking the cause of his illness; second attack.

Note.—Dr. Gall remarked in the first fanatic who fell under his observation a large development of the part of the brain now marked 'wonder,' and subsequently met with many similar instances. See Combe's 'System,' p. 226.

The exactness of the coincidence between the faculties marked as predominant in the above patient, and the features of the insanity, must strike every reader. The next case was E. S.

MR. COMBE'S REMARKS.

E. S.

Large. — Amativeness and Philoprogenitiveness.

Very large. — *Destructiveness* and *Combativeness.*

Large. — Self-esteem and Cautiousness.

Moral organs deficient.— Particularly Veneration and Hope.

Moderate. — Conscientiousness.

Of the moral organs Benevolence is rather well developed.

Intellectual organs rather well developed.

DR. CRAWFORD'S REMARKS.

Patient E. S., aged thirty-four. Ten years since first admission. Total want of moral feeling and principle, great depravity of character, leading to the indulgence of every vice and to the commission of every crime. Considerable intelligence, ingenuity, and plausibility; 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.

The patient was withdrawn, and Mr. Combe added: 'This is the worst head I ever saw. The combination is worse than Hare's.

Combativeness and Destructiveness are fearfully large, and the moral organs altogether deficient. Benevolence is the best developed of them, but it is miserably small compared with the organs of Combativeness and Destructiveness. I am surprised that this man was not executed before he became insane.'

A singular confirmation of the truth of Mr. Combe's inferences occurred in this instance. Mr. Combe, to insure perfect accuracy, sent the proof-sheets of his article to Dr. Crawford for revision. He received along with them a letter from that gentleman, alluding, among other things, to Mr. Combe's 'surprise that E. S. had not been executed before becoming insane,' and adding that, in truth, E. S. *had never been insane*, but was detained as being so utterly void of all moral sense as to be dangerous to society; thus proving how correctly his disposition had been described by Mr. Combe, when he stated the head to be the worst he had ever seen, that of Hare not excepted.[1]

The third patient submitted to examination was Dowling.

Mr. Combe's Remarks.

Patient's name, Dowling.

Enormously large. — *Self-esteem* and *Firmness.*

Large. — Amativeness and Combativeness.

Rather large.—Destructiveness, Adhesiveness and Benevolence.

Full.—Acquisitiveness.

Pretty good.—Intellect.

Dr. Crawford's Remarks.

Joseph Dowling, silk-weaver, aged twenty-nine. Two years ill. Unmarried.

Monomania.—*High pride. An emperor.* Very overbearing, quarrelsome, and dangerous, but easily tamed.

Note.—When the organ of Self-esteem becomes excited by disease the individual imagines

[1] The following is a verbatim copy of the letter to which Dr. Combe refers:—

To George Combe, Esq.,
8 Upper Gloucester Street, Dublin.

My dear Sir,—

I received your parcel on Saturday evening, and having revised the proof sheets, now return them.

I have a few remarks to make on the second of the lunatics, lettered E. S. You observe in your notes, 'I am surprised he was not executed before he became insane.' This would lead to the supposition that he had been afflicted with some form of insanity in addition to a naturally depraved character. Such, however, is by no means the case; he never was different from what he now is; he has never evinced the slightest mental incoherence on any other point, nor any kind of hallucination. It is one of those cases where there is a great difficulty in drawing the line between extreme moral depravity and *insanity*, and in deciding at what *point* an individual should cease to be considered as a responsible moral agent and amenable to the laws. The governor and medical gentlemen of the Asylum have often had doubts whether they were justified in keeping E. S. *as a lunatic*, thinking him a more fit subject for a bridewell. He appears, however, so totally callous with regard to every moral principle and feeling—so thoroughly unconscious of ever having done anything wrong—so completely destitute of all sense of shame or remorse when reproved for his vices or crimes—and has proved himself so utterly incorrigible throughout life, that it is almost certain that any jury before whom he might

Deficient.—Cautiousness.

The organs in great excess are Self-esteem and Firmness.

himself a king, an emperor, a transcendent genius, or even the Supreme Being. Combe's 'System of Phrenology,' p. 164.

The coincidences between the great self-esteem and the high pride and belief of being an emperor are too palpable to require comment.

The next case I shall quote is that of Brady.

MR. COMBE'S REMARKS.

Patient's name, Brady.

Deficient. — Combativeness, Hope, and Veneration.

Very deficient. — Ideality, Tune, and Wit.

Large. — Self-esteem and Firmness.

Rather large.—Benevolence and Conscientiousness.

Considerable.—Cautiousness.

Large. — Individuality and Eventuality.

The deficient Combativeness, Hope, Veneration, Ideality, and Wit, with large Cautiousness and Conscientiousness, will predispose to melancholy.

DR. CRAWFORD'S REMARKS.

George Brady, servant, aged 37. Twelve years since first attack; has relapsed. Unmarried.

Melancholy. 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.

The above presents another form of derangement equally accordant with the predominant development; and the following is also remarkable. It is the case of Duff.

be brought would satisfy their doubts by returning him *insane*, which in such case is the most humane line to pursue.

He was dismissed several times from the Asylum, and sent there the last time for attempting to poison his father, and it seems fit he should be kept there for life as a *moral lunatic;* but there has never been the least symptom of *diseased* action of the brain, which is the general concomitant of what is usually understood as *insanity*. This I consider might with propriety be made the foundation for the division of lunatics into two great classes; those who were *insane* from original constitution, and were never otherwise, and those who had been *insane* at some period of life from diseased action of the brain, either permanent or intermittent. There would be room for a few additional notes of the case E. S. explanatory of what I have said, if you think fit.

I thank you for the 'Scotsman,' and shall, I assure you, always feel the greatest pleasure in giving you any assistance in my power in your candid reasoning and enlightened inquiries after truth.—Believe me, dear Sir,

Very sincerely yours,

J. A. CRAWFORD.

MR. COMBE'S REMARKS.

Patient's name, Duff.

Very large. — Self-esteem, Firmness, and Secretiveness.

Large.—Destructiveness and Cautiousness.

Deficient.—Hope.

Small.—Ideality, Wit, and Philoprogenitiveness.

Moderate.—Veneration.

The combination here is that which is described in the works on Phrenology as leading to melancholy and suicide.

DR. CRAWFORD'S REMARKS.

Bryan Duff, collector of minerals, aged 31. Three years ill.

Melancholy. Deepest dejection. Silent, morose, inactive. *Attempted suicide* and to destroy his own child. After disappointment in his business took to drinking; was seized with maniacal delirium, which has sunk into permanent melancholy.

Among the females I may select one example, showing predominance of still other organs and faculties in close coincidence with the mental features of insanity. It is that of Hall.

MR. COMBE'S REMARKS.

Patient's name, Hall.

Very large.—Self-esteem.

Large. — Concentrativeness, Destructiveness, Hope, and Veneration.

Full.—Wonder.

Fairly developed intellect.

The organ of Self-esteem is here by far the most predominant.

DR. CRAWFORD'S REMARKS.

Jane Hall, aged 48. Ill 8 years.

Monomania.—Pride. Queen of France. Hallucinations about rebels surrounding the house. Fancies she has rats inside her forehead, generally cheerful and quiet. Illness occasioned by fright during disturbance in her country.

The total number of patients submitted to examination was twenty-three. In fifteen or sixteen the coincidence between the development of the brain and the nature of the lunacy was as great as in the cases quoted. In four the organs were so developed as to afford no grounds of inference, and in one the features of the hallucination and the predominant organisation did not correspond; thus presenting results so completely in harmony with what was anticipated, as to render it difficult to deny the influence of a disproportionate development of the different parts of the brain as a predisposing cause of cerebral and nervous disease.

The conclusion expressed in the last few lines of the above is further confirmed by abundant evidence subsequently obtained, and is of considerable practical value, as I further explain in the section on the Utility of Phrenology.

CHAPTER V

EVIDENCE FROM THE DIAGNOSIS OF INDIVIDUALS

I HAVE hesitated considerably in reference to the introduction of this chapter, as the successful diagnosis of an individual character may be a mere coincidence, and a selection might be made excluding failures.

Another difficulty arises from the multitude of such cases at command, every human being, and every other animal with a brain, being included. Therefore, some selection *must* be made. The following therefore are selected, and in making the selection I have chosen a few examples that are well and publicly authenticated, and in which the probabilities against mere coincidence or successful guessing are many thousands to one.

They are all offered purely and simply as supplying only *presumptive* evidence.

The first example is a very interesting case of failure by Gall himself, in an early stage of his researches; a failure that was philosophically used, and therefore became very instructive.

At that time Gall was groping through the fog in which he became enveloped by studying the metaphysical psychology of the schoolmen. He was looking for the seat of what they described as the primitive faculties of the mind; for the organs of attention, perception, association, memory, conception, etc. He had found something like an organ of memory: it was the organ of that sort of memory which constitutes the chief intellectual machinery and stock-in-trade of the mere scholar—the memory of words.

This first emergence from this scholastic fog is described in the following, which I quote from vol. 5 of the 'Fonctions du Cerveau,' p. 101:—

I was shown a child of about five years of age, named Bianchi, and asked to specify her predominating talent. I discovered nothing in her that indicated an extraordinary memory. The idea had not yet entered my mind that one might recognise the talent for music by the conformation of the head, and at this epoch I had not yet learned that there are different species of memory. My friends, however, maintained that the young Bianchi had an extraordinary memory for music, and they concluded from this experiment that my ideas relative to external signs of memory were false.

This child repeated all the music she had heard either sung or played on the piano, she retained by heart entire concertos that she had heard at most but twice. I inquired whether she learned other things by heart with similar facility. Her parents told me that her wonderful memory was limited to music.

What was I to conclude from this ?

That there exists a well-marked difference between the memory for music and the other kinds of memory that I was acquainted with up to this epoch, and that each kind of memory should have its distinct organ.

From this moment I devoted myself to researches more directly applied to different kinds of memory. In a short time I became acquainted with a considerable number of persons who had an excellent memory for certain objects, and a very feeble memory for others. These observations led me to increase the number of my denominations for memory, and I admitted among them a particular memory for sounds (*une mémoire particulière des tons*).

In carrying out these researches, I did not fail to perceive that the individuals endowed with a special memory for sounds were usually good musicians and sometimes composers.

This observation led me to conclude that the denomination, ' memory for sounds,' was too restricted, that it failed to express all that constituted the talent of the musician, that the sphere of that talent extended beyond that of mere memory, that it included all that related to the relations of sounds. I then adopted the expression, ' sense of the relations of sounds ' (*sens des rapports des tons*).

I especially sought to be satisfied that the talent for music is not dependent on the sum of the intellectual faculties generally ; but depends upon a fundamental faculty of its own, and that it consequently must have a particular organ. I therefore considered the means of discovering this organ ; *for it is only when the seat of an organ is determined in a manner to leave no further doubt that I consider myself safe in contending for the existence of the special fundamental faculty.*[1]

I therefore devoted myself to examining the heads of musicians. It happened that I then met several in whom the superior lateral part of the forehead was very narrow, and the temporal part was very wide, the result of which was that their foreheads formed a

[1] The italics here are mine, to mark Gall's own exposition of the basis upon which is founded the phrenological analysis of mind, i.e., the determination of its elementary faculties.

segment of a truncated cone. At this time I was not sufficiently advanced in my observations to seek the external mark of each particular faculty in a limited region of the head. I supposed, therefore, during some time, that a forehead having the form of a segment of a truncated cone was the external sign of musical talent.

But afterwards I had the opportunity of seeing great musicians, Beethoven, young Mozart, Kreibig, etc., etc., who had the superior part of the forehead wide and prominent. This compelled me to abandon the conclusion that a forehead shaped like the segment of a truncated cone was the characteristic sign of musical talent. It was not difficult at Vienna to observe a great number of musicians, among whom were some of the highest merit. I moulded the heads of many of them in order to be able to compare them more easily. I succeeded at last in discovering a region which, in all cases of musicians endowed with creative genius, had a rounded prominence (*proéminence bombée*) produced by the subjacent cerebral mass.

As a further test of my discovery I applied myself to the finding of converse evidence. I made observations on children and adults who had no disposition for music, among whom were some who even manifested an antipathy to it. In all these cases I found the cerebral region in question absolutely flat. Finally I obtained some skulls of great musicians, and the examination of these completed the conviction that my discovery relative to the ' sense of the relation of sounds ' (*sens des rapports des tons*) was perfectly exact. Nothing then prevented me from publishing this truth. I therefore founded in my lectures the natural history of the sense of the relations of sounds both in man and animals.[1]

The usefulness of this well-studied failure is evident from the above. I will now add another case showing how different was Gall's position in reference to this faculty at a later period, i.e., after he had completed the researches above described. It is quoted from the same volume as the preceding, p. 115 :—

At Vienna an ecclesiastic called upon me, and, without giving his name, begged me to supply some information on organology. After I had explained general principles he asked for some examples, and I showed him several, both in plaster casts and skulls. Referring to the organ of the sense of locality, I told him that he himself was endowed with it in a high degree, that he must be very fond of travelling ; he joyfully told me that such was decidedly the case. When I added that he had the sense of numbers and of mathematics generally greatly developed, he sprang from his chair and told me that he was a professor of mathematics. Nevertheless, I added, you have the power of distinguishing yourself still more in

[1] Gall's researches in the comparative development of the brains of singing and non-singing birds are very curious and interesting.

music, especially in the theory; he then threw himself on my neck (*me sauta au cou*) and told me that he was the Abbé Vogler. He subsequently narrated in all the societies this anecdote, which had made him a zealous proselyte to organology.

Following this is another case, the account of which I translate below:—

A lady had become insane in consequence of a severe blow at the back of her head, and her relations observed two large prominences on the sides of her forehead, which the friends supposed to have grown since the accident. These prominences, however, were nothing else than the organs of the sense of music, which had become more apparent from the patient's loss of embonpoint during her illness. I afterwards learned that her misfortune was especially deplored on account of her great talent for music.

From Gall's 'Fonctions du Cerveau,' vol. 5, p. 176:—

At Vienna a number of distinguished men called upon me, bringing with them a subject concerning whom they desired my opinion. I told them that he had great mechanical ability. These gentlemen concluded that I was mistaken, but the person in question was much struck by my decision. He was the famous painter Unterberger. In proof of the correctness of my judgment, he declared that he had always a passionate taste (*un goût passionné*) for mechanical pursuits, and that he only followed painting as a means of bread-winning. He took us to his house and showed us a number of large rooms filled with machines and instruments that he had either invented or improved.

In reference to this it should be noted that the mechanical faculties are all more or less concerned in painting.

The following is from Gall's 'Fonctions du Cerveau,' vol. 5, p. 248:—

In a large company I was requested, in order to put organology to the test, to declare what I thought of a little man that was some distance from me. As it was rather dark, I said that in truth I could not see him very well; but, nevertheless, I was able to perceive that he had the organ of poesy extremely developed. They told me, with expressions of astonishment, that he was the famous shoemaker-poet François. After this, I took a cast of his head, and used it to show to my lecture audience the external appearance of the organ of poetry.

Here are two other of Gall's cases of diagnosis, of a rather different character, from the same volume of the above-quoted work, p, 323:—

The excellent princess of Schwartzenberg conducted me one day through her stables at Vienna, and asked me to indicate, according

to my organological discoveries, which of the thirty horses there was the most gentle. The one which I indicated was the saddle-horse reserved for the special use of the princess herself on account of his extreme gentleness.

At Berlin M. Spurzheim and I distinguished among forty cows in the stables of the Minister of State, M. de Beyme, the most intractable of all.

I intended originally to have included in this work a section on evidences derived from Comparative Phrenology, but find, on going into the subject, that it demands a book to itself. I hope to be able to supply this ere long.

An additional reason for thus postponing this subject is that it presents certain special difficulties, owing to the cavities and other variations of structure of the skulls of different animals. These interfere with the determination of the form of the brain by external examination. Nevertheless, certain features of animal character may be recognised by external indications. As examples of this I copy from plates 64 and 70 of Gall and Spurzheim's folio work the contrasted portraits of a vicious and a docile horse, and similarly contrasted pictures of two dogs of the same breed, the first *indocile et méchant*, the second *docile et bon* (see p. 81).

The cerebral region here indicated by the prominence or rounded form of what we usually regard as the forehead of the animals, really corresponds to the front of the coronal region in man (the anterior-superior portion of the frontal lobe of the brain).

This difference is due to the fact that the cerebral region forming the upper part of the human forehead—the seat of the specially human intellectual faculties—is absent, or only rudimentary, in dogs, horses, etc., and this absence brings the coronal regions downwards and forwards. A further exaggeration of the difference is due to the position of the animal. If a horse be so placed that its spinal cord is perpendicular as in man, the (so-called) forehead of the horse will form the top of the head, that region of the brain which constitutes the organ of benevolence, etc., in man.

Gall's observation in this, as in all his other researches, extended both to man and animals, and he describes the function of this part of the brain in man as *bonté*, in animals as *douceur*.

I find, upon inquiry, that veterinary surgeons and dealers in horses recognise the rounded forehead described and figured by Gall as one of the 'points' indicating good temper in horses.

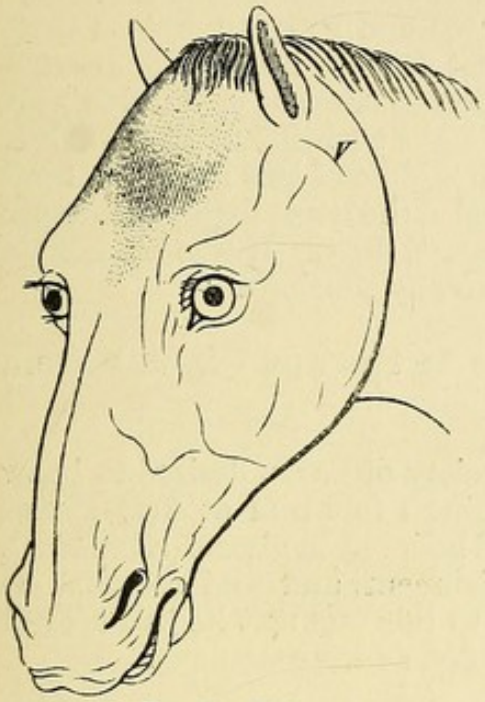


FIG. 12.—Vicious.

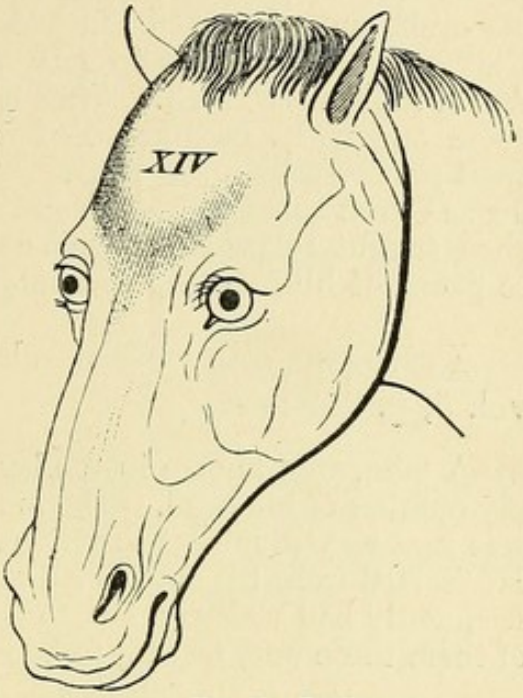


FIG. 13.—Docile.

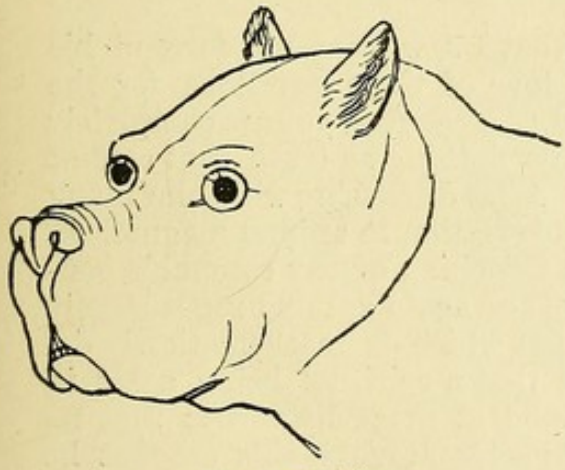


FIG. 14.—Vicious.

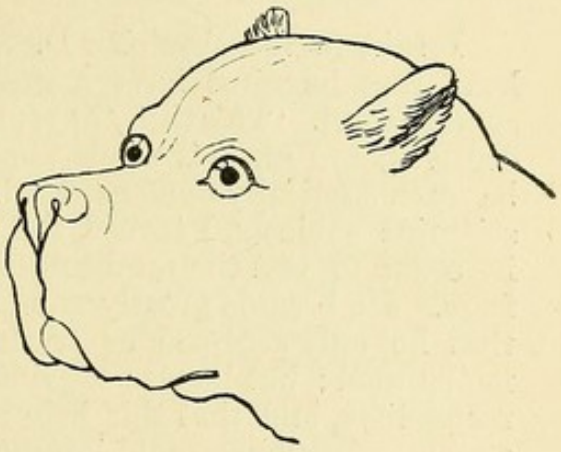


FIG. 15.—Docile.

The following is from vol. 1, p. 445, of 'Fonctions du Cerveau':

We were shown at Berne (in the *Maison de détention*) some fanatics who, a few years previously, had endeavoured to establish a new religious sect. Having observed in the leader a great development of the organisation which disposes to the seeing of visions, we inquired whether this man, named Koerper, had ever had such visions. He replied, No. We then begged him to tell us what events of his life had made the greatest impression upon him. He

told us, with a calm expression of truthful candour, that from his infancy all his thoughts has been occupied by religion, and that consequently he had read with the greatest attention the holy Scriptures and their commentators; but the extreme diversity of opinion convinced him that this was not the manner in which to find the true religion; that he had renounced such reading and research, and addressed himself to God and fervently prayed that, if it were not contrary to His eternal decrees, He would directly reveal to him the truth. After long continuance of prayer, his bedroom one night became filled with light as brilliant as though it were produced by many suns. In the middle of this glory our Lord Jesus Christ appeared to him and revealed the true religion. Koerper then sought to propagate this as a sacred duty. It was impossible to persuade him that he was subject to any illusions.

I give two other cases relative to the same faculty from vol. 5, p. 343 :—

A man, well known in the best society of Paris, desired to know my opinion of his head. The only thing I told him at first glance was that he was subject to visions and believed in ghosts (*revenants*). He started from his chair with astonishment, and told me that he frequently had visions; but that up to this moment he had spoken of them to no one, fearing to be regarded as too credulous.

The other case is described as follows :—

I said to the physician D. W. that I saw from the form of his head that he must have a great love of the marvellous, for the supernatural. 'This time,' he replied, 'dear doctor, you are completely deceived, as I make it a rule to admit nothing as truth that cannot be mathematically demonstrated.' After discussing with him many scientific subjects, I turned the conversation to animal magnetism, in order to test the mathematical reasoning of my estimable confrère. He became greatly animated and again assured me solemnly that he only accepted as truth that which is mathematically demonstrated; but he was convinced that a spiritual being acted in magnetism, and that this being acted at great distances; that no amount of distance could impede its action, and on this account he could sympathise with people placed in any part of the world.

The following is one of Gall's cases published during the life-time of the persons concerned :—

At Paris the Prince of Schwartzenberg, then the Austrian Ambassador, desired to put me and Dr. Spurzheim to the test. On our rising from the dinner-table he led me into an adjoining room, and showed me a young man. Without saying a word I returned with the Prince to the assembled friends and requested Dr. Spurzheim to examine the young man. During his absence I told the

company what I thought of the young man. Spurzheim after a mere glance at the subject returned to the drawing-room and declared, as I had done, that the young man had great mechanical and artistic talent. We were then informed that the Prince had brought him to Paris on account of his great mechanical talent, and had supplied him with the means to finish his studies.

Here is another similar case, of later date and from a different source.

The following is from p. 76 of 'The Memoirs of Zerah Colburn,' the celebrated American arithmetician, whose calculating exploits, when young, resembled those of George Bidder :—

Dr. Gall, well known as the author of the 'System of Craniology,' was then at Paris, and by means of his tutor Zerah was introduced to him without the doctor's having any previous knowledge of the character of his visitor. Being requested by Mr. C., he proceeded to examine the cranium of his subject, and readily discovered on the sides of the eyebrows certain protuberances and peculiarities which indicated the presence of the faculty of computation.

During Dr. Spurzheim's stay in Edinburgh in 1816, he visited the workshop of Mr. James Mylne, a brass-founder, and examined the heads of his apprentices. The following is Mr. Mylne's account of what took place on that occasion :—

On the first boy presented to Dr. Spurzheim on his entering the shop, he observed that he would excel in anything he was put to. In this he was perfectly correct, as he was one of the cleverest boys I ever had. On proceeding further, Dr. S. remarked of another boy that he would make a good workman. In this instance, also, his observation was well founded. An elder brother of his was working next him, who, he said, would also turn out a good workman, but not equal to the other. I mentioned that, in point of fact, the former was the best, although both were good. In the course of further observation, Dr. S. remarked of others that they ought to be ordinary tradesmen, and they were so.

At last he pointed out one who, he said, ought to be of a different cast, and of whom I would never be able to make anything as a workman, and this turned out to be too correct; for the boy served an apprenticeship of seven years, and when done, he was not able to do one-third of the work performed by other individuals, to whose instruction no greater attention had been paid.

So much was I struck with Dr. Spurzheim's observations, and so correct have I found the indications presented by the organisation to be, that when workmen, or boys to serve as apprentices, apply to me, I at once give the preference to those possessing a large constructiveness; and if the deficiency is very great, I would

be disposed to decline receiving them, being convinced of their inability to succeed.

The following is from vol. 1, p. 436, of the 'Edinburgh Phrenological Journal': —

The subject of this notice (Master Hubard) is a native of Shropshire, aged 14. He is now (May 1824) well known in Edinburgh for the talent which shall afterwards be described; but in January 1824, and before coming here, he had exhibited publicly in Glasgow, and had excited some controversy betwixt the phrenologists and anti-phrenologists of that city.

Mr. W. Bewick was in Glasgow at the same time, exhibiting his copy of Mr. Haydon's *Lazarus*, and some other historical pictures; and being aware that his friend Mr. W. Ritchie (3, Hill Square, Edinburgh) was a phrenologist, he suggested a plan by which, on Master Hubard's going to Edinburgh, the points in dispute might be put at rest. Accordingly, in February, and before Master Hubard had exhibited in Edinburgh, or was at all known there, Mr. James Edmonston, of Princes Street, at Mr. Bewick's request, waited on Mr. Ritchie, to whom he was unknown, and, without any previous notice, introduced himself and the boy by a letter from Mr. Bewick, which simply mentioned that a boy would be introduced to him who was possessed of a *peculiar* talent, and who had excited controversy in Glasgow as to whether the development of his brain corresponded with the manifestations of his faculties.

Mr. Ritchie stated that he had not cultivated the science so arduously as to be able to speak with perfect confidence respecting some of the minute organs; but that he would examine the boy's head, and mention frankly what it indicated. Mr. Ritchie then stated, without hesitation, what, according to the development, were the leading talents and propensities of the boy before him, observing that he was gifted especially with those organs which enable one *to distinguish himself as an artist.*

When he had given this opinion, Mr. Edmonston expressed a wish, on the part of his Glasgow friends, that the boy, while unknown, should also be seen by Mr. G. Combe; and the whole party, without separating, proceeded forthwith to this gentleman's house. There the party remained together in a room into which they were first shown, until Mr. Combe was brought to them; and without any other intimation than that there was a wish to *test Phrenology* by an examination of the boy's head, and an opinion of his talents, Mr. Combe proceeded to ascertain the development and dictate an opinion. This was all done and certified in presence of Mr. Edmonston, and before any of the party left the room.

Mr. Ritchie in his examination did not measure the head nor note down the development of the several organs; but Mr. Edmonston certified that the account of talents and character given by him virtually corresponded exactly with what was dictated separately by Mr. Combe, and which was as follows.

Here follow detailed measurements of the head, and estimates of the development of each of the thirty-four organs then accepted as established. I omit these details, but quote Mr. Combe's summary, which was that—

> The head is large, and the organs of the propensities are considerably developed which indicate power. The organs of the faculties which give the social affections are large, so that, while there will be the elements of a good hater, or a formidable enemy, there will also be the constituent feelings of a warm and excellent friend. The combination of concentrativeness, love of approbation, conscientiousness, and intellect generally, will give a philosophic character to the mind, and fit the individual for comprehending and applying principle in all his undertakings. *The distinguishing characteristic, however, is his talent for art.* The combination of secretiveness, form, size, and imitation, with individuality and comparison, should give him the tact of combining expression of character with great truth and accuracy in the details of his work. At his time of life it is probable that the talent will have shown itself in cutting or clipping figures of animals, men, etc. Colouring is also fully developed, and he might succeed as a painter; but his power of colouring will not be equal to his power of drawing and giving expression.

The editor describes Master Hubard's public exhibitions, where he clips in paper profile likenesses of visitors, the walls of the exhibition room being hung round with beautiful specimens of his skill.

The 'Western Luminary' gives the following account of him :—

> Little Hubard's talents were discovered at nearly six years of age. He had been with his parents to the village church, and was observed to be remarkably attentive during the service. They were pleased at such an early appearance of devotion, and wishing to see it continued, made no remarks to him respecting it. Great, however, was their surprise, shortly after his return home, to observe their *pious boy* cutting pictures from a sheet of blank paper, and how much was that surprise increased when they saw the most striking likenesses of their minister, his pulpit, and his precentor.
>
> Nature had so strikingly spoken out in this instance that she could not be mistaken. His talent was encouraged, until he arrived at that acme of perfection in which we now behold him, and which we shall endeavour to give a more vivid and detailed view of by describing the various figures in the Exhibition Room.

Here follows an account of the exhibition, which includes a description of portraits and groups, all remarkable for ex-

pression. Other criticisms are quoted in detail, fully agreeing with the above. The editor adds the following :—

We have heard it observed, that the present exceeded in extravagance all the cases of the Phrenologists ; for that they had found an organ for paper clipping ! This remark is so truly puerile, that we should not have noticed it, except to say that the talent is by no means rare, in an inferior degree, and that in works on Phrenology it is repeatedly mentioned, and ascribed to the faculties which predominate in Master Hubard. We have met with several instances of it in Edinburgh, and one in particular was adverted to in our last Number. On another occasion, we happened to remark a great development of constructiveness, form, and imitation in the head of a child of seven years, and asked if he was not fond of drawing or clipping, or cutting figures. His father produced a portfolio of his productions ; among which was a regiment of Highlanders, then in town, cut in all the varieties of costume, from the drum-boy to the colonel on horseback.

I can add the testimony of my own experience among children (which has been extensive) to that of the editor's. Given a child with natural artistic genius, and given also a sheet of paper, a pair of scissors, and a pencil, the result will usually be clipping in preference to drawing ; the younger the child the more decided this preference.

The following was published in the 'Edinburgh Phrenological Journal' of August 1829 :—

On April 15, 1829, Mr. Combe was taken by Mr. Carr, one of the directors of the Bank of Ireland, to see that establishment. In one of the apartments Mr. Carr presented to Mr. Combe a respectable-looking gentleman, above the middle period of life, telling him he was an extraordinary character, and requesting him to say for what qualities he was distinguished. Mr. Combe had not the slightest idea of who the gentleman was. After examining the head, he dictated the following remarks on his development to Mr. Carr, who wrote it down :

'Anterior lobe, connected with the intellectual faculties, uncommonly large ; perceptive and reflective organs, nearly equal and both large ; Individuality, Size, and Weight, predominant ; Tune and Number, large ; Language, large ; Benevolence and Veneration, large ; Imitation, large.

'The head indicates a general capacity for painting and the imitative arts ; and in general, the mind, if turned to mechanics or any other similar pursuit, is so constituted as to excel.'

Mr. Carr then mentioned that the gentleman's name was Mr. Oldham, and proceeded to show Mr. Combe his works. He was

taken to a separate building, where a steam-engine was in motion which had been constructed from Mr. Oldham's drawings and projection. Upstairs he found the engine printing bank-notes, and registering the paper given out, and the printed notes returned. This is done by machinery all under a locked cover, so that the workmen apply at an opening left in the cover, and on laying down, say 100 notes, the machine instantly withdraws them, and gives out 100 slips of paper for another printing, registers both numbers, and tells in detail from 1 up to 20,000 the number of impressions thrown off. Further, it damps the paper, then in five minutes expresses the surplus moisture, and presents it ready for printing. This machinery was contrived and executed by Mr. Oldham. He constructed likewise another machine which prints the dates and numbers on the notes, registers and throws up the numbers from unity, apparently to an indefinite extent, so that the printer just puts on the ink and turns the lever, and all the rest is performed by the machinery. Mr. Oldham also showed Mr. Combe two very pretty profiles in water colours painted by himself, and told him that he had constructed an organ with a *vox humana* pipe, which delivers syllables in a manner resembling human articulation. Finally Mr. Oldham described all these things with a fluency which, as Mr. Combe remarked afterwards, manifested a great organ of language. Mr. Oldham was originally a miniature painter, but, by good fortune, the bank directors took him into their employment, and he has been a treasure to them.

Florence, Palazzo Briganti, Via Maggio.
Thursday, December 30, 1841.

To-day Signor Salvi brought me a boy of about twelve years of age, and asked if I could discover by Phrenology the peculiarities he possessed. Signor Salvi is an opponent of Phrenology. I replied that I could; and he assured me there was something extraordinary in him. I asked only if it were in the feelings or the intellect. He answered, 'In the intellect.' I examined the head, and told him that drawing was his *forte;* and, after drawing, music, if he was practised; and, after music, he would have great facility for calculation, but not yet for mathematics. That often he had met with accidents in the streets from his want of caution, and that he was not at all timid. That he often told lies, but that he was not an inveterate liar, and that I thought the fault would pass with age; I also said that order should be *very* good.

Signor Salvi confessed that *all* was absolutely true to the very letter. Drawing was his *forte.* He had heard an opera once and could repeat all the airs in it. His power of calculation was very good, and he kept his things in the most exact order—even his books. That he did lie, but was not obstinate in his lies, and he would never swear to them; and that in coming to me he had run against a woman, and that he often met with similar mischances. I then said he had little veneration, which was confirmed by Signor Salvi:—

'I, Donato Salvi, resident member of the Academy of the Crusca in Florence, affirm to be most true all that is narrated above; and also *so true*, that, convinced of the above facts, I begin to believe in Phrenology. I ought also to add a circumstance forgotten by Signor William McPherson Adams, viz.—he mentioned that the boy had more benevolence than veneration, which is perfectly true. And to all above stated I subscribe myself.

'DONATO SALVI.

'Palace of Prince Corsini, Florence.'

The reason I got Signor Salvi to sign the above paper, or rather the original, of which it is a literal translation, was that, although those who know me would not require such evidence of its truth, those to whom I am quite unknown would not be unreasonable in suspecting there must be a little use of the paint-brush for a character to be hit off so exactly without one error. I assure you I felt relieved when it was over; for had I made but one mistake, to which all men will ever be liable, what a story would it not have made against the poor Phrenologist.

WILLIAM MCPHERSON ADAMS.[1]

NOTES OF MR. BARBER'S VISIT TO THE EXETER INSTITUTION FOR THE DEAF AND DUMB. (*An extract from the Journal of the Deaf and Dumb Society.*)

(*From the 'Edinburgh Phrenological Society,'* vol. 13, p. 213.)

The weather is inconstant. The sun has sometimes been glittering over the gloomy landscape. The winter is past. To-morrow the first month of spring commences. Mr. Barber and his son and other gentlemen and ladies visited us. Mr. Barber examined some of our heads. We did not know the meaning of it. Mr. Barber examined Coyle's head, and spoke to Mr. Gordon. Mr. Gordon then asked us who had the greatest imagination among the boys. They wrote on the tablet 'Hugh Coyle.' Mr. Gordon then signed to us that Mr. Barber discovered that Hugh Coyle had a large imagination by the examination of his head. We wondered. Mr. Barber looked at Facey. Mr. Gordon did not sign about his conversation with Mr. Barber, but asked what was Facey most fond of as a study. We wrote 'Geography and painting.' Mr. Gordon signed, 'Mr. Barber said so before you wrote.' But we did not know he said so. We wonder much. Mr. Barber wrote, 'You think me a conjurer.' Mr. Barber told us that Tom has a beautiful head, and many fine and noble qualities. That is true. Tom is pure in his thoughts and signs. He said that Tom loved to mimic or imitate. That is right, because Tom is always drawing funny faces of us, and he signs cheerfully and prettily about many things, and he imitates all people's manners to make us laugh; but he is

[1] 'Phrenological Journal,' vol. 15, p. 145.

not rude or vulgar in his signs, but is very pleasing, and we love him. Mr. Barber said, 'Engraving is fitted to the ability of Aubin.' That is right. Aubin is fond of drawing ships and outlines of form, and he is very clever to copy writing or drawing. Mr. Barber said, 'Edwards is a lover of approbation, and he is fond of being admired, and he is amiable and talented.' That is true. Mr. Barber looked at Sulby and said, 'Sulby is always orderly and careful in his things.' That is true; because Sulby's box is always neat, and he is vexed if boys disorder his desk. Mr. Barber said, 'Harris is benevolent.' That is true. Harris is generous; he always unselfishly gives away his things to his favourite companions. His countenance looks open and enchanting. Mr. Barber examined George Cooke's head, and spoke to Mr. Gordon. Mr. Gordon asked us what sort of employment does Cooke like? George Cooke signed 'he liked usin' different tools,' and we wrote, 'He is fond of making pretty things, and he can make them cleverly.' Mr. Gordon signed 'Mr. Barber said all this before you wrote.' We signed to Mr. Gordon, 'How does Mr. Barber know our characters? He is strange to us and he is strange to you.' Mr. Gordon spoke to Mr. Barber, and they smiled at us. Mr. Barber looked at Perry, and spoke to Mr. Gordon and the ladies and gentlemen, and Mr. Gordon asked us to tell Perry's character, and we wrote 'Cunning.' Mr. Gordon signed, 'Mr. Barber said Perry was cunning, scheming, and clever.' We were surprised: Mr. Barber is true. Perry is very cunning. I will write about Perry's cunning. He dislikes gymnastics, and he said he could not see the exercises because his eyes were dim, but he has good eyes and quick; he said he wanted new spectacles, and Mr. Gordon gave him new spectacles; he was pleased; but he became cunning again, and said his trousers were disagreeable when he marched, and he must have new breeches. The tailoress has measured him for new knee-breeches, like old men's breeches. We laugh much at Perry's cunning and clever signs.

J. H. H.

(Exeter: Jan. 31, 1840.)

The following account of a 'Phrenological Experiment,' which was published at the time in the 'Phrenological Journal,' is instructive, and is rendered the more satisfactory by the discussion which follows:

Sir,—I have the honour to belong to a Literary Society in this place, the members of which are much divided on the subject of Phrenology. In a late debate I ventured to assert that, if a skull was forwarded for the consideration of the Society of which you are the distinguished President, I had no doubt they would be able to detail the character of the individual to whom it belonged. It was agreed that I should do so by this day's coach. I have directed to you the skull of a person with whose previous history they are acquainted.

May I beg you to submit the said skull to the investigation of

the Society, and to favour me with the opinion they entertain of its development. On receiving the same I shall in return forward you the history of the subject to whom the skull belonged. The Society is at liberty to take a cast of the skull—I beg the original may be returned to me. Requesting your indulgence for an intrusion which has the promotion of the science for its only object, I am, sir,

Your obedient servant,

A. R.

Chatham: January 6, 1827.

To Dr. Elliotson, President of the London Phrenological Society.

Sir,—I exhibited the skull with which you favoured me to the London Phrenological Society at their last meeting, and we were all perfectly agreed upon the character of its original possessor. The Society, however, never delivers a judgment upon character on any phrenological point; but, when an opinion is desired, leaves any member or private individual who may think proper to do so.

I take it for granted that the deceased was of sound mind; but, to be accurate, we should likewise know how far he had been educated, and whether his constitution was active or indolent.

Ignorant of these particulars, I should say that he was a man of excessively strong passions, that these were far an overbalance for his intellect, that he was prone to *great violence*, but *by no means courageous*, that he was *extremely cautious and sly*, and fond of *getting;* his *sexual desires* must have been strong, but *his love of offspring* very remarkable. I can discover no good quality about him, except the love of his children, if he had any. The most striking *intellectual* quality about him, I should think, was his *wit*. This must have been not only great, but of a dry cast. He might also have been a good mimic.

I have the honour to remain

Your obedient humble servant,

JOHN ELLIOTSON.

Grafton Street, London: January 29, 1827.

Chatham: February 3, 1827.

Sir,—I had the honour to receive your letter of the 29th ultimo, and much regret that I was unable to forward my notes of the individual whose skull you did me the favour to examine, at the date you requested; they will, however, reach you before the next meeting of the Society. In the meantime I can assure you that your explanation of his character is *singularly correct* in every particular, affording a new and powerful proof of the truth of Phrenology.

There are, however, some gentlemen, unable to overturn the facts of the case, who now turn round and say that, between the period of receiving my communication (January 6 last) and your answer, there was ample time for you to inquire and find out that I had the medical charge of the convicts of this place; that you would naturally suppose that this was the skull of a felon, and

that you could not err much if you ventured to assign to his character all the baser passions. There is only one mode of replying to such opponents, namely, by a straightforward question and answer between us. And, *first*, Until the receipt of this letter had you any knowledge of my public professional employment? *Secondly*, Is your detail of this felon's character drawn solely and entirely from the shape of his skull? *Thirdly*, Had you any previous information whatever as to his past life, habits, or education?

I have the honour to be, Sir,
Your obliged servant,
A. R.

I beg the favour of an early answer.

The following is Dr. Elliotson's reply:

To A. R., Esq.

Sir,—I beg to assure you that I drew my conclusions as to the character of the individual *solely* from the size of the various parts of the skull, and that up to the moment of receiving your letter yesterday I was totally uninformed respecting him, and indeed respecting yourself, except that it appeared from your letter and your card that your name was R., and that you were a surgeon at Chatham. I was ignorant of the existence of convicts at Chatham, and had no communication with any person upon any particular in the matter, nor indeed considered any circumstance for an instant, except the character of the skull.

The suggestion that I had gained some knowledge privately of the individual, or had taken a hint from any circumstance whatever, might have annoyed me were I not unknown to the gentlemen, were I not conscious of detesting every species of duplicity, and were there not something irresistibly laughable in seeing the plain facts of Phrenology give one such power as to produce an astonishment in the minds of those ignorant of them not dissimilar from that which a little chemical or physical knowledge excited in times of darkness. In those days the power of knowledge was ascribed to the devil; at the present time, such agency being universally disbelieved, the manifestation of power is pronounced a deception. Some gentlemen do not believe that I could have drawn so correct a character from examining the skull; but they will cease to wonder if they find that they themselves can with perfect ease do exactly the converse—pronounce upon the size of the various parts of the skull from their knowledge of the individual. If they know him to have been prone to acts of violence, they may assert that the skull should be very large at the organs of destructiveness; if very cautious, very large at the organs of cautiousness; if very fond of children, very large at the organs of philoprogenitiveness, etc.

Allow me earnestly to recommend to the members of your Society Gall's 'Fonctions du Cerveau.' It is worth all the other works on Phrenology together, and full of splendid truths for the

metaphysician, the moralist, and the legislator, no less than for the physician and the physiologist.

I have the honour to remain,
Your obedient humble servant,
JOHN ELLIOTSON.

32, Grafton Street, London: February 8, 1827.

Account of J. L.

J—— L—— was received into the 'Dolphin' convict-hulk at Chatham in February, 1824, from C——e, under sentence of transportation for life. He was in person tall and athletic, with a fine erect carriage, and a stern unbending countenance. He was born of respectable parents at M——, and all his relations were of the yeoman class. His education, however, was limited to reading and writing. During his early life he evinced an ardent attachment to every species of vulgar sensual enjoyment; the ale-house games of chance, and particularly cock-fighting: of this worst species of gambling he was for years the noted and well-known supporter. He was also an active poacher, but only of the class denominated hare-panyers or snarers. At the period of manhood his friends, in hope of reformation, placed him in a small farm. The vicious habits of a previously bad life, however, were not to be thrown off in a moment, nor was the monotony of farming calculated to efface the vivid impressions of a dissipated youth. On the contrary, being now his own master, his first consideration was how they could be extended. Accordingly, he is reported at this period to have sunk lower in the paths of depravity, and to have formed an intimacy with persons which gave a permanent and deeper shade to his character. Living in the vicinity of the most extensive salt-works in the kingdom, he resolved on the formation of a band of smugglers for the plunder of that article, and the sale of it throughout Cheshire, Lancashire, and North Wales. Under this man's direction and command, they pursued this occupation for a long time without the sufferers being able to detect them; and even when he became suspected by the police and excise, he continued to elude their vigilance till, the *duties* being removed, it ceased to be an object of contraband commerce.

If, at the age of twenty, he did not return to the paths of rectitude, it might have been expected that maturer years and the influence of a wife and children would have quieted his evil habits; but these strengthened with time and by long indulgence—he was now as restless as at the moment of their first impulse. With some of the remains of his former associates, therefore, he now commenced plundering of grain, an article not easily identified if once fairly removed from the premises. This was sometimes carried to his own farm (which, it is worthy of remark, he still held at the time of his conviction) and sometimes direct to the market-place. In this nefarious scheme, however, he was soon detected. In an attempt to plunder a neighbouring farmer, his gang were surprised;

they fled to the road, where he was waiting with their horses, and all escaped, except himself and one companion. They were tried and sentenced to death, but which sentence was ultimately transmuted into transportation for life.

Such were the general features in the life of a man who was distinguished by the familiar nickname of *Jack Turpin;* and in contemplating the variety of scenes, and the many singular adventures into which it must have thrown him, it becomes a matter of extreme regret that we are not in possession of many acts committed by him. Using his gang as servants to his will, he more frequently directed than acted with them. The disposal of his spoil being his chief concern, he had often distant journeys to perform in order to arrange with the purchasers; so that, though the connection between them was close and intimate, still it had on his part much mystery attached to it. This he maintained even at the bar of justice, and though, after his conviction, an hundred guineas were offered him for a detail of the adventures of his life, he rejected the bribe with scorn. After sentence of death was pronounced, he was seized with an alarming illness, which continued for five months, and being apparently on the verge of eternity, he still kept the same reserve as to the minute details of his life. On his recovery he was conveyed to the convict-hulk with the view of being conveyed to New South Wales, but his age being deemed too advanced for the voyage, he was detained to labour at the public works. Here he was orderly, obedient, and respectful to his superiors, but towards his fellow-prisoners he was, with one exception, reserved, keeping them at immeasurable distance. In May, 1826, his infirmities increasing on him, he was removed to the hospital ship. Here, by an unvarying system of kindness, the stateliness of his mind unbent, so as to induce him to exercise more familiarity; still, however, with the same guarded avowal as to the facts, with the following solitary exceptions:—

1. That though he had led a lawless life, he had never committed murder.

2. That by his wife he had eight children; that he had also a natural son in North Wales, and he had kept several women in different parts, and at different times, up to the period of his apprehension.

To this scanty detail of facts it only remains to add the manifestation of character he exhibited after he had become familiar with the patients of the hospital.

In the first place, he exhibited a severe sarcastic wit at the expense of those around him. The manners and language of the kind and benevolent clergyman who officiated at the hospital were the frequent subjects of his mimicry.

In the second place, he exhibited a strong attachment to his children. He frequently spoke of them in the most affectionate manner, and made his last moments respectable by directing them as to the disposal of his property among them.

In the third place, he possessed a firm disbelief in the existence

of a Deity and of a state of future rewards and punishment, and sank into eternity avowing his unbelief.

A. R.

Chatham: February 14, 1827.

To Dr. Elliotson.

Sir,—At the meeting of the Rochester Literary Club, the enclosed resolutions were (on the motion of the Rev. Dr. Joynes) unanimously adopted, and, by their direction, I have the honour to forward you the same. Permit me to add the high gratification I feel in being entrusted with the present communication. With great personal esteem,

I have the honour to be, Sir,
Your very obedient servant,

A. R.

Chatham: February 20, 1827.

Resolutions passed at a meeting of the Rochester Literary Club, held on Thursday, February 15, 1027.

Mr. R—— having introduced the subject of Phrenology by an interesting correspondence between himself and Dr. Elliotson, the President of the London Phrenological Society, upon the skull of J. L., it was continued by other members till the usual hour of adjournment, when the following resolutions were passed unanimously:—

1. That the character given of L. by Dr. Elliotson from the inspection of the skull corresponds so exactly with his history, that it is impossible to consider the coincidence as the effect of chance, but that it is an instance which, if supported by many others, affords a strong foundation for the truth of Phrenology.

2. That a copy of the above resolution be forwarded to Dr. Elliotson, with the thanks of the Club for his communication, and that Mr. R. be requested to transmit the same.

H. P. Secretary.

The reader should note that this experiment was not made upon an ordinary average individual taken at random from the multitude, but upon a well-marked case which admitted of no quibbling or misunderstanding of actual character, and one in which the character was formed, not by external circumstances, but by well-defined natural impulses, such as, according to Phrenology, must be indicated by decided and abnormal development of certain regions of the brain, unmistakably indicated by the form of the skull. Ridiculous failure or undisputable success must be the result of such an experiment.

The following case from the 'American Phrenological Journal' of September, 1839, is similar to the preceding:—

On March 14, 1839, a skull was presented to the Phrenological Society of New York, with the request that its indications should be described; the gentleman who presented it promising to furnish some particulars concerning the character of the individual to whom it belonged.

The request being acceded to, the following gentlemen were appointed to draw up a report on the subject: Mr. A. Boardman, Dr. P. H. Wildman, and Mr. William Stuart. On March 28 they reported as follows:—

The committee appointed to examine the skull presented to the Society by Mr. L., and to report upon the same, would say that, this being the first formal trial of their skill as practical phrenologists, they approach the subject with the conviction that, in some points, they might give an erroneous interpretation of the external indications. They hope, therefore, that if such interpretation be given, their want of skill may not be charged to Phrenology. With these preliminary remarks, they respectfully report:

That the skull appears to be that of a male between thirty and forty years of age, and of active temperament.

Here follow detailed measurements of the skull and the estimated development of each particular organ. The following are the deductions based thereon:—

The characteristics of this head appear to your committee to be written upon it in large-hand. The individual possessing such an organisation would be quite unfit to be a law unto himself; he would be profligate and corrupt, of a savage, bloodthirsty disposition, but wily and cautious to a considerable degree. His intellect, ideality, and secretiveness, however, would enable him to cloak his disposition, when necessary, under a plausible and, for his circumstances, refined address; but his sense of benevolence, of veneration, and of conscientiousness would be too feeble in their appeals to restrain him from evil. Remorse would hardly be felt by him for the most atrocious deeds. He would be pleased with villainy adroitly executed, but despise a man who would allow himself to be readily detected. In executing his plans he would hesitate and be loth to commit himself, but once involved would become desperate; were he a pirate, for instance, he would act upon the maxim, 'dead men tell no tales.' His love of children and friends would be considerable; these being, in fact, almost the only amiable traits in his character. His knowledge of facts, of places, of forms, and his love of music were considerable. Your committee think that he would be subject to fits of taciturnity and gloom.

In closing this report, your committee remind the Society that the only information they received with the skull was that it belonged to an uneducated individual. Of the circumstances of temperament, age, sex, and external influences they were uninformed.

ANDREW BOARDMAN, *Chairman.*

After the report was read, Mr. L., who presented the skull, furnished a paper containing the following particulars :—

Account of S., who was tried at New London Court, before the Supreme Court, and executed in the Gaol-yard, June 6, 1834, *and to whom the accompanying Cranium belonged.*

Dr. North, of New London, says : I saw S. previous to his trial ; he seemed to be between thirty and forty years of age ; he had an energetic eye as well as body, and a fierce-looking countenance ; he readily answered most of my questions. From his communications, and other sources, I detail the following particulars :—

S. was born in the state of Rhode Island ; he could neither read nor write, had never been to school, but had been allowed his own way in everything. He was addicted to intemperance. The immediate cause of the quarrel which ended in the death of his wife and child was as follows :—

S. was in danger of going to gaol for debt, and wanted his daughter to give up her hard-earned money. This Mrs. S. advised her not to do, and told her husband that he was intoxicated with cider. This further excited him, and he took his axe, knocked down the cellar door, knocked in the head of the cider barrel, and let out the liquor. He then came up, looked out of the window to see if anyone was near, went behind his wife, struck her on the head with the edge of the axe as she sat with her infant child in her arms, cleft her skull, and almost cut the child in two with the blow. He afterwards said that it was not his intention to injure the child ; but when he saw the distress it was in from the blow he had inflicted accidentally, he finished its life with a second blow.

I have learned from other sources that S. showed a cruel disposition from a boy ; that when he drove a team he would often get angry, beat his cattle cruelly, and also lacerate their sides by punching them with a sharp nail driven into his whip-stock. In gaol he never said, to my knowledge, that he was sorry for having killed his wife, but only for having killed his child.

Mr. L. subsequently furnished the following particulars in addition :—

Mr. H. Palmer, of Norwich, says : I lived in the next house to S.'s at the time of the murder, and was one of the first who entered after the deed. I heard him say 'I have done the work now.' I always considered him a sane man, possessed of as much intelligence as men generally ; he, however, was without education, neither had he learned any trade, but he possessed a good mechanical turn of mind ; would sometimes make and repair shoes, repair cart-wheels, and do other mechanical jobs. He was a very passionate man, and also very cowardly ; would avoid contact, if possible ; was not a moral or religious man. In conversation he was obscene, and sometimes quite affable and humorous ; he was apparently much attached to his children and friends.

He had contemplated killing his wife two or three years before he did it, and often had a knife under his pillow for that purpose, but always shrank back from the task. He wanted to see his wife after her death ; and he appeared much affected, felt sorrow, and wished he had not done it. He seemed quite liberal and generous to his friends, for one of his circumstances ; he was a day labourer.

The following case is selected as one which became public property at the time, and excited much discussion where it occurred, viz., Portsmouth.

At the close of a course of lectures at that town in March 1832 by Mr. Deville, a skull was placed in the hands of the lecturer, concerning which he made the following diagnosis :—

This is an individual that would have some difficulty to keep within the pale of the law. A knowing character, sarcastic, and with some disposition to imitate the actions of others, he would be influenced by the lower feelings, his character partaking more of the animal than of the amiable, and showing but little feeling for religion or morality ; obstinate, self-willed, revengeful, with strong passions, and desperate if opposed ; not over-scrupulous in appropriating to his own use the property of others ; much addicted to female society.

If he has had any children he would not be a very kind parent. If they were not obedient he would be likely to act cruelly towards them. He is an individual that would become a leader of his party, such as a delegate in a mutiny, or captain of smugglers, being fond of command. He would be more likely to spend his time in public-houses and with low society than to move with respectability.

Being a great talker and a presuming, knowing, and cunning character, he would show some ingenuity, but more of cunning. To sum up, this is an individual who would have difficulty to keep out of trouble or a prison, and, perceiving by the jaws that it is the skull of an aged person, I consider him an old sinner and a criminal, and likely to lead others into trouble in company with him.

The gentleman who handed the skull to Mr. Deville was John Porter, Esq., M.D., a local physician, who wrote the following summary of the character of Peter Pass, a convict to whom the skull belonged :—

An aged man, seventy odd ; convicted five times ; transported three times for seven years,—at last for life ; insolent to the utmost, and incorrigible ; intolerably cross ; a most expert thief ; thirty-seven years of his life had passed in gaols, hulks and other places of confinement.

A further report, more in detail but alike in substance,

was forwarded from the 'Convict Hospital Alonzo' (where the man died) by Mr. John Strickland, an officer of the prison, who states among other things that Peter Pass was 'always threatening the lives of his fellow-prisoners and even making attempts at life. I have myself been often threatened by him and violently attacked.'

The following is narrated in the 'Journal du Beau Monde' of August 1, 1805 (published in Leipzig). I quote it because, so many cases of the diagnosis of criminals having been already selected, some readers may suspect that the conclusions of the phrenologists therein stated may have been influenced by the *knowledge* in the case of prison visits, and the *suspicion* where skulls have been *forwarded*, of the criminality of the subject under examination.

In this sad case Gall knew beforehand that the woman was a criminal, and also that she had drowned her child of four years of age in a river. She was among several other criminals brought before him at the prison of Torgau. The result is thus described in the magazine above named :—

> Dr. Gall examined her head; he took the hand of M. Loder, Privy Councillor of Halle, who was there, and moved it over the sides and the back of the woman's head, in order that he might understand what he was about to say. The prisoner having retired, he explained to the large assembly of persons present that he had discovered something very unusual in such cases, viz., that the prisoner had the organ of maternal affection largely developed, and that the organ of murder (now named destructiveness) was very small; that otherwise the organisation was good, and that the woman had considerable facility in learning by heart.
>
> The magistrates present then narrated what follows to Dr. Gall.
>
> This person, born of poor parents that she lost early, has received scarcely any education; when grown up she became a domestic servant in the country, and obtained the best of certificates from her employers. Unfortunately she was seduced and gave birth to a child. She was dismissed from her situation, and no one would employ her on account of her infant. She lived in extreme wretchedness for some time, always cherishing with all the affection of a tender mother the child whose existence she had reason to curse. At last a poor villager and his wife had pity for her, took charge of the infant and kept it for three years, during which the mother was engaged in the service of village employers and was always well conducted.
>
> The infant grew and was much beloved by its adopted father, so much so that the foul-mouthed of the village asserted that he

was the father, whose name the poor mother had always refused to reveal. The brave man treated these libels with contempt, but not so his wife. This led to such frequent and bitter altercations that the child was at last returned to its miserable mother. In vain she pleaded her faithful service in begging to be retained in her situation. She was ignominiously dismissed in the midst of winter. All the other villagers treated her with similar harshness. She wandered homelessly, and finally sold her clothing bit by bit to obtain food for herself and the starving child. Both became weaker and weaker from want of food and warmth. At last, driven to desperation and madness, and fearing to witness the death of her child by the slow process of starvation, she threw it into a river, on the bank of which she fainted, in which condition she was found. On revival she at once accused herself of having caused the death of her child, and was arrested accordingly.

During her detention, which has continued for a year, and while her trial was proceeding, her behaviour has been of the best, manifesting profound repentance, and submitting with resignation to her punishment. The ecclesiastic who visits her from time to time states that she had received no sort of instruction, had no ideas of any kind of religion, but nevertheless is docile, attentive, and gentle. The prison attendants and officers all report favourably of her conduct.

In consideration of these circumstances the regency has modified the original sentence of the tribunal of Leipzig, which condemned her to decapitation. This is commuted to imprisonment for life under mild conditions, and where she will receive religious instruction.

She has learned to read with extraordinary facility and grasps at once all that she is taught ; so much so that, besides learning the lessons given to her, she recites by heart, verbatim and without hesitation, the canticles, the catechism, and many chapters of the Bible. She is one of the prisoners that are the most highly praised.

Here we have a most complete verification of all the points of Gall's diagnosis, even to the very improbable facility of learning by rote.

If my old friend R. A. Proctor were still with us, I would ask him to estimate the percentage of such criminals in an ordinary prison, and on that basis calculate the probabilities—or rather improbabilities—of accidental coincidence of Gall's diagnosis on the several points named, that is, on the supposition that his diagnosis were not based on the actual correspondence of the shape of head pointed out to the Privy Councillor with the functions which Gall assigned to the parts of the brain underlying.

The following is from the introduction to Dr. Andrew Combe's 'Observations on Mental Derangement':—

When yet a student I joined in the general burst of ridicule with which the phrenological doctrines were received at the time of Dr. Spurzheim's visit to Great Britain in 1816–17, a piece of conduct which is explained, though far from justified, by the circumstance that I was then totally unacquainted with their nature and import. My attention was first seriously turned to the examination of these doctrines during my residence in Paris in the autumn of 1818, when Dr. Spurzheim's 'Observations sur la Phrénologie,' then just published, were happily put in my hands at a time when, from there being no lectures in any of the Parisian schools, I had ample leisure to peruse that work deliberately. I had not proceeded far before I became impressed with the acuteness and profundity of many of the author's remarks on the varied phenomena of human nature, and with the simplicity of the principles by which he explained what had previously seemed contradictory and unintelligible; and, in proportion as I advanced, the scrupulousness of statement, sobriety of judgment, and moral earnestness with which he advocated his views, and inculcated their importance, made me begin to apprehend that to condemn without inquiry was not the way to ascertain the truth of Phrenology, or to become qualified to decide in a matter of medicine or of philosophy. I therefore resolved to pause, in order to make myself acquainted with the principles of the new physiology, and to resort, as he recommended, to observation and experience for the means of verifying or disproving their accuracy, before again hazarding an opinion on the subject.

In carrying this resolution into effect in the following winter session, I had the advantage of being able to attend two Courses of Lectures delivered by Dr. Spurzheim, at Paris, on the Anatomy, Physiology, and Pathology of the Brain and Nervous System, during one of which a rather striking confirmation of his doctrine occurred. In the middle of the lecture of December 1, 1818, a brain was handed in, with a request that Dr. Spurzheim would say what dispositions it indicated, and he would then be informed how far he was correct. Dr. Spurzheim took the brain without hesitation, and, after premising that the experiment was not a fair one, in as far as he was not acquainted with the state of health, constitution, or education of the individual, all of which it was essential for him to be aware of before drawing positive inferences, he added that, nevertheless, he would give an opinion, on the supposition that the brain had been a sound one, and endowed with ordinary activity. After which, he proceeded to point out the peculiarities of development which it presented, and desired us to remark the unusual size of the cerebellum, or organ of amativeness, and the great development of the posterior, and of part of the middle lobes of the brain, corresponding to the organs of the lower propensities, the convolutions of which were large and rounded, forming a contrast with the deficient size of the anterior lobes, which are dedicated

to the intellectual faculties. The convolutions situated under the vertex, and towards the top of the head, belonging to the organs of self-esteem and firmness, were also very large, while those of veneration and benevolence were small. These peculiarities were so well marked, that Dr. Spurzheim felt no difficulty in inferring that the individual would be very prone to sensual indulgences; that 'his natural tendencies would not be towards virtue;' that he would be what is familiarly expressed in French by *un mauvais sujet*, a very comprehensive term for every variety of bad dispositions, and that, *he would be one to whom the law would be necessary as a guide*, but not knowing the circumstances in which he had been placed, he could not say what his actions might have been.

At the conclusion of the lecture, a young man, *élève interne* of the Hôtel-Dieu, came forward and said that the brain was that of a *suicide* who had died in the hospital, and that the dispositions inferred by Dr. Spurzheim coincided perfectly with those manifested during life.

As I was at the same time following the surgical clinique of the celebrated Dupuytren, whose patient he was, and as the case was interesting both in a professional and phrenological point of view, my attention had been particularly directed to this very individual from the day of his entrance into the Hôtel-Dieu to that of his death, a period of about fourteen days, and I was thus better able to appreciate the perfect accuracy of Dr. Spurzheim's conclusions than if I had merely trusted to the report of the *élève*. The man, it appeared, had been a soldier, and had, for some crime, suffered ignominious punishment, and been dismissed from the army. He returned to Orleans to resume his trade of barber, but every one shunned him; and suspecting his wife to have been secretly his enemy, he attempted to kill her with a knife, and, being defeated in this, he stabbed himself in the side, was carried to the hospital, and died of the wound.

Dupuytren, when commenting on this case in his lectures, made daily complaints of the man's '*mauvais moral*,' *imperiousness, and violence of temper*, and represented these qualities as great obstacles to his recovery. So that, altogether, the close coincidence between the facts with which I was familiar and the remarks of Dr. Spurzheim, who had never seen the skull, and judged from the brain alone *as it lay misshapen on a flat dish*, made a deep impression on my mind, as it went far to prove, not only that organic size has a powerful influence on energy of function, but that there actually were differences in different brains, appreciable to the senses, and indicative of diversity of function.

I have quoted the above thus fully because it justifies my present chapter by displaying the influence of such 'ostentatious instances' on a truly philosophic mind. Dr. Andrew Combe did not at once accept Phrenology as proved by this single case of successful predication of character under such

difficult conditions, but concluded that it justified further investigation, and he proceeded accordingly. His results are described as follows :—

> In continuing the practical observations I had begun to make on living heads, I met at first with many difficulties, partly from unacquaintance with the local situations of the alleged organs, and partly from want of experience in observing ; and thus, while the general result seemed to be confirmed, many apparent exceptions presented themselves, and gave rise to numerous doubts. In extending my observations, however, for the purpose of substantiating these objections, natural solutions so invariably presented themselves, one after another, in proportion as they were scrutinised, that, after two years' experience, the conviction of the truth of the fundamental principles, and of the correctness of the functions ascribed to many of the larger organs, became irresistible, while I still hesitated in regard to several of the smaller organs, the evidence of which I had not sufficiently examined.
>
> Actuated by the natural feeling of improbability that so much should have been discovered in so short a time by only two individuals, however eminent their talents and felicitous their opportunities, I still expected to meet with some important errors of detail, and, so far from being disposed to adopt implicitly all the propositions of Drs. Gall and Spurzheim, I rather looked for, and expected to find, some hasty conclusions or unsupported assumptions ; and my surprise was extreme to discover that, in the whole extent of their inquiry, they had proceeded with so much caution and accuracy as, in all their *essential* facts and inferences, to have rendered themselves apparently invulnerable.

This is precisely the course which I desire my readers to pursue in presenting to them the only kind of evidences of Phrenology that can be put upon paper. I ask them to consider critically and severely whether the cases and facts described in this section of this book offer *presumptive* evidence of the scientific merits of Phrenology ; and whether, when taken in conjunction with the other section describing the ' Utility of Phrenology,' it is worth their while to proceed further by going to Nature and investigating the subject in the same critical, fair, impartial, and truly scientific spirit as that which actuated Dr. Andrew Combe. Some may fear that this will be very difficult to those who have not the opportunities afforded to the physician. Although it is perfectly true that the physician, both by his professional studies and his practical opportunities, has very special advantages, the difficulties to the layman are not nearly so great as may be supposed. We are all, by

necessity, students of character; we all have phrenological materials continually before us, in ourselves, in our nearest and dearest friends and relations, and in all our fellow-creatures around us. In my final chapter I endeavour to show the reader how he may commence his studies in the practical use of these materials.

CHAPTER VI

PATHOLOGICAL EVIDENCE

LOCAL PAIN

I now come to evidence based on a class of cases described by Bacon as *instantiae ostentivae*, ostensive or glaring instances—extreme cases, which are selected here, not as samples of those upon which the science is founded, but because they are presentable on paper, and because they are more striking than ordinary cases, though, for reasons that will be explained as we proceed, they are less conclusive than such ordinary cases.

In this chapter are some examples of local pain in the head, attended with mental disturbance. My own observations, both on myself and others, have convinced me that milder instances of this kind are very common, and that they demand far more attention from the physician than they have yet received. In these days of mental high pressure we are all liable to cerebral disturbance, to brain trouble, varying in degree from mere irritability to serious derangement. Localized pain in the head, when studied by a physician who understands the functions of the different parts of the brain, may in many cases indicate the origin of the disturbance, and suggest the moral and physical remedies which, if applied in time, will prevent the serious results which are likely to follow when such premonitory symptoms are neglected.

I therefore recommend the perusal of this chapter to my medical friends, both as presenting phrenological evidence, and as worthy of practical and direct professional consideration.

The following is from a paper read by James Simpson, advocate and well-known educationalist, to the Phrenological

Society of Edinburgh, on February 3, 1825, and printed in the 'Phrenological Journal,' vol. 2, p. 290 [1]:—

Miss S. L., a young lady under twenty years of age, of good family, well educated, free from any superstitious fears, and in perfect general health of body and soundness of mind, has nevertheless been for some years occasionally troubled, both in the night and in the day, with visions of persons and inanimate objects. She was early subject to such illusions occasionally, and the first she remembered was that of a *carpet* spread out in the air, which descended near her and vanished away.

After an interval of some years, she began to see human figures in her room as she lay wide awake in bed, even in the daylight of the morning. These figures were *whitish*, or rather *grey* and *transparent* like *cobweb*, and generally about the size of life. At this time she had acute headaches, and very singularly confined to one small spot of the head; on being asked to point out the spot, the utmost care being taken not to lead her to the answer, our readers may judge of our feelings as phrenologists when she touched with her finger and thumb *each side of the root of the nose, the commencement of the eyebrows, and the spot immediately over the top of the nose, the ascertained seats of the organs of Form, Size, and Individuality!* Here, particularly on each side of the root of the nose, she said the sensation could only be compared to that of running sharp knives into the part. The pain increased when she held her head down, and was much relieved by holding her face upwards. (Does not this look like a pressure of blood on that region of the brain?) Miss S. L., on being asked if the pain was confined to that spot, answered that some time afterwards *the pain extended to right and left along the eyebrows, and a little above them, and completely round the eyes, which felt often as if they would have burst from their sockets.* When this happened her visions were varied precisely as the phrenologist would have anticipated, and she detailed the progress without a single leading question. Weight, Colouring, Order, Number, Locality, all became affected; and let us observe what happened. The whitish or cobweb spectres assumed the natural *colour* of the objects, but they continued often to present themselves, though not always, above the *size* of life. She saw a beggar one day out of doors, natural in size and colour, who vanished as she came to the spot. Colouring, being over-excited, began to occasion its specific and fantastical illusions. Bright spots, like stars on a black ground, filled the room in the dark, and even in daylight; and sudden and sometimes gradual illumination of the room during the night often took place, so that the furniture in it became visible. Innumerable balls of fire seemed one day to pour like a torrent out of one of the rooms of the house down the staircase. On one occasion, the pain between the eyes, and along the lower ridge of the brow, struck her suddenly with

[1] The Editor notes that he is 'empowered by the Author to afford the means of satisfactory verification of this case to any philosophical inquirer.'

great violence; when *instantly* the room filled with stars and bright spots. On attempting, on that occasion, to go to bed, she said she was conscious of an *inability to balance herself, as if she had been tipsy;* and she fell, having made repeated efforts to seize the bedpost, which, in the most unaccountable manner, eluded her grasp, *by shifting its place*, and also by presenting her with *a number* of bedposts instead of one. If the organ of Weight, situated between Size and Colouring, be the organ of the instinct to preserve, and power of preserving equilibrium, it must be the necessary consequence of the derangement of that organ to overset the balance of the person. Over-excited Number we should expect to produce multiplication of objects, and the first experience she had of this illusion was the multiplication of the bedposts, and subsequently of any inanimate object she looked at, that object being in itself real and single—a book, a footstool, a workbox would increase to twenty or fifty, sometimes without *order* or arrangement, and at other times piled regularly one above another. Such objects deluded her in another way, by increasing in *size*, as she looked at them, to the most amazing excess, again resuming their natural size—less than which they never seemed to become, and again swelling out. Locality, over-excited, gave her the illusion of objects, which she has been accustomed to regard as fixed, being out of their places; and she thinks, *but is not sure*, that on one occasion a door and a window in one apartment seemed to have changed places: but, as she added, she might have been deceived by a mirror. This qualification gave us the more confidence in her accuracy when, as she did with regard to all her other illusions, she spoke more positively. She had not hitherto observed a great and painful confusion in the visions which visited her, so as to entitle us to infer the derangement of Order. Individuality, Form, Size, Weight, Colouring, Locality, and Number only seemed hitherto affected.

For nearly two years Miss S. L. was free from her frontal headaches, and—mark the coincidence—untroubled by visions or any other illusive perceptions.

Some months ago, however, all her distressing symptoms returned in great aggravation, when she was conscious of a want of health. The pain was more acute than before along the frontal bone, and round and in the eyeballs; and all the organs there situated recommenced their game of illusions. Single figures of absent and deceased friends were terribly real to her, both in the day and the night, sometimes *cobweb*, but generally coloured. She sometimes saw friends on the street, who proved phantoms when she approached to speak to them; and instances occurred where, from not having thus satisfied herself of the illusion, she affirmed to such friends that she had seen them in certain places at certain times, when they proved to her the clearest *alibi*. The *confusion* of her spectral forms now distressed her. (Order affected.) The oppression and perplexity were intolerable when figures presented themselves before her in inextricable disorder, and still more when

they changed from whole figures to parts of figures, faces, and half-faces, and limbs — sometimes of inordinate size and dreadful deformity. One night as she sat in her bedroom, and was about to go to bed, a *stream* of spectres, persons' faces and limbs, in the most shocking confusion, seemed to her to pour into her room from the window, in the manner of a cascade! Although the cascade continued apparently in rapid descending motion, there was no accumulation of figures in the room, the supply unaccountably vanishing after having formed the cascade. Colossal figures are her frequent visitors. (Size.)

Real but inanimate objects have assumed to her the forms of animals; and she has often attempted to lift articles from the ground which eluded her grasp.

More recently she has experienced a great aggravation of her alarms: she *began* to hear her spectral visitors speak! At first her crowds kept up a buzzing and indescribable *gibbering*, and occasionally joined in a loud and terribly disagreeable *laugh*, which she could only impute to fiends. These unwelcome sounds were generally followed by a rapid and always alarming advance of the figures, which often on those occasions presented very large and fearful faces, with insufferable glaring eyes, close to her own. All self-possession then failed her, and the cold sweat of terror stood on her brow. Her single figures of the deceased and absent friends then began to gibber, and soon more distinctly to address her; but terror has hitherto prevented her from understanding what they said.

She went, not very wisely, to see that banquet of demonology, 'Der Freischütz,' and of course for some time afterwards the dramatis personae of that edifying piece, not excepting his Satanic Majesty in person, have been her nightly visitors. Some particular figures are persevering in their visits to her. A Moor, with a turban, frequently looks over her shoulder, very impertinently, when she uses a mirror.

Of the other illusive perceptions of Miss S. L. we may mention *the sensation of being lifted up*, and of *sinking down* and *falling forward*, with the puzzling perception of objects off their perpendicular; for example, *the room, floor and all, sloping to one side.* (Weight.)

Colours in her work, or otherwise, long looked at, are slow to quit her sight. She has noises in her head, and sensations of heat all over it; and, last of all, when asked if she experienced acute pain elsewhere about the head than in the lower range of the forehead, she answered that three several times she was suddenly affected with such excruciating throbbing pain on the top of the head that she had almost fainted, and when asked to put her finger to the spot, *she put the points of each fore-finger precisely on the organ of Wonder, on each side of the coronal surface!* the same points in which the gentleman we saw in London, who was troubled with visions, was affected with pain. The organ of *Wonder* is large in Miss S. L., as it was in that gentleman.

I had written thus far, when I received a communication from our fair sufferer of a more recent experience of hers of a yet more pointed kind. She has lately observed that, while objects were most fantastically enlarging and diminishing to her deluded sense, the pain has struck as if deeply into the minute point where the organ of *Size* is situated, *and there alone*. This happened lately while a pillar magnified and shrank alternately as she gazed on it. This illusion ceased, and another came to her cheated view. Two demons of the 'Freischütz,' decently dressed in black in the original, put on for her the most brilliant scarlet, while acute pain was felt in the middle point of both eyebrows (colouring), *and there alone*.

I. *Case of Spectral Illusion.*—Communicated in a letter to the editor of the 'Edinburgh Phrenological Journal.'

Sir,—I take the liberty of sending the following case of spectral illusion, as it affords an additional illustration of the truth of the phrenological views on this subject.

A gentleman with whom I am acquainted, of rather full habit, and somewhat indulgent in the pleasures of the table, retired one day after dinner to take his customary doze in the afternoon. Before lying down he was suddenly seized with a sense of faintness, *staggered*, and would have fallen had he not laid hold on the bedpost, which supported him. At the same moment he felt uneasiness and pain in the head. On a sudden he perceived, as it were, a number of faces looking over his right shoulder, of various forms and sizes, with large staring eyes and hideously contorted features, which moved without ceasing. After a few moments the pain of head subsided, the spectres vanished, and he regained the power of standing erect. When relating the occurrence, I requested him to point out the precise situation of the pain he experienced, and he immediately referred to the lower part of the forehead and the eyebrows, including particularly the regions of *Form*, *Individuality*, *Size*, and *Weight*. This gentleman was, at that time, wholly unacquainted with Phrenology, and desired me to tell my reason for inquiring the situation of the pain. He had never before experienced illusions, nor has he suffered any return of them. It is interesting to observe that in this case the organs of the perceptive faculties are largely developed.—I remain, &c.

W. N. Whitney.

3 North Street, Westminster.

On the occasion of Dr. Spurzheim's visit to the City Lunatic Asylum of Edinburgh, on February 19, 1828, accompanied by Dr. Hunter, the surgeon of the establishment, the Hon. Mr. Hallyburton. Dr. Combe, and some other gentleman, a female patient who saw ghosts and spectres was examined.

In her the organ of *Wonder* or *Marvellousness* was remarkably developed. Dr. S. asked her if ever she complained of a headache. She answered she did ; and being requested to put her hand on that part of the head where she felt the pain, she did so on the very spot where the above organ is situated. (From the 'Edinburgh Phrenological Journal,' May, 1828, p. 143, where the results of examining other cases are narrated.)

II. *Cases of Disease of the Organs of Perception.*—Communicated by W. A. F. Browne, M.D., Superintendent of the Crichton Lunatic Asylum, Dumfries, to the 'Edinburgh Phrenological Journal,' vol. 16, p. 77 (1841).

Two cases have recently occurred in my practice which tend to establish these important principles : *First*, the plurality of cerebral organs and of the powers connected with them ; *Secondly*, disease of particular parts of the cerebral mass and of the powers connected with them, the integrity of the remainder being unaffected ; *Thirdly*, that the situation of these diseased parts is ascertainable from the sensations of the patient.

1. E. C., æt. 45. Wife of a merchant ; well educated, head large, temperament bilio-lymphatic. This lady has experienced several misfortunes in her family, which gave rise to much ill-health of body, and to a restless, irritable state of mind. The first indication of actual delusion was the appearance of a transient halo around whatever object she steadfastly regarded. Latterly, her false perceptions have become numerous. She now walks with difficulty, in consequence of the impression under which she labours that a smooth surface is an irregular one, that deep chasms constantly occur in the floor over which it is necessary to stride, that the height of one step of the stair is greater than that of another, or that she totters on the brink of a precipice. Noises which are scarcely perceptible to others annoy her much, both from their supposed loudness and harshness, and from their resembling voices addressing her in conversation. Her language is likewise affected. She either has a difficulty in recalling expressions, or misapplies or misplaces such as she can command. Her memory of facts is much impaired. She is not alive to cleanliness or arrangement of dress, etc. These symptoms are occasionally entirely absent, when she regains her original acuteness and intelligence ; but even then, when they are present and inspire her with fear and anxiety, she doubts the reality of the sensations she receives, and appeals to those around her for confirmation and assistance. It is worthy of remark that while in bed or resting recumbent she is rarely visited by these delusions, but that upon getting up, or upon any sudden change of position, she is surrounded by luminous spots, vacillates in her gait, and is for an interval incapable of attending to any external object, or of disabusing her mind of those perceptions, or of the fear and agitation which they create. This circumstance led her former medical attendant to suspect organic disease of the brain. Since

the appearance of her present condition, she has complained of exquisite pain across the lower part of the forehead and temples ; and so intense has been the suffering in these parts upon some occasions, as to render her unable to bear the weight or even the touch of glasses which she was accustomed to wear.

2. E. F., æt. 42. A lady of good birth, and originally of extremely amiable and refined manners, of considerable acuteness, but of rather an irritable temper. The head is small in all its regions, temperament highly nervous. She was educated at a time, and in a manner, which gave a preference to external grace over the more solid and supporting culture of the mind. She had no self-resource, and lived upon external pleasurable impressions. She married her husband after a short acquaintance, upon the ground of what they conceived was affection, but in a great ignorance of their own hearts and expectations. A disagreement took place in the course of a few weeks, and seems to have been the commencement of a long and painful series of quarrels, recriminations, explanations, and estrangements and reunions, which terminated in a final separation.

This disappointment, and great excitability of the heart and circulating system, are assigned as the causes of her disease, which was ushered in by excruciating headache, throbbing in the head, and confusion of thought. Before the period when she observed the puzzling appearances about to be detailed, she was tormented by frightful dreams, in all of which she was tormented by an old woman in a red cloak ; that is, before the mind or other powers were so far enfeebled as to receive, or for a moment give credit to, false impressions in a waking condition. Deviations from healthy action took place during sleep, when the mind is least able to discriminate as to the nature of the impressions imparted, and altogether incapable, voluntarily, to introduce or exclude particular trains of thought.

The malady is now marked by various delusions as to the colour, size, and shape of external objects, and as to her personal identity. This lady is perfectly rational upon all other points, and competent to give a clear and accurate account of her own feelings. Her credibility, as an evidence of her own infirmities, is augmented by her rejection of these false impressions, and her refusal to act upon them, except when under the immediate influence of excitement and apprehension. Her belief, even then, is an equipoise between the suggestions of her senses and the conviction of her reason. When driven to decide between such conflicting testimonies, she attributes the appearances to imperfect vision. She chiefly dwells upon the changes which individuals with whom she is in constant intercourse undergo in their general appearance, but especially in the colour of the hair, the eyes, and the contour of the nose and face. For example, while residing in a clergyman's house, her host presented himself to her in at least thirty different forms ; and so perplexing and distressing did the metamorphosis become, that she was, in self-defence, obliged to leave the house. These alterations most frequently occur when she becomes accustomed to

the society of those in whom they are noticed, when the novelty and vividness of her first impressions have ceased to rivet her attention, and when her interest in ordinary events begins to flag. Twice persons have entered her apartment who were not, and could not be, in the house; who were, in fact, at a distance, but who were so visibly before her, and submitted to be so thoroughly scanned and recognised as to overcome all her doubts, and induce her to pursue them when they retired. Her caps, stays, etc., sometimes become so large as to caricature her real size; and she has observed differences of colour in curtains. Next in order of intensity is the suspicion that there are two E. F.'s exactly alike, wearing clothes of the same hue and material, and so placed and acting as to lead to incessant mistakes as to their individuality and concerns. When beset by this apprehension, she goes over her whole genealogical tree, produces letters from her relations, and so forth, to prove that she is what she represents herself to be, the genuine E. F. While subject to these delusions, she complains of headache, chiefly confined to the superciliary ridge or lower part of the forehead, and, when traced by her finger, as clearly circumscribing the region of the organs of perception as the line upon a phrenological bust.

When lately at Manchester, we visited the excellent school of Mr. Charles Cumber, a member of the Society of Friends. While conversing with us upon the heads of several of his pupils, he presented to us an interesting girl of about seventeen or eighteen years of age, who, he said, had received a violent blow on the middle of the forehead, just above the eyebrows, having run up against the edge of an open door in the dark. She had since suffered much pain on the spot, and was retarded in her education, probably in consequence of an injury to the organs of Individuality and Eventuality.

It immediately occurred to us that there was a possibility that this girl might have experienced some of the illusions which follow morbid action in that region of the brain. We asked her whether she was not visited by apparitions of persons and other objects. She answered in the affirmative; and from her description of her case, it appeared to us to resemble in several respects that of Miss S. L. Her apparitions were as real as apparitions can be, and their appearance was always attended by increased pain in the part. They had alarmed and terrified her at first, but she told us that, having been informed that they proceeded from a certain state of her brain, occasioned by the blow, her terrors vanished, and she does not mind her visitors when she ascertains them to be spectral illusions. We consider this a valuable addition to the evidence already accumulated on this curious subject, from the disease having a local ascertainable cause.

The above is by the editor of the 'Edinburgh Phrenological Journal' (vol. 10, p. 217). It is one of a long series of communications and articles on the subject of spectral illusions.

To quote all of these would overburden the present work. One is that of Miss S. L., which I have already quoted. In addition, I select the following from vol. 5, p. 430, communicated by Mr. Levison, of Hull :—

J. B., a retired tradesman to whom I was introduced, was a man of strong uncultivated intellect, but with very curious and *outré* opinions. After some conversation he informed me that he saw, on going to bed, all kinds of figures—sometimes they were ugly and deformed, and at other times they were pleasing and beautiful; when the latter, he invariably retained them *ad libitum*, and when the former, he very soon dismissed them.

In answer to a question I put to him in reference to his power over the *groups*, either to retain or dismiss them through an effort of his will, he replied that it had puzzled him very much, 'for they seemed quite dependent on my caprice—yet not exactly so at all times, as I do not know when I go to bed *which set* will present themselves, but when they are the demon-like ones I start them immediately; sometimes I cannot recall others in their place, but generally they (the handsome ones) come at my suggestion.' I further interrogated him whether he shut or opened his eyes; he said, 'That makes no difference, and I can continue to speak to my wife and describe them without their being the least disturbed by it.'

It naturally suggested itself to me that *individuality* and many of the perceptive faculties were under a morbid excitement, and therefore I requested that he would inform me whether or not he felt pain at any part of the head; he answered, 'that every time before he experienced this peculiar power of seeing figures he *invariably felt pain in and between his eyes, and, in short, all over the eyebrows.*'

The friend that introduced me to him is a medical man who has a lurking taste for Phrenology (but has hitherto been prevented by ill-health and an extensive country practice from attending to it), but who brought the subject of this sketch to me, *as one that presented to him a real enigma;* for, 'strange to tell,' J. B. did not believe in the phantasmal *existence* of these sprites, and referred them himself to 'some disease of the eye or vision,' till I convinced him, by my remarks on his seeing in the dark whether his eyes were open or shut, that such an opinion was erroneous, and gave him the phrenological solution of his case. He assured me that he was a decided sceptic on matters of a speculative or abstract nature, and certainly I never felt such a deficiency of *marvellousness* as that in the cranium of J. B.; it was just as if the brain had been scooped out at the situation on each side where the organ is situated.

It was J. B.'s constant disputations on the absurdity of believing in aught that the senses could not demonstrate, and still more his frequent assurance of seeing nocturnal sprites, that suggested to my respected friend that he would be a decided riddle to me, but

nothing was easier to unravel. Although his perceptive organs (those which take cognizance of objects and their qualities) were evidently under peculiar excitement, yet his referring these to natural causes must be explained by his having good intellectual faculties and such a palpable deficiency of marvellousness.

I select this case as it strongly indicates an apparent contradiction that may have puzzled some of my readers. In the visits to lunatic asylums described in Chapter iv. are some cases where the phrenologist inferred the probable existence of spectral visions on account of the great development of marvellousness, while in the cases narrated in this chapter the spectres are described as due to the morbid activity of the perceptive faculties, and in J. B. this is accompanied with extreme deficiency of marvellousness.

Now note the difference. Where marvellousness was excessively developed there was *belief* in the reality of the visions. Marvellousness is the organ of *faith* or sentimental belief; its function includes a craving for the marvellous, and a desire to believe in it. In monomania due to diseased activity of this region of the brain this desire overpowers the intellect, and the phantoms are accordingly believed to be realities, just as the victim of diseased activity of self-esteem not only desires to be a king, but believes that he is one in spite of his compulsory obedience to asylum discipline.

The following from the 'American Phrenological Journal,' vol. 4, p. 174, 1842, is an intermediate case, communicated by Mr. B. J. Gray, of New Fairfield, Connecticut:—

Mr. T. Parsels, of this town, has, for several weeks past, complained of having a most violent pain in the coronal region of his head. Knowing that he had recently connected himself with the church, and that, of late, he had been very thoughtful upon religious subjects, I concluded it was probable an undue excitement of the organs had created the pain in his head; inasmuch as he had made use of the usual remedies for headache proceeding from a disordered stomach. He also said it was entirely different from common headaches. I then asked him if religion were not the chief subject of his thoughts while awake. He answered he could scarcely think of anything else, that he had been uncommonly exercised in his mind on this class of subjects for the last two months, had dreamed of hearing a voice that waked him from sleep, when at once the Saviour clothed in white appeared before him, and conversed with him. I asked if he experienced any pain after this vision. He said 'the pain was very severe across the top of his head.' I then placed my fingers on the organ of marvellousness, and asked him

if the greatest pain were not there. He said it was. He has at other times, within a few weeks, dreamed of seeing the Saviour, and always experiences the same violent pain in the organs of marvellousness and veneration. I observed, in particular, that these organs were much warmer than other portions of the head. Veneration, however, is smaller than marvellousness, and the pain is much more severe in the latter than in the former. Conscientiousness and cautiousness are large, and this combination, I apprehend, produces his occasional doubts and fears of being lost, etc. I advised him to keep his mind from dwelling on this class of subjects as much as possible for the present, and to work moderately; then, if it did not subside, to apply a blister, which I thought would reduce the excitement, and he would soon be well. I am no doctor; these are simply my views of the subject, and accord, I believe, with many similar instances recorded in your most valuable journal.

I have found no further record of the progress of this case, which is typical. If Mr. Parsels attended to the advice of his friend (as regards the moral prescription, I am doubtful about the blister), he was probably saved from serious monomania.

When Phrenology takes its proper place in medical education, local pain in the head and inequality of temperature will be understood as symptoms of cerebral disturbance demanding serious attention.

Here is a case in point from vol. 5 of the same Journal, p. 96, Feb. 1843:—

Dr. Hurd, of Canastota, Madison Co., N. Y., has reported the following. A girl in his practice, who was studying arithmetic with unusual zeal and earnestness, came home one day from school, saying that she felt a strong disposition to *count*, *add*, *subtract*, and *multiply*; and complaining that her head ached. Her sleep, also, was continually interrupted by ciphering *in her head in the night*. These symptoms continued to increase for two days, until, at last, they became intolerable, and the family physician was called. He was a phrenologist, and no sooner learned that she experienced pain in the head together with this counting propensity, than he asked her what part of her head pained her. She replied, 'Here,' placing her thumb and finger upon the two organs of calculation. He, of course, applied local remedies to the afflicted organ, with a view to allay the irritation, and soon effected a cure.

Morbid Affection of Alimentiveness.

(*From the 'Edinburgh Phrenological Journal' of March* 7, 1831.)

To the Editor.

Sir,—The following case may perhaps be deemed worthy of record, on account of its affording presumptive evidence in confirm-

ation of the opinion, that the desire for food is a function of the particular part of the brain at the base of the middle lobe, and lying on the fossa of the sphenoid bone, behind, and partly lower than the sockets of the eye. . . . D. M. was admitted into the Clinical Wards of the Royal Infirmary of Edinburgh in December last as a patient, under the following circumstances, narrated by the clinical clerk at the time of the physician's visit. He had been subject to epileptic attacks about twelve months before, which had ceased for some time, but again returned about two months previous to the date of his admission, in consequence, it was supposed, of his being exposed to the nauseous effluvia of a dead body. Two fits had occurred the day before his admission, the second of them at half-past four in the afternoon, but at bedtime he was as well as usual, and appeared to have slept from thence to five the next morning, when he awoke, as related by his sister, 'craving for food,' and had been 'eating continually' from that time till sent to the Infirmary about noon. His stomach was greatly distended by the quantity of food swallowed, but was not painful on pressure. He was delirious, and still complaining that he was dying of hunger at the time of admission.

He knew his sister and other friends who accompanied him. Since his last attack he had complained of pain of the right ear. Was reported not to have slept during the night after his admission, but about midnight became less noisy, though still equally incoherent. The details of treatment it is unnecessary to give. He was first seen by me during the physician's visit, twenty-four hours after admission into the Infirmary, at which time he was very dull and unwilling to be disturbed by questions or any external impressions. His head was thrown far back, and when raised from the pillow evinced some tendency to move from side to side, and a slight degree backward and forward at the same time, so as to make the motion somewhat diagonal, but this motion never brought the head nearly so far forward as in the natural position.

When roused by loud or repeated questions he answered imperfectly, but to the point, and frequently muttered, 'Hunger, hunger, hunger, it's hunger,' which expressions were almost invariably followed by a peculiar motion of the mouth, as if he were sucking and moving to and fro something enclosed in it. The lips were protruded forwards. He could now eat but little when food was given him. To ascertain the exact seat of the pain in his ear, I asked where it was, but could not induce him to raise his hand to the spot, though he said 'in his ear.' I then touched the head immediately above the temporal process of the zygomatic arch, and he said it was there. On touching the mastoid process, and asking if the pain was there also, he replied no; but on applying my finger about an inch below the situation first touched, he said it was there too. This showed that the pain was limited to the locality of alimentiveness. An hour afterwards he fell asleep, and slept nearly nineteen hours, with the intermission of an hour. From this

period he gradually improved, and at the end of a fortnight was dismissed.

The day before dismissal I asked if he felt any pain, and he immediately touched the right side of his head, exactly in the situation before mentioned, and said that he still felt occasional pain there, but not always. . . .

The external configuration indicated a large but not remarkable development of alimentiveness, with but a moderate anterior lobe of the brain. What his usual appetite had been I have not succeeded in learning.

The above are such of the particulars of this case as seemed most important to be related. The epileptic attacks, the delirium and incoherence, the local pain, and the pathognomic symptoms evinced in the position and peculiar motion of the head, all tend to establish the existence of disease in the head, and also in that particular part of it where phrenologists have supposed the organ of alimentiveness to be situated. Nor was any complaint made of pain in the stomach, or elsewhere, till three days after admission into the hospital, when slight pain was felt on the right side.

It has been objected to phrenologists that their physiological views derive little confirmation from pathology; but the case here given may furnish an instructive, nay, almost satirical answer to such an objection. It occurred in those wards of the Infirmary set apart for the instruction of medical students, and was consequently seen by many. It was also under the care of a medical Professor, fully competent both to observe and reflect upon what passes beneath his eye; yet the coincidence which it offered in confirmation of one of the phrenological organs passed unnoticed, except by a very few. How many other evidences which the sick-bed would furnish in support of the doctrines of Gall and Spurzheim may be thus overlooked! Certainly, this is by no means the first of such evidences that during a brief attendance in the wards of our Infirmary I have seen pass equally unobserved. . . . I have not the slightest reason to believe that such evidences would be purposely overlooked. They remain unobserved merely on account of the physicians in superintendence not having made themselves sufficiently acquainted with Phrenology to see whether disease really does yield facts in confirmation of its doctrines. Perhaps phrenologists ought not to expect our physicians to study *their* philosophy of the mind; but they may with justice affirm that no one *unacquainted with Phrenology* is entitled to say that pathology affords no evidence in support of it. . . .

A Medical Student.

Edinburgh, January 12, 1831.

A similar case is described by M. C. Place in 'La Phrénologie' of May 20, 1837. The pain was in the same region, and described by the patient 'as if a knife were thrust in front of the ear and almost to the middle of the head.' The stomach

was simultaneously inflamed. 'The patient only felt relief at the moment when she satisfied the hunger, or rather the appetite, which she felt; but the food, even in the form of the lightest drinks, was immediately thrown up again.'

A peculiarity of this case was that—

> Leeches were applied to the epigastric region, and repeated without alleviating the inflammatory symptoms in the stomach or those in the head, but when they were applied to the temporal region with iced water after their fall, the pain in this region was lessened; and *then, and then only*, and without any fresh application of leeches, was the inflammation of the stomach subdued, so far as to allow the retention of fluids, and to support light food given by degrees. The abdomen no longer had any symptoms of inflammation, but was soft and free from pain.

The patient afterwards continued well for six weeks, and then had a relapse. 'The symptoms were similar, although less violent; and the headache, instead of being in the left temporal region, this time was felt in the corresponding situation on the opposite side.'

The writer says that he has observed many other similar cases, usually brought on by intemperance in drinking or eating: that is, by excessive action of that part of the brain to the over-activity of which the phrenologist attributes gluttony and drunkenness.

We now have a society for the study and cure of inebriety, all the medical members of which agree in regarding the intense craving for drink of the habitual drunkard as a form of insanity, but they have not yet located the cerebral seat of this disease, and, so far as I am acquainted with their proceedings, have not yet begun to look for it where they are likely to find it, nor will they do so until they become phrenologists.

A curious case is reported by MM. Ombros and Pentelithe. A patient 'was tormented with a continual desire of eating. Spurzheim, who was taken to see him on his way to Lyons, thought he perceived in the temples a greater heat than in the rest of the head. Leeches were applied *and the hunger was immediately allayed*.'

MM. Ombros and Pentelithe also tell us that 'an old man of the Hospice de la Charité, who had been remarkable for drunkenness, died of gastro-hepatitis: on dissection we found a perfectly distinct erosion of the two convolutions of

alimentiveness on the left side;' and 'a man aged fifty died of chronic hepatitis, brought on by excessive use of spirituous liquors. We found in him the same erosion. These two observations are highly interesting with reference to the study of the seat of the faculty in question.'

Another case is thus narrated by the same :—

> A woman of small stature and spare habit of body, and whose appetite had always been strong, got a violent fright. Instantly, as she herself stated, she felt the blood carried to her head, and the rest of the body chilled. From that time she was subject to severe pains in the temples; but what tormented her most was a desire to eat which nothing could satisfy.

Some readers may regard the bare idea of placing the sense of hunger and thirst in the brain rather than the stomach as quite absurd. If so I recommend them to read an article entitled 'View of the Present State of Knowledge respecting the Organ of Alimentiveness,' in the 'Edinburgh Phrenological Journal,' vol. 10, p. 249. Some of the cases of insane voracity there quoted from the 'Philosophical Transactions,' the 'Dictionnaire des Sciences médicales,' and other similar authorities, are horribly sensational—cases of hospital patients devouring not only the broken food of their fellow-patients, but their poultices, and drinking their blood; of devouring living dogs, and cats, and snakes; of tearing their own flesh, and finally resorting to cannibalism. This, like all other forms of mania, is due to brain disease, not to any condition of the stomach.

Sudden Affection of Philoprogenitiveness.—Communicated to the editor by Richard Cull. (From the 'Edinburgh Phrenological Journal,' vol. 11, p. 292.)

The following case of acute pain in the organ of philoprogenitiveness, in connection with a dreadful circumstance to a fond mother's feelings, was related in company by a medical gentleman who is a non-phrenologist—that is to say, not an anti-phrenologist nor yet a confirmed one. As I thought the fact valuable in itself, and also valuable as it was observed by a non-phrenologist, I requested a written account of it in order to transmit to you for insertion in the Journal. The following is the note I received :—

20 Grove Place, Lisson Grove, January 10, 1838.

My dear Sir,—The following is the case you are anxious should be made public. A woman about thirty years of age called on me one morning, complaining of pain in the side, attended with slight febrile symptoms, etc. Among other questions concerning the state of her feelings, I asked if she had any pain in the head; she replied she had a 'constant pain in the back part of her head,' at the same time placing her hand over the region in which phrenologists have placed the organ of philoprogenitiveness. She then proceeded to state that, about four years since, as she was standing at her street door, her only child (then about two years of age) wandered to the side of the carriage road; and that she suddenly saw him between the fore and hind wheels of an omnibus which was passing. With a superhuman effort she flew towards the vehicle, and succeeded in rescuing him from his perilous situation. At that instant she felt a severe pain dart across the back of her head, 'as though a knife had been stuck into it,' and she immediately became senseless, and continued so for several hours; and from that time she has always had pain in this situation, which is increased whenever she is out of health, but never disappears altogether. In haste, yours very truly,

H. B. Burford.

A similar case to the above is thus reported in the 'Edinburgh Phrenological Journal,' vol. 12, p. 65 :—

A lady, who was remarkably fond of her children, in relating the particulars of an accident that happened to one of them, stated as a very strange occurrence that, from the moment she saw the child fall until she was assured of its being out of danger from the consequences of the accident, she never lost sense of an acute pain confined to one spot of the head. This pain seized her suddenly as she staggered against a wall, in consequence of the shock at witnessing the accident, and the medical attendant was inclined to think that her head had sustained some injury, till the cessation of the pain, as suddenly as it occurred, put an end to any apprehension on the matter. Before the lady pointed out the seat of this pain, as she proposed to do, the gentleman to whom she had related these circumstances (and who records them to us) begged to try whether he could not tell, on phrenological grounds, the situation in which this pain had been felt. On placing his hand over the organ of philoprogenitiveness, the lady with surprise confessed that to have been precisely the part affected. The organ was very largely developed, and the lady of a highly nervous temperament. R. T. E.

I have little doubt that when Phrenology is generally understood by medical practitioners, cases of pain in this region will be abundantly observed, the organ of philoprogenitiveness being very large in accordance with its powerful influence, and liable to violent action under circumstances of excessive maternal anxiety.

At a meeting of the Phrenological Association held at the Portland Street Medical School, Glasgow, September 19, Mr. Deville mentioned a case which had fallen under his observation of derangement of the organ of philoprogenitiveness in a woman who was separated from her children, and whose thoughts and words were entirely engrossed by her calamity. The temperature of the occiput was higher than that of the rest of the head—a fact to which his attention was attracted by the melting of the pomatum employed in taking a cast. It was only over the organ of philoprogenitiveness that it lost its consistency.

Case of deficient Hope, accompanied by Pain in the Organ. Communicated by E. J. Hytche to the 'Edinburgh Phrenological Journal,' vol. 13, p. 80:—

J. S., aged twenty, and of sanguine temperament, is much subject to depression of mind; and to such an extent does his despondency obtain the ascendent, that, even when circumstances wear the most favourable aspect, he incessantly conjures up some evil awaiting to derange every plan and blast all his goodly prospects. Knowing me to be acquainted with Phrenology, of the doctrines of which science he is entirely ignorant, he informed me, with the view of having his difficulties removed, that he had a hollow place in one part of his head, which, from his not being aware that he had ever received any injury in the part specified, had often excited his surprise, and a desire to know the cause. He further informed me that when he was most disposed to be satisfied with 'things as they are,' the feeling had been accompanied several times recently with an acute sensation of pain in the hollow portion referred to, which pain he described as though the adjacent part of the cranium [? brain] had been heated by the continuous pressing of the skull against it. The painful sensation, however, was confined to this region, and was not felt by the corresponding organ on the opposite side. On passing my hand over his head, I found the spot indicated, and that it was situated over the organ of hope. The organ is not merely depressed, but is sunken to such a degree that, on the right side, half the depth of a nail of the forefinger can be placed in the hollow. This portion of the skull is very thin, and indicates some organic defect; for if it receives the slightest pressure, pain is immediately produced, which continues until the pressure is removed. The organ of cautiousness is broad and prominent.

The following is a letter from Dr. B. Hoppe, of Copenhagen, to the 'Edinburgh Phrenological Journal,' vol. 5, p. 458:—

Last October I was called to visit Mrs. G——, a nervous but very intelligent woman of my acquaintance, labouring under a moderate degree of *delirium puerperale*. When spoken to she was

quite sensible, and gave reasonable answers. She stated, *without being particularly questioned*, that, though she was perfectly conscious of herself and everything around her, she had no conception of time ; so that sometimes an exceedingly long period, and at other times but a few moments, seemed to her to have elapsed since she fell into her present state. She experienced a like perturbation of thought when telling me what had happened since the preceding day. She expressed great astonishment at this state of her mind, of which she was perfectly aware. She knew persons and things, and reasoned and spoke as well as ever. It was only on a few occasions, when left to herself, that she fell into slight delirium. I did not at first think phrenologically about this case, but when she, *unquestioned*, complained of pain and a 'strong sense of burning in a *line*' (these were her words) 'across the forehead,' I was immediately struck, and asked her to point out the place with her finger. 'There,' said she, and laid the point of her finger *most exactly* upon one of the organs of time. I asked her if she felt pain in any other part of the head? 'No,' replied she, 'only in this line.' Upon application of cold water, leeches, etc., to the temples, this pain and 'sense of burning,' as she expressed herself, finally left her. She continued for some days, however, confused in her memory *quoad tempus et quoad facta*. When, for instance, I asked her about her bowels, she said, 'I am not able to recollect now ;' but when speaking about other things, sometimes she would suddenly interrupt herself or me, and say, 'Now I recollect what you were asking about : it was so-and-so.' When I asked her if her mother had been seeing her to-day, she would answer, 'Yes, she has been here, but I cannot tell whether it was to-day or yesterday,'—adding sometime afterwards, 'Now, I know it was to-day.' In the same manner too she answered my inquiries about her medicine, etc. A day or two afterwards she said with a smile, 'Do not ask me such questions : you know I cannot recollect it.' She was so feeble and nervous that I abstained from farther experiments on her faculty of time, and in four or five days she had regained by degrees her full power of memory. She was very musical. In less than four months she died of *phthisis pulmonalis*. She scarcely knew Phrenology even by name ; and if she had known it, her moral character was too sincere to allow her to play tricks. Her husband can be witness, and I pledge my honour to the correctness of these statements.

The following is a letter to the editor of the 'Phrenological Journal,' vol. 3, p. 362 :—

When I read the proceedings of the London Phrenological Society, as given in your last number, and observed no less than five instances mentioned in which great activity of particular faculties was attended with heat and pain in the situation of the corresponding organs, I confess I felt somewhat sceptical whether, with the view of pleasing, the subjects of these cases had not given way to the mere suggestions of fancy, or, at least, had not a little

exaggerated what they really felt; and under this impression, when a gentleman lately wrote to me, that 'Sometimes, when I cannot account for it, tune is amazingly active, so much so that even my knife and fork at dinner mark time to the music that is going on in my brain, and I cannot eat in a regular manner,' my first question was, whether in this state of intense activity he ever felt any of that external heat or pain so often noticed by the London phrenologists. But scarcely was the letter out of my hands, when a case in point occurred to myself, which, from the order and precision of the phenomena, and their most distinct connection with excitement of the cerebral organ, is not a little remarkable, and which, therefore, I beg to offer to the notice of your readers.

A young lady of high musical and intellectual powers, and of a very active mind, and who has for some months past been subject to frequent attacks of hysteria in all its ever-changing forms, and who suffers almost constantly in a greater or less degree from headache, complained on Saturday, 22nd April, 1826, of feeling acute pain at the external angle of the forehead, precisely in the situation of the organs of tune, which are largely developed, and upon which, in describing the seat of the pain, she placed almost accurately the points of the fingers. Next day the same complaint of pain in that region was made; and about two hours after I saw her she was suddenly seized with a spasmodic, or rather convulsive, affection of the larynx, glottis, and adjoining parts, in consequence of which a quick, short, and somewhat musical sound was regularly emitted, and continued with great rapidity, as if the breathing had been very hurried. On examination externally, the os hyoides at the root of the tongue and the thyroid cartilages were seen in constant motion, and in the act of alternately approximating and receding from each other. The will was so far powerful in controlling this motion that the young lady was able to utter a few short sentences at a time without much difficulty, interrupted, however, by two or three movements. After this singular state had continued for about two hours, she herself remarked that it was becoming rather too musical, and wished it to cease, which it did at the end of another half-hour, from accidental pressure with the finger in pointing out the motion to another person; she was then as well as usual, only somewhat fatigued.

On Monday, 24th April, she still complained of pain in the situation of the organ of tune; and stated that she had been dreaming a great deal of *hearing the finest music;* that she felt quite excited by it, and could not even now get the impression out of her head. The day passed on, however, and nothing remarkable occurred.

On Tuesday I found that I had been rather anxiously expected. During the night the young lady had been tormented with the recurrence of the musical dreams, during which she heard and performed the most beautiful airs, with a distinctness which surpassed those of the preceding night. These dreams continued for some hours, and left such an impression that on waking she thought she could almost note down one piece of composition which had

particularly pleased her. But, what is very remarkable, the excessive excitement of the faculty of tune had now reached a height that could not be controlled; the patient felt, not to say a desire only, but a *strong and irresistible passion or craving* for music, which it was painful beyond endurance to repress. She insisted on getting up and being allowed to play and sing; but, that being for many reasons unadvisable, she then begged to have a friend sent for to play to her, as the only means of relief from a very painful state; but shortly after the craving of the faculty became so intolerable that she got hold of a guitar, laid down upon a sofa, and fairly gave way to the torrent, and with a volume, clearness and strength of voice, and a facility of execution which would have astonished anyone who had seen her two days before, she sang in accompaniment till her musical faculty became spent and exhausted. During this time the pain at the angles of the forehead was still felt, and was attended with a sense of fulness and uneasiness all over the coronal and anterior parts of the forehead. Regarding all these phenomena as arising from over-excitement chiefly of the organs of Tune, I directed the continued local application of cold, and such other measures as tended to allay the increased action, and soon after the young lady regained her ordinary state, and has not since had any return of these extraordinary symptoms.

In this case, the order in which the phenomena occurred put *leading* queries on my part, or exaggeration or deception on the part of the patient, alike out of the question. The pain in the organ was distinctly and repeatedly complained of for many hours (at least 36) before the first night of dreaming, and for no less than *three days* before the irresistible waking inspiration was felt. When my attention was first drawn to the existence of the pain, I imagined it to arise from an affection of the membranes covering that part of the brain, and had no conception that it was to terminate in any such musical exhibition as afterwards took place; and, in fact, although the young lady had mentioned her previous melodious dreams, my surprise was quite equal to, although, thanks to Phrenology, my alarm was not so great as, that of her relations, when, on entering the house on the morning of Tuesday, the 25th, I heard the sound of the guitar mingling with the full and harmonious swell of her own voice, such as it might show itself when in the enjoyment of the highest health and vigour.

I am, etc.

Edinburgh, 28th April, 1826. A. C.

The following, from Number III. of 'Zeitschrift für Phrenologie' (Karl Groos), is related by Dr. Hirschfeld, under whose own observation it fell:—

Mr. J. H. Arnholz [says he] is a highly talented carriage-builder in Bremen. He had invented a carriage which, containing the moving power within itself, should be capable of being propelled without the aid of horses. The mode of executing the design had

engrossed his every thought, and so absorbed all his faculties that he was frequently alarmed at his own condition, and made vigorous efforts to avoid thinking on it. He suffered during the same period severe pain in the head. Dr. Hirschfeld put the question, whether the pain extended over the whole head? when he replied that it did not, and pointed with his two fingers to the two sides of the head, at the temples, where the organ of constructiveness is situated, as the spots in which the pain was almost exclusively felt, and from which it proceeded to the region of the reflecting organs. The excitability was so great that, while making the slightest drawing to illustrate the nature of his machine, he felt the darting pain in the temples; and mentioned this fact without any question having been put to him on the subject.'

This case occurred in the spring of 1843.

CHAPTER VII

PATHOLOGICAL EVIDENCE CONTINUED

INJURIES OF THE BRAIN

If we could capture a ferocious roaring lion, and by simply excising his combativeness and destructiveness render him 'as gentle as a sucking dove,' the evidence thereby afforded would at once be brought down to the level of minds of 'the meanest capacity.' The mechanical grossness and superficiality of such direct proceeding would recommend itself at once to such minds. It has done so in fact, and a hideous chapter in the history of science has been the result.

If the structure of the brain were as simple and uniform as that of some cream-cheese, the profound device of scooping out a portion of the brain of an animal and watching the result might supply some evidence concerning its functions. But with a complex structure, including converging and diverging, and crossing fibres; some proceeding from one part of the hemispheres of the brain to other parts of the hemispheres, both near and distant; some from the surface to the interior, others from the interior to the surface, even down to the medulla oblongata; and from the medulla oblongata upwards to the corpora striata, and all of them incapable of performing their proper functions when severed in any part—with the whole cerebral mass permeated by a complex network of blood-vessels, all in hydraulic communication with each other in such wise that a leakage of one must affect the rest; with all this complication and interdependence of structure the anatomical inter-relations of which are but imperfectly understood, it is evident that the cutting out of any predefined portion without injuring the neighbouring and even distant parts of the brain is a hopeless device.

The correctness of this view has been demonstrated by

the miserably contradictory results of those experimental physiologists who, in spite of the above-stated considerations, have attempted to discover the functions of the different regions of the brain by their mutilation in living animals.

Certain experiments made about a century ago have simply proved that when the cerebral hemispheres are removed as completely as they can be without destroying life, the animals thus mutilated are reduced to a condition corresponding to that of the lower creatures in which these hemispheres do not exist, or exist only in a rudimentary form.

Thus nothing has been learned by these cruelties that might not have been far better learned by the careful and patient study of the mental characteristics of those animals which supply us with cases of 'natural mutilation,' as Gall aptly describes it; natural non-development of the parts in question, cases which are supplied by Nature in unlimited numbers, and in full health.

Gall has a special chapter on this subject of cerebral mutilation in the third volume of the work I have so frequently quoted. He opens it thus:—

> It is a notorious fact that, in order to discover the functions of different parts of the body, our anatomists and physiologists prefer the employment of mechanical methods to the accumulation of a great number of physiological and pathological facts; to collecting these facts, to repeating them, or waiting for their repetition, in case of need; to drawing from them slowly and successively the consequences, and to publishing their discoveries with philosophic reserve.
>
> The method, at present so much in favour with our physiological investigators, is more sensational and gains the approbation of the majority of ordinary men by its promptitude and visible results.

After reference to the contradictory results of the mutilation experiments he adds:—

> It is but too notorious that these violent experiments have become the scandal of the academicians who, seduced by the glamour of ingenious operations, have applauded with as much enthusiasm as superficiality the pretensions to glorious discovery made by these mutilators.

These severe strictures, and others that I shall quote hereafter, are as applicable to the cerebral physiologists of to-day as they were to those of the beginning of this century.

They do not, however, exclude the proper use of pathological phenomena. Although it is quite hopeless to attempt the foundation of cerebral physiology, and its resultant psychology, on pathological observations alone, they frequently afford interesting and striking confirmation of the inductions based on the sound and truly philosophical method of research instituted and carried out by Gall, viz., THE COMPARISON OF MENTAL EVOLUTION WITH CEREBRAL DEVELOPMENT.

The reader will therefore understand that the cases which follow are merely presented, like those of the last chapter, as *instantiae ostentivae*, incidental confirmations of a striking character. They are not examples of the facts upon which Phrenology is based, nor is it pretended that they exhibit the ordinary average results of violent injury to the brain; they have more or less of an exceptional nature, are injuries of an exceptionally isolated character.

We must also remember that Gall's general exposition of the functions of the brain differs essentially and totally from the modern view. Gall does not assign to the thin stratum of grey matter of the convolutions and cerebral ganglia the whole of the functional energies of the brain, and to its vastly greater mass of white fibres the mere business of conduction. If he is right, the mental function of any region of the brain can only be destroyed by the extirpation, destruction, or disorganisation of not only the grey matter, but also of the white fibres throughout their whole depth. Such disorganisation may possibly occur at once as a direct result of injury, or may follow subsequently as a consequence of atrophy where the nutritive function of the grey matter is suspended by the injury.

In reference to the cruelty of experimental mutilation of the brain, it should be noted that the substance of the brain itself suffers no pain when cut or seared, but the operation of penetrating the skull to get at it, unless anæsthetics are used, must necessarily cause much pain.

Affection of the Sentiment of Hope in consequence of an Injury of the Brain.—Communicated by W. A. F. Browne, M.D., Resident Physician to the Dumfries Crichton Asylum, to the 'Edinburgh Phrenological Journal,' vol. 12, p. 157 :—

I was applied to in the autumn of 1836 by C. C., aet. 40, a flax-dresser, who complained of giddiness, and wished to be bled.

On entering the dispensary he took off his hat, and I immediately noticed that there appeared to be a cicatrix of a large wound on the coronal surface. On examination and inquiry, I found that several years before the man had received during a drunken brawl a tremendous blow from a shoemaker's hammer, which fractured and depressed the skull, injured the brain, and rendered trephining necessary. A large piece of bone had been removed from the middle of the upper part of the right parietal bone, about an inch and a half from the sagittal suture. From the situation of the injury occupying the space corresponding to the organ of hope, including the confines of the spaces corresponding to the organs of conscientiousness and veneration, I inquired if he was subject to depression of spirits, to despondency; but he answered in the negative. As my interrogations were made in the presence of several pupils who had attended a course of lectures delivered by me on Phrenology, I urged and varied my queries as much as I could, but obtained no acknowledgment from him that he had been, or was less cheerful, less hopeful, than previous to the infliction of the injury; and indeed his denials were accompanied by so good-humoured and laughing an expression of countenance as to place the matter almost beyond doubt.

I did not again see C. C. as a patient until the autumn of 1837, when he applied at the dispensary for advice. He requested a private interview with me; and when my pupils were removed, he confessed, with the most dejected and humiliated aspect, that he had formerly deceived me as to the state of his mind: that for years he had been occasionally unhappy and desponding, but that now his feelings of depression and despair were so constantly awful and unbearable, that unless I could do something to relieve him he was lost. His fears were indefinite; but they, more or less, affected every train of thought, clouded every prospect, and incapacitated him for life or work. I said everything that was calculated to encourage him; prescribed a course of medicines, in the potency of which I attempted to inspire confidence, remembering Coleridge's saying, that 'in the treatment of nervous disease he is the best physician who is the most ingenious inspirer of hope;' and dismissed him much improved.

Frequently did he return during the three following weeks, describing various fluctuations in his complaint, but evidently sustaining an aggravation of his sufferings. At last the crisis came, the whole mind participated in the disease, and at his own request and that of his friends, who saw reason to entertain fears for his safety, he was admitted into the lunatic asylum. The following is an extract from the case-book:—

'*December* 9, 1837.—His friends affirm that since the blow on his head his disposition has undergone a great change, and that he is remarkably excitable by stimulants. Has been for a long period subject to despondency, and now labours under the most uncontrollable melancholy. He declares that his life is insupportable; that whether he looks back to what he has done, or onward to what he has to expect, all is terrible. The patient's thoughts have often by his own confession

tended towards death, self-inflicted or otherwise, as the only mode of relief; but they do not appear to have assumed any definite design. He can assign no reason for this habitual gloom ; the condition cannot be resisted. Has pain of head, vertigo,' etc.

He was now subjected to such discipline, medical and moral, as seemed likely to allay constitutional irritation, compose, soothe, stimulate, cheer, amuse. Apparently in consequence of the feeling of protection created by his mere residence in the asylum, and the system of compulsory occupation in which he is engaged, rather than from direct appeals to his higher sentiments, he rapidly improved, and was regarded as cured, but was removed at a much too early period of his convalescence, namely, January 25, 1838.

He was sent back to the asylum under restraint March 23, and the case-book contains the further entry : ' The symptoms are much the same as before. The despondency is, however, of even a darker and deeper shade. When at liberty he is reported to have been furious and unmanageable, and to have attempted to commit suicide repeatedly. He is now tranquil and docile. Has now a delusion that his skin exhales a strong nauseous smell, etc.'

When I ceased to be connected with the Montrose Lunatic Asylum, some slight mitigation of the symptoms had taken place ; but it was rather the doubtful glimmering of an intellect endeavouring to discover grounds for hope, than the meridian light of the sentiment itself, that had cheered my unfortunate patient.

Case of Religious Melancholy, with Disease in the Organ of Veneration.—(Extracted from a letter addressed to Dr. W. A. F. Browne, by Dr. J. H. Balfour.) Communicated to the ' Edinburgh Phrenological Journal,' vol. 13, p. 259.

A case occurred here (Edinburgh) a few days ago (February 1840), which I think will be interesting to you in a phrenological point of view, and therefore I sit down to give you a short notice of it. A man employed in a druggist's shop (Pugh and Plew's) laboured under *religious melancholy* for many months, if not years, and attempted to poison himself some time ago by laudanum. In this he failed ; but being still intent on self-destruction, he at length succeeded by swallowing about an ounce and a half of strong sulphuric acid. He lingered in great agony in the infirmary for four hours. The point, however, to which I wish to direct your notice is the state of the brain. The organ of *veneration* in one hemisphere (the right, I think) has obviously been for some time in a state of chronic inflammation. The membrane covering it was opaque and much thickened, and there was a sort of hollow over it, the convolution being flattened. The circumstance was particularly pointed out to me by Dr. John Reid, who examined carefully the position of the disease as well as of, the organ.

Case of Change of Dispositions simultaneously with Change

in the Development of certain Organs in the Brain.—From the 'Edinburgh Phrenological Journal,' vol. 10, p. 426.

To George Combe, Esq.

Barnard Castle, January 2, 1837.

Dear Sir,

During the last few weeks a case of change of character, accompanied by a corresponding change in the form of the head, has occurred within my own practice and observation, which is strongly illustrative of the views of the writer of Article 3 in the last number of the 'Phrenological Journal;' and, as this branch of phrenological study deserves the utmost attention, I take the liberty of sending you the particulars of the case to which I allude.

A. B. is a female, who in her youth and for some years after her marriage was exceedingly fond of gaiety and dress; she was haughty and exhibited all the distinguishing marks of active self-esteem. Some years ago a decided change took place in her character: this commenced by religious impressions, and since then she has gradually become more and more remarkable for the increasing humility of her disposition, and for manifestations of character directly opposite to her former conduct. She has had seven children, one of whom died about six years ago, and other three within the last two years. During the early period of her matrimonial life she showed less than the ordinary degree of attachment to her children; but during the period of the above-named bereavements, her mind was much exercised over her offspring, and she felt a strongly increasing attachment to them. Her love for her remaining children is at present ardent—she seems to dote upon them with the fondest delight, and her solicitude and affection for them are extreme. She is herself subject to frequent attacks of severe illness; and during these attacks the all-engrossing subject of her thoughts is her children, and she absolutely makes herself unhappy by picturing to her mind the state of helplessness and distress which she fancies must be their lot in the event of her death. On the third of last month, I (being the medical attendant of the family) was sent for to consult on a subject which she alleged had been giving her considerable uneasiness. She then related to me that a great change in the form of her head had taken place, which lately had become so apparent as several times to have attracted the attention of her servant who was in the habit of occasionally dressing her hair. Placing her hand upon the posterior and inferior part of her head, she observed that the large protuberance there had come within the last year or two; and then again, over the posterior and superior part of the head, she observed: 'It has fallen away from here.' I examined the parts and found the organs of philoprogenitiveness, adhesiveness, and concentrativeness enormously developed; while over the region of self-esteem and love of approbation there was a complete depression, and the tables of the skull there appeared to have receded to a considerable extent. The increasing size of the one part and depression of the other had been matter of repeated observation between

herself and the servant before mentioned. As serious apprehensions began to be entertained that it was indicative of disease in the head, I was sent for and consulted upon the case. The only symptom complained of was 'a throbbing sensation in the back part of the head *when under any mental excitement;* at any other time no inconvenience or pain was experienced.' The lady and her servant are both entirely ignorant on the subject of Phrenology, and at the time of my visit were not even aware that such a science existed.

I make no comment on this case, but if you think the facts mentioned will be of any service in assisting the investigation of the important question to which they refer, you can communicate them to the Journal, or make what other use you please of them; they certainly do appear to prove the accuracy of the sentiments entertained by the writer of the article in the last number of the Journal to which I have before alluded, in which he mentions a class of cases of change of the head caused by one or two feelings becoming exceedingly active, or subjected to great neglect or suffering.

I am, dear Sir, very truly yours,
Martin Kirtley.

The following is one of the cases referred to in the last paragraph of the above letter:—

A young artist of my acquaintance had formerly been a dealer in dry goods, and a few years since commenced the business of portrait-painting. He had been absent for several years from his mother when, on a visit to her, she called him up to her, observing every part of his countenance carefully, and said, 'Your forehead has altered in form since I saw you, all the lower part of it seems to be pushed out.' This was the careful observation of a fond mother when tracing out the lineaments of a beloved son. It was no doubt true. Nearly all the perceptive organs are now very decidedly large; and he says they have increased in size since he commenced his new vocation.

I have no doubt that these narratives of change in the form of head will surprise some of my readers. The idea that the hard bone should yield to the growth of the soft brain appears at first glance rather paradoxical, but it is not so. The forehead of the young artist which surprised his mother on his return home was not the same forehead as that which he carried away when he left home a few years before. The bones of the head, like all the other bones of the body, are alive, and their life is animal life; they are permeated by blood-vessels and absorbents; their materials are continuously in the course of removal and redeposition; they are formed originally by the deposition of calcareous particles in cartilaginous or fibrous tissue, chiefly the latter in the case of the

skull bones, and thus the bone of to-morrow may or may not be of precisely the same shape and size as that of to-day, and in the healthy body this depends on functional requirements. Thus if a full-grown man developes certain muscles by exercise, the processes of bone to which the tendons of these muscles are attached are developed proportionally.

So with the brain-protector. It grows with the growth of the brain, and when the brain diminishes, as it sometimes does in old age or dementia, the skull follows the shrinking brain either by general diminution of volume, or by recession of the inner table of bone causing a thickening of the skull. I shall illustrate this further when treating some of the objections that have been brought against Phrenology.

This perfect adaptation of the skull to the brain is greatly favoured by the fact that the outer membrane by which the brain is enveloped—the *dura mater*—performs the function of bone-forming periosteum, or nourishing bone membrane, besides that of brain enveloper. In the early stages of life it does so much of this work that it adheres to the skull-cap when we have sawn it round and attempt to remove it.

Those who are still puzzled by this mechanical paradox of the soft overcoming the hard should watch a tender blade of grass thrusting itself through stiff soil, or a growing tree displacing a brick wall, emblems of the potency of perseverance.

Case of Disease of the Brain with corresponding Affection of the Mind, by Abram Cox, M.D. (From the 'Edinburgh Phrenological Journal,' vol. 10, p. 449) :—

About the middle of November 1836, Dr. Spittal and myself were requested to visit Mrs. B., a woman about the age of 68, who was at that time confined to bed. We found that about six weeks before she had apparently an attack of apoplexy, which produced paralysis of the lower extremities. From the condition she was then in (sloughing having commenced on the back), it was evident that she could not survive many days. Her death accordingly took place on the 28th. At our first and subsequent visits I learned the following particulars regarding her. She was naturally of a somewhat harsh, but very pious, disposition; she was a most regular attender of the church, and was in the habit of performing family worship daily; she belonged to the Scottish Presbyterian Church, but afterwards joined a Baptist congregation, and latterly had no fixed place of worship. About four years before the date of our visit she met with several family afflictions, by which, however, she seemed little affected. Shortly after, while drinking tea with a

friend, she was attacked by a fit, which appears from the description to have been apoplectic. She, to a certain extent, recovered from this ; a considerable change, however, occurred in the state of her mind. The principal feature of this was the increased warmth of her devotional feelings, her conversation being generally interspersed with quotations from the Bible, references to a future state, and the name of the Deity. She also occasionally saw visions having the same tendency ; for example, of her children inviting her to a future life of happiness. It may be remarked, too, that she never expressed a doubt regarding her own salvation, but, on the contrary, spoke of it as a certainty. This continued till her second apoplectic attack, which gave rise to the paralysis and a state of mind bordering on dementia. Even then her devotion remained a prominent mental manifestation.

This account, as exact as can be expected from persons of the rank of life of her relations, meagre as it is, is abundantly sufficient to establish the case as one of religious monomania ; the more so when it is considered that the principal facts were elucidated from her son and daughter before her death by the simple expression of a desire on my part to know her mental condition, and that the increase of her religious feelings after her first apoplectic attack was pointedly insisted on by them.

The morbid appearances presented by the brain will be found fully to coincide with these symptoms. The brain was examined by Dr. Spittal, Dr. Macdonald, and myself. On removing it from the skull, serum to the amount of 6 or 8 oz. escaped. A moderate degree of effusion existed between the convolutions generally over the brain. There were several small adhesions between the opposed surfaces of the arachnoid membrane on the right side, *about the centre of the coronal region*. There was no unusual vascularity of the membranes. At the posterior part of the organ of imitation on the right side, the brain presented a depression about an inch in length from before backwards, and about three-fourths of an inch broad, occupying the whole breadth of the convolution. Fluctuation was perceptible under the depression. On making an incision, the substance of the convolution was found reduced at that spot to a state of complete fluidity, with the exception of an almost imperceptible layer of grey matter lining the pia mater. On tracing the ramollissement, it was found to extend, in a rather firmer state than the part already mentioned, downwards, backwards, and slightly inwards into the white substance of the organ of veneration, nearly the whole of which it occupied, leaving the grey matter of the superior surface untouched. It reached downwards as far as the roof of the lateral ventricle, without penetrating it. From this nidus of ramollissement there extended one or two smaller prolongations towards the left, forming a communication between it and a second nidus occupying the grey substance on the right side of the great interlobular fissure, equalling in length the corpus callosum. . . . It gradually diminished almost to a point at each end. The organs of veneration and imitation were thus extensively

implicated ; the adjacent ones of hope and wonder were encroached on to a small extent, and benevolence still more slightly, and the whole of the long convolution above the corpus callosum, whose use is not yet known. There was also a small tubercular-looking body in the white substance, about the juncture of the middle and posterior thirds of the brain on the same side. The lateral ventricles had evidently been distended by two or three ounces of serum, which had escaped on the removal of the brain from the skull. No other morbid appearance was found in any part of the brain or cerebellum. The basilar artery and its branches were lined with thick cartilaginous plates to a considerable extent.

We have, then, in this case a remarkably accurate and minute correspondence between the symptoms and the state of the brain. The lesion of veneration is distinctly indicated by the excitement of the religious feelings; that of hope is equally clearly indicated by the confidence with which the patient looked forward to happiness in a future life ; and lastly, that of wonder by the visions by which she was visited.

The progress of the case was probably this. Her organ of veneration possessed great natural activity, bordering, perhaps, on disease, for its development, though good, is not remarkable. By being frequently excited, it at last fell into a state of actual disease, ushered in by the first apparently apoplectic attack, a state from which it never recovered, but which, continuing to increase, gave rise at last to the ramollissement and effusion of serum, implicating thereby so great an extent of the brain as to affect not only her entire mind, but also her powers of locomotion.

The following is from Dr. A. Combe 'On Mental Derangement,' p. 197 :—

A curious example of morbid excitement of the organ of *wonder* will be found in the 'Phrenological Journal,' vol. 5, p. 585, which is instructive as illustrative both of the tendency to cerebral disease which a sudden transition from active life to retirement and idleness produces, and of the efficiency of functional causes to excite mental derangement. The patient, Dr. A., after several years' service in the navy, was placed on half-pay, and retired to Cupar. In the course of his reading, when his spirits were depressed from disappointment and want of employment, he met with some articles on Animal Magnetism, which made a great impression on his mind. After pondering long on this subject, he first began to admit the existence of magnetism, and then imagined himself to be under its influence, an opinion which gradually acquired an ascendency over him, till it became so strong as to haunt him continually. His sleep became disturbed, and his mind filled with phantasms. He was convinced that his enemies exerted a malignant influence over him by means of magnetism, and tormented him in the shape of '*invisibles*,' against whom he complained to the authorities for protection. On all other subjects his judgment was sound, and his reasoning acute.

After some years' suffering, he died suddenly from the bursting of an aortic aneurism. On opening the head, the skull-cap was found to be very thick and hard, affording evidence of long-continued disease; and over the organ of wonder was 'an inflammatory deposit, apparently of old standing, under the arachnoid coat, with thickening of the membrane itself, and the adhesion of the parts beneath for about the space of an inch and a half in length, and one in breadth;' but the substance of the brain was not apparently altered. Dr. Scott, who reports the case, does not specify the organ of wonder as the exact seat of the affection, because, from not being acquainted with Phrenology, he did not know it. But I had a letter from a gentleman who was present at the dissection, and who had studied the subject, stating explicitly that the deposit had its seat *precisely over the organ of wonder;* and adding that the pain complained of during eight years was 'confined to the forehead and coronal surface, but *principally* to the latter region;' and that it was Dr. A.'s invariable practice to apply cold water to these parts every night, to abate the extreme heat which he felt in them.

The following cases were communicated by Mr. Alexander Hood, surgeon, Kilmarnock, and published in the 'Edinburgh Phrenological Journal,' vol. 2, p. 74. They are preceded by some editorial remarks, which I also reprint:—

In laying the following interesting cases before our readers, as examples of the concomitance of lesion of cerebral and mental function, we are anxious to direct the attention of medical phrenologists to a minute and accurate observation of the phenomena consequent upon wounds and disease of the different portions of the brain.

Much valuable information has been lost to science from physiologists not being acquainted with the functions performed by different parts of that organ. A knowledge of Phrenology affords a facility, and adds an interest to such investigations, of which its opponents have no conception. We shall mention a single example.

We lately attended a woman who continued in a state of delirium for three days, during which her ravings were chiefly about the supposed murder and abstraction of her children. On recovering her senses, and being asked if she felt pain in any part of the body (not even mentioning the head), she put her hand over the organ of philoprogenitiveness, and said that she had 'no pain except in that spot, *where it had been very severe*, but was now much easier.' It may be said that this was merely a curious coincidence. Let it be so; but let us attend to such coincidences, and we may at length discover how they are connected. While we wish it, therefore, to be distinctly understood that we do not adduce Mr. Hood's cases as *proofs* of the functions discovered to belong to the different organs, and do not publish them as such, still we think them of importance, as examples of the relation between the functions assigned in a state of health and the phenomena of

disease. The medical details may appear to general readers inappropriate to our Journal, but medical practitioners will recognise them to be indispensable to the full comprehension and authenticity of the cases.

I have omitted most of these medical details ; their interest even to medical practitioners is far less now than in those days of bleeding, blistering, purging, etc., and are rather prolix. Also other cases of the series are described with similar technical prolixity, but include the following :—

J. M., a maiden lady, 48 years of age, was, about twenty years ago, affected with a kind of religious melancholy, which lasted some months. Shortly after this she was seized with typhus fever, but ultimately had a good recovery. For many years after she enjoyed good health, was inoffensive, social, cheerful, and rather gay in her deportment.

In the summer of 1823 she went to sea-bathing quarters with some friends, and was observed to be somewhat more volatile than usual, which might possibly have escaped notice, had it not been for what followed. On returning from the coast she went on a visit to a friend, but returned in a few days rather unexpectedly, in a very uneasy and depressed state of mind. An incident of a trifling nature was mentioned as being in some way connected with the exciting cause of her complaint.

In early life, having been for a short time somehow inadvertently locked up by herself in a room, her mind became so much agitated by fear, and the impression which it made was so permanent, that, during the subsequent period of her life, she could not endure the idea of sleeping in a room with the door locked. While absent from home, she unfortunately happened to be again placed in a similar situation to that which had left such an unpleasant impression on her mind. The excitement which was produced on this occasion, although of a very unpleasant nature, seemed to be temporary, as she did not brood over it, or make it the subject of conversation. About the middle of September she lost all relish for society, was pensive and melancholy, with religious despondency. Her compunction and self-accusation were at times most poignant, but evidently morbid. In the extremity of her suffering she would start with hurried steps from one corner of the room to another, staring wildly, and uttering the most piteous and piercing shrieks.

October 6.—On the recession of one of these paroxysms an opportunity was afforded me of observing the effects of this disease on her constitution. At this time every bodily complaint was absorbed or forgotten in her mental affliction. Though the paroxysm had subsided, the fearful and gloomy forebodings constantly clouded her mind.

October 15.—Since the application of the leeches, blister, etc., the disease has never assumed such an aggravated form ; and though

the paroxysms have lost much of their former violence, still there are periodical exacerbations of the complaint. She speaks little, but is always coherent; has no symptom of derangement but melancholy; shuns the society of her friends and acquaintances; takes no interest in passing events; remains much in bed; leaves her sleeping room with much reluctance, and soon returns to it.

The patient gradually became weaker, and, after suffering much from epileptic fits and continuance of despondency, died on the 20th of February, completely exhausted. The following were the appearances after death:—

On dividing the scalp and removing the skull-cap no spiculæ were observed to project from the bones that compose the case of the brain by which this viscus could be injured. The blood-vessels in the dura mater appeared to be more numerous than usual, full of blood, but not preternaturally distended. From the internal surface of the dura mater, a little posterior to the coronal suture, and an inch and a half to the left of the sagittal suture, grew a small, round, hard tumour, of the size of a split pea, which, being raised, left a corresponding depression in the convolutions of the brain on which it pressed. Two-thirds of it pressed upon one convolution, and one-third upon another. *This tumour was precisely in the position of the organ of hope* in the phrenological system. In the dura mater, or rather in the superior and posterior part of the falx, precisely beneath the commencement of the lambdoidal suture, a spicula of bone a quarter of an inch in length was detected dipping between the two organs of self-esteem. The brain itself was unusually firm, its blood-vessels numerous and conspicuous, clearly indicative of its having been in a state of chronic inflammation. The ventricles contained a small quantity of water; but, notwithstanding a minute and tedious examination, no other morbid appearance could be discovered.

The post-mortem examination in this case revealed two elements of cerebral disturbance; the first, and most considerable, being the rounded tumour depressing a part of the brain, the second the small spicula of bone projecting into another part. Neither of these was a growth within the brain itself; both were growing from the membrane in which the brain is firmly enveloped.

All we know concerning the action of such intruders justifies the expectation that the first would act in suppressing the action of the brain, and the second in irritating it. Both being so small, their action would be mainly local. A large tumour pressing on the brain may produce general insensibility.

The symptoms of the sufferer were just those which would be due, in a high degree, to suppressed hope, and in a small

degree to irritated self-esteem, shown in the morose desire for seclusion.

There are two organs of hope—one on each side—as of every other organ, and only one of these was subjected to abnormal pressure. The result should, therefore, correspond with that of an irregular development of this pair of organs.

I have made many observations on the effect of such irregularity, and find it to be an alternation of action, amounting in some cases to contradictory variations of character. The gloomy hopelessness with which Mr. Hood's patient was afflicted came in paroxysms, or fits; it was not sustained and regular.

My attention was first directed to such irregularity in the early days of my phrenological studies, when about twenty years of age. A lady member of my own family was being fitted with a bonnet (then worn round the back part of the head), and complained that her bonnets never 'sat properly,' on account of the shape of her head. I then examined her head and found an excessive irregularity in adhesiveness—very large on one side and quite deficient on the other. She was notorious among her friends for what they described as 'hot and cold fits.' My mother used to say, 'Aunt Betsy is in one of her cold fits; I shall not see her until she recovers. Next month she will be most affectionate.' I have since met with a multitude of similar cases.

The following is the substance of a paper (details of medical treatment, some prolixity omitted) read before the Royal Medical and Chirurgical Society of London by Mr. Robert Dunn, a well-known medical practitioner in London:—

> The patient was a little boy, two years old, a fine intelligent child. His mother informed me that he had been a healthy child from the time of his birth, very active and of quick perceptions.
>
> There was one circumstance, however, with which both his father and mother had been particularly struck, and that was a change in the disposition of the child, which they had observed to have been gradually taking place for more than four months previous to his last illness. From being a happy, placid child, he had become irritable, peevish, and petulant, impatient of control, very determined to have whatever he set his mind upon, and not to be driven from his purpose: in a word, to use their own language, he had become *a most obstinate and self-willed boy.*
>
> So marked, indeed, was this change of disposition in the child that it had become a subject of serious consideration with his

parents whether it was to be attributed to some latent disease under which he might be labouring, or to mere infirmity of temper. But as the child continued to eat, drink, and sleep well, and did not appear to be suffering from any bodily complaint which they could detect, they did not take any medical opinion, but contented themselves with endeavouring to correct, by moral discipline and management, what they were inclined to consider rather as an infirmity of mind than of body.

On October 7 I was suddenly called to attend him, and he died on November 15. He had awoke, as usual, between six and seven o'clock in the morning, and whilst amusing himself with his sister in bed, and in the act of attempting to turn over, his left hand began to jerk or twitch convulsively, but the convulsive twitching did not extend beyond the wrist. Alarmed at the sight of this, his mother immediately sent for me. Beyond the continued convulsive jerking of the hand the child did not appear to be in any other way affected.

Here follow prescriptions, etc.

At my second visit in the course of the day I was told by his mother that the child had fallen downstairs about a fortnight before, but the circumstance had been studiously concealed from her by the nurse, and she was unable to say whether he had fallen upon his head or not. There was no swelling upon the scalp nor any contused appearance that I could perceive. She had observed, however, that the child had been more fretful and self-willed from the time of the fall.

At nine o'clock on the following morning the jerking returned and extended to the elbow-joint, but subsided in the course of about half an hour on the application of the mustard and water as before. On the 9th he had a slight return. The next day passed without any return of the jerking, but I observed an imperfect paralysis of the hand and arm. The child, too, gave evidence of constitutional disturbance. He was irritable and fretful, with a quick pulse, hot skin, dry tongue, great thirst, and other symptoms of general pyrexia. He complained, too, of pain about the head, and frequently applied his hand to the right temple. On the 11th he had severe attacks of the convulsive jerking, which now involved the whole of the left side and the eye and angle of the mouth. During the next two days he had two fits each day of a still more severe character.

Towards the termination of the fits he cried and even screamed violently, but throughout their continuance he was sensible, and could at times be soothed by kind attentions from his parents. The fits were followed by profound sleep for several hours and the side was left partially paralysed. At one o'clock on the morning of the 14th I was called up in consequence of a more severe attack than any he had previously had, and which lasted nearly three hours. The convulsive agitation, affecting the whole of the left side from hand to foot, was violent. At times he screamed out and then again was

quiet; during the whole paroxysm he knew everyone around him, but clung eagerly to his father as if in dread.

Dr. Todd, of King's College, was then called in, and assisted in the future treatment of the case.

The report continues with detailed descriptions of similar symptoms in still more violent form, until, 'on the subsidence of one of these attacks, he gradually sank, on the morning of the 15th of November.'

A post-mortem examination was conducted by Mr. Dunn, assisted by Dr. Todd and Mr. Bowman, of King's College. The following is Dr. Todd's account of the results :—

> The scalp was pale and bloodless, like the rest of the body, which was much emaciated. The dura mater healthy. The vessels on the superficies of the brain were tinged with dark blood, but there was no subarachnoid effusion. On the surface of the right hemisphere of the brain there was a deposit of tubercular matter in patches of irregular shape and size, the whole occupying a surface of about two inches square. The deposit was most abundant on the surface of the convolutions; it nevertheless descended into the sulci between them, a circumstance which proved its connection with the deep surface of the pia mater. The cortical substance of the brain in contact with the tubercular matter was reddened and greatly softened, and on microscopic examination evinced a nearly total destruction of the tubules in it, a great enlargement of the proper globules of the grey matter and of the pigment granules which adhere to them. The softening extended a slight way into the subjacent white matter. On the edge of the left hemisphere, corresponding to the diseased patch on the right, a slight tubercular deposit had taken place in a similar manner, producing a red softening of the grey matter in contact, but not occupying more than half an inch square in surface. The ventricles contained more water than natural—about double—and did not collapse when laid open. The cerebral substance throughout, excepting at the diseased part, was firmer than usual at the patient's age. The firmness was no doubt owing to the compression of the fluid, which probably at an earlier period of the disease was more abundant.

Mr. Dunn here adds a commentary on the connection between these conditions and the convulsive symptoms, and the following in reference to the phrenology of the case. This is not printed in the Society's Transactions :—

> I cannot close this communication without briefly adverting to the phrenological bearing of the case. I have mentioned in the history that the parents of the child (who know nothing of Phrenology, not even the meaning of the term) had been forcibly struck with a *change* in the disposition of the child, which they had

observed, for some time previous to his last illness, to have been gradually taking place. From being a happy, placid, and docile boy, he had become more and more petulant, self-willed, and obstinate. Now it is a circumstance worthy of observation that, on the post-mortem inspection of the brain, the tubercular deposit was found to be situated on that part of the hemispheres where Gall and Spurzheim have located the organ of *firmness ;* it extended a little perhaps beyond the boundary-line, especially on the right side, and encroached upon the site of the organ of *self-esteem.* I have no wish to attach any undue importance to this fact, but if the *grey substance* of the brain be really the seat of its *functional power*, it is difficult to conceive how the *grey matter* situated beneath the *tubercular deposit* could maintain the healthy exercise of its functional power. In the present instance, among the first of the morbid effects arising from the tubercular deposit would be an *irritating excitement in the grey substance* which would lead to an abnormal development of its functional power. Now *obstinacy* is an abuse of *firmness*, and if we associate the *change* of disposition which had taken place in the child with the *structural disturbance* induced by the tubercular deposit, the case may be fairly adduced in support of the hypothesis of Gall and Spurzheim, and of the locality which they have assigned as the site of their organ of firmness.

In Mr. G. Combe's 'Notes on America,' vol. 1, p. 335, a case is narrated which resembles the above.

Dr. George McClellan, Professor of Surgery in the Jefferson College, Philadelphia, removed two tumours, one external to the skull and the other internal, from the head of a young man named Richardson. The internal tumour, about the size and shape of half a hen's egg cut longitudinally, was situated between the skull and the falx (i.e., where the two halves of the brain meet in the middle of the upper part of the head), and had carried the longitudinal canal down below its lower surface unimpaired. Both tumours were attributed to a blow from a stone, which they followed, and their growth had extended over a period of three years.

Dr. McClellan removed the skull to the extent of several square inches, and at first supposed that the brain in this region had disappeared; but to his astonishment, on the second or third dressing, he found that the convolutions had risen up, that they had not been destroyed, but only displaced by the pressure of the internal tumour. The organs affected by this pressure were self-esteem and love of approbation. Mr. Combe saw the young man a few days after the operation, and thus describes the interview :—

When I saw the patient he was pale and much reduced in flesh, but placid, and quite intelligent. He rose from bed, came into an adjoining room, and sat before the fire. On the dressings being removed, I saw the surface of the organs of self-esteem and love of approbation exposed. They were large, particularly self-esteem. They rose and fell with the pulsation of the arteries. They were entire and on a level with the other portions of the brain. I conversed with him and received from himself the information concerning the cause and the growth of the tumours. He said he knew that it was a matter of life and death, and resolved to submit to the operation, and endure it manfully. His organs of firmness seemed to be large, but were not involved in the injury, or only partially so at the posterior edge.

Mr. Combe adds:—

The patient recovered, and after his convalescence he mentioned facts that showed that his sentiments of self-esteem and love of approbation had not remained unaffected during the progress of the disease. He was a player and ventriloquist, and performed in the Western cities. He stated that, before receiving the blow, he was an entire stranger to diffidence. For the first three months after the accident he felt no change in his mental condition, and was not aware that there was an affection of his head. At the end of that time the external tumour began to attract his attention, and he felt visitations of diffidence, which he had never before experienced. He was convinced that his powers of acting were unimpaired, yet he could not give effect to this conviction, for he felt as if he should fail. In course of time his self-confidence diminished so much that he could no longer appear on the stage, yet his intellectual faculties were clear and active.

Here again we have local pressure producing depression of function; it was pressure merely, without inflammatory action or structural change. In the two cases which follow the injury was of a totally different character, and of a nature to produce inflammatory irritation.

Case of Injury in the Region of the Organ of Tune.—Reported in the 'American Phrenological Journal' of August, 1840, by Dr. Jacques, of Wilmington, Delaware, who was the attending physician. It occurred in 1821 at Young's factory on the Brandywine, five miles above Wilmington.

Mr. Hunter was engaged blasting rocks; and having charged a rock with a heavy blast, which did not ignite, he swore he would *make* it go off at some rate, and jammed with great violence his drill down upon the powder. It struck fire and went off, but did not split the rock. The drill was thrown, no one knows where.

Both of Mr. Hunter's hands were torn off by the charge, which, coming up in a body, also struck his head along the superciliary ridge, cutting a furrow in the skull, and carrying away a portion of the dura mater, as well as affecting more or less of the brain. From his friends at whose house he boarded and died (Mr. and Mrs. White) I learned the precise location of the injury, viz., *along the superciliary ridge* and externally of it. About fifteen minutes after he was carried to the house of Mr. W. 'he fell to singing songs,' and continued singing almost without intermission till his death, which took place nine days after the accident. The following description of his singing propensity I noted down from Mrs. W.'s remarks, and give them in her own words: 'He sung the whole time after he was blown up—did not stop one hour, put it altogether. Mr. W. began to read the Bible to him, but he broke out singing and stopped his reading. He was very musical, much more so than when he was of himself. I thought this very strange. It was not a quarter of an hour after he was brought in before he began to sing, and he sung all the time till he died, and stopped only when someone went to see him, and then began again directly. His principal song was "*Erin go Bragh*," and he sung it with a better tune than I ever heard it sung before or since. It beat all how musical his voice was. He sung very loud and seemed to take a great deal of pleasure in it.' Dr. Jacques observed that what struck him most forcibly was to hear him sing with so much feeling, and pathos, and ecstacy. Several other persons also bore testimony to the same point. From the description of Mr. and Mrs. W., who frequently dressed the wound, as well as from Dr. J., who was the attending physician, I am certain that the injury of the head occurred on the borders of the organ of tune, highly exciting it, though not disorganising it.

The following is from the 'American Phrenological Journal,' vol. 1, p. 24. It is the record of a case by Dr. Thos. Miller, of Washington, D.C.:—

The patient was a coloured boy named Posey, æt. 16 years. I was called to see this boy at four o'clock P.M. on 10th October, 1835; found him labouring under all the symptoms of compression of the brain, produced by the kick of a horse. The point of the horse's shoe struck him under the left superciliary ridge, outer angle, fracturing the orbital plate, and forcing the spiculæ of the bone upwards and outwards[1] on the dura mater, which was wounded by them (spiculæ). As soon as practicable, in the presence of my friends, the late Dr. Joseph Lovell and Dr. T. Sewell (this case occurred in Washington, D.C.), I dilated the wound of the soft parts, and removed without difficulty the pieces of bone that could be taken away with safety, or were likely to be injurious. Though some of the symptoms were relieved by the operation, yet our patient gave no signs of returning consciousness. The next morning,

[1] That is in the direction of the organ of tune.

about twelve or fifteen hours after the operation, I called, and was informed that Posey had remained comatose till within an hour or two of my arrival, when he suddenly waked up *singing*, called for water, which he drank, and then continued his songs. The attempt to make him comfortable, give him medicine, bleed him, etc., etc., excited him very much; so much so, that he was almost unmanageable, and it was by main force alone that he was prevented from getting out of the house. He was quieted by free depletion, etc. In this state of quietude, I was informed on my next visit, he remained till night, when he again commenced singing songs, and continued to do so nearly the whole night. As morning approached his musical propensity ceased, and while I was with him he was calm and more rational than he had been since the injury. From this period he gradually improved; the wound healed kindly; a few more spiculæ of bone were removed, and his singing propensity returned only with the occasional nightly exacerbations. These became slighter every night, till, at the expiration of about one month from the accident, he entirely recovered.

This boy (I was informed by his parents, very respectable people, and others who knew him well) was never known, before this accident, to sing or even attempt to *hum a tune;* to use his mother's language, 'William, she knew, never was a songster.' And what is still more remarkable, he has never been known since his recovery to sing, or even attempt it. This statement was given by his mother.

Very respectfully yours, etc.
Thomas Miller.

These are two remarkable cases of what may appear to many readers as a paradoxical result of injury of an organ, but it is now well understood by physiologists and pathologists that the brain and nervous system generally are liable to remarkable exaltation of function when subject to certain kinds of mechanical violence. Thus a puncture of the retina (which is the peripheral expansion of the optic nerve) produces the sensation of a flash of light. Many of us who have been schoolboys, and have had a few fights, may remember the flash which accompanied a blow on the eye from our opponent's fist.

The following is also from the 'American Phrenological Journal,' vol. 2, p. 26. It is a communication to the editor:—

A boy, nine or ten years of age, was riding a spirited horse. The horse started at full speed, and the boy was thrown off; as he fell, the back of his head struck against a stump, and also received a blow from the hoof of the horse, the effect of which double injury was what might be called an egg-shell fracture of the occiput. The

occipital bone was crushed in, and the brain much injured. Dr. Turner was called to attend the case. When he arrived it presented a frightful appearance, the injury extending to the angles of the parietal bones on each side. The brain was exposed—a portion escaped from the wound, and a portion was removed in the treatment; in all about a tea-cupful was lost. The case seemed, indeed, a desperate one, but in a few weeks the lad recovered. Dr. Turner, having remarked that the portion of the brain which was removed came chiefly from the organs of combativeness on each side, suggested that the lad would probably become a coward on his recovery.

During the first week or two, as he lay in a comatose or oppressed condition, his dreams, or, more properly, delirious wanderings of the mind, presented images of terror, under the influence of which he frequently started from the bed, as if endeavouring to escape. Upon his recovery, the usual debility of the convalescent probably prevented any particular observations of its effect on his character. Two years afterwards the doctor saw him. He was perfectly cured, and his mind, *intellectually*, was unimpaired; but his *character* was changed. He was as timid as a hare. He could not be induced to ride a horse, and even if he saw a horseman approaching in the road, he would run into the woods to escape. At an age at which boys are usually high-spirited and proud to show their independence, he was destitute of the feeling, and seemed to lean upon others. He would not even leave the house and go a few hundred yards by himself, but was escorted from the farm by the negro women. He was quite intelligent, and able to converse over his own case in a full and satisfactory manner. He told a full story of his dreams of terror during the first fortnight after the accident.

He was quite unsocial and indisposed to mingle in the athletic sports of boys. His cerebellum was undeveloped, his manners were timid and feminine, and his voice like that of the eunuch.

Permit me to suggest to practical phrenologists the importance of another class of facts, which may easily be collected, and which are sometimes not less valuable than those furnished by pathology. I refer to the materials to be collected from an accurate study of the various sensations in different regions of the head connected with the cephalic section. The other day a young man gave me a minute account of an apparition which he had pursued until it made a mysterious escape, and of others which followed him until he became familiar with them. Seeing that he was sincere, I inquired into the condition of his perceptive organs, and found that he was at certain periods liable to an affection in which there was pain along the brows and just over the eye-balls. This generally terminated after a free bleeding of the nose. Such affections of the perceptive organs may well be the foundation of popular superstitions, for it is difficult to resist the sincere and graphic accounts of those who are thus deceived, without being able to suspect the source of their delusion.

I have been fortunate in obtaining this class of facts, some of

which, indeed, might not be credible to those who test every statement by its harmony with their preconceived opinions. I feel confident, however, to assert that peculiar conditions, or excessive action of any organ, *will always be accompanied by a sensation of this kind at its site*, and that every true principle in the science of Phrenology may thus be sustained by *the evidence of sensation*.

Yours respectfully,
Jos. R. Buchanan.

New Orleans, December 20, 1839.

Dr. Otto, of Copenhagen, mentions, in a letter dated October 27, 1833, the following case:—

A little boy was some time ago brought into the Frederick's Hospital in this city. He had got a fracture of the skull, so that the different pieces of bone could easily be felt. He exhibited symptoms of irritation of the brain; but the most remarkable thing was that he *sang* all the words he uttered, and when a watch was applied to his ear, in order to ascertain whether he heard or not, he went on counting for more than half an hour. Being asked in what particular part he felt pain, he pointed to the position of the organs of tune and number. I have this report from one of the candidates at the hospital.

In the 'Lancet,' No. 749, Jan. 6, 1838, Mr. James Smellie, of Glasgow, reports a case of fracture of the skull where an external wound occupied 'nearly all the space allotted to the organs of causality and ideality' on the right side. In five or six days after the accident the man returned to his employment as an engineer. 'He was in moderately good spirits,' but was found incapable of comprehending the orders of his employer.

It now became evident to those around him that his ideas were completely perverted and confused. He was still able to go to a friend's house, about a mile distant, in the evenings and join in the exercise of vocal music, yet he was unfit to give any lengthened account of himself, or tell any story which could be understood. Anything further than the most simple idea he was incapable either of understanding or of uttering; still he sometimes was in good spirits, laughed and tried to joke with his friends.

He drank freely, became worse, and died on the sixteenth day. On dissection a small portion of the skull under the wound was found depressed and the brain underneath in a state of disease.

From the left boundary of this depression an extensive fracture was seen extending across the forehead into the angle of the left

[1] The 'Edinburgh Phrenological Journal,' vol. 8, p. 574.

orbit, and from the edges of the right side of the depression the fracture extended backwards until it was stopped by the squamous portion of the temporal bone.

Injury of the Anterior Lobe of the Brain, with Morbid Affection of the Perceptive Faculties.—Communicated by Dr. Otto, Professor of Medicine in the University of Copenhagen :—

In the month of February, 1837, N. H., a labourer, had a fall on the ice, and was carried home insensible. On arousing from his state of unconsciousness, he felt a slight degree of pain in the *right* super-orbital region, the part on which he had fallen, and a tumour formed there equal in size to a closed fist, but which disappeared in the course of a couple of days, as well as the pain, so that the patient, notwithstanding some peculiar hallucinations, could attend to his usual occupations on the fourth day. He afterwards consulted several physicians on account of the affection that remained, and after the unsuccessful trial of antiphlogistic treatment, he came to Dr. Fleischmann, of Erlangen, in July following. The most remarkable morbid symptoms then were as follows :—Ever since the fall, whenever he opens both eyes, he sees all external objects at an unusual distance from him. He falls consequently very often into ditches, and hurts himself on stones, which, according to his perceptions, yet lie far from him. An object lying about a foot from him appears to himself to be at five or six feet distance, and a man at the real distance of forty paces appear to be a quarter of a German mile from him. He judges quite correctly of the form and colour of external objects, according to the distance at which they appear to him ; that is, if an object seems to be only six or eight paces from him, he then perceives its form and colour as well as in his healthy days he perceived an object six or eight paces from him ; but if he thinks an object to be at the distance of a quarter of a German mile, its form and colour appear to him even as indistinct as they really were in that distance. It is likewise remarkable that, when he keeps the *left* eye shut, he again sees all objects in the right distance, and he is then able to walk safely, to read, etc. If, on the contrary, he opens the left eye, whilst he looks with the right eye, all the objects at the same moment that it is opened are observed at their real distance, but they immediately retreat farther and farther from him, so that at last they are thought to be at a greater distance than they really are. If both eyes are kept open, he also in a distance of six feet sees all objects double for a short time ; and if both eyes are kept open for a longer time, he gets a little confused in his head, sees small worms or lines, has a tingling in the ears, becomes as if intoxicated, stumbling over his own legs, etc. But if he again shuts the left eye this state again disappears suddenly, he feels better and sees as in his healthy days. Finally, if he shuts the right eye, and looks only with the left one, all objects indeed appear to him farther distant than they really are, yet not to that degree of distance in which they appear to be when he keeps

open both eyes. Not the least morbid change can be observed in the eyes on the most close examination, excepting only a little squinting of the left eye when it looks upwards. The clearer the weather is, the better he feels; but in foggy and cloudy weather the head is heavy, he sees small worms and light lines, and perceives a sort of biting in the angles of the eyes, as if there were salt in them. When he scratches his head, or makes a false step, it appears to him as if the right side of his head was hollow. His health is otherwise perfect. All means, and amongst these galvanism, have hitherto been tried without success.

This remarkable case is related in 'Hufeland's Medical Journal' for July 1838, by Dr. Fleischmann, of Erlangen, who takes infinite trouble to explain it, yet in a manner that involves him in contradictions and absurdities. But if the author had thought it worth while to make himself acquainted with Phrenology, he would have been able to explain the whole case in a clear and satisfactory way. To Phrenology it is an extremely valuable case, as this true and interesting science is confirmed by it on the one hand, and on the other it enables us to unriddle at once what seems quite incomprehensible to other observers.

The external senses conduct, by their respective nerves, only the impressions of external objects to particular parts of the brain which perceives them. If the connection between the nerves of the senses and those parts of the brain is interrupted, the individual immediately ceases to see, hear, smell, taste, and feel the objects acting on the senses. The whole function of the external senses consists in receiving and propagating the impressions to the organs of the inner faculties, and in consequence we, properly speaking, do not see with the eyes, nor hear with the ears, etc., but employ these parts only as instruments by which the impressions are sent to the brain, which perceives them, and suggests the clear idea of them. In that part of the brain situate immediately above the eyes is the organ of size, supposed by phrenologists to be the organ which enables us to perceive the size, extension, and (as Mr. G. Combe justly remarks) the distance of objects. The optic nerve receives and propagates the impression of an object also to this part of the brain, and the individual is then able, if the cerebral part is healthy, to judge rightly of the distance of the object; but if the part is morbidly affected, the idea of the distance of objects must be deranged. By the fall on the super-orbital region, the cerebral organ of size appears to have sustained an injury, probably on the right side, where the pain and swelling were induced. But the other cerebral parts immediately adjacent appear not to have been affected, and accordingly the forms and colours of objects are correctly perceived, whilst the size and distance are judged falsely. That the patient sees all objects at their right distance when the left eye is kept shut is easily accounted for by the decussation of the optic nerves; the impression of the objects being consequently propagated from the right optic nerve to the organ of size on the left side, which is sound, and its function duly performed. The

contrary holds good when the left eye is open, the optic nerve of which communicates with the right hemisphere of the brain, which was the side injured by the fall. Double vision is thus induced when both eyes are open, and confusion and stumbling are caused by it, unless these symptoms indicate that the organ of weight also participates in the morbid affection. The facts of the case narrated confirm the following points :—

1. That the brain consists of a congeries of organs, each one appropriated to the manifestation of a single mental faculty.
2. That one organ may be affected with disease deranging the corresponding faculty without disturbance of the other organs and faculties.
3. That there are two organs of each faculty, one in each hemisphere of the brain, and that one of these may suffer injury without affecting the other.
4. That the organ of size also enables us to judge of distance.
5. That all physicians would do well to study Phrenology, in order to avoid exposing themselves to useless trouble in attempting to explain the different mental affections.

I have by no means exhausted my list of cases, but fear that I have nearly exhausted the patience of my readers, and will therefore conclude this chapter with a narration of the particulars of the celebrated 'CROWBAR CASE' as supplied by Professor G. Wilder, M.D. of Cornell University, in a lecture on 'The Brain and Mind' (see publication of Mass. Med. Soc., vol. 2, p. 330).[1]

Referring to the possibility of survival after serious injury to the brain, he said :—

By far the most extraordinary instance of this is that known in the profession as the 'Crowbar Case,' or, as it was at one time called, in derision, by foreigners, the 'Great American case,' indicating its similarity to the Cardiff Giant and some other illustrations of the love of humbugging and being humbugged, which seems to be equally and largely developed among us. However, there is no longer any room for doubt respecting this case, for here is not only the published account, but anyone may inspect the skull of the man to whom the accident occurred, and the identical bar which passed through his head, at the Warren Anatomical Museum of Harvard University. The bar which I now show is an exact model of the real iron bar, and the holes in this skull fairly indicate the direction which it followed. The bar is called a tamping-iron, is round and comparatively smooth, 3 ft. 7 in. long, $1\frac{1}{4}$ in. in its largest diameter, and at one end tapers for about a foot to a point $\frac{1}{4}$ in. thick.

[1] I have not succeeded in obtaining a copy of this publication, but copy the quotation and illustration from 'The English Mechanic' of December 19, 1873, with full confidence in its accuracy.

The following is condensed from the account of Dr. Harlow, who attended the case :—

On September 13, 1848, in Cavendish, Vermont, Phineas P. Gage, the foreman of a gang of workmen, was charging a hole drilled in the rock, sitting at the time upon a shelf of rock above the hole. The powder and fuse had been adjusted, and he was tamping it down with the iron bar. While looking behind him, he allowed the iron to strike fire upon the rock, and an explosion followed, which sent the bar obliquely forward, through his head and high into the air, so as to fall several rods behind him, smeared with blood and brains.

The iron entered, by its taper end, the left cheek, and passed obliquely upwards and backwards, so as to emerge in the median line on the top of the head, at the back part of the frontal bone, near the coronal suture. Gage was thrown upon his back, and moved his extremities convulsively a few times, but spoke in a few minutes. He was carried some rods to the road, and then rode in an ox-cart three-quarters of a mile, supported in a sitting posture. He got out of the cart with little assistance, and an hour afterwards, aided only by Dr. Harlow, walked up a long flight of stairs and got into his bed. The wound bled profusely, the brain protruded through a hole in the skull, 2 in. by 3½ in., and shreds of brain hung upon his hair. While searching for fragments, the doctor passed the two forefingers into the two openings so as to meet ; but this was scarcely felt by the patient. His mind was clear for two days, but he was then more or less delirious for about ten days ; then he had a lucid interval followed by a serious relapse, when his life was despaired of, but on the 28th day he was very clear in his mind ; stated how long he had been in bed, how he was injured, and the circumstances attending it. On the 56th day, less than two months after the injury, Gage was improving in every respect, sat up most of the day, ate and slept well, walked up and down stairs and into the street. On the 64th day he caught cold from exposure, but the relapse lasted but a few days, and he improved steadily until three and a half months after the injury, when the opening on the top of the head had closed over. In April 1849, seven months after injury, his condition was as follows :—' General appearance, good ; stands quite erect, with his head inclined slightly towards the right side ; walks steadily ; his movements are rapid and easily executed ; vision of the left eye lost ; partial paralysis of left side of face ; has no pain in the head, but says it has a queer feeling, which he is not able to describe. Is undecided whether to

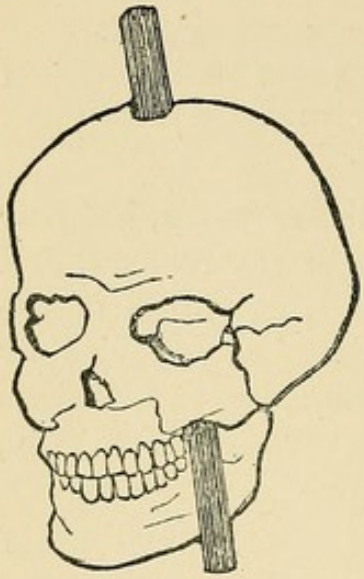


FIG. 16.

work or travel; but his former employers, who regarded him as their most efficient and capable foreman, *consider the change in his mind so marked* that they could not give him his former place.'

The equilibrium or balance, so to speak, between his intellectual faculties and his animal propensities seems to have been destroyed. He is fitful, irreverent, indulging at times in the grossest profanity (which was not previously his custom), manifesting but little deference for his fellows, impatient of restraint or advice when it conflicts with his desires, at times pertinaciously obstinate, yet *capricious and vacillating, devising many plans of operation, which are no sooner arranged than they are abandoned in turn for others appearing more feasible.* A child in his intellectual capacity and manifestations, he has the animal passions of a strong man. *Previous to his injury, though untrained in the schools, he possessed a well-balanced mind*, and was looked upon by those who knew him as a shrewd, smart business man, very energetic and persistent in executing his plans. In this regard *his mind was radically changed, so that his friends said he was no longer Gage.* He was accustomed to entertain his little nephew and nieces with the most fabulous recitals of his most wonderful feats and hairbreadth escapes, without any foundation except in fancy.

After trying various occupations, he went to South America in 1852, four years after injury, and during the next eight years was occupied in caring for horses, often driving a coach and six. During the year 1860 his health failed somewhat, apparently from hardship and exposure, and he removed to San Francisco. His health improved somewhat, but in February 1861, while sitting at dinner, he fell in a fit, and soon after had two or three fits in succession. He had no premonition of these attacks or any subsequent ill-feeling; had been ploughing before his first attack. He got better in a few days, and continued to work in various places; could not do much, changing often, and always finding something that did not suit him in every place he tried. On May 20, 1861, he had a series of convulsions, apparently epileptic, lasting until the evening of May 21, when he died—twelve years six months and eight days after the date of an injury which had destroyed the anterior and part of the middle lobe of the left cerebral hemisphere. Unfortunately his brain was not examined, but the openings in the skull well indicate the extent to which one half of the brain was destroyed.

The italics in the above are my own; their purpose is to indicate the phrenological bearings of the case, an indication especially needed, as it has been absurdly misrepresented in this respect by certain persons, who cite this as a case in which a large proportion of the cerebral hemispheres was destroyed without doing any mischief. Thus Dr. A. Wilson, in the 'Gentleman's Magazine' of January 1879, p. 83, says:—

This patient undoubtedly lost a relatively large portion of his brain-substance. At one fell swoop there must have been a considerable destruction of phrenological organs. Yet he suffered from no deprivation of intelligence, and few would dream of associating the drinking habits which finally beset him with his accident and with his loss of brains, or otherwise maintain that he was less rational before than after the accident. Thus the misfortunes of existence and the experimentation of the physiologist positively contradict the Old Phrenology, and assert that localisation of functions does exist, it is true, but that the 'organs' of the phrenologist are mere theoretical nonentities, without a trace of substance to ensure their stability or real nature.

Dr. Wilson, from his standpoint, is of course incapable of looking for any other derangement than that of 'intelligence' or 'rational' functions. Not recognising the phrenological function of that part of the brain from which the crowbar emerged and where the greatest loss of brain occurred, he is of course incapable of deciding whether the phrenological functions of that part were disturbed or not.

He also appears unable to perceive the general physiological dilemma in which his general conclusions place him; for if Gage lost all this 'large portion of his brain substance' and suffered such 'a considerable destruction of phrenological organs' without any disturbance of mental or bodily functions, the brains must be mere excrescences, having no physiological functions whatever. This dilemma becomes the more absurd, as, according to the 'New Phrenology' which he advocates and so greatly admires, the chief 'loss of brains'—that is, where the crowbar emerged—occurred where the 'New Phrenology' places the motor centres for the movement of the limbs, according to which Gage should have lost the power of moving these limbs—an unmistakable result.

The fact is that the intellectual and moral character of Gage suffered a great and serious alteration, and this occurred immediately after the accident, as his incompetence to perform his former duties and the consequent loss of his situation show.

In the first place, great instability and oscillation of character supervened. This is a common result of irregular or ill-balanced action of the opposite hemispheres of the brain. It is evident that the greater part of the course of the crowbar was through the left side of the brain, implicating chiefly the

left anterior lobe, or one side of the intellectual region; but when it reached the upper part of the brain and emerged in the region of veneration, the mischief must have been inflicted on both of these organs, on both the right and the left, as they lie in contact in the middle line: they must have been completely disorganized and much of their substance actually removed.

His irreverence and use of 'the grossest profanity' with want of 'deference to his fellows,' which became new features of his character, are clear and obvious results of want of veneration, and some of the other features of caprice and vacillation may be due to some injury to firmness, or the one-sidedness of the intellect, or both combined.

The absence of a post-mortem examination of this very curiously injured brain is much to be deplored. The Harvard University would do good service to the cause of truth by publishing a cast of the skull. I should be glad to add such a cast to my own collection, and I think I may express for the trustees of the Phrenological Museum of Edinburgh a similar desire. As it is, my diagnosis of the position of emergence of the bar is based on the engraving I have copied and Prof. Wilder's description, and therefore is somewhat vague.

CHAPTER VIII

MUTUAL CONTRADICTIONS OF CEREBRAL MUTILATORS

I HAVE already referred to the fallacy of attempting to *discover* and localize the functions of the different parts of the brain by partial mutilation of that complex organ. This, however, need not prevent us from making use of the general results of the multitude of experiments that have been made as supplying incidental illustrations of the inductions already obtainable by the more philosophical method of comparing development of the brain with mental evolution in men and animals.

In making use of such material I do not justify such experiments. I do not apologise for them. I would not even use them as they lie before me if by doing so I contributed in any degree to the encouragement of their repetition and extension.

I hope and believe that my examination of them will have a contrary or discouraging effect, by exposing the pitiful smallness of the measure of *consistent* results that is obtainable on logically sifting the mountain of contradictions that has been heaped across the path of scientific progress by the labours of experimental cerebrum-mutilators, and the fact that the most recent and highly vaunted among them were fully anticipated by Gall and Spurzheim nearly a century ago.

In the course of reading the records of these experiments I have made marginal notes of their contradictions with the intent of specifying them in this work for the edification of my readers, but on reviewing these notes I find that such detail would alone fill such a volume as this. Therefore I must be content with a few samples only, which fairly represent the bulk.

They are mainly taken from the 2nd edition (1886) of 'The Functions of the Brain,' by Dr. Ferrier, because he is

the ablest living representative of the school of cerebral physiologists to which I refer.

Referring to experiments on the spinal cord (p. 60) he says :—

> It is still held by Schiff that the posterior columns are the paths of tactile sensibility, each for the same side, and that sensations of pain can be conveyed by any portion of the grey matter. Section of the posterior columns, according to him, causes at first a condition of hyperæsthesia followed by loss of tactile sensibility, and if all the cord is divided except the posterior columns, though there is complete analgesia, the sense of contact is still preserved. These doctrines have been so completely disproved by the experiments of Brown-Séquard, Ludwig, and Woroschiloff, the above recorded experiment on the monkey, as well as by the facts of disease in man, that *they must be disregarded as entirely untrustworthy.*

A little further on (p. 66) Brown-Séquard is thus condemned :—

> Under no circumstances whatever can Brown-Séquard's doctrine be accepted, that the paths of the muscular sense are in the anterior roots and motor-tracts of the spinal cord. This is so utterly opposed to every well-established fact respecting the anatomy, physiology, and pathology of the anterior roots that *it seems a marvel that such a doctrine should still be mentioned otherwise than to be condemned.*

Among the most cruel experiments performed by these gentlemen are those of extirpating or otherwise mutilating the apparatus of the internal ear. This is far worse than slicing or burning the substance of the brain, as the greater part of the brain is insensible to pain. Not so the internal auditory apparatus. The effect of the mutilation of this in various ways is pretty much the same in various animals. In fishes, as Dr. Ferrier states (p. 133) :—

> Cyon found that though these animals gave no indications of hearing the loudest sounds, yet they exhibited the most profound disorders of equilibration when their semicircular canals were injured. They were unable to maintain their normal attitude, circled round and round when attempting to swim, or rotated round the axis of their bodies.

Further on (p. 134) he describes the effects of cutting the auditory nerve in dogs thus :—

> The animals roll round towards the side of operation, and exhibit a skew deviation of the eyes—that on the side of section

looking downwards and outwards, the other upwards and inwards, and oscillating in the opposite direction. The rolling is most marked during the first few days after the operation, being then almost incessant. When not rolling on its axis the animal lies down on the side of section, with this side of the head downwards, *the other upwards.*

In this there are no discrepancies so far as regards description of the visible results, but the usual contradictions appear in the pathological and physiological conclusions, respecting which Dr. Ferrier tells us (p. 136) that—

> The hypothesis advanced by Goltz, and supported in all essential points by the investigations of Mach, Breuer, and Crum Brown, is that the impressions are conditioned by the degree, and relative variations, of pressure exerted by the endolymph upon the ampullary dilatations of the membranous canals on which the vestibular nerves are spread. This hypothesis has, however, been contested by Cyon and others, on the ground that variations in pressure in the canals, experimentally induced, do not cause disturbances of equilibrium. Cyon's hypothesis is that vibrations of the otoliths, conditioned by movements of the head and undulations of the endolymph, are the immediate excitants of the ampullary nerves.

This is more monstrous than the record in Jack Falstaff's pockets, for there is not 'one halfpennyworth of (common-sense) bread to this intolerable deal of (pedantic) sack.' Less than one halfpennyworth of the former would have sufficed to show that the writhings and rotations of the victims were simply the expressions of the agonies of ear-ache. When I was a child I was a victim to this exquisite torture. I rolled on my bodily axis, coiling the bed-clothes tightly round me during the worst violence of the paroxysms, and when not rolling on my axis, lay down on the tortured side 'with this side of the head downwards,' and strange to relate, 'the other upwards.' The pressure of the pillow seemed to dull the pain. I have seen others do the same without the aid of any artificial probing, section, or other artificial lesion of the tympanum, the semicircular canals, or any other part of that dreadfully sensitive region, the internal ear.

The erudite record of the fact that when one side of the animal's head is downwards the other side is upwards, is delightfully typical of the discoveries that have been revealed by these profound researches.

On p. 153 (chapter on the Functions of the Optic Lobes)

we are told that 'Flourens found that destruction of the optic lobes in birds *caused blindness*,' another profound revelation, seeing that Gall had previously demonstrated their optic functions; but when we arrive at the researches of the more modern experimenters we encounter the usual contradictions. Thus (p. 164) we are told that—

> Goltz found that gentle stroking of the back of frogs no longer excited croaking when the optic lobes were destroyed; and he concludes—and in this he is confirmed by Steiner—that these ganglia are the centres of this emotional responsive action [i.e. that the function of these very prominent cerebral ganglia is croaking in response to stroking]. Longet, however, found that in rabbits and dogs, even after complete removal of the corpora quadrigemina [1]—as well as the hemispheres, corpora striata, and optic thalami—when, therefore, only the pons and medulla oblongata remained intact, irritation of the sensory nerves induced general agitation and plaintive cries as of pain; phenomena which entirely ceased when the pons was broken up. Vulpian states that he has obtained exactly the same results, but in the experiment he relates—on a young rabbit—the corpora quadrigemina were not destroyed. He, however, seems to share the opinion of Longet, that it is the pons, rather than the corpora quadrigemina, which is the centre of these emotional manifestations [i.e. the centres of croaking in response to stroking].

Further, Ferrier says:—

> I have found in rabbits that extensive lesions may be made in the corpora quadrigemina without causing cessation of the characteristic cries and other forms of response to general and special sensory stimulation; and Bechterew states that it is only when the optic thalami [2] are destroyed, or sections made posterior to these ganglia, that emotional responsive manifestations cease. *This, however, is contradicted* by the experiments of Longet and Vulpian, and also by experiments of my own, in which all the centres anterior to the corpora quadrigemina were removed without annihilating emotional response. And I have found in the rabbit that breaking up the optic thalami on both sides did not interfere with the utterance of plaintive and continued cries in response to pinching of the legs or tail, or starting to sounds made in its proximity.

In the chapter on the Functions of the Cerebellum (p. 176) we learn that—

[1] Another name for the *optic lobes*. In an early stage of his researches Gall demonstrated that the anterior pair of these four bodies—also called the *nates* and *testes*—are the true optic centres, and traced the optic nerves directly from the eyes to them.

[2] These are not the 'optic lobes' before specified, but the ganglia *over* which the optic nerves pass on their way to the true optic centres.

Vulpian and Philipeaux did not observe any appreciable disorders in the movements of fishes unless the peduncles of the cerebellum were injured, in which case the phenomena were similar to those observed in birds and mammals. Renzi, however, found that lesions of greater or less extent, confined to the cerebellum, caused in fishes precisely the same kind of disturbances of equilibrium and locomotion as Flourens described in birds and mammals. Dickinson also, in a series of careful experiments, in which he established lesions in the cerebellum of perch, dace, and goldfish, found that in every instance there were marked disorders of equilibrium. The animals invariably showed loss of lateral balance, oscillated from side to side, or rolled round and round when they swam. In many similar experiments which I made on goldfish, in which I satisfied myself by post-mortem examination that the lesions were accurately confined to the cerebellum, I found that the animals *continued able to swim, but never in the normal attitude, but belly upwards, or on one side or the other.*

The italics are mine, to mark the exquisite fooling involved in these pretentious researches. Is there any angler or any school-boy who lives near a pond or river containing fish who is not aware that when fishes are 'sick,' and likely to die from poisoning or any other source of injury, they 'turn up' and swim 'belly upwards, or on one side or the other'?

If Dr. Ferrier will make 'post-mortem examinations' of a few hundreds of fishes that have thus died from any pollution of their native element, he will learn that 'lesions accurately confined to the cerebellum' are quite unnecessary to produce this well-known effect.

The following is in the same chapter (p. 185):—

> When the lateral lobe of the cerebellum is injured, or the middle peduncle divided, equilibrium is overthrown laterally, and the animal rotates on its longitudinal axis [as I did with the ear-ache]. Some differences of opinion exist as to the direction of the rotation after such injuries, but it was found by Magendie—and his statements have been confirmed by Renzi, Schiff, and many other physiologists—that division of the middle peduncle caused the animal to revolve on its axis with incredible rapidity towards the side of section. Thus if the left peduncle were cut, the animal turned over and over from right to left. Animals so operated on when placed among straw turned so incessantly as to coil themselves up in the straw like bottles packed for transit [as I did in the bedclothes].

On this very profound question of direction of rotation, Dr. Ferrier describes his own contribution. He exposed 'the left lateral lobe of the cerebellum in a monkey, and by means

of the actual cautery destroyed the surface of the posterior superior lobule, to the depth of a quarter of an inch.' This animal perversely contradicted the others by falling backwards and to the *right*, 'instead of towards the side of lesion'; and, moreover, 'on repeated examination for a period of twenty-four hours' Dr. Ferrier found 'that the tendency to fall backwards and to the right continued whenever the animal attempted to move.'

The reader should note the resemblance between the results of cutting and burning away the cerebellum to those obtained by probing and crashing into the nerve ends of the bony cavities of the inner ear. Many of us have direct knowledge of the effect of stirring the nerve ends of a tooth-cavity, and of the similar and still more overwhelming agony of an irritation of the corresponding constituent of the auditory cavities. If any reliance is to be placed on the conclusions of the early experimenters on cerebral mutilation, the climax of physical torture must be attained in extirpating *the whole* of either lobe of the cerebellum; for though the general mass of the brain is insensible, the inner part of these lobes, and more especially the *peduncles* of the cerebellum (the *crura cerebelli*), is within touching distance of the very focus of general physical sensation. The experiments of Magendie, Flourens, and the rest, all show that the most violent and horrible writhings and rotations occur when the medulla oblongata is thus approached.

But to proceed with my list of contradictions in this one book. Further on (p. 204) Dr. Ferrier says, concerning the 'feebleness and incapacity for exertion' of mutilated dogs, that 'these facts do not necessitate the hypothesis originally advocated by Luys and supported by Weir Mitchell and Luciani, that the cerebellum is a reservoir of energy for the reinforcement of movements throughout the economy.' Dr. Ferrier then proceeds to deny not only this hypothesis, but also the *facts* asserted by Luciani. He says, 'There is no diminution in the force of muscular contractions after cerebellar lesions.' Luciani as plainly says that there is. On p. 206 we are told that—

> The posterior columns being regarded as the path of common or tactile sensation, the opinion that the cerebellum was the seat of common sensibility seemed well founded. But we have seen that

the more recent investigations into the sensory paths of the spinal cord do not support this view of the functions of the posterior columns; for tactile sensibility is certainly not abolished by section of these tracts. Brown-Séquard has also shown by direct experiment that section of the restiform bodies does not cause loss of tactile sensation. These facts, in conjunction with the results of experimental lesions and disease of the cerebellum, afford *overwhelming evidence against the view that the cerebellum is the seat of common sensation.* Neither Flourens, Vulpian, Luciani, nor other recent experimenters have ever observed cutaneous anæsthesia in animals deprived of their cerebellum.

Further on we are told that 'Lussana endeavours to show that cerebellar inco-ordination is due to loss of the muscular sense. *But this is a pure assumption, and he supplies no tangible evidence of the actual impairment of this so-called sense.*'

In the introductory chapter on the Functions of the Cerebrum (p. 232) we are told that—

Deep narcosis abolishes the excitability both of the grey matter and the subjacent medullary fibres, so that no reaction whatever occurs on the application of currents otherwise effective. It has, however, been asserted by Marcacci—whose experiences in this and many other respects appear altogether unique—that, even after freezing the cortex, electrical stimulation is still effective, and causes the same movements as before. *This assertion has been completely refuted by Varigny*, who found after refrigeration of a given region that no ordinary stimulation was capable of exciting the movements formerly readily excitable; and that, when the current was intensified beyond all limits of localised irritation, general agitation was produced everywhere *except* in the parts governed, and ordinarily alone thrown into action, by stimulation of the region in question.

The following is from p. 249, in reference to experiments on dogs:—

Hitzig, in subsequent experiments, while confirming in many respects the results described by me in the 'West Riding Asylum Reports,' vol. iii., questions the accuracy of others, especially as regards the excitability of the regions posterior to the fissure of Sylvius. The phenomena described by me he attributes to vague conduction of currents. In support of his view he endeavours to show that the phenomena are discordant with each other, and that my experiments would localize different motor centres in essentially the same regions, and motor centres for the same movements in widely different parts of the brain. These discrepancies which Hitzig discovers do not exist in reality, but only in his own method of reading the facts. *The mere fact that movements result from stimulation of a given part of the hemisphere does not necessarily*

imply that the same is a motor centre in the proper sense of the term.

The italics are mine, to indicate my perfect agreement with Dr. Ferrier, and I have especial pleasure in quoting below the sentence which immediately follows them: 'It will afterwards be shown that the movements which result from stimulation of the regions in question are expressive of sensation, and that the character of the movements furnishes an important index to the nature of the sensation.'

This is a step forward in philosophy, though backward in date, as it carries Ferrier to the threshold of Gall's explanation of the true nature of the so-called 'motor centres,' of which anon.

On p. 264, in reference to electrical stimulation of the basal ganglia, is the following:—

> It has been asserted by Franck and Pitres that neither from the corpus striatum nor from the optic thalamus is it possible to excite movements even with currents 'les plus intenses' when the electrodes are placed exactly on the ganglia themselves, whereas general muscular contraction of a tetanic character is readily induced by irritation directly applied to the internal capsule. I have, however, so often and in so many orders of animals proved the positive influence of irritation of the corpus striatum, and the negative influence of the same strength of current when applied to the optic thalamus, *that I cannot admit the accuracy of the statements made by these physiologists.* I have recently re-investigated the subject, and arrived at the same results as before on monkeys and rabbits.

Dr. Ferrier here adds that 'in order that the results should be trustworthy it is necessary that the cerebral ventricles be exposed in such a manner as to avoid shock and hæmorrhage.' Dr. Gall said the same, and when we consider that these ganglia are at the base of the brain, and in such animals as rabbits and monkeys are covered and enclosed by the whole mass of the cerebral hemispheres, the difficulty, or rather the impossibility, of getting at them, of cutting away the upper part of the skull, and then dissecting away the hemispheres without shock or hæmorrhage is obvious.

Dr. Ferrier says, in explanation: 'I have generally reached the interior of the ventricles after piecemeal exposure of the hemisphere, so that sudden shock and hæmorrhage were avoided.'

Neither I nor my readers can suppose that Dr. Ferrier

means to assert that there was no hæmorrhage, and as to the shock, it is unfortunate that we cannot consult the monkey. I should place far more reliance on his opinion as to its magnitude and suddenness than on that of Dr. Ferrier.

The conclusions and statements of experimental facts by Franck and Pitres are further controverted on p. 266, and the testimony of Carville, and Duret, and Minor is quoted against them.

On the page following this we are told, in reference to Dr. Ferrier's own experiments, that—

> On no occasion did irritation of the optic thalamus, in any of the animals experimented upon, cause the utterance of any sound expressive of pain or emotion of any kind. Bechterew, however, states that he has excited emotional utterances in pigeons, fowls, and dogs by mechanical as well as electrical irritation of the optic thalami. He seems to have applied electrical irritation only by insulated needles thrust through the substance of the hemisphere to the optic thalamus.
>
> As no such phenomena ever occurred in my own experiments in which the optic thalami were clearly exposed, *I cannot accept Bechterew's statements as accurate representation of the facts* as regards irritation strictly confined to the ganglion itself.

On p. 273, in treating on the so-called Visual Centre, Dr. Ferrier says :—

> The statements of Munk, that lesion of one occipital lobe causes hemianopsy towards the opposite side, by paralysis of both retinæ on the side of lesion, and that bilateral lesion causes complete blindness, *are entirely erroneous*, and depend on direct implication or secondary extension of the lesion into the angular gyri. In two cases I removed the greater portion of both occipital lobes at the same time without causing the slightest appreciable impairment of vision. One of these animals within two hours of the operation was able to run about freely, avoiding obstacles, picking up such a minute object as a raisin without the slightest hesitation or want of precision, and to act in accordance with its visual experience in a perfectly normal manner.

Other similar cases are narrated, and Horsley and Schäfer are quoted in support of the results of Dr. Ferrier, who then says, '*We can therefore dismiss Munk's statements as to the effects of lesions of the occipital lobes as being unfounded and erroneous.*'

On the same subject, on p. 283, he says :—

> As to other effects of lesion of the angular gyrus, I have never seen, either on unilateral or bilateral destruction, the slightest

appearance of ptosis or paralysis of the ocular muscles; and, *in direct contradiction to Munk*, I have found the sensibility of the conjunctiva and the reflex closure of the eyelids as distinct as in the normal condition. If one may utilise Munk's own data, *the account he gives of the effect of lesion of the angular gyrus demonstrates the absurdity of his notion* that the angular gyrus is the sensory centre of the eyeball, and confirms the account above given of its relation to vision. After destruction of the left angular gyrus he found that brusque approximation of the finger to the left eye invariably caused winking when the eyelids were actually touched; a clear proof of the sensibility of the eye, and the non-perception of the threatened danger at a distance. This absence of winking at threatened danger he admits to be characteristic also of true blindness; but, inasmuch, says he, as this animal cannot be blind, presumably because its optical lobe was intact, 'therefore the absence of winking could only be due to the inability of the cortex to act on the sphincter palpebrarum.' *This exquisite specimen of petitio principii needs no further comment.*

Further, he says that after destruction of the left angular gyrus, and closure of the left eye, the animal often fails to seize things offered it, or thrown down before it, especially when the objects are small; another clear indication of defective vision. Lastly, he says that on bilateral extirpation of the angular gyrus he has observed that monkeys, 'after complete restitution,' whatever this may mean, are unable, like normal monkeys, to take things offered to them delicately with the fingers, but instead make grabs at them with the whole palm.

This subject is further discussed at considerable length, and Charcot's diagram of the course and decussation of the optic tracts is copied and described, with the following commentary:

It cannot, however, be doubted that *this scheme is unsatisfactory, and in contradiction with the now well-established clinical, as well as experimental, facts* which prove that hemiopia may result from cortical and sub-cortical lesions of the posterior lobe, not affecting the optic tracts. Landolt has also shown that, even in those cases in which apparently only the opposite eye is affected, there is also some contraction of the visual field in the eye of the same side; a condition which is not accounted for in Charcot's scheme. *Those on the other hand are equally wrong who, like Gräfe and Féré*, in the scheme they propound of the cortical relations of the optic tracts, allow only for homonymous hemiopia as a consequence of lesion of the hemisphere or internal capsule. Some of the writers who adopt this scheme boldly deny the existence of any well-authenticated case in which the lesion of one hemisphere has caused blindness in the opposite eye.

Still on the subject of 'the Visual Centre,' the following further contradictions are expressed in a note on p. 297:

'*Loeb makes an egregious blunder* in calling the Sylvian convolution the angular convolution, and attributing to Dalton the localization of the visual sphere in this region.'

A little further on (p. 299), this prostrated Loeb rises again and contributes to the general Punch and Judy business by knocking down Munk as follows :—

These statements, for which *the evidence adduced by Munk appears ridiculously insufficient, have been conclusively refuted by Loeb.* Loeb has shown by carefully devised experiments, in many of which he first enucleated one of the eyeballs, where it was necessary that it should be entirely eliminated, that there is no single portion of the region included within the visual zone by various authors which may not be injured without causing any visual defect perceptible on the day after the operation. Munk's assertion that lesion at the point A (Fig. 94) causes defect in the point of clear vision *is especially erroneous*, as it is precisely this point which is least affected when visual disturbances do occur. When visual disturbances do ensue, which is the rule, and, as the record of the various experiments shows, particularly when secondary extension of the primary lesion occurs, or when the operations are repeated, they are invariably of the character of hemiopia or hemiamblyopia. *There is no foundation whatever for the statements made by Munk* that particular regions of the retina are in special relation with particular regions of the visual zone. When defect of vision occurs from lesion of the posterior lobe, it is always of the same hemiopic character, whatever region is specially injured. The lateral portion of the sphere defined by Munk is not specially in relation with the outer quadrant of the eye on the same side, nor any portion more in relation with one part of the opposite retina than another. In particular, as remarked, central vision is precisely that which is least affected in all cases, whether of unilateral or bilateral lesion of the visual zone as defined by Munk.

There is never any eccentric or abnormal fixation of the eyeballs when the special regions indicated by Munk are destroyed such as would necessarily result if particular portions of the retinæ were paralysed. Nor is the recovery of vision, after partial lesions of the visual zone, due to practice and the acquisition of new visual experience ; inasmuch as recovery takes place when the animal is kept absolutely in the dark, and prevented from exercising its visual faculties.

The results obtained by Loeb are in perfect harmony with the strict localization of the visual sphere in the hemisphere. Partial lesions produce only transient effects, which may not be perceptible on the day after the operation. But to argue, as this physiologist does, that there is no definite visual sphere in the hemispheres because the limits may not have been correctly assigned by any of the experimenters, and because unfounded assertions have been made by Munk, is in the highest degree illogical ; *and he is contradicted*

by his own experiments, in which it is clearly shown that the degree and duration of the hemiopia varied with the degree of destruction of the occipital region, and in some cases remained permanent without any appreciable defect otherwise in the animal's powers and capacities.

I cannot leave this set of contradictions concerning 'the visual centre,' or 'visual zone,' or 'visual area,' or 'visual sphere,' as the region of the brain under dispute is variously named by Ferrier, without a few remarks in anticipation of what will follow in a subsequent chapter.

These gentlemen will perhaps be surprised to learn, as they may if they choose, that in spite of all their contradictions they agree remarkably in supporting Gall and Spurzheim, who at about the beginning of the present century discovered and announced that this region is the centre, not of *vision*, but of *vigilance*. It is the region of the organs of *cautiousness*, *combativeness*, and *secretiveness*. The centre of Ferrier's centre is a little behind cautiousness, and its circumference encroaches upon combativeness, which, as anybody may learn by reference to a phrenological bust, is immediately behind cautiousness. It also extends downwards into the region of secretiveness.

Munk, who appears to have experimented on dogs, places it further behind than Ferrier does, i.e. quite in the region of combativeness. If his victims were fighting dogs this is exactly what should be expected, as their great business is to keep a sharp look-out on the movements of opponents.

The monkeys of Ferrier are timid animals, and therefore most vigilant in looking out for sources of danger, i.e. in exercising the functions of cautiousness.

Other indications of another kind of vigilance are brought out by other experiments on the region immediately below this, marked 14 in Ferrier's plates. This is the vigilance of hiding or concealment, and the number 14 is placed over secretiveness.

If Gall is right, there are what he describes as the 'converging fibres,' connecting these regions with the true 'optic centres,' i.e. the anterior part of the corpora quadrigemina, so largely developed in birds with penetrating vision, that, until Gall's demonstration of the error, they were regarded by anatomists as the optic centres, and named accordingly.

Proceeding now to Ferrier's section on the Auditory Centre, I find the following on p. 311 :—

In order to secure total and enduring deafness—*absurdly termed by him* '*Cortical*' (*Rindentaubheit*) in contradistinction to 'psychical' deafness (*Seelentaubheit*)—Munk states that destruction, not merely of the posterior division of the third external convolution, but also of the posterior divisions of the first and second convolutions, is necessary. His experiments on this point are, however, *exceedingly unsatisfactory ;* and that *his conclusions are erroneous* has been demonstrated by Luciani and Tamburini, who have found that bilateral destruction of the posterior division of the third external convolution has no effect on the sense of hearing whatever. Munk's primary lesion destroys only a portion of the true auditory centre, and the secondary disturbances which are set up by the lesion functionally annihilate the whole for the time being. For the time, therefore, the animal appears totally deaf. But when the secondary disturbances have subsided, the uninjured portion of the auditory centre is able to resume its functions, and the animal recovers its hearing.

In the chapter on the Motor Centres are long passages contradicting both the facts and conclusions of Schiff, from which I select the following :—

P. 372 :—

Schiff ascribes the movements resulting from electric stimulation to irritation of the fibres of the posterior columns, which—*altogether without proof and contrary to all recent anatomical investigations*—he assumes, approach the cortex before turning downwards to reach their true centres at the base. In order to account for the secondary degeneration which ensues in the pyramidal tracts after destruction of the cortex, he further assumes that the pyramidal tracts, issuing from the basal centres, ascend near to the surface before turning downwards to pursue their path to the crura cerebri and lateral spinal tracts. The cortex itself, according to this imaginary anatomy, would appear to be altogether indifferent material, merely forming a covering for fibres which come near it, but form no connection with it.

The resemblance which Schiff traces between the effects of destruction of the cortical motor centres and the ataxy following section of the posterior columns of the spinal cord *is of the most flimsy and superficial character, and disappears on more careful investigation.*

Further down, on p. 373, we are told that—

Schiff, in further support of his theory of the identity between the effects of section of the posterior columns and destruction of the cortex, makes the extraordinary statement that after section of the

posterior column on one side the motor area of the opposite hemisphere ceases to be excitable after a lapse of about four days, etc. etc.

It is true, as Schiff states, that the operation for section of the posterior columns, as he performs it, leads to abolition of all reactions from the cortex in the parts situated below the section, but the explanation is a very different one from that which he gives. There is no degeneration up to the cortex, but, as Horsley has satisfactorily demonstrated, the pyramidal tract, injured by the operation for section of the posterior column owing to secondary inflammatory changes, undergoes degeneration below the section, so that it ceases to be capable of transmitting motor impulses to the parts with which it is in relation, etc. etc.

P. 374 :—

Schiff holds that the posterior columns of the spinal cord are the paths of tactile sensibility or touch proper, as distinct from other forms of common sensibility, and he attributes the ataxy which results from section or disease of these columns to the loss of tactile sensibility. These questions I have already discussed (Chapter II., § 10), and we have seen reason to regard Schiff's views as to the functions of the posterior columns, and as to the cause of ataxy, to be entirely erroneous.

The assertion made by him, as well as by Tripper, Munk, and others, that removal of the cortical motor centres causes loss of tactile sensation, *has no better foundation*.

Munk, indeed, goes further than Schiff, and holds that not merely tactile sensibility, but common sensibility in general, is abolished by lesion of the cortical motor zone. Munk's *statements are justly ridiculed by Goltz as being unsupported by any evidence worthy of consideration, and directly contradicted by his own experiments, as well as those of Hitzig, Schiff, and my own.*

The conclusion that tactile sensibility is lost or diminished after the destruction of the cortical motor area is *based on defective methods of investigation and erroneous interpretation* of the reaction of the lower animals to sensory stimulation.

The following, on p. 377 (Motor Centres), is curious. If it were not written by Ferrier, I should have supposed it is by someone who has some knowledge of Gall's strictures on the methods followed by Ferrier, and his predecessors and contemporaries, in cerebral mutilation :—

Morbid anatomy is not equivalent to pathology, and less so in the case of the brain than elsewhere. The extent of the part visibly diseased is by no means a measure of the extent or position of the functional or organic derangement that actually exists. If the mere visible anatomical lesion were always to be regarded as the true cause of the symptoms, we might find with Exner a centre for

almost every function in the most diverse cerebral regions; or conclude with Brown-Séquard *that there is no localization of function whatever, and that a cerebral lesion, wherever situated, produces symptoms only through some dynamical influence on the true centres somewhere unknown.*

P. 380 (the Motor Centres) :—

As there is no evidence of the impairment of the common sensibility of the limbs from destruction of the cortical motor zone, but conclusive evidence to the contrary, so are the views of Hitzig and Nothangel respecting the abolition of the muscular sense equally without foundation.

P. 400 (the Motor Centres) :—

Munk professes to have found that, after destruction of the prefrontal regions in dogs and monkeys, paralysis occurs in the muscles of the trunk on the opposite side, so that the animal is unable to turn to this side, and that bilateral destruction causes paralysis of the trunk muscles on both sides, so that the animal can turn neither to the right nor to the left.

Though he furnishes no evidence of impaired sensibility in the trunk or elsewhere, he nevertheless calls the prefrontal region the sensory sphere (*Fühlsphäre*) of the trunk. Munk's assertions as to the effects of lesion of the prefrontal region *have as little foundation as many other of his utterances on cerebral physiology.*

My own experiments, as well as those of Horsley and Schäfer, disprove Munk's assertions in the case of monkeys, and clinical observations show that in respect to man they are equally untrue.

In regard to dogs *Munk is flatly contradicted by Hitzig, Kriworotow, and Goltz.* Not one of these physiologists has observed any of the motor disturbances described by Munk after entire removal of the prefrontal regions. Kriworotow says that in all his dogs the mobility of the trunk, trunk muscles, and lumbar vertebræ was absolutely unimpaired, whether one or both prefrontal regions were destroyed.

Goltz relates that in one dog he removed the whole of the region lying in front of the crucial sulcus on both sides. Yet this animal was able to turn its trunk, as well as to be able to seize a piece of meat attached to the root of its tail. In numerous other cases in which the prefrontal regions were removed, in addition to extensive lesion of the motor zone proper, there *never* occurred such affection of the trunk muscles as Munk describes. *It is unnecessary to adduce further evidence of Munk's untrustworthiness.*

In the next chapter, on the Functions of the Basal Ganglia, we are told in reference to the structure and functions of the optic thalami, that—

The views of Luys have been regarded by most anatomists as purely speculative and devoid of any foundation in demonstrated

fact. But Gudden has shown that after removal of the cortical centres in their entirety the corresponding optic thalamus entirely atrophies, while the corpus striatum remains intact.

Further on (p. 413)—same subject—Dr. Ferrier says:—

Though Luys and Fournié consider that the optic thalamus is the ganglion of convergence of all the sensory tracts before they radiate into the cerebral cortex, *their views are neither in accordance with recent anatomical researches, nor are they supported by well-established clinical or experimental data.* The clinical cases collected by Luys in support of this theory *are exceedingly unsatisfactory*, and do not exclude implication of the internal capsule. The experiments which Fournié adduces to prove that destruction of the optic thalamus causes loss of sensation on the opposite *side are not such as to inspire confidence.* Fournié injected strong solutions of chloride of zinc into the optic thalami, but his own description of the diffuse lesions and general cerebral disturbance which his procedure induced, *justifies the complete distrust with which his results have been received by physiologists and by pathologists in general.*

Nothangel detected no paralysis of either motion or sensation after destruction of both optic thalami in rabbits, nor anything at first sight capable of distinguishing them from perfectly normal animals. They retained their voluntary motor power, and reacted as usual to cutaneous stimulation. The only abnormality was that they allowed the fore limbs to be placed in any position without resistance, and if the one thalamus only were destroyed, the limb opposite the lesion.

After expounding his own explanation—lesion of the internal capsule—Dr. Ferrier tells us that—

Bechterew did not observe this condition in his experiments, and saw nothing to indicate affection either of sensation or voluntary motor power. The author, however, states that electrical irritation of the optic thalamus in his hands caused the animals to utter cries such as they employ to express their feelings or emotions. I have, however, never observed any phenomena of this nature in my experiments on the optic thalami of various animals, *and cannot, therefore, admit the correctness of Bechterew's statements.*

Further discussion of Bechterew's experimental facts and theoretical conclusions follows, concluding with the statement (p. 414) that—

Bechterew's criterion between reflex and true emotional cries, and other manifestations of feeling, appears to be somewhat arbitrary: and the experiments of Longet and Vulpian, as well as my own, *are distinctly contradictory, in several particulars, of the results arrived at by him.*

On p. 460 (Brain and Mind) even Hughlings Jackson, to whom the book is dedicated, comes in for a share, as we are told that—

> It has been assumed by several writers, among others by Hughlings Jackson, that in addition to the sensory and motor substrata, which have been demonstrated and defined by physiological and clinical research, there are other and higher motor as well as sensory centres in which all the motor and sensory functions are again represented, and form the substrata of the higher mental operations. *This hypothesis receives no confirmation from the facts of experiment*, nor does it appear to me to be at all necessary to explain the facts either of normal or abnormal 'mentation.'

This is a considerable catalogue of contradictions from *one book*. I select it as a sample, simply because its author is acknowledged in this country as the highest authority on this system of localization of the various motor and sensory centres that are described in most of our modern text-books as being now established by mutilation and electrization of different parts of the brain; a system that has ever been described as 'the New Phrenology.'

I could go on throughout the literature of all the latest fashions in this 'experimental' cerebral physiology, and from each book fill a chapter of quotations of contradictions similar to the above.

The reader may think that having quoted Ferrier's contradictions of so many authors, I ought in justice to them to quote all their replies, but life is too short for this; and it is unnecessary, as the simple expression '*You're another*' embodies a general summary of their retorts to Dr. Ferrier.

I will, however, quote the summary of an impartial writer, W. R. Benedict, Professor of Psychology and Logic in the University of Cincinnati. It is from a series of articles on 'The Nervous System and Consciousness' contributed by him to vol. 27 of 'The Popular Science Monthly.' After stating many of the prominent contradictions of each other by the highest authorities of this school, he says:—

> Until lately the defenders of localization seemed to be justified in believing that something had been established as to a motor area of the brain; they might well feel, also, that a beginning had been made towards connecting certain parts of the cortex with specific sensations, and might hope that further experiments would remove, in considerable degree, the present disagreements.

The doctrine of localization, both as a whole and in detail, has, however, received a severe blow at the hands of Professor Goltz of Strasburg. In 1876 this distinguished experimenter began the publication of a series of papers in 'Pfluger's Archiv für die gesammte Physiologie.' In September 1881 this series was finished and published by itself. Professor Goltz fearlessly declares that he has overthrown *all* the conclusions about division of the brain into motor and sensory areas, and brought back our knowledge of brain function to the old view of Flourens, viz. that the cerebrum is one organ, having one function throughout. Professor Goltz's experiments are confined entirely to dogs, and their chief significance is due to the fact that he was able to keep the animal alive after removal of larger masses of the cerebrum than any other experimenter. These experiments seem to have been abundant and thorough. As a result of them, Professor Goltz concludes that the degree of the disturbance of function from destruction of brain substance depends upon the *quantity* removed, not upon the location of the lesion. He says, most positively, that 'no extirpation of the motor centres, or of any other portion of grey matter, could cause permanent paralysis to any muscle of the body.' His emphasis is upon the word *permanent*.

Very many of the effects insisted on by advocates of localization did follow these brain lesions, but the effects were not lasting, and they did not depend upon removal of specific portions of the substance. Blindness follows destruction of the angular gyrus, but it is temporary; the animal will see again in time. Professor Goltz admits a compensation of brain functions, so that remaining portions of the organ may take up the work of a part destroyed; but this is not at all the compensation talked of by the supporters of localization. Their compensation requires that the additional work shall be done by the corresponding part in the other hemisphere. Professor Goltz destroys the angular gyrus on *both* sides, and still the dog sees. Professor Goltz believes, however, that there are some permanent disturbances resulting from brain lesions, such as 'a certain dulness in the sensation of touch, a diminished power of vision, everything appearing cloudy to the eye, and some awkwardness in the movements.'

It will disturb the opponents of vivisection to know that Professor Goltz sacrificed fifty-one dogs in attempting to determine the effects of lesion in *both* hemispheres. He found that what happened only on one side of the body, and that the opposite, if one hemisphere was dealt with, happened on both sides of the body if both cerebral masses were affected. *In all these cases mental weakness increased with the increasing quantity of matter removed.* When considerable portions were taken away on both sides, the dog presented a demented appearance, very plain to be recognised. He would walk, run, see, hear, smell, and taste, but he was imbecile in all these activities.

It was not to be supposed that so fierce an attack on localization would go unchallenged. Professor Goltz certainly did not shrink

from the demand to make good his assertions. He took up basket and dog, and journeyed from Strasburg to London. Here, in 1881, he came before the physiological section of the International Medical Congress, opened his basket, and, taking out the dog, placed him over against the almost equally celebrated monkey of Professor Ferrier. The dog walked, ran, saw, heard, tasted, and smelt; this was as his master desired, yet he should not have behaved so, for he had lost almost all the centres for these respective functions. Large territories in both hemispheres were gone. He was clearly weak-minded, but, on the whole, he was not the kind of dog believed in by the advocates of localization. Professor Yeo even went so far as to say before the section, 'I candidly admit that, should the entire of the so-called motor centres prove to be destroyed in this case, Professor Goltz has succeeded in completely changing my views on cerebral localization.'

After the dog there was a monkey. Professor Ferrier introduced him. He had lost the motor zone in the left hemisphere seven months previously. Of him Professor Ferrier said, 'As to any independent volitional action of the right arm and leg we have not seen a single indication since the operation was made. The animal is, in every other respect, perfectly well, and as to its tactile sensibility there is not the slightest sign of impairment.' It is pleasing to know that, as the dog had been faithful to his master, so the monkey was true to his friend: he displayed the proper amount of paralysis on the opposite side of the body. In this connection Dr. Ireland's words are suggested. He says, 'It is to be hoped, in the interests of the martyrs of cerebral physiology, that definite results will be obtained as quickly, and with as little suffering as possible.'

I must add to this that, in the interests of science, as well as of these poor unnecessary martyrs, it is most desirable that the study of cerebral physiology shall fall from the barbaric hands of mere mutilating mechanics, and be taken up by men who can use something higher and better than the knife and searing iron:—men who will not emulate the silly impatient child who cut open his drum to find out where the sound came from, but will laboriously and patiently study the devices of Nature as presented by the gradual building up the brain and the concomitant evolution of the mental faculties throughout the whole animal kingdom; men endowed with sufficient philosophic acumen to collate and arrange these observations according to their natural relations to each other, and cautiously to induce therefrom the great general facts or natural laws which they present and demonstrate.

In my next chapter the reader will find that Gall anticipated and explained the results obtained by our modern

electrical stimulators of the cerebral surface. I may here add that his more philosophical demonstrations also explain the above-stated contradictions of the mutilators. He showed that the cerebral hemispheres, the seat of mind, have specific local connection with certain muscles, with those that are employed by the specific mental faculties in the manifestations of their functions. So long as the mental organs and their communications with the body remain intact, the excitation of the cerebral organs of the mental faculties may produce convulsive movements of these servant muscles; or otherwise, if these commanding mental organs are injured or destroyed a disturbance of these muscular functions may occur. The *inability* of the modern mechanical mutilators and galvanizers *to distinguish between the actual 'motor centres' and the mental organs that make use of these centres* has created the humiliating muddle presented by the poor dogs and monkeys described above, whose cerebral conditions were but ironical exaggerations of that of their masters, when they fail to understand the difference between the loss of mental control and command of muscular movements, and the total loss of motor nerve-function.

Though my respect for these cerebral mutilators is but scant, I would not treat them as Dr. Andrew Wilson has done in the 'Gentleman's Magazine' of January 1879, where, referring to their work, he said:—

> Hence the New Phrenology—for the word itself is perfectly explicit as denoting a science of mind or brain—is gradually being built up from sure data and accurate experimentation; the results arrived at by one worker being tested by a host of fellow-experimenters ere his inferences become facts, and before they are allowed to form part and parcel of the scientific edifice.

I should be treating Dr. Ferrier very unjustly if I left my readers to suppose that he is as easily and fully satisfied as Dr. Andrew Wilson seems to be. Ferrier's highest merit in my opinion resides in the truly philosophic candour which he displays in admitting, and clearly stating, the doubts and difficulties of the investigations he has conducted, as the following quotation of the opening words of the preface to the second edition of the work I have so freely quoted will show:—

> There is, perhaps, no subject in physiology of greater importance and more general interest than the functions of the brain, and there

are few which present to experimental investigation conditions of greater intricacy and complexity. No one who has attentively studied the results of the labours of the numerous investigators in this field of research can help being struck by the want of harmony, and even positive contradictions, among the conclusions which apparently the same experiments and the same facts have led to in different hands. And when the seemingly well-established facts of experimentation on the brains of the lower animals are compared with those of clinical observations and morbid anatomy in man, the discord between them is frequently so great as to lead many to the opinion that physiological investigation on the lower animals is little calculated to throw true light on the functions of the human brain.

He then proceeds to state that these discrepancies are due to the method of mutilation, the necessary fallacy of which Gall so clearly explained nearly a century ago.

Attentive readers of the preceding part of this chapter may have observed that nearly all the contradictions I have quoted were obtained by those who attempted to carve out as *isolated* regions of the brain portions which are *not* isolated, but which are variously connected and co-ordinated with other parts of the brain by those *converging fibres*—those intra-cerebral commissures which were shown by Gall and Spurzheim to permeate *every part* of the medullary cerebral substance, and which are still so little understood by our modern cerebral physiologists.

I feel both sad and savage when I contemplate Ferrier's great mistake in imitating Magendie, Flourens and the rest, by cutting, searing, or otherwise mutilating *any part of any brain of any animal whatever*. On reading the above quotation from the preface to his second edition one might imagine that some such feeling is beginning to invade his own mind, especially when he adds that—

The discovery of the electric excitability of the brain by Fritsch and Hitzig[1] has given a fresh impetus to researches on the func-

[1] Is it correct to attribute this discovery to these modern physiologists? Are we to forget the work of Galvani and the laborious experimental researches of his nephew Aldini, throughout which he used the legs of dead frogs as the most delicate galvanometers of the period? Are we also to forget the stock experiments of the sensational scientists of the early part of the century? the horrible contortions of the faces of decapitated criminals described as the result of exciting by electricity the roots of the facial nerves, and the general muscular convulsion obtained by similar excitement of the nerves of the trunk and extremities? I well remember seeing a dead cock flap its wings and a dead rabbit strike out with its hind legs. This on the lecture table of the old theatre of the London Mechanics' Institution between fifty and sixty years ago.

tions of the brain, and thrown a new light on many obscure points in cerebral physiology and pathology. Though great advances have been made within the last ten years, much, however, still remains to be done. We are still only on the threshold of the inquiry, and it may be questioned whether the time has even yet arrived for an attempt to explain the mechanism of the brain and its functions.

I may add to this my own opinion, which is, that the time will arrive when modern physiologists cease to ignore the work of Gall and Spurzheim and learn the true significance of their own experiments in local electric excitation of the brain, by comparing them with the results obtained by Gall's better method of comparing normal and healthy development of brain with normal and healthy evolution of mind both in man and lower animals. My next chapter is an attempt to assist them in doing this.

CHAPTER IX

FARADIZATION OF THE HEMISPHERES

GALL AND FERRIER

In the preceding chapter I have shown some of the contradictions and confusion resulting from attempts to discover cerebral functions by mutilating the organs which perform them. As already stated, the quotations there are merely samples, and they are fair samples. If the whole bulk were similarly presented they would include flat contradictions by one or another, or by many others, of every conclusion of every experimental cerebral mutilator; showing that the repulsive whole is much worse than worthless.

The other series of experiments, those by electrical stimulation, are not deserving of such condemnation. There is a fair degree of consistency in their results; the various experimenters generally agree in obtaining certain muscular contractions by the electric stimulation of given regions of the cerebral cortex. There are some few contradictions, but we must remember that in all experimental investigations there are necessary limits of error, and if these are not exceeded the results may be accepted as sound science.

The difference between slicing, or gouging, or searing out the substance of a complex intercommunicating structure like the brain, and merely stimulating its surface by means of electricity, is so obvious as to require no further elucidation; and, as far as I have been able to learn, it appears that the practical results in diagnosis of the position of cerebral tumours are based on the latter class of experiments. Nevertheless I venture to express a strong protest against the customary description of certain parts of the hemispheres of the brain as 'motor centres,' or 'sensory centres,' when the terms are used as expressing the idea that the ultimate or primary

function of the cerebral region in question is that of motor volition, or physical sensation.

Thus Fritsch and Hitzig speak of 'the centre for the neck muscles,' 'the centre for the hind leg,' and so on with the rest; and Ferrier speaks of the 'tail centre of the dog,' and treats the whole subject of the 'Hemispheres considered Physiologically' under general and special headings of the various sensory and motor 'centres.'

These terms logically express, and naturally convey, the idea that the portions of the cortex under examination are the localized central foci of the nervous energy thus specialized, though neither Ferrier nor any other intelligent physiologist can directly and seriously maintain this, as they know that Flourens and others have removed *all* these cortical 'motor centres' without destroying *any* of the motor powers said to be connected with them (see Ferrier's first Croonian Lecture, delivered before the Royal College of Physicians, June 1890).

This view was very plainly expressed at the Washington session of the U.S. Academy of Science, April 1874, by Dr. Brown-Séquard, who there said:—

> It is perfectly well known that cutting away of a large portion of the brain does not produce the least alteration of voluntary movement anywhere. Suppose that part of the brain, say the anterior lobe, being excited by galvanism, produces a movement in the anterior limb; now suppose that part of the brain is cut away, then the anterior limb should be paralysed, for its voluntary movement is gone. Admitting that the other half of the brain should supply the place of the missing part, let us take that away also; then certainly there should be a paralysis of the anterior limbs. But there is not. This should be sufficient to invalidate the conclusions of Dr. Ferrier. But there are abundant pathological facts of this nature proving the fact beyond question. And there are the cases of recovery from paralysis. There is no such localization of power as Dr. Ferrier has assumed. If galvanism be applied to the severed leg of the frog, the leg will jump, although there is no brain power in question.

As the reader will learn by what follows, I am able to show that the researches of Gall, made nearly a hundred years ago, may now be brought to the rescue of Dr. Ferrier and the others from this very awkward dilemma. He showed that these so-called 'centres' of the arms, the legs, the mouth muscles, etc., are the organs of certain mental faculties which

use the arms, the legs, etc., as *their instruments* in the manifestation of their activities; and therefore, when these are stimulated by electricity or otherwise, corresponding movements will occur, but these cortical 'centres' being no part of the instruments themselves, may be removed without injuring those instruments which they only use.

In the great quarto work of Gall and Spurzheim (1810–1819), and in the later work by Gall alone ('Fonctions du Cerveau,' 1822–25), is a chapter headed, '*De la Pathognomique et de la Mimique ou de la Pantomime*,' in which, after defining the difference between physiognomy and pathognomy, he says that the latter—

> is founded by Nature herself, for it is Nature that inspires all the gestures, the attitudes, the movements, that is, all the pantomime by which man and animals express their sentiments and their ideas. Pathognomy has its fixed and immutable laws, whether applied to man or animals, in reference to the expression of the same sentiments and ideas.
>
> Pantomime is the universal language of all nations and of all animals; there is no beast, there is no man, who does not learn it; there is no beast, there is no man, who does not understand it: it accompanies words, and gives force to their expressions; it supplies the defects of articulate language; words may be ambiguous, pantomime never.
>
> Who does not recognise by his pantomime the sensualist, the bully, the proud and the vain man, the devotee, etc.; are we ever deceived concerning the expression of rage, of despair, of jealousy, of the thirst for vengeance, of sorrow, of pity, of irony, of gaiety, of confusion, of envy, etc.?
>
> There are, nevertheless, some persons who assert that the expression of affections, of passions, of sentiments, of ideas, is not subject to invariable laws, but is arbitrary, and varies according to the man or according to the animal that exhibits them.
>
> There is no doubt that sentiments and ideas are modified differently in different individuals, and that consequently their pantomime is modified in a corresponding manner. Nevertheless, so far as primary essentials are concerned, all human beings feel and think in the same manner, and their essential primary pantomime is the same. If this pantomime be arbitrary, how is it that infants, and even animals understand it?
>
> Another cause which interferes with the absolute uniformity of the pantomime of the affections, etc., in all their details, is that there is almost always a complication of different affections, and this complication does not always consist of the same elements. Jealousy, for example, expresses itself differently according to whether it is complicated with passion, with a desire to obtain vengeance, with confusion, with pride, with sorrow, with contempt, with irony, etc.

Pantomime must of necessity become complicated according to the different sentiments, ideas and passions that are simultaneously excited.

What would become of painting and sculpture, of the art of the comedian, of eloquence and poetry, if the expression of sentiments and ideas were not subject to immutable laws ?

After quoting examples in the arts he goes on to say :—

Where is the man or the animal who deliberates concerning the manner in which he shall express his feelings ? At the moment when they arise they are written externally in characters that are legible by all. It is therefore certain that the sentiments, the ideas, the affections, the passions, manifest themselves externally by gestures (*la mimique*) in accordance with definite and invariable laws.

He then asks what is the source of all these pantomimic gestures and movements, and why they should thus vary with the different sentiments, passions, and desires that they express ? He admits the hardihood of these questions, the more so as no one has previously attempted to answer them, and then makes his own attempt as follows :—

The brain is the source of all sentiments, all ideas, all affections, all passions ; all their manifestations therefore must depend on the brain and be modified by it. The brain is in communication (*en liaison*) with the instruments of all the senses, and, by means of the spinal cord, it is equally so with the instruments of voluntary motion. It dominates the senses and the muscles, and consequently the extremities ; it sets all parts in action, and by its activity determines their movements ; and when it is in repose, the senses, the muscles, and the members generally, are in a state of inaction.

But the different cerebral organs are placed in different regions of the brain, and the point of departure of the cerebral influence must vary according to which of these regions is active.

He then proceeds to general statements concerning the movements of the head in connection with the position of the organs, and describes in detail the *mimique* or natural language of each faculty. These details are far more minute, elaborate and complete than those described by the modern pathologists in their determination of the so-called ' motor centres.' They are illustrated by twenty-two well drawn figures on Plate 97 of his folio atlas, and others in other plates where the positions of the head are depicted.

I will now consider the movements described by Ferrier

and other recent physiologists as connected with particular regions or 'motor centres' of the brain, and compare them with the movements determined by Gall at the beginning of the century.

For this purpose I reproduce in Figs. 17 and 18 the well-known and largely copied diagrams of Ferrier, and take the regions marked therein in their order as numbered by Ferrier himself.

Commencing with the region marked 1, Ferrier thus

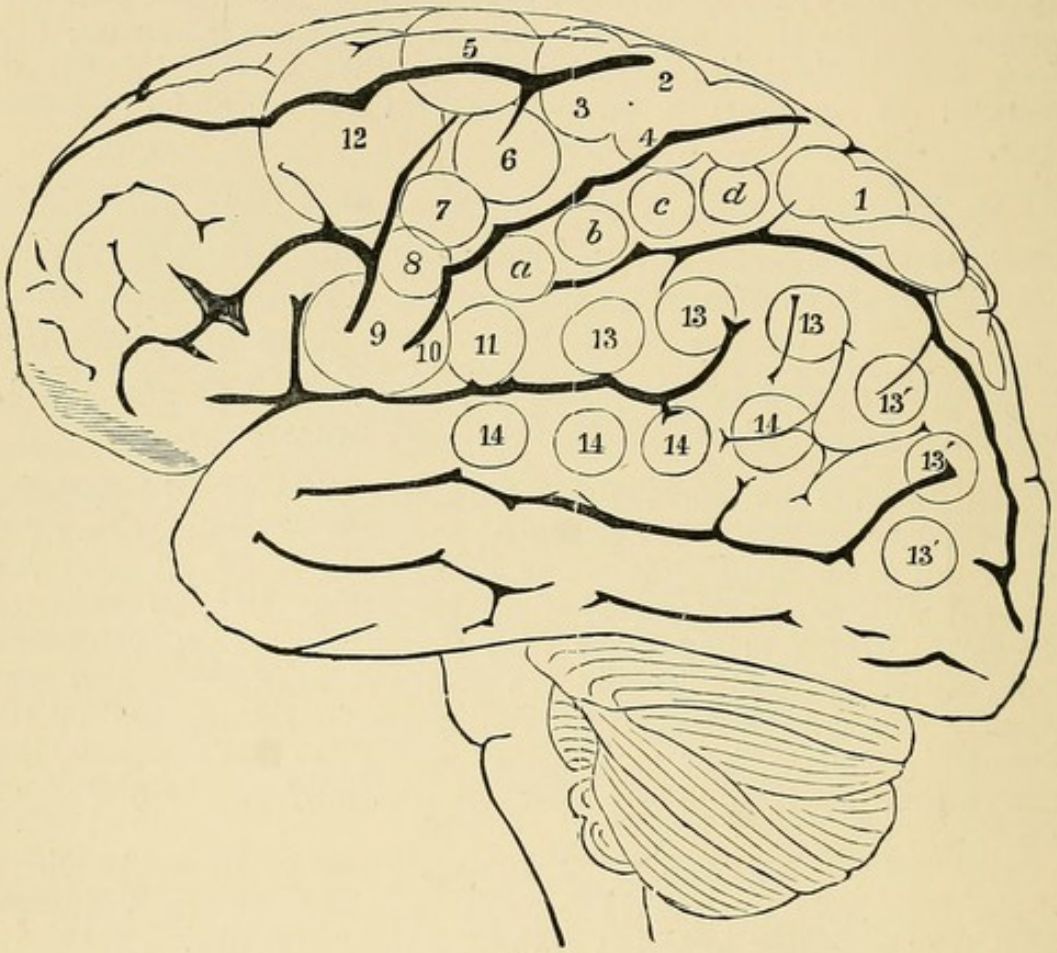


Fig. 17.

describes the result of its electrical excitation. I copy his own italics:—

The opposite hind leg is advanced *as in walking*, the thigh being flexed on the pelvis, the leg extended, with dorsal flexion of the foot, and spreading, or extension, of the toes. Occasionally the action is limited to the foot, this being dorsally flexed, and the toes expanded.

See Gall's picture of the *mimique* of the same region, '*mimique de la vanité*,' Fig. 19.

It depicts the description of Ferrier as nearly as possible,

Gall's model, a fop, being the human analogue of Ferrier's monkey.

This region, No. 1, while including love of approbation—the source of vanity—also encroaches upon self-esteem, the source of pride. See Gall's representations of the '*mimique de l'orgueil*,' Figs. 20 and 21.

If Ferrier had said that the leg is advanced 'as in

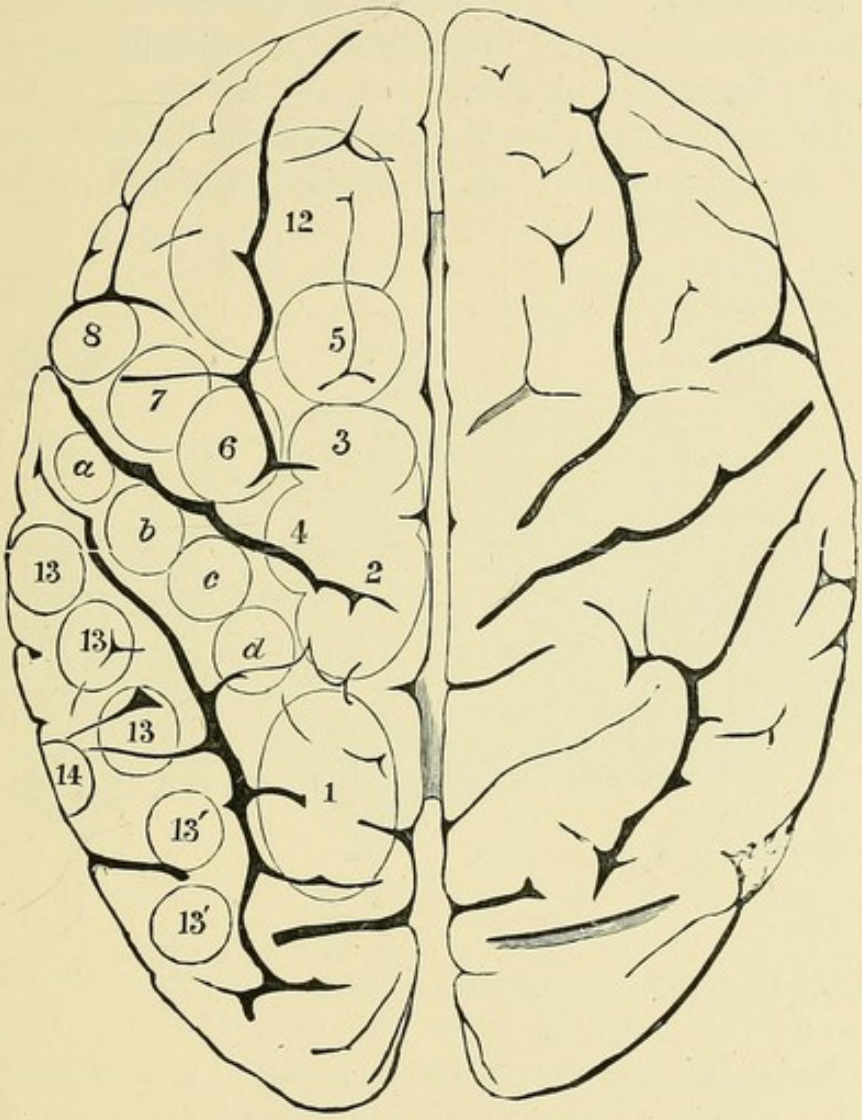


FIG. 18.

strutting,' instead of 'as in walking,' his fidelity to Gall would have been quite perfect, and the significance of his description more intelligible.

Ferrier's region No. 2 makes another encroachment on the anterior part of self-esteem, and he describes the result of its excitation as '*flexion with outward rotation of the thigh, rotation inwards of the leg with flexion of the toes*.'

I do not quite understand how the thigh can rotate outwards and the leg inwards at the same time without the aid of a ball-and-socket knee-joint, which even a monkey does not possess. Perhaps Dr. Ferrier means an alternation of these movements. Be that as it may, it is evident that in Fig. 21, representing the '*mimique de l'orgueil*,' Gall has anticipated the outward rotation of the thigh so far as it can be performed by the human leg. Gall refers to the proud strutting of the victorious game-cock and other similar manifestations of pride and vanity by other animals.

Gall is not alone in having observed the leg movements as part of the natural language of these faculties. Artists who



FIG. 19.



FIG. 20.



FIG 21.

are skilful in representing character and emotion, and who in order to do this must be keen and accurate observers, commonly depict this peculiar outward rotation and advancement of the leg as one of the manifestations of pride and vanity. A large scrap-book might be filled with illustrations of this from 'Punch' alone. As examples of my meaning I submit the following portrait of a well-known gentleman under the influence of Ferrier's No. 1, i.e. Gall's love of approbation and self-esteem.[1]

Look on Figs. 19, 20 and 21, and mark the 'outward rotation' of the thigh and the forward strut as described

[1] The Author wished here to reproduce the cartoon from 'Punch' of Feb. 7, 1891, but the necessary permission could not be obtained.

both by Gall and Ferrier; look now on Fig. 23, and see the changed condition of the legs common to all the three, Figs. 19, 20 and 21, under conditions of humiliation shown in Fig 23.

The quotations just given are from Ferrier's account of his 'Experiments on Monkeys,' part 1 of chapter viii., 'Functions of the Brain.' Now let us turn to those on Dogs.

Here we are told that there is no movement of the dog's leg comparable to that resulting from irritation of (2) in the monkey; but in the region marked (3) the result of stimulation was '*lateral or wagging motion of the tail.*' The italics are Ferrier's, and he adds:—

In my first experiments, as detailed in the 'West Riding Reports,' vol. iii., Fig. 6, the position of the tail centre was placed too far back. In the case in question the stimulation of the

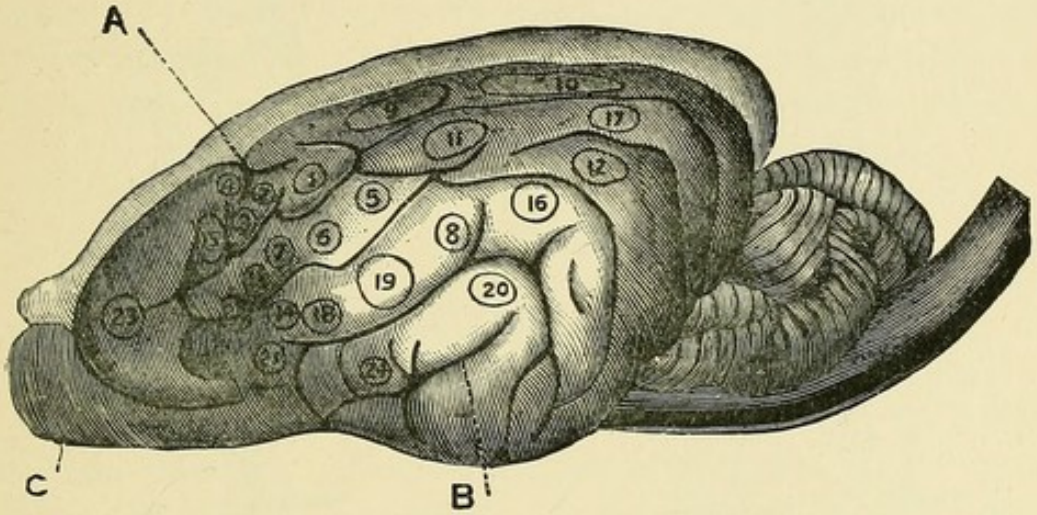


FIG. 22.

tail movements from so extended an area was no doubt due to a condition of higher excitability consequent upon long-continued exploration.

This No. 3 or 'tail centre' (p. 258), or centre of '*lateral or wagging motion of the tail*' (p. 250), corresponds, according to Ferrier's homology, to the region to which in man the phrenologist assigns the sentiment of hope. It also encroaches upon the front part of love of approbation. Assuming that the organ of hope, like that of the sentiment of hope, is only in a condition of rudimentary development in the dog, while that of love of approbation is greatly developed, it is evident that the latter must extend towards the former and encroach upon it, thus making the tail-wagging centre to correspond with the region of hope and love of approbation in the dog,

Now we all know how overwhelming is a dog's desire for the approbation of his master, how vehement is the wagging of his tail when he is praised, and how prone and motionless becomes that member when the faithful animal is scolded. I have said that in dogs the sentiment of hope is rudimentary, but nevertheless it does exist in reference to physical objects. If a piece of meat—or to the pampered dog a lump of sugar—is held before a hungry dog, 'the lateral or wagging motion of the tail' commences forthwith. The same when his master puts on his hat and the prospect of a walk together is presented.

The connection between this tail-wagging and love of



FIG. 23.



FIG. 24.

approbation is rendered the more significant by the earlier experiments of Ferrier, which place the 'tail centre' further back than is indicated in the figures, i.e. quite in the locality of love of approbation.

Ferrier's No. 4 region is indefinite, as the figure shows, being mixed with 2 and 3. It is also phrenologically indefinite, falling between hope and conscientiousness, neither of which is demonstrative. Ferrier, on pp. 480–1, puts 2, 3, and 4 together as 'including centres for various complex movements of the arms and legs, such as are concerned in climbing, swimming, etc.' This is everything in general and nothing in particular.

No. 5 is more definite. It is described by Ferrier (p. 481) as 'the centre for the extension forwards of the arm and hand, as in putting forth the hand to touch something in front.'

This takes in *benevolence* and part of *veneration*, and here are Gall's illustrations of the natural language of these two sentiments. The first figure (No. 23) is Benevolence, the second (No. 24) Veneration. The defect of Ferrier's location is that it is too limited. The phrenologist in determining this region in the human brain as homologous to that of the monkey would have given it a larger area, as this part of the human brain is so much more developed altogether in man corresponding to the far larger manifestations of function.

Respecting the 'centres' 6 and 7, I can only venture very cautiously upon any explanation, as, according to Ferrier's transfer of these from the monkey upon which he experimented to a supposed corresponding region of the human brain, they occupy the region of ideality, the poetic sentiment. If, however, we assume that this sentiment is non-existent, or in very rudimentary condition in the monkey and the cerebral region correspondingly undeveloped, it is evident that the surrounding regions must close in upon this centre and occupy the position which it takes in the human brain. In seeking to determine which of the organs thus encroach [in the monkey's brain], we are justified in selecting the organs of the faculties which are most dominant in its mind. This principle also applies to Ferrier's regions marked *a*, *b*, *c*, *d*, which, phrenologically regarded, encroach upon ideality (especially to its posterior portion), the function of which remains doubtful, and upon conscientiousness.

The dominant monkey organs thus encroaching are acquisitiveness (named covetousness by Spurzheim) and secretiveness. If Gall is right, the former, which he discovered by its prominence in the heads of thieves, must in the monkey occupy the whole of the region marked 6 and 7 and encroach upon *a*, *b*, and *c*, while the upper part of secretiveness will encroach upon *a* and *b*. Thus acquisitiveness should be the main occupant of this region in the monkey's brain, as we are not justified in expecting to find conscientiousness at the upper and back part.

Ferrier describes the movements due to stimulation of this phrenological region of acquisitiveness as follows:—

a, b, c, d. Clenching of the fist.—With slight stimulation the action begins in the thumb and index finger, followed on longer stimulation by flexion of all the fingers and firm clenching of the fist. With the closure of the fist is associated the synergic action of the extensors of the wrist and fingers.

Region 6 is described by Ferrier as the centre for '*flexion and supination of the forearm*, the completed action bringing the hand to the mouth.'

Here we have the actions of grabbing, stealing, and holding, and finally that of conveying to the final destination of monkey-property, the mouth pouches.

Let us compare this with Gall's description of the *mimique* or natural language of the same region, which I quote in his own words, as he has no picture of it. He says that when the action of this region of the brain is energetic, 'the head leans forward and a little to one side, and *the arms are held forwards, the hands now opened flat as to receive, now the fingers curved as though to catch a fly on the wing.*' This refers only to human language, and nothing is said concerning the mouth.

But in animals with the mouth as a prehensile organ the case must be different. In the monkey we have the hands as prehensile organs and the mouth pouches as the receivers of stolen property, and accordingly we learn that Ferrier's monkey, after faithfully performing the grabbing actions of the hands and arms as described by Gall, concludes with 'the completed action (of) bringing the hand to the mouth.' Had Gall himself suffered a Simian metempsychosis, and in that form had sought to make a proselyte of Ferrier, he could scarcely have appealed more eloquently than did this and others of Ferrier's monkeys in responding to their master's stimulation.

The next centre is No. 8, which is the lower part of 'acquisitiveness,' encroaching upon 'gustativeness,' or the desire for food. Ferrier tells us that the result of electrization of this region is '*elevation of the ala of the nose and upper lip*, associated with depression of the lower lip, so as to fully expose the canine teeth.' (The italics are Ferrier's.)

Here we have the natural order of proceeding from the

acquisition of food property to its examination by the nose, and utilization in the mouth.

To No. 9, which Ferrier describes as homologous with Broca's convolution in man, I devote the whole of next chapter, and therefore now proceed to Nos. 10 and 11.

These, with part of No. 9, take in the bulk of gustativeness, the function of which was determined by Gall's successors. It is the organ which is prominent in the gourmand, and in animals supplies one of the dominant impulses, and is therefore proportionally extended in the brain.

The following are the movements which Ferrier found to result from the electrical excitation of this region in monkeys. The italics are his own :—

Opening of the mouth, with protrusion (9) *and retraction* (10) *of the tongue.* These movements are occasionally repeated for some time after the electrodes are withdrawn. The movements are bilateral.

(11) *Retraction of the angle of the mouth.* The action is that of the platysma myoides, and when this is strong the head is drawn slightly to the side.

The correspondence of these movements with the phrenological localization of function is too obvious to demand any further comment.

I now come to No. 12. The centre of this circle corresponds as nearly as possible to the centre of wonder. Monkeys manifest this sentiment very decidedly. They are addicted to considerable excitement on the arrival of a new comer, or the presentation of other strange object. The movements observed by Dr. Ferrier on stimulation of this region are described as follows (the italics are his own) :—

'*The eyes open widely, the pupils dilate, the head and eyes turn to the opposite side.* Occasionally this action is apt to be associated with that described under (5),' i.e. with 'extension forward of the arm as if the animal tried to reach something in front.'

There, again, Dr. Ferrier proves himself a faithful follower of Gall, by accurately describing the natural language of the faculty which Gall assigned to the part of the brain in question. If, instead of stimulating this region electrically, he had applied a mental stimulus by presenting a mirror for the first time to the monkey, the staring of wonderment, the dilatation of the pupils, the looking round and possible exten-

sion of the arm to feel the mysterious object, would have been similarly displayed.

As will be seen by reference to Figs. 17 and 18, Dr. Ferrier extends his next number (13) over a large oblong area. This includes the phrenological regions of secretiveness and cautiousness. It is rather curious in reference to this that Combe, in his 'System of Phrenology' (published more than 50 years ago), in describing the natural language of secretiveness connects it with cautiousness, as I will presently show.

Ferrier's description is as follows, with his own italics :—

The eyes move to the opposite side with an upward or downward deviation, according as the electrodes are on (13) or (13′). Usually the pupils become contracted, and there is occasionally



FIG. 25.

a tendency to closure of the eyelids, if the eyes are already open at the time of stimulation, as if under the stimulus of a strong light.

Now mark what Combe says concerning the eyes : 'The eye is half shut, just sufficiently open to enable the secretive person to see out, but not so wide as to enable others to see in.' Further on he adds : 'If cautiousness also is large, the eye, when the individual is alarmed, rolls from side to side.'

Here is Combe's illustration of the natural language of this region, showing the side movement of the eyes with

'upward and downward deviation,' as described by Ferrier, and he further illustrates the subject by the following description of the eye movements of Cormac Doil in Sir Walter Scott's 'Lord of the Isles' :—

> For evil seemed that old man's eye,
> Dark and designing, fierce, yet shy.
> *Still he avoided forward look,*
> *But slow and circumspectly took*
> *A circling never-ceasing glance,*
> *By doubt and cunning marked at once.*

The word 'circumspection,' looking around, shows how ancient and general is the observation that the movements of the eye obtained by Ferrier when he stimulated the organs of cautiousness and secretiveness, express the natural language of those faculties, and therefore that Ferrier is again a staunch supporter of Gall.

In the section of cautiousness, Mr. Combe says: 'The natural language of this faculty when predominantly active presents the following characteristics. The eyes are opened wide, the head turns horizontally from side to side, and the look is often directed all around,' and Ferrier concludes his description of the results of stimulation of this region by telling us that 'sometimes the head turns with the eyes to the opposite direction.'

He also tells us that 'Luciani and Tamburini have occasionally seen the pupils dilate instead of contract.'

It may be that 'sometimes' Ferrier has stimulated cautiousness alone, and that 'occasionally' Luciani and Tamburini have done the like.

13′ on Ferrier's diagram extends with a curve downwards to combativeness, but I do not find any distinct and separate description of the *lower part* of this region. Very little character is to be expected in the case of monkeys; they are not combative animals. We never hear of any fighting among the variety upon which Ferrier made his experiments. Ferrier's centre No. 14 is oblong, includes destructiveness and runs back to combativeness. The results of stimulation he describes as follows—in italics :—

'*Pricking of the opposite ear, head and eyes turn to the opposite side, pupils dilate widely.*' In some animals this was accompanied with a 'sudden spring or bound forward' (p. 256,

Jackal), or 'a sudden start, apparently as if the animal were about to bound forward' (p. 260, Rabbit). The pricking of the ears is common to all.

This is not so definite as some of the preceding indications, though, so far as it goes, it describes a part of the natural language of destructiveness, i.e. the vigilance of the carnivorous animal when seeking its prey, especially when lurking slily in wait for it. Had Ferrier operated on cats or other feline carnivora the manifestations would probably have been more characteristic.

On p. 482 Ferrier broadly generalizes by including the large area of 13 as well as the occipital lobe in 'the centre of vision' and the whole of 14 as 'the centre of hearing.'

As already intimated, my own view is, that these two centres constitute together a region *not* of *vision*, but of *vigilance*. They include secretiveness, cautiousness, combativeness, and destructiveness.

The secretive or sly animal or man is vigilant in his efforts to conceal and escape detection; the timid animal and the cautious man are also vigilant in looking out for danger. The fighting animal and the combative man are vigilant in seeking advantage over their opponents; the carnivorous animal and the vindictive man are vigilant in hunting prey or following up an enemy.

Each of these forms of vigilance has its own speciality, and all employ either vision or hearing, and therefore the organs of all these propensities are specially connected with those senses.

I will next examine the negative results of Hitzig, Ferrier, and the other electric stimulators. They agree very fairly in describing that portion of the brain which the researches of Gall and his successors have shown to be the seat of the intellectual faculties, as the *silent regions*, its excitation being unattended with any decided muscular disturbance. Ferrier says:—

> As a rule, stimulation of the frontal lobes in advance of (12), as well as of the orbital lobule, was without obvious effect.
>
> In one case, however, I had observed a movement of the eyes to the opposite side on irritation of the prefrontal region, and in two others, which I have recently experimented on, the same results were obtained, viz., movement of the eyeballs to the opposite side. I am therefore disposed to consider these movements in causal re-

lationship with irritation of the prefrontal regions, and not accidental or mere coincidences.

I fully agree with Ferrier, on purely phrenological grounds. The prefrontal region is that of the *perceptive* faculties, or those which take cognisance of the forms, colours, sizes, positions, numbers, movements, and general individualities of physical objects. The eyes being the chief instruments that are used in doing this, are naturally placed in most direct connection with their cerebral organs, both by proximity and commissure fibres. We move our eyeballs from side to side when we require to convey to the mind a picture of the physical objects before us, or, otherwise stated, the perceptive organs of the prefrontal regions employ the eyes to do this in order to obtain the material they demand as their mental food.

I have now with one exception, No. 9 (which will form the subject of my next chapter), gone through all the regions or 'centres' marked in Ferrier's diagrams of the cerebral cortex, and venture to assert that they *all*, so far as the muscular movements of dogs and monkeys can, supply incidental evidence in support of Gall's localization of the cerebral functions, and I further maintain that when associated with Gall's researches, and their true significance explained thereby, they acquire a scientific and philosophical value which, standing alone, they do not possess.

I leave the reader to form his own estimate of the conclusion of Ferrier, who, writing in 1886, says that—

> The indications furnished by the electrical irritation of the hemispheres have so guided and directed experimental and clinical research, that the physiology of the brain has made greater advances during the last ten years than in all the previous years of physiology and pathology together.

As regards the value of these experiments in their medical and surgical applications to the diagnosis of cerebral tumours, etc., I am unable to offer any opinion, but if the claims that are made in this direction are sound, there can be no doubt that their value will be vastly increased by associating them with Gall's localization of the mental faculties, and his explanation of the muscular movements produced by electrical irritation. If, for example, the leg and arm movements of a patient indicate a possible tumour in the region or centres

1 or 2 or 3 or 4, a further examination of the mental condition of the patient with respect to the functional disturbances of self-esteem, love of approbation, firmness, etc., will surely assist in confirming and more clearly defining the seat of the cause of disturbance; and so on with the rest.

Besides this, Gall's localization includes the frontal 'silent region' of the intellect, which refuses to respond by muscular indications to electrical irritation, and thus remains a blank to the electrical experimentalists.

In order, however, to apply this method of diagnosis the physician must understand the subject, must know what are the normal functions of the cerebral organs or *mental* centres, as without this he cannot test their disturbances.

CHAPTER X

APHASIA

In his first Croonian Lecture, 'On Cerebral Localization,' delivered before the Royal College of Physicians, June 1890, Dr. Ferrier says (p. 15 of his published report) :—

> The connection between aphemia, or aphasia, and lesion, more particularly of a definite region of the left hemisphere, viz., the base of the third frontal convolution, *was first pointed out by Broca* (1861). Broca's observations have since been amply confirmed by clinical and pathological research, and further elucidated by physiological experiment.

This is the story that is now told to the medical student by all his lecturing teachers, and in all his modern text-books, and I presume that these gentlemen believe that they are telling the truth. (The italics are mine, to indicate the statement I am about to controvert.)

Dr. Bateman commences his elaborate work of 420 pages on 'Aphasia or Loss of Speech, and the Localization of the Faculty of Articulate Language' with an historical sketch of the subject, including an account of its 'Bibliography,' and after telling us about the ancients, the 'French writers,' and the work of Dr. Dax and his son, proceeds to say that—

> The *ne plus ultra* of pathological topography, however, was reserved to M. Broca, who originally defined the seat of lesion in aphasia to be the '*posterior part of the third frontal convolution of the left hemisphere!*' [The italics are Dr. Bateman's.] He however subsequently extended his area to the island of Reil and to the extra-ventricular nucleus of the corpus striatum, and affirmed that as soon as a lesion occurs in the immediate neighbourhood of the left island of Reil, and especially in the convolutions directly above it, aphasia is the invariable result. M. Broca's views are detailed at some length in the Proceedings of the Paris Anatomical Society for 1861, and the following is a brief summary of the two cases on which he founded his somewhat startling theory.
>
> A man named Leborgne, fifty years of age, and epileptic, was

admitted into the surgical ward of M. Broca, at Bicêtre, for phlegmonous erysipelas occupying the whole of the right lower limb. When M. Broca questioned him about the origin of his disorder he only answered by the monosyllable 'Tan,' repeated twice and accompanied by a gesture of the right hand. On making inquiries it transpired that this man had been an inmate of the hospital in another wing for twenty-one years; that he had been the subject of epilepsy since infancy; that he had followed the occupation of a last-maker up to the age of thirty, when he lost his speech; but no information could be elicited as to whether the loss of speech had come on suddenly or had been ushered in by any other symptom.

On his admission at Bicêtre he is stated to have been intelligent, understanding all that was said to him and differing from a perfectly healthy man only in the loss of the faculty of articulate language, for whatever question was put to him, he invariably answered by the monosyllable 'Tan,' which, with the exception of a coarse oath, composed his vocabulary. At the end of ten years a new symptom showed itself in weakness in the motor power of the right arm, which gradually resulted in complete paralysis of the right side, and he had already been bedridden seven years when the occurrence of a surgical complication rendered it necessary to transfer him to the ward of M. Broca, who, in describing his *then* condition, states that there was no distortion of the face; the tongue was protruded straight, the movements of that organ being perfectly free in every direction; mastication was unimpaired, but deglutition was effected with some difficulty, this being, however, due to paralysis of the pharynx and not to paralysis of the tongue, for it was only the third period of deglutition which was difficult; the voice was natural and the functions of the bladder and rectum were unimpaired.

The patient having died in six days, a careful *post-mortem* examination was made, when all the viscera were found healthy, with the exception of the encephalon; the muscles of the right upper and lower extremities, however, were in an advanced state of fatty degeneration and shrivelled up. The bones of the cranium were somewhat increased in density, the dura mater thickened and very vascular, the pia mater considerably injected in certain places, and everywhere thickened, opaque, and infiltrated with yellowish plastic matter of the colour of pus, but which, examined under the microscope, did not contain any pus-globules. The greater part of the frontal lobe of the left hemisphere was softened, and the destruction of the cerebral substance had resulted in a cavity of the size of a hen's egg and filled with serum; the cavity was situated upon a level with the fissure of Sylvius, and was caused by the destruction of the inferior marginal convolution of the tempero-sphenoidal lobe, of the convolutions of the island of Reil, and of the adjacent part or extra-ventricular nucleus of the corpus striatum. In the frontal lobe the inferior part of the *transverse frontal convolution* was destroyed, as also the superior half of the *second and*

third frontal convolutions, the loss of substance being most apparent, however, in the third frontal convolution. The weight of the encephalon, after the evacuation of the fluid filling the cavity, did not exceed 987 grammes (35 ounces), being less by 400 grammes (14 ounces) than the average weight of the brain in men of fifty years of age.

M. Broca then compares the result of the autopsy with the clinical observations during life. He considers that the primary seat of mischief was probably in the third frontal convolution, extending gradually to the others, and that this process of disorganisation corresponded to the first stage of the clinical history, which lasted ten years, and during which period the faculty of speech alone was abolished, all the other functions of the body being intact; the second stage, which lasted eleven years, and which was characterised clinically by partial paralysis, and then complete hemiplegia, he connects with the extension of the disease to the island of Reil and to the extra-ventricular nucleus of the corpus striatum.

The above case effectually converted M. Broca to the doctrine of localization, and was the starting-point to all his subsequent brilliant researches in reference to the seat of articulate language.

These be your modern physiologists, 'effectually converted' by a single case. Gall required thousands. Broca's next case is the following:—

A man, aged eighty-four, formerly a sailor, was admitted into the surgical ward at Bicêtre on October 27, 1861, for a fracture of the neck of the femur. This man had been received into the hospital eight years before for senile debility, there being at the time no paralysis, and the organs of special sense and the intelligence being unimpaired. In the month of April 1860, whilst descending a staircase, he fell, suddenly became unconscious, and was treated for what was considered to be an attack of apoplexy; in a few days he was convalescent, there never having been the least symptom of paralysis of limbs, but since the fit he had suddenly and indefinitely lost the faculty of speech, being only able to pronounce certain words articulated with difficulty; his intelligence had received no appreciable shock; he understood all that was said to him, and his brief vocabulary, accompanied by an expressive *mimique*, enabled him to be understood by those who lived habitually with him. He continued in this condition up to the time of the accident which caused him to be transferred to the surgical ward under the care of M. Broca, to whose questions he only answered by signs accompanied by one or two syllables pronounced hastily and with visible effort. These syllables had a definite meaning, and consisted of the following words: '*oui*, *non*, *tois* (for *trois*), and *toujours*.' He also possessed a fifth word, which he only pronounced when he was asked his name; he then answered 'Lelo,' for Lelong, which was his proper name. The three first words of his vocabulary corresponded each to a definite idea. When he wished

to affirm or approve he said '*oui*,' employing the word '*non*' to express the opposite idea. The word '*tois*' expressed all his ideas of numbers, but as he was aware it did not correctly convey his thoughts he rectified the error by gesture; for instance, when asked how long he had been at Bicêtre, he answered *tois* but raised eight fingers. When asked what o'clock it was (it being then ten), he answered *tois* and raised ten fingers. Whenever the three other words were not applicable he invariably used the word *toujours*, which consequently for him had no definite meaning. There was no paralysis of the tongue, which was protruded straight and was movable in every direction, each half being of the same thickness; sight and hearing were good, deglutition was normal, and there was no paralysis of the limbs nor of the rectum or bladder.

M. Broca sums up the symptoms by calling attention to the following salient points: (1) that the patient understood all that was said; (2) that he applied with discretion the four words of his vocabulary; (3) that his intelligence was unimpaired; (4) that he understood numbers; (5) that he had neither lost the *general* faculty of language nor the movement of the muscles concerned in phonation and articulation; and that, therefore, he had only lost the faculty of *articulate language*. The patient died in twelve days. Autopsy:—The bones of the cranium were somewhat thickened, and all the sutures ossified; the dura mater was healthy; the arachnoid cavity contained a considerable quantity of serum; the pia mater was neither thickened nor congested. The encephalon weighed, with its membranes, 1,136 grammes (40 ounces), being far below the average weight of that of adult males. The right hemisphere, the cerebellum, the pons varolii, and the medulla oblongata were in a perfectly normal condition. In the left hemisphere, the lesion was limited to a loss of substance, very accurately defined, in the *posterior third of the second and third frontal convolutions*, a small cavity having been thus formed which was filled with serum. The walls of the cavity and the neighbouring cerebral tissue were firmer than usual; there were present some little spots of an orange-yellow colour, apparently of an hæmatic origin, and microscopic examination revealed the presence of blood crystals. The lesion then was clearly not softening, but the seat of a former apoplectic clot, and it will be remembered that the patient suddenly lost his speech in an attack of apoplexy eighteen months before his death.

In alluding to the above two cases, M. Broca says that in the first case—that of Leborgne—it is only by comparing the different stages of the disease as observed during life with the *post-mortem* appearances that he assumes the high probability of the lesion having commenced in the third frontal convolution; but in the second case—that of Lelong—there being no other symptom than loss of speech, and the lesion being strictly limited to the second and third frontal convolutions, he considers the aphasia was incontestably due to disease of that portion of the nervous centres. Whilst admitting that two cases are insufficient to resolve one of

the most obscure and disputed questions in cerebral pathology, M. Broca considers himself justified in asserting that the integrity of the *third frontal convolution* (and perhaps the second) appears indispensable to the exercise of the faculty of articulate language.

Ferrier tells us ('Functions of the Brain,' 2nd edition, p. 444) that—

> The cause of this affection (aphasia) was shown by Broca—and his observations have been confirmed by thousands of other cases—to be associated with disease in the region of the *posterior extremity of the third left frontal convolution, where it abuts on the fissure of Sylvius*, and overlaps the island of Reil; a region which I have shown corresponds with the situation of the motor centres of articulation in the monkey.

In a footnote to this he says:—

> I do not consider it necessary, in the present state of clinical medicine and pathology, to enter at length into cases and arguments in favour of the definite location of the lesion causing aphasia. *I take it as established beyond all possibility of doubt.*

Nearly all our modern text-books in like manner describe this third or hindmost transverse convolution of the anterior lobe, which *abuts on the fissure of Sylvius*, as 'Broca's convolution,' and describe Broca as the discoverer of the seat of aphasia, and of 'the localization of the faculty of articulate language' in that convolution and its neighbourhood. They do this with about the same matter-of-course confidence as in attributing the discovery and demonstration of the circulation of the blood to Harvey.

So completely has this become accepted and established as one of the irremovable landmarks of scientific history that most of my readers will probably regard me as a hopeless paradoxer, an incurable crank, labouring under some extravagant delusion, when I distinctly assert that all these high authorities are guilty of gross and shameful blundering in thus attributing this discovery to Broca in 1861, and when I further assert that this so-called 'Broca's convolution,' and its neighbourhood, as described in the above quotations from these high authorities, is the same region as that in which *Gall located the faculty of articulate language and the seat of aphasia more than sixty years before the discovery was repeated by Broca.*

The shameful atrocity of this universally accepted blunder

is rendered the more shameful and atrocious by the fact that Gall publicly announced and elaborately explained his discovery in his lectures commenced in Vienna in 1796, and continued to do so by himself and in association with Spurzheim in the great Universities or other public institutions of Berlin, Potsdam, Leipzig, Dresden, Halle, Jena, Weimar, Göttingen, Braunschweig, Copenhagen, Kiel, Hamburg, Bremen, Münster, Amsterdam, Leyden, Düsseldorf, Frankfort, Würzburg, Marburg, Stuttgart, Carlsruhe, Rastatt, Freiburg, Donaueschingen, Heidelberg, Mannheim, Munich, Augsburg, Ulm, Zürich, Berne, Bâle, Mulhausen, and Paris. At the latter city he lectured continuously, and most prominently, during above twenty years, i.e., from 1807 till the time of his death, in 1828. During all this time the subject occupied the attention of the most eminent anatomists in Europe, who either supported or controverted it. The large quarto work in four volumes with 100 folio plates, and the other work in six volumes that I have so largely quoted, were published during this period. The Institute of France appointed a special commission, of which Cuvier was the reporter, to examine the subject, and Napoleon himself publicly declared his views upon it.

In 1814 Spurzheim came to London, and there published an epitome of the quarto work with reduced copies of several of its engravings. Both here and in Edinburgh the subject was discussed with considerable animus and abundant publicity, and a number of other works, notably those of George Combe, were published and widely circulated.

In all these works that treated Gall's cerebral localization at any length, a special prominence was given to the localization of the 'organ of language,' as it was called, and the reason for this special prominence was the fact that the external sign of the prominent development of the now-called 'Broca's' convolution was Gall's first schoolboy observation, which, when understood anatomically, as it was when he became a student of medicine, suggested his subsequent researches in cerebral localization.

In spite of all this, our modern physiologists have most effectually, though blindly, conspired not only to ignore the work of Gall, but have joined in a general chorus of mis-

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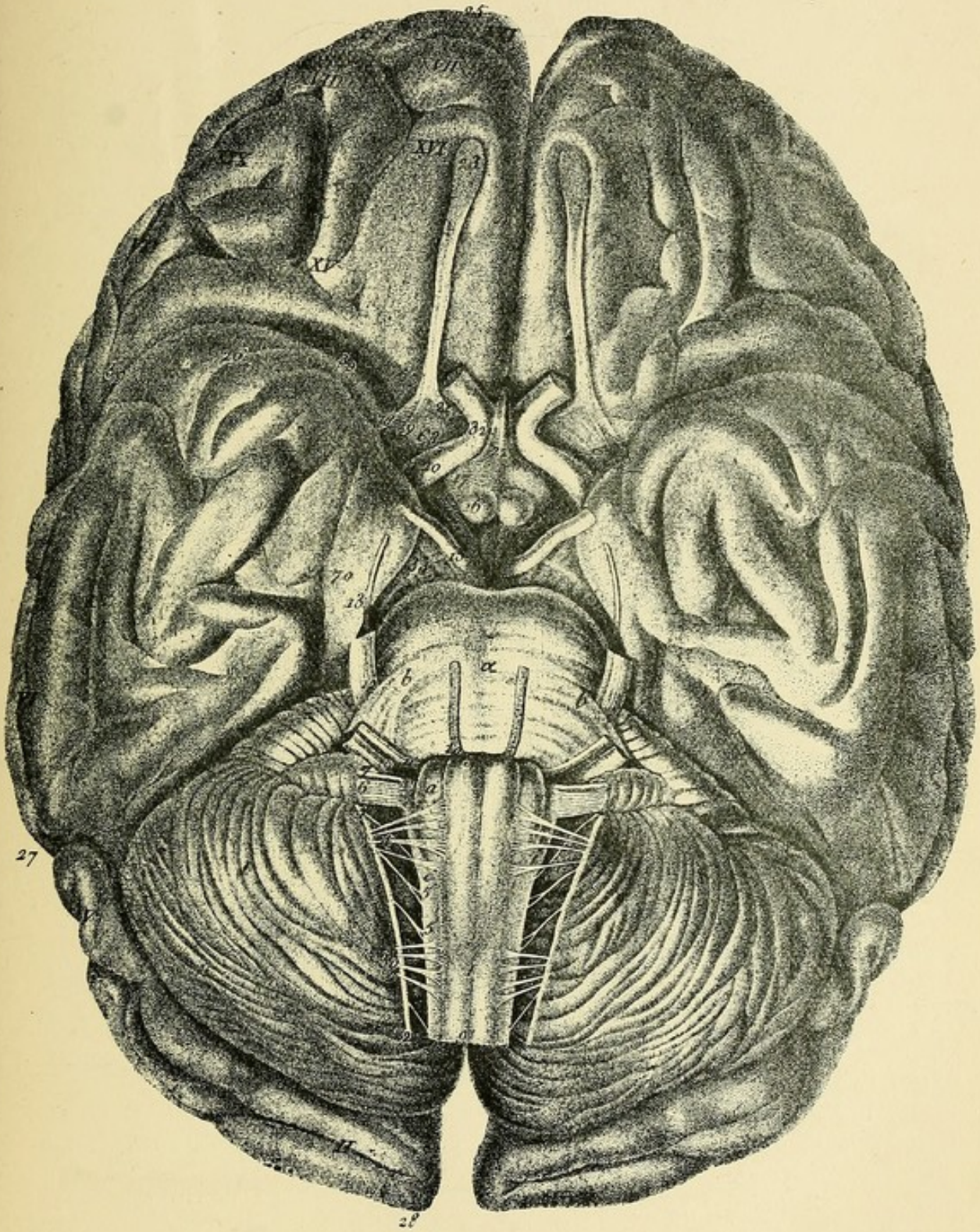


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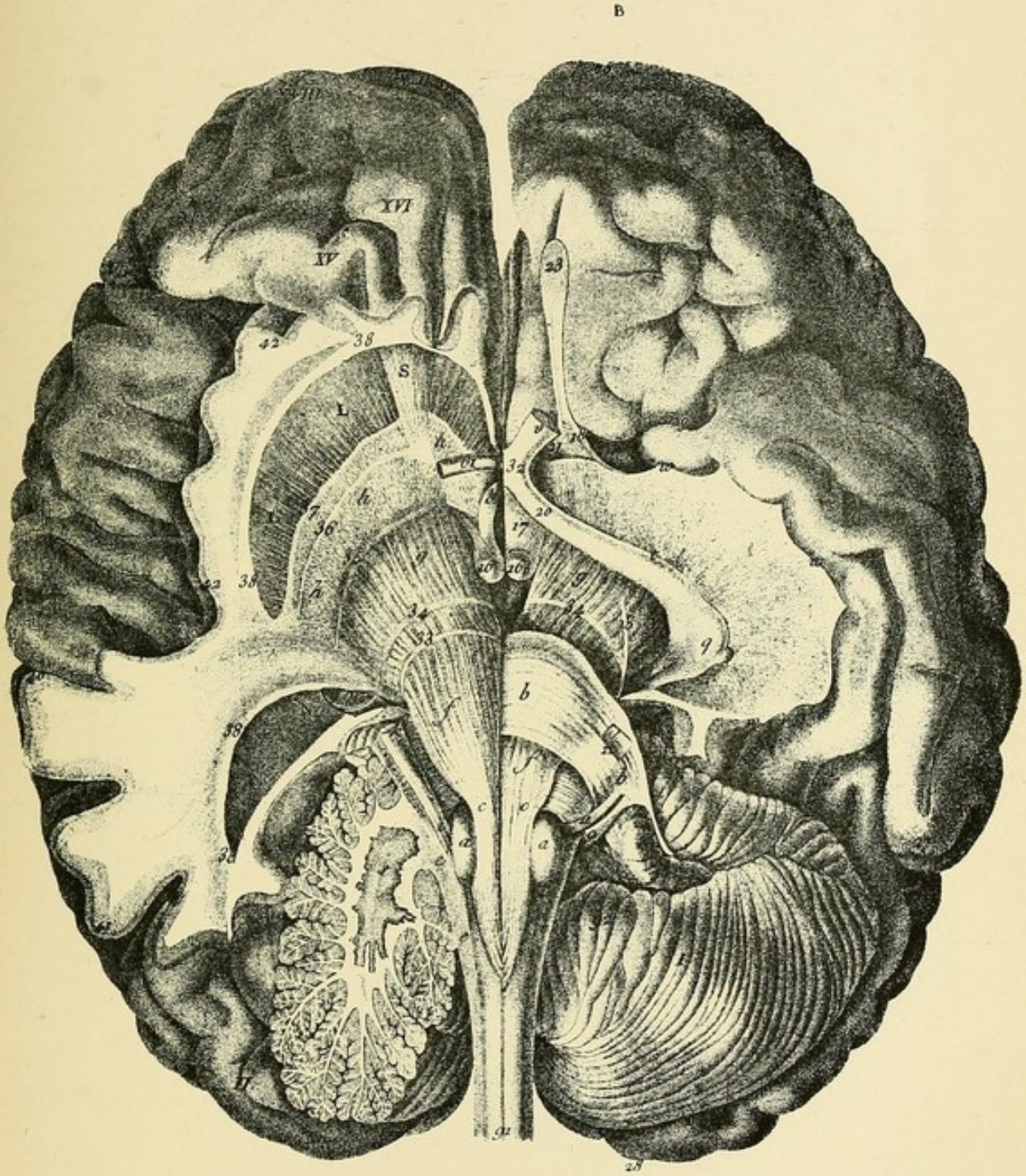


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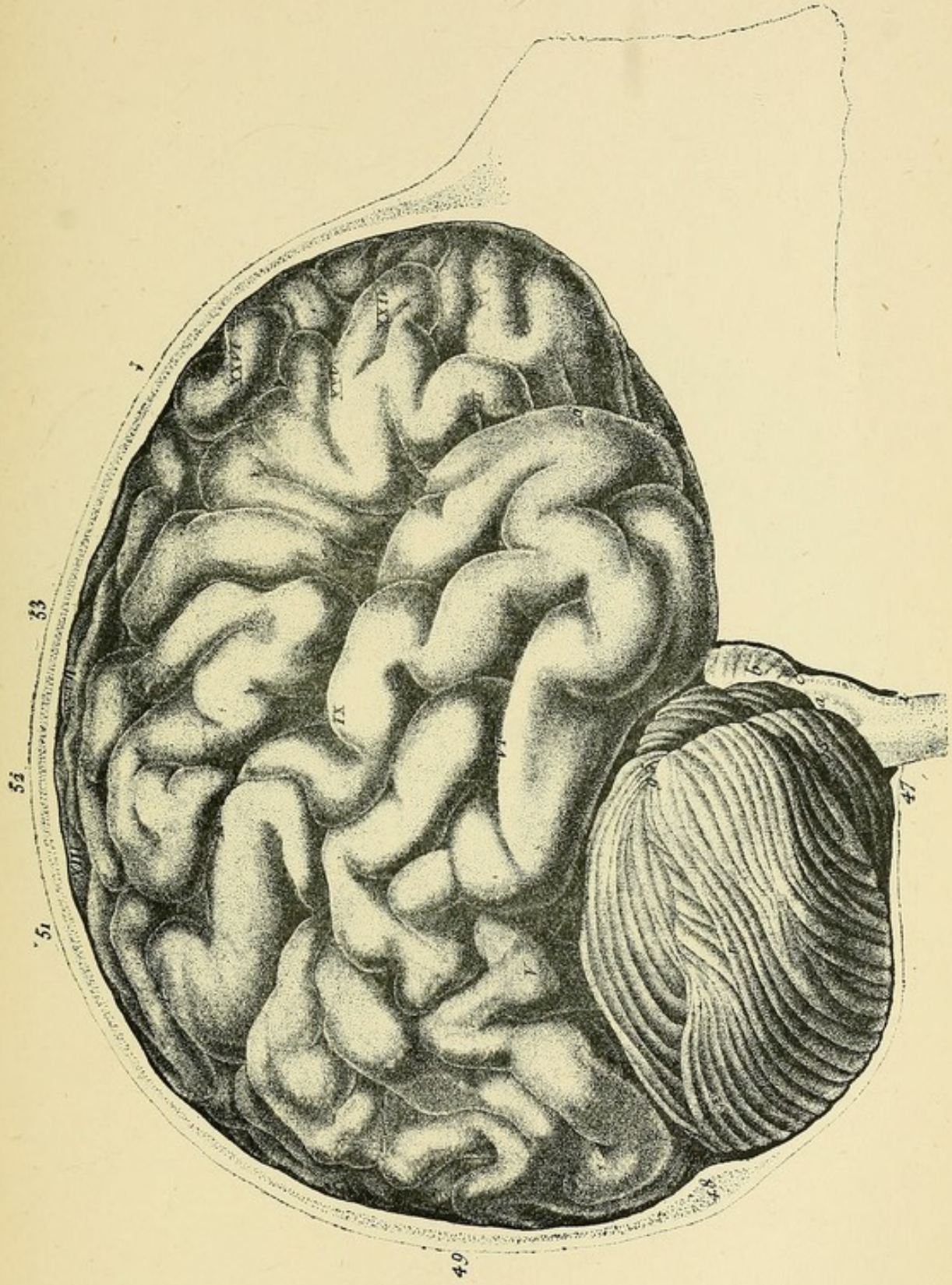


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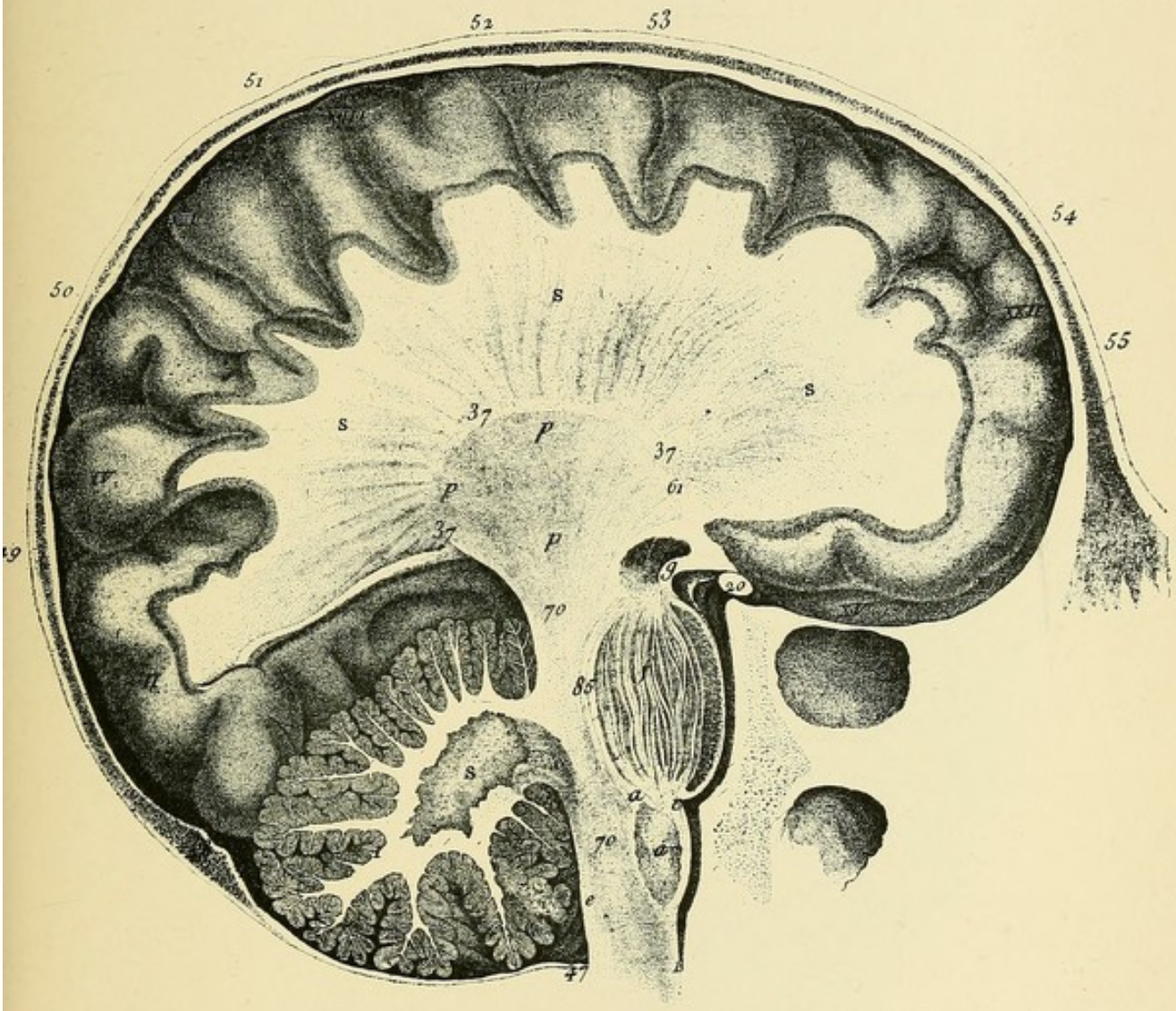


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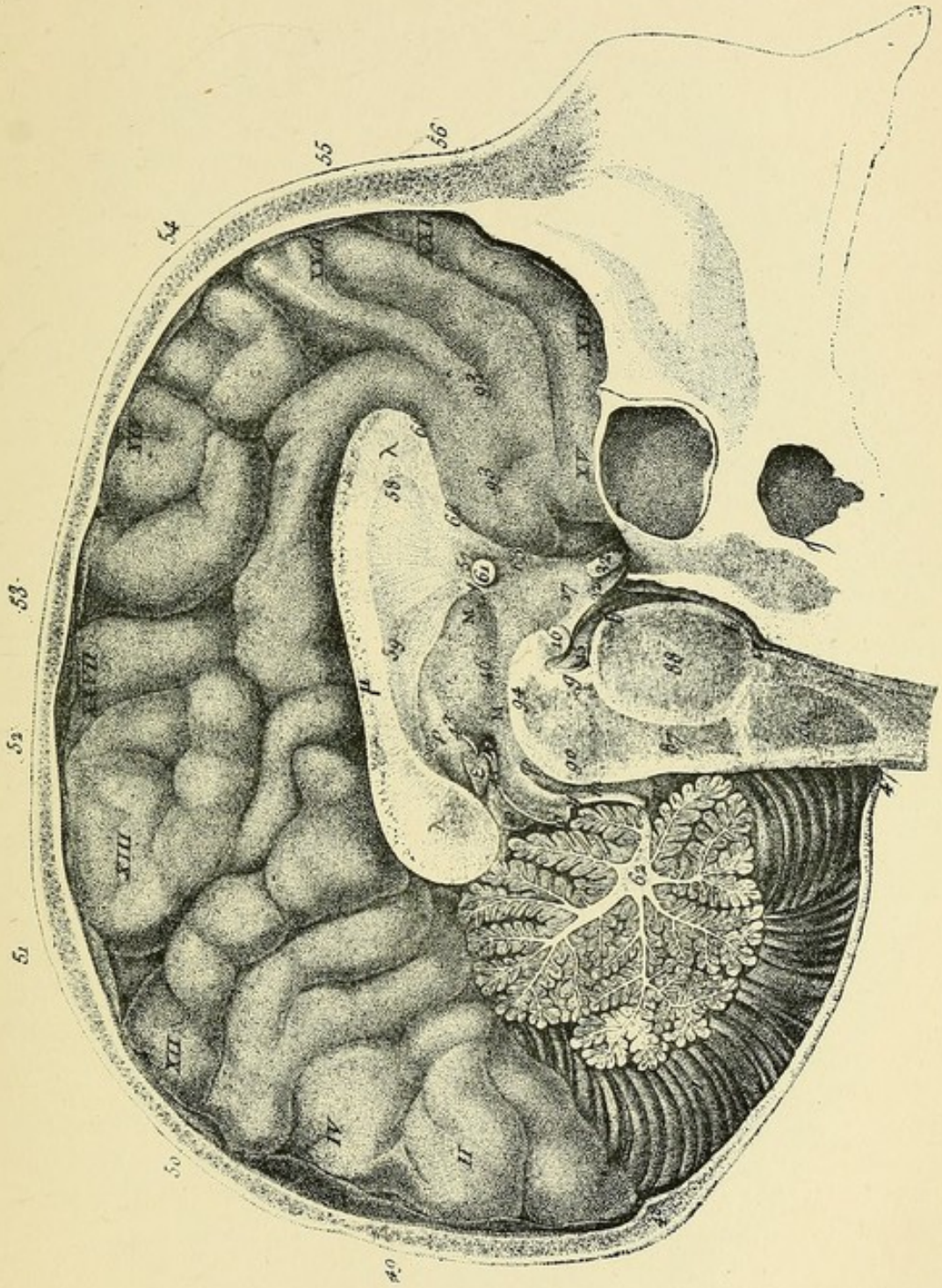

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PLATE VI.

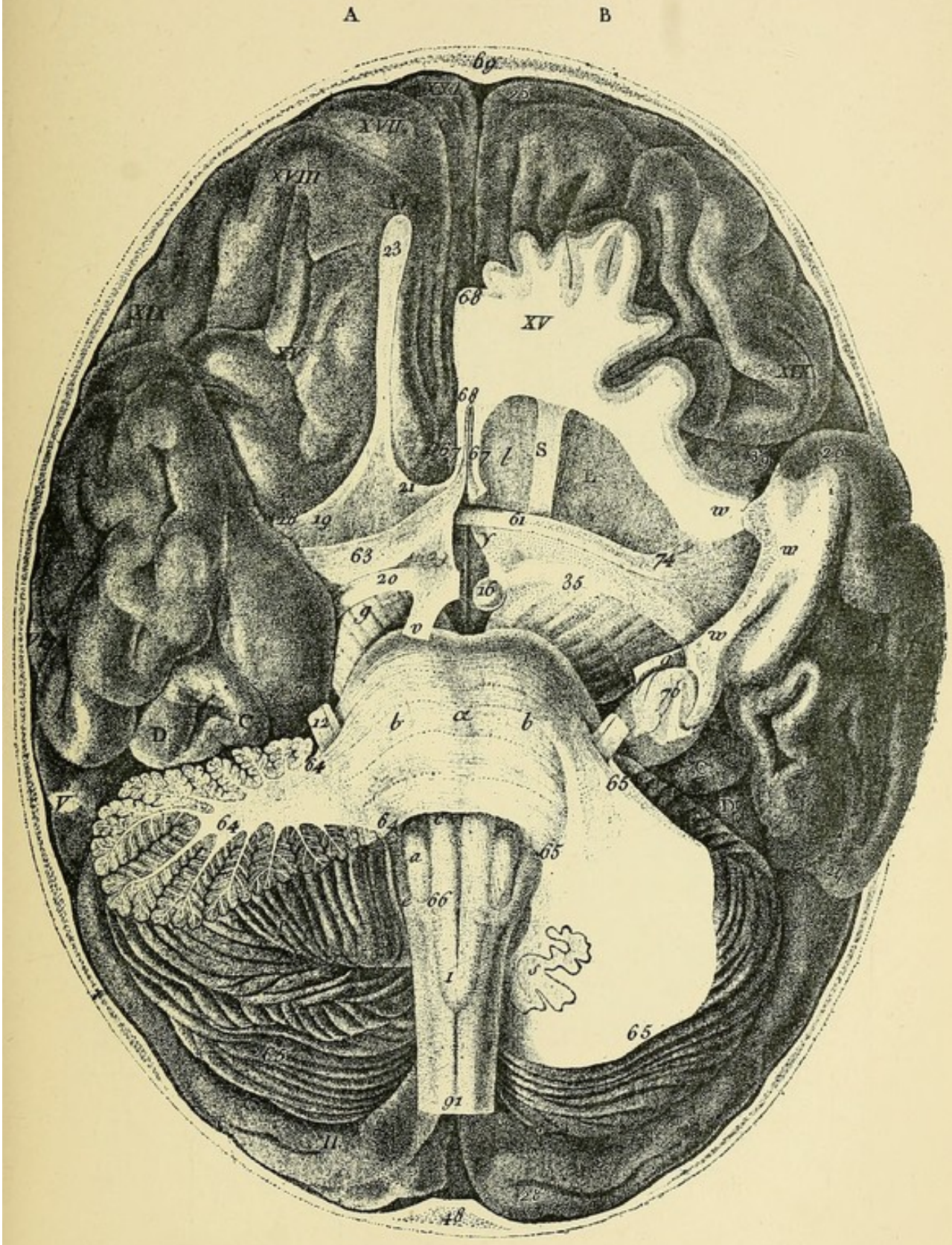
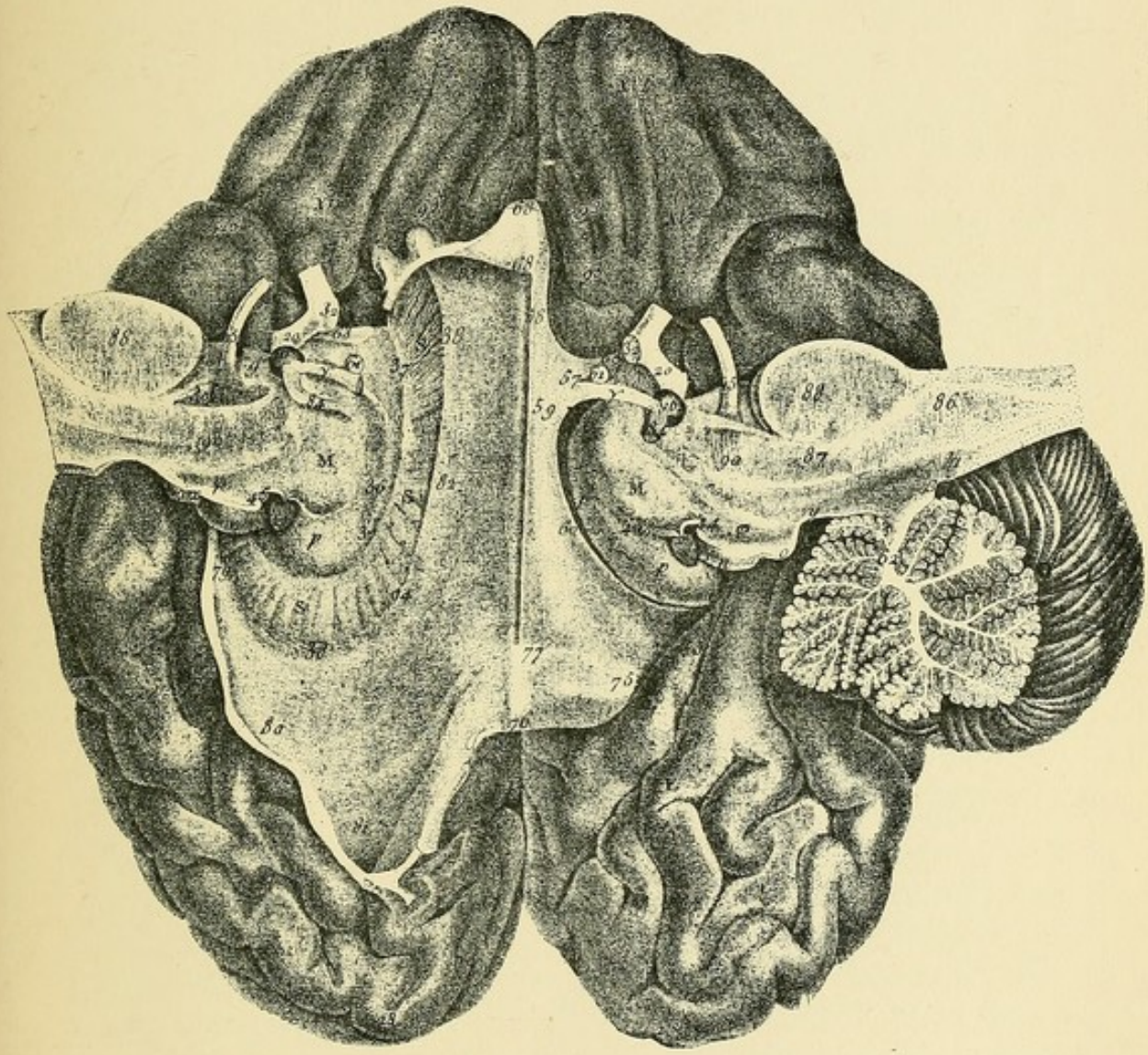

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PLATE VII.



representation, by attributing his first discovery in cerebral localization to another, and its demonstration to yet another.

I do not say that they are doing this wilfully, as I know full well that it is *now* due to their profound ignorance, and that this ignorance is the result of being led by those who followed the loathsome guidance of priestcraft at a time when the appointment of fat university professorships was largely under priestly patronage.

To prove that I am right in identifying 'Broca's convolution' and its neighbourhood, as described by our high modern authorities, with Gall's location of the faculty of language, I present copies in photo-gravure of no fewer than seven of Gall's plates of the brain, with the original figures and lettering. See pp. 199–211.

The originals are life-size, but my copies are somewhat reduced to bring them within a full page without folding. In the original atlas they are Plates IV., V., VIII., XI., XII., XIII., and XVII. The position of the convolutions constituting the region of language and of *aphasia* as described in Gall's pathological cases, and those published by other phrenologists before Broca's 'discovery,' is shown by the figure XV., and the two figures 39 and 39.

Gall thus describes this part of Plate IV., '*Partie cérébrale sur la moitié postérieure de la voûte de l'orbite entre* XV. *et* 39, *organe de la mémoire des mots*' (the cerebral region resting on the posterior half of the roof of the orbit between XV. and 39 is the organ of the memory of words). The same figures indicate the same in all the other plates.

The fissure of Sylvius is that great depression which separates the anterior lobes from the middle lobes of the brain. It is shown in the first of this series of plates (Gall's Plate IV.) in front of 26, extending from 18 to the doubled figures 39 and 39. These figures are placed exactly where '*it abuts on the fissure of Sylvius*,' as Ferrier describes the modern localization of the faculty of language and the seat of aphasia. To make it quite clear that the whole of the so-called 'Broca's convolution' is included, the figure 39 is duplicated by Gall, and placed at each end of this 'transverse convolution,' each figure touching the fissure of Sylvius as the posterior boundary of the region extending from XV. to these fissures. The quotation of Gall's description given above is

from his general description of plates at the end of vol. iv. of his quarto work. In the body of this volume, p. 72, he says again: 'I regard as the organ of the memory of words that part of the brain which rests on the posterior half of the roof of the orbit, Plate IV. between XV. and 39.' My apology for this repetition is supplied by the astounding prevalence among the highest philosophical authorities of the error I am striving to refute.

The same apology applies to my further repetition of pictorial evidence supplied by figures which are copies of two of the plates which illustrate Spurzheim's first English book, and also his subsequent French, English, and American books

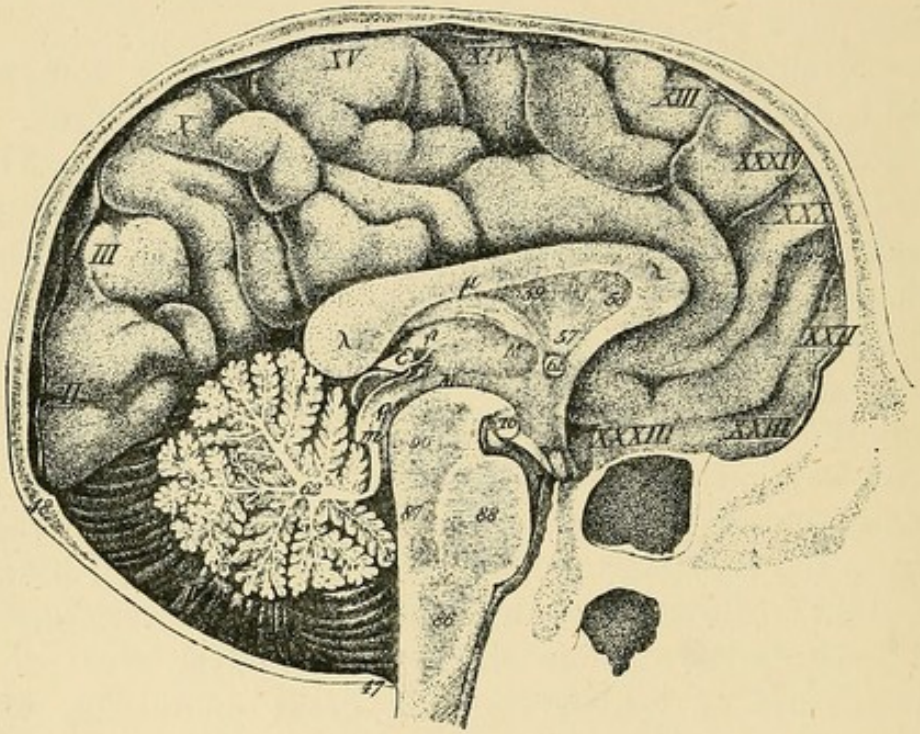


FIG. 26.

on 'Phrenology,' and his 'Anatomy of the Brain.' The wide circulation of these popular treatises, in English as well as French, adds to the atrocity of the ignoring of which I complain.

These figures are of the same size as the originals, and in both the convolution in question is marked XXXIII. Fig. 26 represents a vertical section of the brain made longitudinally down the middle between the hemispheres, thus presenting a view of the inner side of the left hemisphere, like that of Plate V. from Gall.

The following are Gall's accounts of some cases of aphasia

which he describes in the fifth volume of his 'Fonctions du Cerveau,' and the fourth volume of his large quarto work :—

An officer was wounded by a thrust immediately above the eye. He told me that from that moment he had much difficulty in remembering the names of his best friends ; he had absolutely no knowledge of my views. He perceived no weakening of his other faculties.

At Marseilles, another young man received above the eyebrows a thrust from a fencing foil which caused him to lose memory for

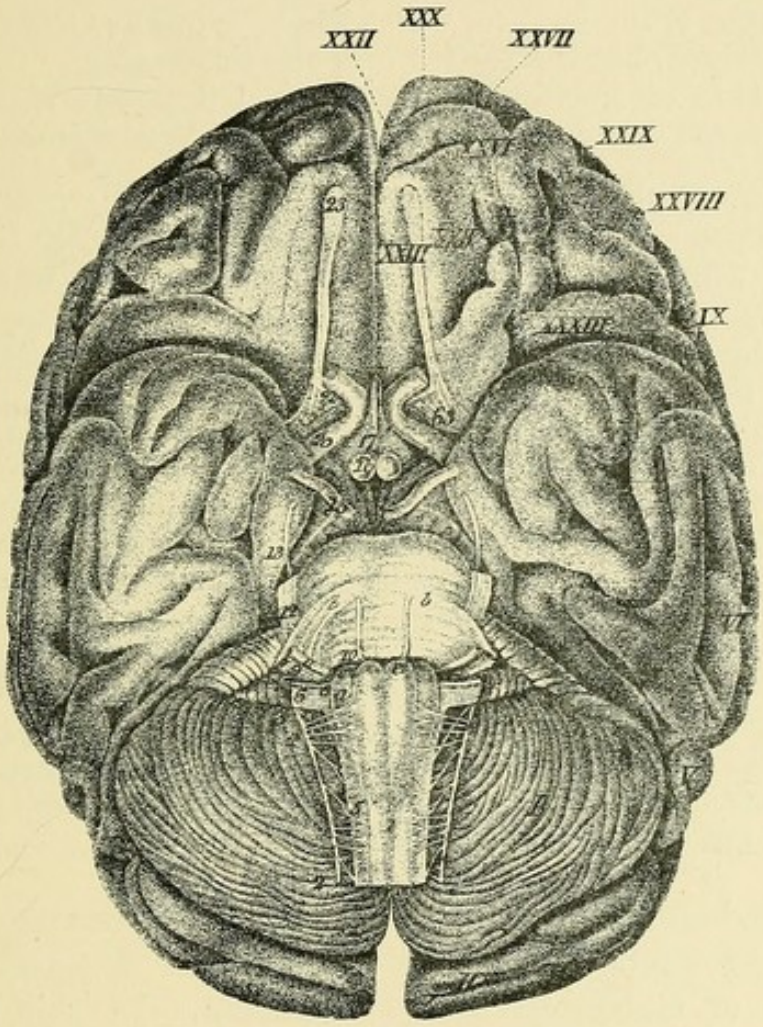


FIG. 27.

names entirely ; he could not remember those of his most intimate friends, or even that of his father.[1]

Baron Larrey kindly brought to me one of his patients, of whom the following is a history :—

M. Edouard de Rampan, 26 years of age, received from a fencing foil, the point of which had broken on his breast-plate, a thrust at the middle part of the left canine region near to the side of the

[1] Spurzheim gives some further particulars of this case, viz., that the young man's name was Lecard, and that he stated the particulars of his malady to Dr. Gall on applying to him for medical advice.

nose, in an oblique direction from below upwards and somewhat inwards. The sword penetrated to a depth of about 3½ inches, and passed through the ethmoid bone, piercing the intero-posterior part of the *left* anterior lobe to a depth of about half an inch, in such a manner as to approach the anterior part of the mesolobe.

The patient bled considerably on receiving the wound, and numerous splinters of bone escaped through the nose and mouth.

All the organs of sense were paralysed, but they gradually resumed their functions, and there now remain only the following alterations :—

The sight of the left eye, which had been totally lost for a month, is now regained, but the patient sees objects doubled.

The sense of smell was totally lost, but is now regained, and the patient can distinguish alcoholic odorous liquors from inodorous liquors.

The sense of taste was equally abolished; it is now so far re-established that the right half of the tongue perceives flavours very well, while the left half is insensible, and the whole of this organ is drawn to the right.

The hearing, at first lost on the side of the wound, is regained, and there now only remains a buzzing.

The voice, that was entirely lost, is now re-established, with the exception of a slight stammering. The memory for names has been totally extinguished, and is now but very imperfect, while his memory of objects and of matters susceptible of demonstration is intact.

The intellectual aberration which existed at first has now ceased, but all reference to what relates to his *amour-propre*, his military achievements, etc., throws him into a state of alienation and profound melancholy; but he is restored by directing his attention to what relates to his family, his neighbours, and his friends.

He remembers well the figure, the face and features of Baron Larrey, recognises him easily, but nevertheless cannot remember his name, but calls him *M. Chose*.

I may here remark that Baron Larrey was a friend of Gall's, and supplied valuable pathological material in confirmation of Gall's cerebral localization. In this direction they were virtually co-workers, especially as regards Gall's much controverted localization of the sexual instinct in the cerebellum. Nothing in cerebral pathology is more striking than the cases supplied by Baron Larrey to Gall with the avowed object of assisting Gall in his researches on cerebral localization. All these cases are fully narrated in both of the works I have so often quoted, and have been specially translated and published in English. In the teeth of all this I find, in the 2nd edition of Bateman's 'Aphasia,' p. 187, the following paragraph :—

The above observation is all the more interesting as Napoleon's great surgeon lived long before the attention of the profession was directed to the question of cerebral localization, and consequently he wrote without any preconceived notions on this much-controverted subject.

Here we have blundering all round, due to the prevailing fashion of ignoring Gall and his work. Baron Larrey was a practical student of cerebral localization, and must have well understood the bearings of the case referred to, which closely resembles that of Rampan above narrated. The injury was inflicted by a bullet which penetrated the skull 'about six or eight millimetres from the eyebrow.' Baron Larrey did not communicate this confirmation of Gall's localization to his old friend, for the simple reason that the autopsy which is described was made two years after Gall's death. In both cases the aphasia was limited to the memory of names or 'substantives.' Gall specially distinguishes between this and other forms of aphasia, and treats them separately.[1] Thus the above-quoted cases are narrated under a section entitled 'De la mémoire des noms et des mots dans l'état de maladie' ('Fonctions du Cerveau,' vol. v., p. 25).

Further on in the same volume, page 36, is another section entitled, 'Sens de langues dans l'état de maladie,' from which I translate the following:—

A woman endowed with sufficient intelligence to manage her household and take charge of her children could not learn to speak, although her hearing was good. In her skull the orbital region of the ethmoid was unusually arched upwards with spherical curvature

[1] I may mention incidentally that his investigations of these differences have not been followed up by his successors as I think they deserve to be. He localizes two faculties: First, the memory of words (*sens des mots, sens des noms, mémoire des mots, mémoire verbale*—*Wortgedächtniss*). Second, the faculty of spoken language (*sens du langage de parole, talent de la philologie, etc.*—*Sprachforschungssinn*).

The centre of localization of the latter is marked XV. in his plates which I have copied, while the region of the first extends, as already stated, from XV. to the fissure of Sylvius, and possibly penetrating to the island of Reil. Gall describes very minutely, with portrait illustrations, the special appearances of protrusion of the eyeball respectively produced by excessive development of these cerebral regions, stating explicitly the difficulty of observing these differences. It is this difficulty, doubtless, that has caused the neglect to which I have alluded. More careful study of pathological cases will probably supply the data which are demanded for the further elucidation of this interesting subject. Mutilation experiments are here quite out of the question. Had the pathologists who have recorded the thousands of cases to which Ferrier refers been acquainted with Gall's researches, they might have obtained some truly scientific results.

—*voûtés en sphère*—a certain proof that the cerebral region above was feebly developed.

The next case is quoted by Gall from Pinel's treatise 'Sur l'Aliénation mentale' as follows :—

A notary having, in consequence of an attack of apoplexy, forgotten his own name, that of his wife, his children and his friends (although otherwise his tongue retained its full mobility), and having also lost his ability to read and write, was nevertheless able to remember objects that had made an impression on his senses and that related to his profession as a notary. He indicated with his fingers the cases which contained papers that were sought for, and showed by other signs that he retained his former chain of ideas.

A soldier that Baron Larrey has kindly sent to me is in a similar condition.

This case is also the result of an attack of apoplexy. The man is unable to express in spoken language his sentiments and ideas. His features exhibit no trace of mental derangement. His mind responds to questions addressed to him : he does what he is told to do. I showed him an easy chair, and asked him if he knew what it was ; he replied by lounging in it. He is unable, at the moment, to articulate a word that is pronounced for him to repeat ; but some instants afterwards this word escapes him involuntarily. In his embarrassment he points with his finger to the lower part of his forehead, displays impatience, and indicates by gestures that his inability to speak comes from there. It is not his tongue that is at fault, as he can move it in all directions with much agility, and he pronounces very well a great number of isolated words. It is not even his memory that is in default, as he showed me very vividly that he was sorry to be unable to express himself on many things which he desired to recount. He has lost nothing but the faculty of speech. This soldier, like the patient of M. Pinel, has become unable to read and write.

Perhaps such facts as these may throw some light upon those forms of mental derangement in which the patient stubbornly refuses to speak. I have in my collection the skull of a lunatic of this kind ; in this skull the upper plate of the orbit forms a high vault in segment of a sphere. In these cases, where the nervous system generally is attacked with weakness, it may be that the part which was previously the weakest suffers the most, and that the patient becomes unable to speak or loses even the remembrance of having ever spoken, although his other intellectual powers may act up to a certain point. This explains also how by disease, or after a fall or other injury, a man may become unable to speak without this inability being due to any paralysis of the vocal organs.

In such cases we have endeavoured in the Vienna Asylum [1] to stimulate the action of the brain, not only by medicines administered

[1] Gall was physician to this Asylum.

internally, but also by friction—for example, by an ointment of tartrate of potash and antimony. By these means we have succeeded in restoring the faculty of speech.

There are children from two to twelve years of age, and even up to fourteen, who do not learn to speak, although in some cases intelligent, or not nearly so idiotic as others that do speak. In these cases the mischief does not lie, as commonly supposed, in the vocal organs, and still less in apathy. Such children often, on the contrary, display physical vivacity; they merely skip and pass from one idea to another with astonishing rapidity, and fix their attention on nothing. When they are held in restraint and one pronounces in their ear a name or some other word, they repeat it distinctly. It is very difficult to repeat this experiment twice in succession, and impossible to succeed a third time, which shows general feebleness of the intellectual faculties.

Sometimes, however, such patients are able to express their ideas and sentiments in writing with some degree of clearness, which proves that their intellectual weakness is especially connected with the faculty of speech.

He then discusses the medical treatment of such children and the results he has observed. He proceeds to tell us that—

M. Spurzheim has seen at Inverness a man suffering from apoplexy who knew the qualities of objects and remembered their vocal signs, but could not pronounce them. If he was shown a colour, such as green, and was asked whether it was brown, yellow, or any other colour but green, he replied 'No'; immediately the true colour was named, he said 'Yes.' M. Spurzheim also observed a similar case in Paris. The man understood all that was said to him, but could not pronounce the words he desired to speak. He asked for different things; if they brought the thing of which he had pronounced the name, he said at once, it is, or it is not that.

Sometimes this species of memory is exalted by disease. The patients recollect what they did not remember when in health. They recite entire passages that had long since been forgotten; they speak languages that they had learned in infancy, but which they had completely lost when in health.

This last paragraph describes a form of disease of the faculty of language which has received but little attention from modern physiologists, and the following describes two others, which, so far as I am able to learn, had entirely escaped them. Gall (on the same section as the above) says:—

The organ of the faculty of language is perhaps particularly excited in those cases of insanity where the patients believe that they hear voices speaking to them. I have attended two women

suffering from this form of mania, and both had large eyes that were pushed downwards towards the cheeks.

The same irritation appears to take place in lunatics that imagine themselves able to speak various languages. In the case of a lunatic of this kind that we saw in Berlin in the great hospital called 'La Charité,' the cerebral region connected with this faculty was extraordinarily developed.[1]

Gall thus sums up the subject of *Aphasia*, though himself aphasic as regards that particular modern *word* :—

There exists, then, a form of partial insanity limited to the faculty of speech ; now, this phenomenon would be impossible if the faculty of spoken language was not the function of a particular part of the brain.

The above quotations are, I think, sufficient to prove the fallacy of attributing the discovery of the existence of aphasia and its seat in the brain to Broca. Those who, with Bateman, regard this as the *ne plus ultra* of pathological topography, must in justice transfer their homage from Broca to Gall.

In order to clench this the more firmly I will now quote other pathological cases that have been recorded, and published in phrenological works by the followers of Gall, all anterior to the date of Broca's *ne plus ultra*.

Dr. Otto, of Copenhagen, communicated the following to the 'Edinburgh Phrenological Journal,' vol. 8, p. 574, June 1834 :—

A correspondent writes (January 1834) :—' A friend of mine has very recently been staggered in his unbelief of Phrenology by a startling fact in its favour which came under his own observation, and which affords an interesting confirmation of the science, though it has long been independent of such proofs. My friend has been in the habit of occasionally visiting the Royal Infirmary (Edinburgh), with the view of witnessing the surgical operations ; and during one of these visits he saw a patient who had completely lost the power of utterance, and could not ask for anything he wanted, though, on the medicines being placed before him, he immediately pointed to the one he wished for. When the head was opened after death, one of the hemispheres of the brain was found entirely diseased, and the other in a perfectly sound state, with the exception only of that part of it which is held by phrenologists to be the organ of language.'

[1] I may add to this that in my youth I listened to the eloquence of the preacher Irving, who founded a sect that claimed ' the gift of tongues ' by some. He displayed extraordinary development of this region.

The following case was communicated to the 'Edinburgh Phrenological Journal,' and published in vol. 13, p. 344, December 1840, by my old friend and fellow-student in Phrenology at that date, Mr. E. J. Hytche :—

R. T. A. is of sanguine nervous temperament; his organ of language is rather large, and the organs of individuality and form are large, whilst that of eventuality is moderate. He has some literary taste; his style is fluent, and he composes with rapidity. He has also lexicographical power, his definitions being complete and terse. He is also habituated to extempore public speaking; and he rarely hesitates in his delivery, or finds occasion to correct or withdraw any word or phrase. There is, however, an occasional peculiarity connected with this person, which is that, when speaking in private, he has a tendency to disassociate words from the things conventionally signified, and thus to designate them by names the most opposite to those by which they are ordinarily known. He says that this does not occur through forgetfulness of the appropriate word; but that, on the contrary, it is spoken under the impression that the proper term has been employed. This peculiarity does not extend to mispronunciation, but is confined to the selection of one word for another, the term selected generally possessing not the remotest analogy to that which should have been chosen. Thus he would call for a razor when he meant a candlestick; and when he mentions the names of individuals he will transform Smith into Brabazon, or the converse. He also, when under the influence of this affection, designates food by most inappropriate names; thus bread is called bacon, and bacon becomes bread. This is likewise the case with the designation of nations; without confounding the characteristics of either, he changes France into America, and Polynesia into Lapland. He is, however, unaware of his blunder, until he detects a mantling laugh, and on enquiry discovers the cause, or before an article is brought the reverse of that for which he intended to ask. These mistakes occur most in substantives, and occasionally, but very rarely, in verbs.

R. T. A. complains much of pain occurring over his eyes, or, more accurately speaking, of an intense downward pressure of the upper orbital plate, combined with a sensation of the fibres of the superincumbent brain being forcibly pressed together: the latter sensation ceasing repeatedly and then recurring, with a brief interval between each pressure. The pain is greatest over the *left* eye,[1] where it also commences. It mostly occurs after mental excitement, and the period of its duration varies from one to five hours. His misapplied phraseology generally happens after the occurrence of this painful sensation; and in proportion with its intensity is his liability to the affection. The locality of this painful sensation is too well defined in the preceding case to allow the supposition

[1] The reader should note this occurrence of the pain being greatest over the *left* eye (the italics are mine) in connection with recent researches on aphasia. This case was published more than twenty years before the announcement of Broca's supposed discovery, and therefore neither the patient nor the narrator could have been influenced by any suggestion therefrom.

that it is really situated over the superciliary ridge, though the site is mistaken.

Case of Injury sustained by the Organ of Language.—By James Inglis, M.D., M.R.C.S.E. Published in the 'Edinburgh Phrenological Journal,' vol. 10, p. 68, June 1836. (Some details of medical treatment omitted.)

As the doctrines of Phrenology can be supported and strengthened only by facts, the following notes, taken at the hands of the patient (without having Phrenology in view), will, it is hoped, add at least a little weight to them.

Maria Wilson or Kennedy, aged 33, was shot by a sheriff's officer named Blair, on Thursday, December 24, 1835, in the village of Springholm, near Castle Douglas. The ball entered the cranium at the external orbital angle of the frontal bone. On the Tuesday following I was requested to visit her, along with my friend, Mr. McKeur. It appeared that, on the night of the injury, she had had an epileptic fit, that from that time till the Saturday morning following she had remained insensible; but that during some part of that day sensibility had returned, and she had continued in the use of *all* her faculties until the Tuesday morning when we saw her, at which time she answered questions correctly, and the memory was quite unimpaired. She complained of some pain in the back part of the head, but especially of a dull, heavy, constant pain in the region of the wound. This was increased by some degree of vertigo, which followed from assuming the erect posture. A probe was introduced into the wound, and, after penetrating about an inch and a quarter, was stopped by a splinter of bone. On passing the probe a little to the right, or towards the median line, the bullet was distinctly felt, having penetrated both tables of the bone, imbedded in the rugged edge of the internal one. A sufficient incision being made, I succeeded, after considerable force had been used, in extracting the bullet. It was flattened on one side and rugged, having the impression of the bone into which it had been impelled. Several splinters were removed, and also the one mentioned above, of greater size, which was pressing upon a portion of the anterior lobe of the brain. The orbital plate of the frontal bone was also considerably injured, so much so that until I removed a small portion of it, which was pressing down upon the eye, the woman complained of something 'pricking' the eye-ball.

After all source of irritation had been removed, the external wound was brought together with adhesive straps, and a portion of lint wrung out of cold spring water was applied over all, and ordered to be changed frequently. She was ordered also, every third hour, a wine-glassful of purgative solution, till the bowels were sufficiently acted on. The pulse was 72 when we left her. The following day, December 30, she complained of violent pain in the back part of the head, but the dull pain in the site of the wound had not returned since the extraction of the ball. Pulse 80. Breathing easy. Had

slept for three hours during the night, tranquilly. December 31. Had slept little, and still complained of the pain in the back part of the head. Appears drowsy, and answers questions incoherently. The wound discharges healthy pus. Tongue white, but moist. On Friday, January 1, I found she had been up frequently, sitting by the fire, and had partaken of some animal food, although particularly cautioned against it. The pulse was about 100, but not full. Face flushed, skin hot. Tongue white, but still moist. Wound appeared healthy. She had some degree of stupor, and when roused talked incoherently. The next day (Saturday, January 2, 1836) was the first time that I began to notice the difficulty she had in speaking; the report runs as follows: 'Has slept none. Is, or affects to be, insensible. Complains little of pain. When roused, *she observes and knows everyone, and understands whatever is said to her*. Pulse only 68. Tongue foul, but moist. Pupils natural. Has *spoken little since yesterday*. Has got out of bed several times. She *appears to have lost the memory for words*; thus she cannot express her wants. Sunday, January 3. Pulse 68. . . . Slept little during the night, but frequently sat up in bed without speaking.

It was *now* only, *for the first time*, that my attention was called to the phrenological import of the case by the following circumstance. The nurse in attendance on Maria said to me, 'I wonder many times *that she does not speak, for her tongue is well enough*, and when she *wants anything* she *cannot name it*, so that we have to bring a number of things to her, and when it is what she wants she gives a kind of smile.' These were her *exact words*, for I took them down at the time as she spoke.

She continued nearly in the same state for the next two days, when, after getting into a passion at her attendants, she became rather more comatose. The pulse was 60; heat of head increased, especially in the forehead. . . . An ample blister applied to the head. Wednesday, January 6. Was up several times; *appeared to notice everything that was going on, but never spoke, except in monosyllables*. A considerable discharge took place from the wound, and a small piece of bone came away. . . . Thursday, 7th. Still cannot find words to express her wants. Saturday, January 9. The symptoms to-day are improving. . . . She is quite collected. The power of speech is also returning. Monday, January 11. Pulse only 48, slept well. Considerable pain in the *back part of the head, but none now in the region of the wound*. Talks now slowly, and with some hesitation. The wound is greatly cicatrised.

All the symptoms have gone on improving down to the present time (January 18). Still, however, she forgets some words, and, when talking about anything, she repeats the same words several times before she can recollect others to express her ideas in succession, and often stops short in the middle of a sentence, telling her nurse to finish it for her. I am afraid that the detail of the above case has been somewhat tedious; but from it we find that whilst, throughout, her other faculties have, for the most part, been unimpaired, *that of speech*, or *rather the memory of words* to express

ideas or feelings resulting from the other faculties, has been very much affected. We find, too, that even this symptom did not appear till, imprudently, she excited the circulating system on January 1 (nine days after the receipt of the injury), and that then the pulse was greatly accelerated from its wonted state; that some head symptoms appeared, and that the 'weak point,' as is always the case, suffered most, and *continued to suffer long after the other symptoms had completely subsided.*

Castle Douglas, Kirkcudbrightshire, January 18, 1836.

Postscript.

My patient, Maria Wilson, is now out of danger, and the memory for words is quite restored. I had another case the other day of a somewhat similar nature, a boy who complained of violent pain over both eyes, and also of the eye-ball, as if they were about to start from their sockets. When I saw him he spoke a few words and then stopped short. He commenced again and again, with a like result. Cold cloths being applied over the eyes and frontal ridge, he experienced great relief; and after two hours' continuance, words flowed upon him as uninterruptedly as before. He then told me that he knew well enough what he intended to say, but that, just as he was about to pronounce the word, it went entirely out of his memory. After two days the pain returned, and words again were lost. He laboured under hepatic disease, and also disease of the heart.

He died about a week after the first attack upon the organ of language, suffering most part of that time great pain in both anterior lobes of the brain. A *post-mortem* examination could not be obtained.

March 21, 1836.

Case of Impairment of the Faculty of Language accompanied by Pain above the Eyes.—By Mr. William Gibson, Surgeon, Montrose. Published in the 'Edinburgh Phrenological Journal,' vol. 9, p. 515, March 1836:—

Late in the evening of the 11th May last, I was asked to see Janet Whyte, wife of a miller at Rossie Mills in this neighbourhood, a woman about thirty years of age, and who had recently weaned her first child. She had, I found, frequently complained of headaches during her nursing and since, and had of late lost flesh considerably. About 8 o'clock that evening she was found sitting with her hand pressed on her forehead, and partially insensible, being only able to say that she felt great pain. She was put to bed and was much in the same state when I saw her. She still often put her hand to her head, groaned and muttered occasionally, and took no notice of what was going on around her, except in firmly resisting me in making an attempt to bleed her. The pulse was not affected,

nor was there any heat of the head, or of the surface generally. We succeeded in forcing into her mouth a little sugar, with three drops of croton-oil upon it, of which she appeared to feel the disagreeable flavour. Next morning she was quite insensible.

I then bled her freely, and gave more croton-oil. She, however, remained perfectly insensible for five days, during which time leeches were applied to the head, blisters and sinapisms to the nape of the neck, spine, and lower extremities, and turpentine embrocations to the loins and epigastrium. A little tea, which she swallowed from a tea-spoon, was her sole nourishment. Gradually she began to throw off the stupor, to notice, to take nourishment, and to move about. Her speech, however, was very much affected: at first she only uttered inarticulate sounds; then single words very indistinctly and generally inapplicable; and when she did begin to utter sentences, they were either very unconnected or unmeaning, the different words being either wrong or strangely jumbled together. It has been very slowly that she has acquired the use of speech, and it is only now that, with difficulty, she can give an account of her feelings during her illness. She says that she was first attacked with pain on one side of the head; that it soon went to her forehead; and then, as she expresses it, 'it fell down into her *een*,' where it has remained more or less ever since, excepting, of course, during the five days that she was insensible. She refers the pain to a spot immediately above and behind the eyes: and, when I desire her to point out the spot, she puts her fingers beneath the superciliary ridge, presses back the eye as far as she can, and says that it is there and farther back. She complains much of her defect of speech; she says that she knows perfectly what words she ought to use, but cannot get them expressed. She has no other complaint now remaining, excepting a slight dimness of sight, which is going off gradually.

Montrose, June 11, 1835.

A later number of the 'Phrenological Journal' (No. 48, June 1836) contains the following supplementary remarks on this case:—

The case of Janet Whyte, reported by the late Mr. William Gibson, surgeon, Montrose, in our Number 46, p. 515, is commented on by our esteemed contemporary the 'Medico-Chirurgical Review,' January 1836, p. 208. 'It seems clear to us,' says our contemporary, 'that it was not the intellectual function that was injured, but the power of directing the tongue that was impaired. The patient said that she knew well enough what words she ought to use, but that she could not get them *expressed*. If the conception and remembrance of language had been lost, she would not have known what words to use. . . . We make these remarks because loose observations and indefinite statements are seldom of benefit to science.' As the report stands, these remarks are unquestionably well founded; but an obvious inconsistency in it affords reason for

suspecting that the statement alluded to by our contemporary is inaccurate. For Mr. Gibson expressly says, that when the patient began to utter sentences, 'they were either very unconnected or unmeaning, the different words being either wrong or strangely jumbled together.' From this it is evident that she had the power of *expression*, and that the defect was in the *faculty* of language alone. In order to get at the bottom of the matter, we communicated this suspicion to Mr. W. A. F. Browne, of Montrose, and added the following request: 'Could you conveniently see the woman, and ascertain what she exactly meant by saying that she knew perfectly what words ought to be used? Probably she told Mr. Gibson that "she knew the words perfectly, but somehow could not recollect them"; just as we say of any person that we are sure we know his name, but cannot recall it at the moment.'

Mr. Browne's reply, dated April 25, 1836, is satisfactory and conclusive. 'On Saturday,' says he, 'I had a long conversation with Janet Whyte, the subject of Dr. Gibson's short paper. Her statements confirm your opinion, and are as follows. She was seized with headache, which she knew continued some hours, but subsequently to this she lost all consciousness. She remained insensible and speechless for some days. She then recovered so far as to recognise objects, but she could not yet name them. On attempting to do so, she could speak with perfect ease—that is, she could pronounce words; but she failed in applying the words to the things signified, in selecting the words requisite to express her meaning. For instance (the illustration is her own), she could distinguish her husband from a chair, but she could not *name* either one or the other. She repeatedly and distinctly averred to me and Mr. C. Watson that this difficulty arose from her total inability to *recollect* proper *terms*, and not from her inability to *utter* them. What places the truth beyond a doubt is that she still occasionally labours under the same affection. She cannot conjure up words to express her meaning, and is obliged to leave her sentences incomplete. What classes of words are thus forgotten she could not tell. Her husband, whom I likewise examined, corroborated all that she communicated. Both parties are highly respectable, and their testimony may be relied upon.'

The following is from George Combe's 'System of Phrenology,' fifth edition, 1843, vol. 2, p. 136:—

In the 'Transactions of the Phrenological Society' (1820 to 1823), p. 235, Mr. Hood, of Kilmarnock, has communicated a very interesting instance of this kind which fell under his notice as medical attendant. The patient, a sober and regular man of sixty-five years of age, possessed of the ordinary knowledge of written and spoken language, on the evening of the 2nd of September 1822 suddenly began to speak incoherently, and became quite unintelligible to all those who were about him. 'It was *discovered that he had forgotten the name of every object in nature.* His recollection of *things* seemed to be unimpaired, but the *names* by which *men* and

things are known were entirely obliterated from his mind, or rather he had lost the faculty by which they are called up at the control of the will. He was by no means inattentive, however, to what was going on ; and he recognised friends and acquaintances perhaps as quickly as on any former occasion ; but their names, or even his own or his wife's name, or the names of any of his domestics, appeared to have no place in his recollection.

'On the morning of the 4th September,' says Mr. Hood, 'much against the wishes of his family, he put on his clothes, and went out to the workshop ; and, when I made my visit, he gave me to understand, by a variety of signs, that he was perfectly well in every respect, with the exception of some slight uneasiness referable to the eyes and eyebrows. I prevailed on him, with some difficulty, to submit to the reapplication of leeches, and to allow a blister to be placed over the left temple. He was now so well in bodily health that he would not be confined to the house, and his judgment, in so far as I could form an estimate of it, was unimpaired ; but his memory for words was so much a blank, that the monosyllables of affirmation and negation seemed to be the only two words in the language the use and signification of which he never entirely forgot. He comprehended distinctly every word which was spoken or addressed to him ; and, though he had ideas adequate to form a full reply, the words by which these ideas are expressed seemed to have been entirely obliterated from his mind. By way of experiment, I would sometimes mention to him the name of a person or thing—his own name for example, or the name of some one of his domestics, when he would repeat it after me distinctly, once or twice ; but, generally, before he could do so a *third time*, the word was gone from him as completely as if he had never heard it pronounced. When any person read to him from a book, he had no difficulty in perceiving the meaning of the passage, but he could not himself then read ; and the reason seemed to be, that he had forgotten the elements of written language, viz., the names of the letters of the alphabet. In the course of a short time he became very expert in the use of signs ; and his convalescence was marked by his imperceptibly acquiring some general terms, which were with him at first of very extensive and *varied* application. In the progress of his recovery time and space came both under the general appellation of *time*. All future events and objects before him were, as he expressed it, *next time ;* but past events and objects behind him were designated *last time*. One day, being asked his age, he made me to understand that he could not tell ; but, pointing to his wife, uttered the words '*many times*' repeatedly, as much as to say that he had often told her his age. When she said he was sixty, he answered in the affirmative, and inquired what *time* it was ; but as I did not comprehend his meaning distinctly, I mentioned to him the hour of the day, when he soon convinced me that I had not given him the proper answer. I then named the day of the week, which also was unsatisfactory ; but, upon mentioning the month, and the day of the month, he immediately signified that this was

what he wanted to know, in order to answer my question respecting his age. Having succeeded in getting the day of the month, he pointed out the *time* or day of the month on which he was born, and thereby gave me to understand that he was sixty years of age, and five days, or *times*, as he expressed it.'

In the month of December 1822, his convalescence was so complete that he could support conversation without much difficulty. The headaches, with which he had been so long affected, recurred occasionally; but in other respects he enjoyed, in general, tolerably good health. On 10th January, 1825, he suddenly became paralytic on the left side. On 17th August he had an attack of apoplexy, and on 21st he expired. In the 'Phrenological Journal,' vol. 3, p. 28, August 1825, Mr. Hood has reported the dissection of his brain. In the left hemisphere, lesion of the parts was found, which terminated 'at half an inch from the surface of the brain, where it rests over the middle of the superorbital plate.' Two small depressions or cysts were found in the substance of the brain, 'and the cavity, considered as a whole, expanded from the anterior part of the brain till it opened into the ventricle in the form of a trumpet. The right hemisphere did not present any remarkable appearance.'

Those who are acquainted with the results of modern research on the pathology of aphasia will note this localization of the mischief in the *left* hemisphere. Such localization is so common that some easily satisfied theorists jumped to the conclusion that the seat of the faculty of language is one-sided, that 'we speak with the left side of the brain.' I need scarcely add that these are not phrenologists.[1]

The following case, also reported by Mr. Hood, was published in the 'Edinburgh Phrenological Journal,' August 1824, p. 82:—

Adam M'Conochie, gardener, Dankeith, aged forty-eight years, of regular and sober habits, was observed to be indisposed on the 31st of May. The morning being damp, he did not rise quite so early as usual; and when he rose, his wife remarked that he began to seek for something which he could not name; nor could she for a time comprehend the nature of his search. The socks which he had been accustomed to wear in his shoes had been mislaid, and occasioned his embarrassment. After they were found, and the other parts of his dress adjusted, he went out to the garden, and began to plant some cauliflower. Thither he was accompanied by his wife, whose attention had been forcibly arrested by something peculiar in his manner, and by a striking deficiency that she observed in the use which he made of language, which in fact was

[1] Dr. A. Wilson, in his attack on Phrenology already quoted, tells his readers that 'aphasia is invariably associated with disease of the left, and never with disease of the right side of the brain.'

limited to a few words. More anxious concerning the duty which he owed to his master than the complaint with which he had been so lately seized, he immediately proceeded to gravel the walks in the vicinity of the mansion-house. In the meantime, his wife informed the steward that her husband was singularly indisposed, yet in a way which she did not by any means comprehend. The steward advised him to leave off work for the present, and to go home and send for medical aid. The first part of the advice was adopted, though he could not be induced to send for medical assistance till the factor on the estate urged the propriety of it. Being requested to visit him, an opportunity was afforded me of seeing him on the afternoon of the day on which he was seized. He was lying dozing in bed, and perspiring copiously, but rose quickly and came out of bed as if nothing had been wrong. After the first agitation of the moment had subsided, the pulse was found to be natural ; but the tongue was foul, and the bowels were slow. In questioning him respecting the nature of his complaint and the state of his feelings, little information of a satisfactory nature could be obtained from him, on account of his utter inability to give a description in language of the state of his mind, together with his internal feelings and sensations. He raised his hand to the left side of his head, and pointed more particularly to the temple behind the angle of the eye, and said there was '*something about it.*' After repeating the phrase several times, he got out the word 'rheumatism,' signifying, as it was understood, that his complaint was a rheumatic affection of this part. He had no apparent difficulty in comprehending any question which might be put to him ; but his answers were always such as these—'*something about it, plenty about it, little about it,*' or '*nothing about it.*' When asked whether he had any pain or uneasiness in his *head*, his answer was, that there was 'something about it.' But when similar questions were put to him with respect to the *chest and abdomen*, he replied by saying, there was '*nothing about it.*' A psalm-book was presented to him, to see whether he could read ; but the only word that caught his eye which he could name was 'man.' The names of the letters, however, of which this monosyllable is composed, he did not recollect so vividly as to be able to pronounce them. He was then asked whether he could read fluently prior to the present attack, to which he replied, that he knew 'plenty about it ;' and forthwith brought me a volume of travels that he had lately been reading. On requesting him to repeat the Lord's Prayer, his answer was, that he 'ken'd plenty about it ;' but this was all the information he could give concerning it.

June 2.—Pulse and skin natural, tongue foul, and bowels rather slow since the operation of the physic. Being asked if he had any complaint in his head, he replied, that there was 'a hantle about it.' He continued to take much interest in what was going on in the garden ; and besides working a little himself, he pointed out to the labourers, by means of signs, what plots required to be dug or hoed, what crops required to be thinned, weeded, or otherwise

sorted. To his wife, who accompanied him on all occasions, he pointed some flowers that wanted water. His manner, however, of expressing this idea was very peculiar, which was by saying, 'they have nothing about them;' and he desired her, by signs which she could not misapprehend, to put 'plenty about them,' meaning that she should give them plenty of water. When she ceased to apply water before he judged them to have enough of moisture, he urged her to apply more by unequivocal signs, and by uttering the expression 'little about them,' by which he would have her to understand that they were not sufficiently watered. His judgment did not appear, from anything that could be observed in his conduct, to be the least impaired; and his recollection of facts and circumstances was clear and distinct, as was exemplified by instances of daily occurrence. There were some words, when pronounced before him, that even then he could not articulate, which induced me to believe that some of the small muscles which are brought into action in the pronunciation of certain words were somewhat paralysed. A psalm-book was presented to him as on a former occasion; but instead of naming the letters of the alphabet, or pronouncing the words, he numbered them accurately in the order of reading from left to right, thus—one, two, three, four, five, six, seven, etc., and when he came to the end of the line, he again began at unity, and went on as formerly, numbering the words in each line instead of reading.

9th.—Has had some paroxysms of passion, which for a short time became so extravagant as to indicate something like derangement. On the whole, however, he has made considerable improvement: he has not only the use of a much greater number of words than usual, but he has also recovered the power of reading, though very imperfectly. There still are many words that he cannot pronounce; and when interrogated whether he has any uneasiness in his head, his answer is uniformly, that there is a 'hantle about it,' implying evidently that it is far from being in a healthy condition.

The diary notes are continued in the report, and the details of these are rather prolix. I need only add that they describe a slow and only partial recovery up to August 9.

Here again, as in other cases I have quoted, the symptoms point to disease on the *left* side, followed by slow and partial recovery of the faculty, which throughout was not *entirely* lost, as the power of understanding language remained, but not that of using it.

This, so far as I have been able to learn, is usual in these and unilateral cases, and merely indicates a resemblance between our powers of speaking and of writing. The left side of the brain is connected with the right side of the body; the right hand is controlled or governed by the left side of

the brain. Writing is an *acquired art, so is speech.* We write with our right hand, but not with our left, simply because we have trained the right hand and not the left.

It appears from these cases that the majority of us have similarly trained our powers of articulation. If we lose the use of our right hand, we nearly but *not entirely* lose the power of writing. But if the right hand continues disabled we may gradually acquire the power of writing with the left hand; doing it first very clumsily, until the education of the left hand is completed.

Many cases are recorded in which the power of writing and of reading has been partially or entirely lost, in consequence of brain injury; to this the name of *agraphia* has been given. Its location is not yet clearly defined, but if it prove to be nearer the median line of the brain than that of aphasia, the explanation will not be difficult, as the region of the organ of *form* would thus be implicated.

Case in which the Faculty of Language was Impaired

(*From the 'Edinburgh Phrenological Journal,' vol.* 2, *p.* 410, 1825.)

To the Editor.

Edinburgh, April 20, 1825.

Sir,—I am afraid any account I can give you of the case of the gentleman who has lost his power of language must be very meagre; but I can vouch for its authenticity, and you may make any use that you choose of the information.

The gentleman in question is about seventy-two years of age, and nearly five years ago he had a pretty severe attack of palsy. Upon his recovery his whole mental faculties were found to be unimpaired, but the power of his right arm and leg was much diminished. Before the attack, his sight had in some degree failed, and for some time he had used spectacles, but after it he was able to read perfectly without using them.

He remained in this state till the end of June last, when he was seized with a complaint of the nature of apoplexy. He complained much of excessive pain across the eyes, for which he was bled and blistered on the temples. I was living in his immediate vicinity at the time of this attack, but I returned to town before he recovered, and remained here for a month. Upon my return to his neighbourhood I saw him daily for several weeks. At first I imagined his memory was gone, but I soon discovered that it was merely in so far as language was concerned. He knew all his friends, and was delighted to see them, although he could seldom name any of us. He took a great interest about everything that was going on at

home, particularly in regard to his harvest, and the struggle which he often made to find words to convey his meaning to us was very distressing. He still retained his relish for a rubber of whist, and frequently took one. He was more changed in regard to reading than anything else. Before the attack he read a great deal, but after it a book was rarely seen in his hand.

His power of language varied somewhat from day to day, according as he was quite well or otherwise. Frequently, when I have asked his wife in the morning how he was, I have been answered, 'I don't think him so well to-day, his eyes are red and heavy.' On these days he always used to sit with his hands on his eyes and complain of the pain, and had always much greater difficulty in expressing himself than on the days he was free from pain.

I do not at present remember any other circumstance which I think it necessary to mention; but if anything occurs to you upon which you wish to be informed, you have merely to let me know, as Mr. —— saw the gentleman daily till the end of last summer, and his sister is at present living with us, and she continued to see him throughout the whole winter.

I am, etc.

N.

Affection of the Faculty of Language from an Injury of the Brain.—Communicated by G. L. Smith, M.D., and Mr. D. Niddrie, surgeon, Montrose, and published in the 'Edinburgh Phrenological Journal,' vol. 12, p. 155, March 1839.

January 12, 1838.—Alexander Campbell, aet. 14. Temperament sanguine, nervous. Overbalanced himself while employed in oiling the machinery of a spinning mill, and fell upon the point of the spout of the oil jar which he held in his hand. He immediately ran down the stairs leading from the room in which he received the injury, and on reaching the bottom fell to the ground insensible. He was shortly afterwards seen by Dr. Niddrie, who found him in bed with the following symptoms:—a small wound of about a quarter of an inch in length was observed *under the left eyebrow;* there was considerable ecchymosis and swelling around the wound; the eye itself was uninjured, and no other external injury could be discovered; pupils dilated and insensible to light, deglutition difficult; occasional disposition to vomit; pulse imperceptible; surface cold.

He was visited four hours afterwards by Drs. Niddrie and Smith, who found the pulse eighty, small and irregular; action of heart and respiration likewise irregular; extremities still cold; pupils slightly sensible, still dilated; moaning, restlessness, tendency to lie on left side. A probe was introduced into the wound, but could not be made to penetrate deeper than an inch.

13*th.*—Swelling round the wound considerably reduced; pupils still dilated, but more sensible to light; when asked if he felt any pain, raised his hand to his head, but unable to answer any ques-

tion addressed to him further than by groaning or shaking the head. Pulse sixty, irregular; able to project the tongue.

14*th*.—Eyes suffused, particularly the right; pupils natural, but could see distant more distinctly than near objects; pulse fifty, very irregular, but of good strength; perfectly sensible, but totally unable to speak. When the hand was held before him, and he was asked to pronounce the name or number of the finger or fingers extended, he immediately raised his own hand with the corresponding finger or fingers extended: when asked if he knew his mother, who stood by the side of the bed, he bowed; when asked if he knew when and how he received the accident, he grumbled, shut his eyes and shook his head; when asked which part of the head was painful he pointed to the wound.

15*th* and 16*th*.—Symptoms much the same as before, but when asked where he had pain, he pointed to the right temple; suffusion of eyes diminished; still unable to articulate, but quite sensible.

18*th*.—Improving; has attempted to speak, in so far as he can pronounce the word *no* distinctly, *ius* for *yes*, *mud* for *mother*, *mungd* for *mug*, etc.; but when repeatedly asked to name objects exhibited to him, such as a hat, a glove, an umbrella, a plate, key, knife, shilling, or halfpenny, he was unable to do so, although he seemed to reflect for some time as each question was put, and invariably responded by shutting his eyes and shaking his head. But when his questioners insisted that he should tell them the use of a knife which was shown to him, he imitated the act of cutting by applying it to one of his fingers. Slight paralysis of the right arm was observed to have taken place.

19*th* and 20*th*.—Still improving; speaks more readily and distinctly; named the key and hat when shown to him, but the interrogations put seemed to cause slight flushing of the face, followed by squinting, which continued for about a minute, and then, after a long inspiration, suddenly went off. Paralysis of the right arm continues.

22*nd*.—Has nearly recovered use of right arm; got out of bed and walked across the room, but with difficulty; speech much improved; external wound healed; vision of both eyes perfect.

February 2.—Improved in every respect; considerable general debility. When he enters upon general conversation, he answers correctly, although with hesitation; but if it is kept up for six or eight minutes the hesitation amounts to a difficulty, and if pushed farther the face becomes flushed; a slight degree of strabismus comes on, and there is a total inability to utter a word. This is generally followed by a deep inspiration, and a moment or two of apparent insensibility. If immediately after this twelve different objects are shown to him in succession, he cannot name more than one half of them, and part even of these in a way scarcely to be understood; but if allowed to remain a few minutes undisturbed, he will answer as correctly as before. For a month he continued to improve, when he resumed his work at the mill, but after repeated attempts was compelled to abandon it, the motion of the

machinery invariably causing pain in the head and vertigo, so severe that he was unable to stand or walk, and this condition was always accompanied by inability to express himself.

In October he seemed to have perfectly recovered his speech, but the noise of the mill still produces considerable headache, and if at any time he is crossed or irritated, he stammers, hesitates, and has great difficulty in expressing himself.

In the 'Edinburgh Phrenological Journal,' vol. 15, p. 323, December 1842, is published the following, from the Proceedings of the Phrenological Association :—

Tuesday, June 21.—Dr. Moore in the chair. Mr. Cull read a letter addressed to Mr. Bryan Donkin by Mr. William Stark, of Norwich, communicating a *case of disturbed function of the organ of language*, occasioned by the rupture of a blood-vessel within the orbit, and, apparently, consequent pressure of the distended eye-ball on the cerebral organ, which is separated from the eye by a very thin plate of bone. 'My friend, B. H. Norgate, Esq.,' says Mr. Stark, 'an eminent surgeon of this place, in the month of March, 1841, kindly took me to a patient upon whom he was in attendance, to see an affection of the brain which he thought worthy the observation of phrenologists. As it was a case totally different from anything I had seen before, and as he had been professionally interested in it from the time the symptoms of disease in the brain first appeared, I requested him to furnish me with every particular respecting it. He very obligingly consented to this, and allows me to make whatever use of his communication I may think proper. He says, "On Wednesday, March 11, 1841, Sarah Haze, aet. 29, a slender woman in good general health, being in the last stage of pregnancy, was attacked with an acute lancinating pain in the *left* [1] side of the head and temple, which extended deep into the orbit. The palpebra soon became swelled, and she experienced a throbbing and constant 'boiling,' as she expressed it, just below the brow. At five o'clock the following morning, with very little effort, and before the midwife could arrive, she was delivered of a well-formed child. I saw her a few hours before she was confined, and perceived that the conjunctiva of the lids of the left eye was much infiltrated with serum ; the pain and distension caused by the pressure on the globe became almost intolerable, and she was constantly moaning with agony. It became quite evident that some large vessel at the back of the orbit had been ruptured, and was producing the pressure. Leeches were plentifully applied to the part, and afterwards cold and evaporating lotions were constantly employed. In the evening of the same day I found the eye protruding and nearly immovable, *and first noticed a remarkable hesitation in answering questions*, which was quite unusual to her; although perfectly conscious, she *occasionally made use of one word for another, mistook letters, or dropped syllables in the articulation of*

[1] Left side again.

words. On Friday the eyeball was perfectly fixed, her agony extreme, and though the cornea was clear, the retina was amaurotic, the iris quite insensible to light, and of course vision was lost. On this day she confused her words so much as to be quite unintelligible to those around her; she still made great efforts to make herself understood by signs that she wrote down on a slate. On Sunday there was a distinct line of slough in the transverse diameter of the lower section of the cornea. I applied a large blister to the nape of the neck, fomented the eye (which had every indication of bursting) with poppy-head decoction, scarified the conjunctiva of the upper and under lids freely, and obtained full evacuations from the bowels; by these means I found the next morning, Sunday, that there was a little relaxation of the pressure, and that the globe was less distended; the outer layer of the cornea sloughed, but the content of the globe did not escape. *Her power of expressing herself evidently improved from this date, and in two days more she could articulate perfectly; and I found that, in proportion as absorption proceeded, did her powers of expressing herself improve.* She told me afterwards that she comprehended everything that was said to her during the period that she had so much difficulty of articulating. Vision of the affected eye was entirely destroyed."'

Case of Derangement of the Faculty of Language in consequence of a Blow near the Eye.—Published in the 'Edinburgh Phrenological Journal,' vol. 9, p. 118, December 1834.

A considerable number of years ago, M. de Fouchy read to the French Academy a very interesting account of an accident which he himself had sustained, and which was followed by a derangement of the faculty of language. It is quoted by M. Moreau, in the 'Encyclopédie méthodique,' article 'Médecine mentale' (Paris, 1816; vol. ix. of the Medical Division), and is regarded by that writer as described 'with the courageous, calm and wise impartiality which forms the characteristic of a philosopher.' M. de Fouchy's narrative is as follows: 'The first of the accidents,' says he, 'which kept me absent from the Academy during a considerable time was accompanied by a circumstance which appears to me worthy of being communicated. On the 24th of March last, leaving the house of M. Anisson, where I had been assisting at the trial of his new press, I was returning home about seven in the evening, when it was beginning to be rather dark. A projecting part of the pavement tripped my foot, and caused me to fall forwards and a little on one side, with my face on a heap of stones which happened to be there. The blow struck precisely on the vomer (the thin bone which forms the partition of the nose) and on the angle of the right eye; the skin covering the former was cut, and bled much. I felt at the moment of the blow an acute pain, which extended along the left eye; but I was in no degree stunned, nor experienced any affection of the heart (*maux de cœur*); and I proceeded on my way holding a handkerchief to my nose. On reaching home I washed the wound, which had stopped bleeding, with

warm wine, and the pain diminished so much as not to prevent me from sleeping. Next day it was supportable, and I thought I remarked it in two places, namely, on the vomer, and also above the left eye, which had not suffered from the blow.

'The pain of the vomer was accompanied by a particular circumstance, which lasted a long time, and consisted in this—that when I moved that bone to the right or left with my finger, I perceived a slight internal crepitation, as if its articulation with the other bones of the face had suffered. Up to this time I had noticed nothing extraordinary. I went out and returned to dinner, when the following circumstance occurred, which appears to me worthy of much attention.

'Towards the end of dinner I felt a slight increase of the pain above the left[1] eye, and, at that very instant, became unable to pronounce the words which I wished. I heard what was said to me, and thought what I wished; but I pronounced other words than those which could have expressed my thoughts, or if I began, could not finish them, but substituted other words for them. I had, however, the power of every motion as free as in my usual state. I did not drop my fork, nor the piece of bread which I held in my hand. I saw clearly every object; and the organs which produce the action of thought were, so far as I could judge, in their natural state. This kind of paroxysm lasted for a minute, and during its continuance I was sufficiently conscious of this singular distinction in the sensorium of the mind (*sensorium de l'âme*), which had only one of its parts affected, without the others suffering the slightest disturbance.

'When M. Vicq d'Azyr read to the Academy on the anatomy of the human brain, I was struck by what he said regarding the nervous filaments which pass from the brain and enter the interior of the nose through the cribriform plate, and I thought I had discovered in them the explanation of my singular state. These filaments having perhaps received a shock from the blow on the vomer, had transmitted that shock to the brain; but I could discover no reason for the singular phenomenon of the sensorium of the mind being affected in one of its parts only.

'I confine myself, here, simply to the relation of the fact, which I deemed it my duty to communicate to the Academy, in order that, if deemed expedient, it may be entered in the registers.

'An observation of this kind must necessarily be extremely rare, since it is requisite that a man of science should be the subject, and that the accident should not be so severe as to prevent him from observing all the circumstances attending it. Notwithstanding, however, all my zeal for the promotion of the sciences, which is the object of the Academy, I trust it will readily pardon me for not wishing to present it often with similar observations.'

To this narrative by M. de Fouchy the editor of the 'Phrenological Journal' adds:—

The phenomena here described are altogether inexplicable, except on the phrenological principle that the brain is an aggregate of

[1] Left again.

organs, performing different functions; and the appearance of the derangement at the very moment when an increase of pain took place in the situation of the organ of language must be regarded as strikingly confirming the function of that part of the brain.

The following is from the introductory historical chapter of Dr. Bateman's 'Aphasia,' p. 18 :—

> As this subject has more particularly engaged the attention of the French pathologists during the last few years, it is most convenient to consider first their researches, as the early literature of the localization of speech is especially associated with the names of Bouillaud, Dax, and Broca.
>
> As far back as 1825 Bouillaud placed the faculty of articulation in the frontal lobes of the brain, which he considered to be the organs of the formation of words and of memory : and he stated that the exercise of thought demanded the integrity of these lobes ; he also collected 114 observations of disease of the anterior lobes accompanied by lesion of the faculty of speech.

On p. 325 he again tells his readers that M. Bouillaud 'placed the seat of speech in the anterior lobes,' and speaks in the following page of 'the views of M. Bouillaud' and on p. 327 of 'M. Bouillaud's doctrine.'

In one of our most recent and highly approved text-books on Physiology[1] I find the following under the heading of 'The Centre for Speech,' p. 870 :—'The investigations of Bouillaud (1825), Dax (1836), Broca (1861), Kussmaul, Broadbent, and others have shown that the third left frontal convolution of the cerebrum is of essential importance for speech, while probably the island of Reil is also concerned.'

I suspect that Dr. Bateman and most of our modern cerebral physiologists 'will be surprised to learn' that the 'doctrine,' or 'views,' in support of which M. Bouillaud collected 114 pathological observations was simply Gall's location of the organ of language; that Bouillaud was a *prominent phrenologist and editor of the Journal of the Phrenological Society of Paris;* that in the winter of 1839–40 he introduced the subject of Phrenology before the *Royal Academy of Medicine* at Paris and thereby provoked a discussion that was continued during three sittings of the Academy, the leading advocates of Phrenology being M.

[1] 'A Text Book of Human Physiology, including Histology and Microscopic Anatomy, with special reference to the requirements of Practical Medicine,' by Dr. L. Landois. Translated from the seventh German edition, with additions, by William Stirling, M.D., Sc.D., 1891.

Blandin, M. Ferrus, and M. Bouillaud; the opposers, M. Curveilhier, M. Rochoux, and M. Gerdy. This discussion excited considerable attention, and M. Bouillaud's cases of aphasia, etc., were brought forward in support of Dr. Gall's location. The 'Gazette' of Paris, in closing a notice of the discussion, said:—

> Certainly we must acknowledge that the phrenological doctrine has, on the whole, very successfully resisted the attacks of its adversaries during this rather protracted ordeal, and that no little merit is due to M. Bouillaud for his manly and able defence of its positions.

The atrocity of this cowardly ignoring of Gall's researches (for it is cowardice at bottom—fear of the pedant—fear of being out of fashion) is rendered the more atrocious in this case by the fact that Bouillaud's position as a phrenologist is fully recognised by phrenologists generally, and freely published in the widely circulated works of George Combe, as the following extract from the 5th edition of his 'System of Phrenology' (1843), vol. 2, p. 140, will prove:—

> M. Bouillaud, an eminent Parisian phrenologist, has made extensive investigations into the pathology of the organ of language. In an essay which he has published on this subject [1] a number of interesting cases of loss of power of speech are reported, partly from his own observations, and partly from the works of MM. Rostan and Lallemand, two of the most accurate and highly esteemed continental writers on nervous diseases. In two of the patients the anterior lobe, at the part which corresponds to the orbital arch, was reduced to soft purulent-looking matter; a third was restored to health. Not fewer than sixteen instances follow, in which the recollection of words and their relations and the ability to use them were altogether destroyed, although it was evident from the looks and gestures of the patients that their silence resulted from no want of ideas, but solely from incapacity to express them. In these cases the same organic lesion was discovered. M. Bouillaud's essay led him into a successful controversy with M. Scipio Pinel, of which some account will be found in the 'Phrenological Journal.' [2]

In justice to Dr. Bateman, I must add that I do not by any means assert or insinuate the existence of any prejudice on his part against Gall. The contrary is proved by his appreciative reference to him on p. 319, as 'one of the greatest philosophers of the present age.' The errors that I have quoted, and others that might be added, are only ordinary

[1] 'Archives générales de Médecine,' tome viii., pp. 25–45, 1825.

[2] Vol. 8, p. 256.

samples of the prevailing Egyptian pitchy darkness that enshrouds the mind of our most *enlightened* modern physiologists in reference to the unparalleled achievements of the great founder of cerebral physiology.

The preceding cases, which might be multiplied far beyond the powers of endurance of my readers, are quoted, with their dates carefully stated, in order to show that our modern physiologists and pathologists have, in their researches and writings on aphasia and its seat, been merely Jourdainizing: have been advocating Phrenology during more than thirty years —as M. Jourdain talked prose all his life—without knowing it.

As a phrenologist I cordially thank them for their valuable contributions to this part of the science. I refer to the careful collections of interesting pathological cases similar to the above-quoted samples of those recorded by *conscious* phrenologists, and *not* to the contradictory mutilation experiments.

The fact that they have done so much for Phrenology in this particular region, and so little in other parts of the brain, is curious, and suggests some instructive reflections, seeing that clinical experience and cerebral autopsy are subject to no such limitation.

The cause of this anomaly I believe to be simply that the diagnosis of aphasia is extremely easy, while that of the disturbance of the other intellectual faculties, of the moral sentiments, and of the animal propensities is difficult—is practically impossible to those who have no definite ideas concerning the nature and functions of the elementary faculties.

When a patient can make no reply at all to the questions of the doctor and the nurse, and there is no physical derangement of the vocal organs, the existence of some mental trouble is obvious enough. Formerly, when the brain was supposed to act as a whole in every mental manifestation, such a symptom was commonly regarded as indicating general imbecility, and much mental torture was suffered by intelligent patients on finding themselves regarded as idiots. Much malpractice must also have resulted from such mistakes, and the consequent condemnation of their victims to lunatic asylums.

With the other faculties the case is quite different. The

physician who is not a phrenologist,—however skilful he may be in other respects,—is no more capable of analysing the psychic results of a local injury to the brain than a pre-Cavendish chemist of analysing a compound of hydrogen.

Ample proof of this is supplied by the numerous cases that are recorded, by eminent men, of injuries of the brain, where large quantities of its substance have been lost, and the patient is reported to have suffered no mental, sensory, or volitional loss. According to such, the brain is merely an excrescence, a sort of intercranial fungus performing no vital function.

A patient is treated in a hospital for serious injury of the head, involving lesion of some part of the brain. The shock and the pain produce languor and general feebleness. The usual questions are asked; the patient answers rationally; therefore, according to the highest authorities, the mind is unaffected. The psychology of these high authorities included in the human mind no other intellectual faculties, no other emotional faculties, no other desires or passions than those which enable the human being to say whether his medicine has operated, whether his appetite has improved, and to describe any pain or other inconvenience he may have suffered.

Where can we find record of case of brain injury in which the condition of mind has been tested, by comparing the existing with the previous condition of the patient as regards affection for children, affection for friends, pride, desire to please, circumspection, courage, firmness of purpose, hopefulness, religious sentiment, poetic feeling, love of novelty and tendency to wonderment, constructive ingenuity, sense of humour and antithesis, abstract reasoning faculty and appreciation of analogies, memory of events, knowledge of localities, of relative position of objects, arithmetical ability, orderly habits, colour vision or colour blindness, artistic ability, musical appreciation and ability, power of mimicry, etc., etc ?

Any one, or two, or half-dozen of these faculties—all of which are human mental faculties—may be deranged most seriously, and the ordinary doctor and ordinary nurse remain as profoundly ignorant of such derangement as were Harvey, Sydenham, Abernethy, Munro, or Liston of the existence and natural history of the tubercle bacillus.

Take the ' Crowbar case ' narrated in Chapter VII. This

has been described again and again by non-phrenologists as one in which a large quantity of cerebral substance was lost without producing mental derangement; the source of this blundering is simply that the describers know not what are the elementary faculties of the human mind, have no idea of where to look in order to observe the derangement. They are utterly imbecile in reference to psychic diagnosis, as ignorant and as incapable of diagnosing mental disease as were the predecessors of Harvey of diagnosing heart disease.

The phrenologist, on the contrary, directly he sees such a drawing as that on p. 150, or otherwise learns the localization of the injury, knows what to observe and how to diagnose; he sees at once that the most serious, complete, and definite organic destruction occurred in the region of veneration, of the sentiment of religion, of general reverence to sacred things, feelings of respect to fellow-creatures. The first enquiries of the phrenologist would therefore be directed to the determination of whether or not any change of character had occurred in this direction, and such enquiries would at once have elicited the facts concerning the profanity which had become a new element in Gage's character, and the want of respect for his fellows that had also arrived; besides these he would look in the other directions which I have referred to in commenting on this case, in order to learn the effect of the unilateral lesion below the coronal exit of the tamping iron.

The superiority of the phrenological to the non-phrenological practitioner in diagnosing such cases is equal and similar to the superiority of a modern physician to a non-ausculting Choctaw medicine-man in the diagnosis of lung and heart diseases.

When Phrenology shall become a recognised element in medical education (even though to make room for it we perpetrate the horrid sacrilege of excluding Greek), Gall's localization of the other mental faculties will be as triumphantly confirmed by pathological cases as his localization of the superficially obvious faculty of language has been.

CHAPTER XI

SOME OF THE STOCK OBJECTIONS TO PHRENOLOGY

The philosopher who examines the ideas that prevail among mankind soon discovers that very few indeed are the products of any kind of study or investigation performed by the person who holds them;—that the great majority of popular ideas are epidemic, are communicated from one to another by a sort of intellectual contagion, and thus they become generally accepted whether true or false. The objections to Phrenology which I shall discuss in this chapter are epidemics of this class. They break out even in table talk. In this case the eruption is usually of a mild form, but in the systematic attacks on Phrenology it assumes a malignant type.

The most prevalent of these antiphrenological epidemics is the idea that phrenologists believe the form of the brain to be accurately represented by that of the skull or the living head. Nothing can be more supremely ridiculous than the self-sufficient complacency with which these phrenologophobiacs discourse on the inequalities of the thickness of the skull, the existence of temporal muscles, and, above all, the *frontal sinus*. The more benevolent assume a patronising tone and supply the poor phrenologist with elementary information concerning these cranial and integumentary irregularities; some adopt a tone of dignified censure, and others vituperate or sneer; but all assume that the phrenologist has failed to consider the subject.

The absurdity of all this is sufficiently demonstrated by the fact that in the great quarto work of Gall and Spurzheim a special section is devoted to the question stated under the following title, which I translate below as literally as possible:—

On the influence of the brain on the form of the skull, or an examination of the question: Under what circumstances can we, from the external form of the skull or the head, determine the degree of development of the whole brain, or of some of its parts, and thus judge the degree of moral and intellectual depositions by examining the form of the head?

This section of the large work is reprinted by Gall in his later book 'Sur les Fonctions du Cerveau,' vol. 3, and it occupies 105 pages of this volume, and is followed by another section entitled a 'Preliminary discourse on the difficulties and the means of determining the qualities and fundamental faculties of the mind, and the discovery of the seat of their organs in the brain.' This extends over another 36 pages, and together with the first constitutes the most complete and exhaustive treatise on the subject that existed at its time, or exists even now. It includes both the human and comparative anatomy of the subject, with especial reference to the difficulties which the cranial and integumentary irregularities present.

I will first examine that best-beloved bugbear—that blessed Mesopotamia of the phrenologophobiacs—the *Frontal Sinus*.

Drs. Gall and Spurzheim, George and Andrew Combe, and all other respectable phrenologists distinctly, definitely, and emphatically state that there are cases of cerebral disease in which the abnormal extension of the frontal sinus renders a diagnosis of the development of the frontal lobes of the brain—especially of the lower region—by examination of the external head or skull impossible; and, further, that in many cases of healthy individuals of mature and advanced age it presents considerable difficulties.

But are there not difficulties in all kinds of diagnosis? Are there not difficulties in chemical analysis? Are there not difficulties in astronomical measurements? Shall we close our observatories because the sky may be cloudy? Shall we call upon the physician to cast away his stethoscope and abandon auscultation because certain patients have much fat overlying the ribs and the muscles of the back? Shall no surgical operation be performed if its failure is remotely possible? Shall all investigation cease, shall all truth be suppressed, because in searching for it there is a possibility of error?

'Show me the man who has never made a mistake, and I will show you the man who is incapable of making any scientific investigation,' was the exclamation of the Grand Master of experimental science; which I would paraphrase by saying, 'Show me the critic who demands infallibility in science, and I will show you the man who is incapable of discussing any scientific question.'

Some of these critics go so far as to inform the pupils of Gall and Spurzheim that the lower animals have large developments of the frontal sinus. Thus Dr. A. Wilson in his communication to 'The Gentleman's Magazine' of January 1879, entitled 'The Old Phrenology and the New,' treats his readers to the following profound revelation:—

> The elephant's brain is placed certainly not within a foot or so of the most skilful of phrenological digits. The frontal sinuses, or great air spaces in the frontal bones of the animal, intervene between the front of the brain, the region *par excellence* of intellect according to Phrenology, and the outside layer of the skull. So that an observer could no more accurately construct a phrenological chart of an elephant than he could diagnose the contents of a warehouse by scanning the exterior of the building.

The writer of this should know that no phrenologist has ever dreamed of constructing the chart to which he refers by any outside examination of an elephant's skull. Gall, Spurzheim, and Vimont have made special studies of the relations of the brain to the skull in all the mammalia, and have published the results of their researches with abundant illustrations. In Gall and Spurzheim's folio atlas (1815) there are no fewer than 117 such illustrations, among them the brain of an elephant (Plate 35) drawn in full size with all its convolutions carefully represented. Spurzheim supplied the first recorded measurement of the depth of the frontal sinus of the elephant, which he found to be 13 inches. This has been so frequently copied into elementary anatomical treatises, that Dr. A. Wilson's 'foot or so' is probably an unconscious quotation of Spurzheim's measurement. In Spurzheim's small popular English book on the brain, published in London in 1826, are forty-one pictures of brains of lower animals, all shown as removed from the skull.

The great work on this subject, however, is Vimont's

'Human and Comparative Phrenology.'[1] This treatise is in two quarto volumes, the first containing 431, the second 654 pages. The magnificent folio atlas of 120 plates, containing above 600 figures of brains and skulls, cost the author 75,000 francs to produce.[2] Dr. A. Wilson ought to know that the method which Dr. Vimont adopted for studying the form of the brain of such animals as the elephant, etc., is to take casts in wax or plaster of *the cavity of the skull within which the brain is lodged*, and that such casts accurately represent the form of the brains of the mammalia generally.

Some lecturers in anatomical schools, when they perpetrate their annual kick at Phrenology, illustrate their own ignorance by showing their students the skulls of animals cut open to display the frontal cavities as refutations of Gall and Spurzheim. If these gentlemen have any sense of shame and sentiment of honour, the following quotation from vol. 3, p. 26, of the quarto work of Gall and Spurzheim, and vol. 3, p. 45, of Gall's 'Fonctions du Cerveau,' should redden their cheeks and extract a full apology to the memory of the great cerebral physiologists :—

> In order to extend to animals the interpretations of cerebral development which the human skull enables us to make, we must specially study the structure of the head of each of the different species. No general rule can be given for the mammalia, nor for birds, nor for amphibia, nor for herbivorous or carnivorous animals. In certain species age produces essential changes. In fishes, tortoises, etc., we are absolutely unable to determine the form of the brain by that of the skull.
>
> The head of certain animals is scarcely more enclothed in muscles than that of man ; others have certain regions of the head covered

[1] 'Traité de Phrénologie humaine et comparée ; accompagné d'un magnifique Atlas in folio de 120 Planches, contenant plus de 600 Sujets d'Anatomie humaine et comparée, d'une parfaite exécution.' Par J. Vimont, M.D., etc. 2 tomes 4to., Paris et Londres. 1835.

[2] The origin of this work as described by Dr. Andrew Combe, 'Observations on Mental Derangement' (page xxxv., Introduction), is interesting. 'Dr. Vimont, after attending Dr. Gall's lectures, thought he could easily refute Phrenology ; and, with that aim, began what afterwards proved to be the most extensive and varied collection that has ever been made, amounting to upwards of *six thousand* specimens of the skulls, brains and casts of both man and animals. Instead, however, of thereby undermining Phrenology, as he expected, Dr. Vimont found his scepticism give way as his knowledge increased, and with commendable candour he, who began his labours with the view of subverting the new phrenology, is continuing them as one of its most zealous supporters.' This was written while Vimont's great work was in preparation.

with masses of strong muscle. Some species are without any frontal sinus; in others the cells between the osseous tables extend not only to the frontal sinus, but spread all over the skull and into the horns; in others there are only cells in one considerable part of the skull.

The cerebellum of birds occupies only the median part of the occipital bone; its lateral parts are entirely occupied by the apparatus of hearing. In certain animals the cerebellum is covered by the posterior lobe of the brain; in others it is freely exposed behind these lobes. In night birds the two tables of the skull are at a considerable distance apart, the interval being filled with very light cellular material. In certain species the tables are parallel, although at a considerable distance apart; in others again their directions are quite different. In dogs we may observe, as regards the muscular masses, the frontal sinuses and the crests or ridges (*les crêtes*), a great difference not only between one variety and another, but even between individuals of the same breed. Some dogs have no frontal sinus at all; in others it is as big as in the wolf or the hyena. The cat, the martens, the squirrel, the horse, the ape, have no frontal sinuses; the ox, the pig, the bear, the elephant, etc., have them.

In a word, the skulls of animals demand a special study, in which we must never lose sight of the principle *that it is only that portion of the skull the external form of which is determined by the brain which has an organological significance.*

Some of the opponents of Phrenology have dared to repeat the infamous misrepresentation of the frontal sinus that was perpetrated by Dr. Sewall in his lectures to the students of the Columbian College.

As some of my readers may regard 'infamous misrepresentation' as a strong expression, I present below in Fig. 28 a correct copy of his picture of the frontal sinus from the book in which he has published these lectures, which he describes in terms that are intended to lead his pupils to suppose that it is a fair representation of the ordinary or normal development of this cavity in the human skull.

Combe, 'System of Phrenology,' vol. 1, p. 127, describes and pictures it as follows:—

The frontal sinus is the dark hole seen in the annexed cut, Fig. 29, above the nose. It does not generally appear before the age of twelve, and as the organs over which it may subsequently be formed are well developed and very active before that age, there is no obstacle to our comparing their size with the vigour of the mental manifesta-

tions before the sinus exists. After puberty it is generally present. Beclard remarks that 'the frontal sinuses are not formed till after birth. Towards twelve years of age only the rudiments of them

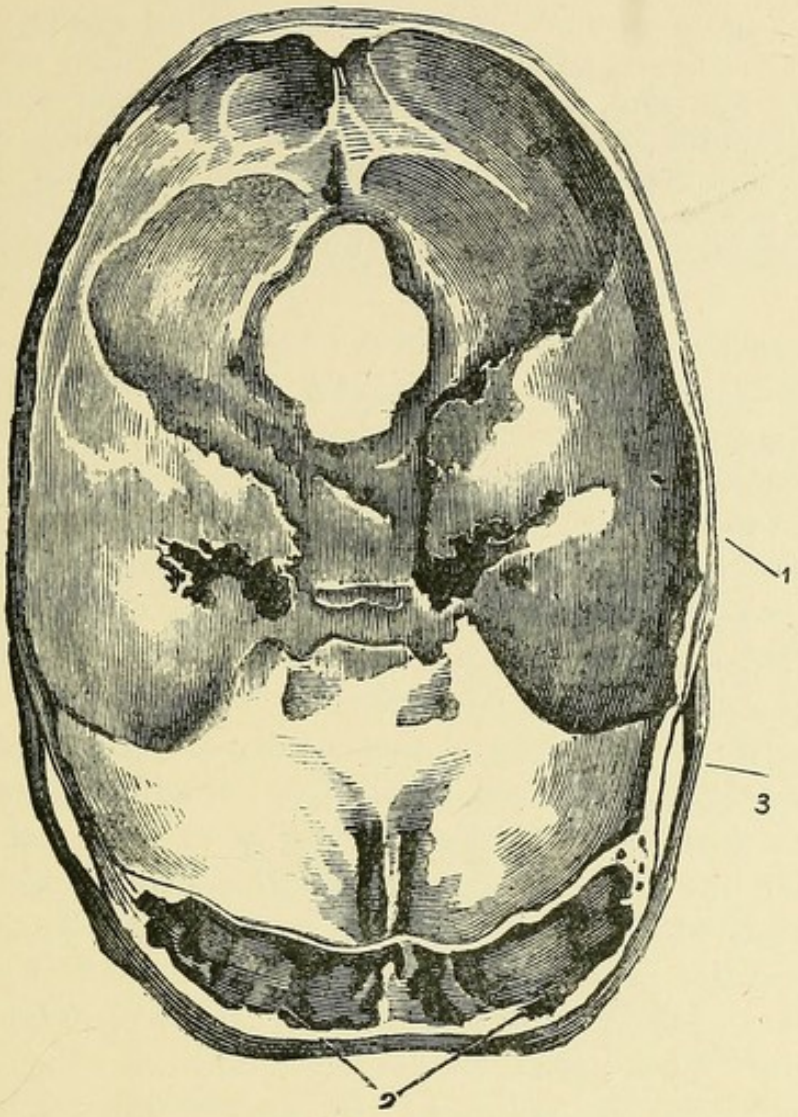


FIG. 28.

exist, and they appear only as cells a little larger than the others in the ethmoid bone. They go on increasing with age, and extend themselves, at the same time, in the frontal and orbital portion of the bone, which sometimes they entirely cover.[1] Its size in one individual is shown in the cut; it is sometimes larger and sometimes smaller than is here represented.



FIG. 29.

It is intimately connected with the general development of the teeth and the consequent extension of the upper jaw and protrusion of the facial bones. As Dr. Alexander Macalister says in his admirable address

[1] 'Dictionnaire de Médecine,' ix. 504.

to the Anthropological Section of the British Association at the Edinburgh meeting, 1892:—

> But the inner layer of the skull is moulded on the small frontal lobes of the brain, so this forward extension (of the upper jaw and cheek bones) must affect only the much thicker and tougher outer table of the skull, which, at the period of second dentition, here separates from the inner table, the interval becoming lined by an extension of the mucosa of the anterior ethmoidal cell. In this way an air space, the frontal sinus, is formed, whose development is thus correlated to the two factors of brain development and size of teeth.

Even the longitudinal sinus has been utilized as a bugbear. The fallacy of this is sufficiently obvious to any anatomist who compares its width with that of the organs as marked in a phrenological bust on the median line of the parietal bones.

The inequalities of thickness of the skull which are presented at the points of ossification of the frontal and parietal bones, so far from presenting any obstacle to phrenological research, supply important advantages. They are valuable landmarks, being usually sufficiently prominent to be felt on the living head. They indicate the centres of cautiousness and causality, and lines drawn from these centres are used to show approximately the boundaries of the coronal region. Another line drawn from the frontal centre of ossification to the suture of the zygomatic arch (also distinguishable, with a little practice, in the living head) roughly indicates the posterior boundary of the frontal region. The other ridges, such as the temporal and occipital, are merely long lines or ridges totally different from the result of the protrusions resulting from development of cerebral convolutions. The thinning of the temporal bones where they are covered by the temporal muscles diminishes the deformation produced by those muscles, which unquestionably presents a difficulty when we are investigating such a question as that which I have already stated in reference to the subdivision of the organ or centre of acquisitiveness. In the ordinary study of the living head an experienced observer can estimate the thickness of the muscle in near approximation by noting the effect of opening and closing of the jaws, just as we judge the development of the biceps by flexure of the arm at the elbow.

I have already referred to the shameful position of those who falsely assume that the phrenologist measures the strength

of the intellect by the size of the head, and then attack him for doing so. The falsehood of this is exposed by the following, from Combe's 'System of Phrenology,' fifth edition, 1843, vol. 1, p. 159:—

The phrenologist never compares intellectual ability with the size of the brain in general; for a fundamental principle of the science is, that the different parts of the brain have different functions, and that hence *the same absolute quantity* of brain, if consisting of intellectual organs, may be connected with the highest genius, while if consisting of animal organs lying in the basilar and



FIG. 30.

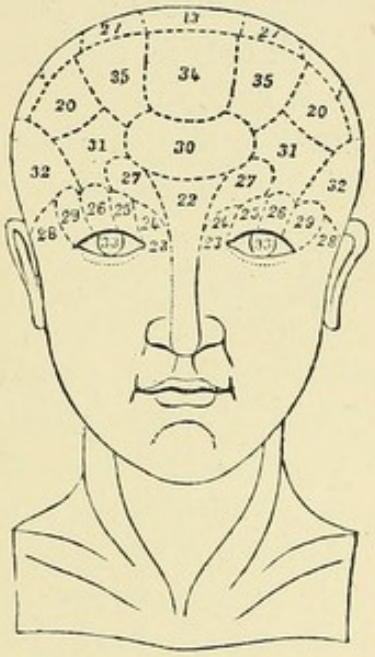


FIG. 31.

occipital regions of the head, may indicate the most fearful energy of the lower propensities.

The absurdity of the falsehood is demonstrated by a glance at any of the published phrenological busts. Here (Fig. 30) is a profile copy of the most familiar one, that from Combe's 'Elements of Phrenology.' I have thickened the boundary line which separates the region of the intellect from those of the sentiments and propensities behind it. The absurdity demanding that the development of the small fraction of the head in front of that line shall determine the size of the whole head is too obvious to need further comment. What

shall we say concerning the accuracy or veracity of writers who say—

> that the organ of phrenologists known as 'form' actually reposes in anything but a noble position on the cavity of the nose; that the organ of 'calculation' is a solid, bony (*orbital*) process; and that the size of the organ of 'language' really depends upon the want of forward protection of the eye, depending on the special development of a bony process on which the organ of sight rests; that when vainglory besets us we must hold, if we are phrenologists, that there is a molecular stirrage and activity of brain particles beneath a certain bump of 'self-esteem,' situated above and in front of the ear?

Some writers of this class have denied that the shape of the skull can be determined by that of the brain, because the brain is soft and the skull is hard. This objection is simply a plausible appeal to popular ignorance. It is well known to physiologists that the shape and size of the bony cavity which encloses the brain is moulded by the brain, that it increases with the growth of the brain, and diminishes when any shrinkage of brain occurs, as in cases of senile decay and dementia. If such accommodation were to fail the consequences would be very serious, as a shaking of the brain within its bony resting-place would probably produce death.

Every anatomist knows the mechanism by which this plasticity of the skull is secured; he knows that the skull is made up of several bones which are built upon the membrane enveloping the brain by radiating growths from a central part of each. He knows that they are not united in early life, and even at maturity are not firmly so, but grasp each other loosely by 'sutures,' that they are still capable of extension; that, even then, they may make room for abnormal growth by the insertion of patch bones between them.

Dr. Macalister says in the address already quoted (p. 248):—

> The frontal bone grows from lateral symmetrical centres, which medially coalesce, union taking place usually between the second and sixth year of age. It has been noticed by anthropologists that metopism, as the anomalous non-union of the halves of this bone has been termed, is rare among microcephalic races, occurring only in about one per cent. among Australian skulls. Increased growth of the frontal lobes, as the physical accompaniment of intellectual activity, interposes an obstacle to the easy closure of this median suture.

In the more intellectual races cases of this non-union of the frontal bones down the middle of the forehead reaches to as much as five to ten per cent. of frequency, a proportion quite as great as that of the truly intellectual minority of the most civilised nations.

A common feature of nearly all the attacks on Phrenology is that of finding fault with the number of faculties it includes. They don't agree with the notions of the structure of the human mind which the critic has elaborated by the examination of his own consciousness, or obtained by reading the works of certain metaphysicians. In the latter case the fact that the metaphysicians are utterly at variance with each other upon this fundamental question does not appear to disturb his reliance upon them. He usually regards the number of faculties stated by phrenologists to be too great—that they do not harmonise with his notions of the simplicity of Nature.

It is perfectly natural that he should make this objection, seeing that his standpoint in mental science corresponds to that which was occupied three or more centuries ago in physical science by those who reduced the physical elements to four, and would certainly have been disgusted had the results of modern inductive chemistry with its elements been stated. As I have already shown, this natural objection really presents an interesting evidence of the parallelism of the results of Gall's inductive method of psychology with that of the application of inductive research to physical science.

The following from 'The English Mechanic' of May 17, 1889, by 'A Fellow of the Royal Astronomical Society' who writes very copiously in that magazine on astronomy in general, and everything else in particular, is very amusing. He tells his readers that—

> Modern research on the physiology of the brain has so perfectly upset the systems of Gall and Spurzheim, that no one familiar with the details of recent investigations can for an instant continue to believe in a scheme which mapped the cerebral convolutions in so symmetrical a way into areas of the size of a fourpenny piece. Vivisection may or may not be justifiable ; but, at any rate, it has enabled such able and skilled experimenters as Ferrier to show the utter fallacy of the location of the so-called phrenological organs.

He adds:—

> I do not speak as one ignorant of Phrenology. I have investigated it carefully, and seen upon what a hollow and baseless foundation it rests. Perhaps it may not be superfluous to add that I have studied both sides of the question.

Readers believing F.R.A.S., and accepting his statement concerning the size of the 'cerebral convolutions' mapped by phrenologists as expressed in the above, would naturally conclude that the average or general area of these is equal to that of a fourpenny piece. The shameful falsehood of this is evident at once to anybody who has ever seen a common phrenological bust. In mercy to the writer I will, however, assume that he writes carelessly, and that he alludes to those which are marked on the superciliary ridge—on the eyebrows—of the bust. Even the area as there marked is considerably greater than that of a fourpenny piece, as anyone may prove by experiment (the coin mentioned is now out of circulation, but it had the same area as the present threepenny piece).

But, even after helping him thus, he still remains in a pitiful position, as he tells his readers that he has investigated the subject carefully. Had he done so with only a moderate amount of intelligence, he would have learned that these 'symmetrical' outlines on the eyebrows of the bust do not at all measure, or pretend to measure, the area of 'the cerebral convolutions.' Anything beyond the most superficial smattering of the subject would have taught him that only the anterior edges of these frontal convolutions—their anterior outcrop—is thus indicated, and that his measurement is as absurd as would be that of an ignorant geological smatterer who should measure the superficial outcrop of a geological formation, and describe this as the area of its strata.

Fig. 27, page 215, is a reproduction of the very familiar view of the under surface of the brain as given in Spurzheim's 'Anatomy' and all the earlier elementary works on Phrenology published in England, America, and France. On this all the 'prefrontal' convolutions the edges of which lie above the eyebrows are marked. They are, XXIII. form, XXII. individuality, XXIV. size, XXVI. colour, XXIX. order, and XXVIII. number. Had the 'investigation' of the subject by F.R.A.S. only gone so far as to examine the pictures in phrenological

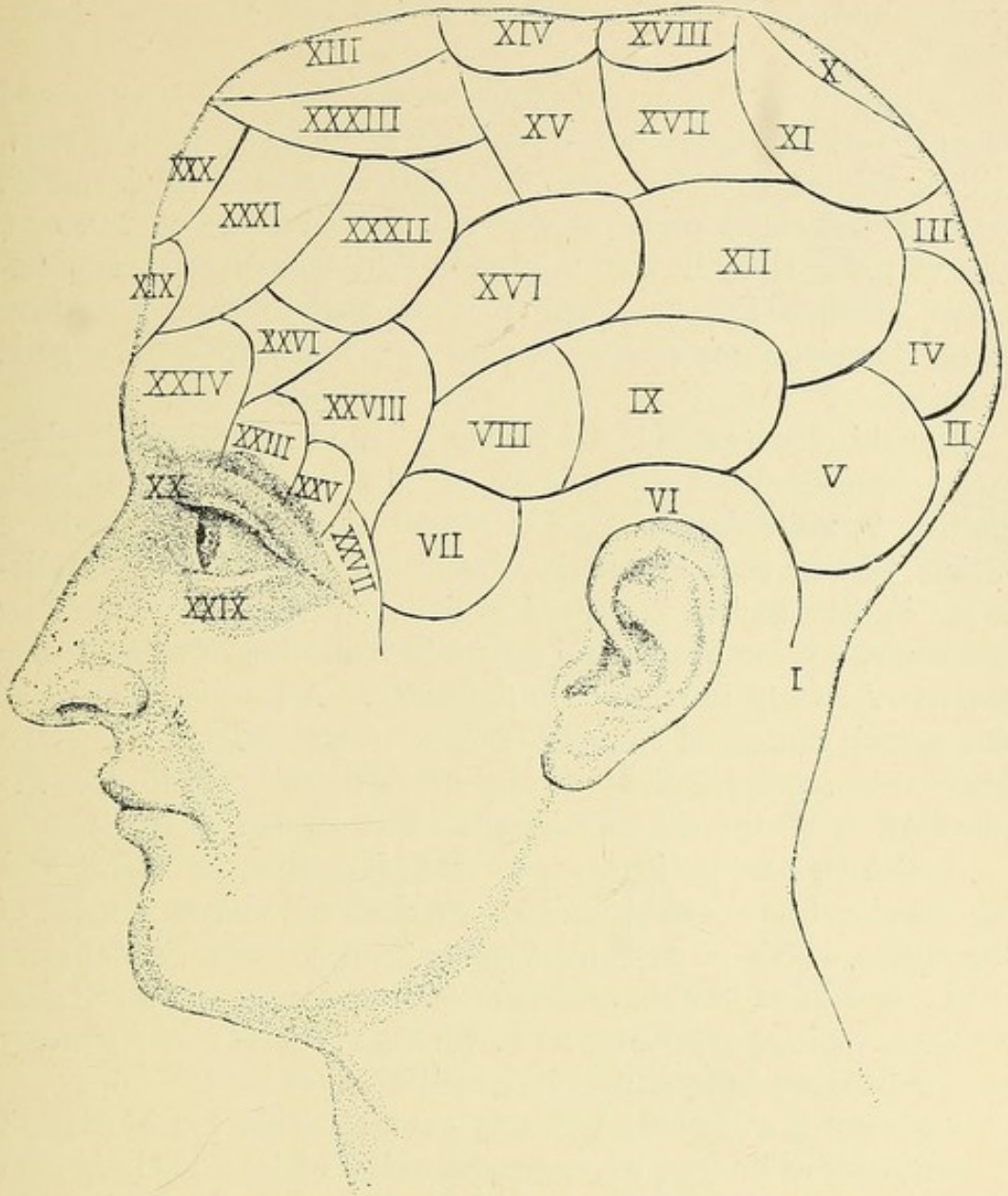


FIG. 32. Spurzheim Bust showing Localization of Organs of Brain.

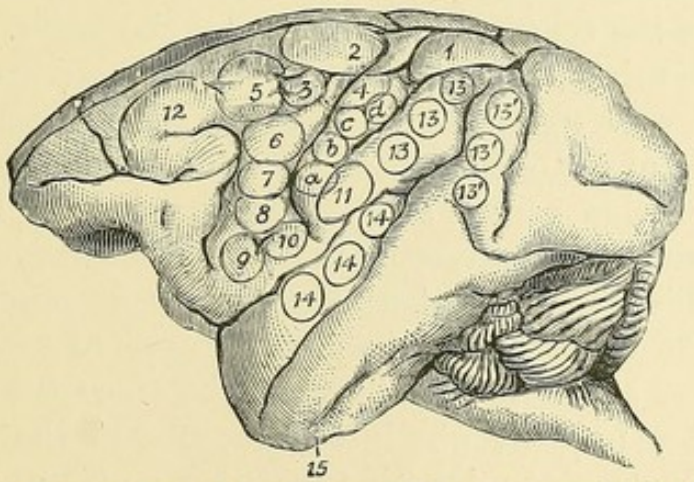


FIG. 33. Showing Ferrier's Localization of Motor Centres in Monkey Brain.

works, he could not have perpetrated the fourpenny-piece blundering.

A glance at the convolution marked XXIII. (form), and comparison of this with its position as marked on the bust, will enable the reader to understand that only its foremost bend is indicated on the bust near the corner of the eye, and will also show how it produces that widening of the distance between the eyes which is so well marked a feature in the physiognomy of artists who are distinguished by good drawing.

Speaking of colour, marked XXVI. in Spurzheim's plate and represented on the middle of the eyebrow in the bust, Gall says, after describing his observations on the heads of artists, 'Later on an attentive examination enabled me to discover in the region indicated a little convolution projecting outwards, having *from half an inch to an inch in transverse diameter*.' Only in *transverse* diameter. A further glance at the usual elongated forms of these convolutions will show what this means. This is one of the smallest, if not the smallest, of all the convolutions which Gall describes.

F.R.A.S. having, in his own estimation, settled Gall and Spurzheim by exposing, in his own fashion, the smallness of the areas of their cerebral localization, proceeds to admire the results of such able and skilled experimenters as Ferrier, whose mapping, according to F.R.A.S., must be free from any such ridiculous fourpenny-piece smallness of area.

In order that the reader may examine this for himself, I present to him in Fig. 32, a reproduction of Spurzheim's own representation of his 'fourpenny-piece' areas on the human head, and in Fig. 33, a copy of Ferrier's own representation of his areas in the corresponding region of the brain.

In comparing these the reader should note that Ferrier's areas are drawn upon the brain of a little Macaque monkey, while those of Spurzheim are on a full-sized human head. Having done this he will be able to determine for himself the merits of the careful investigations of F.R.A.S., and the profundity of his studies 'of both sides of the question.'

With the exception of the fourpenny-piece measurement, his objections are mere repetitions of the oft-repeated quibbles of those who, in their absolute ignorance of the origin and history of Phrenology, imagine that it is a system which Gall

and Spurzheim elaborated out of their own consciousness, and that they then mapped out a head with compartments to fit these preconceptions. Had such been the case their results would, of course, have been as worthless as those of their metaphysical predecessors and contemporaries, and no better than those of the scholastic psychologists of the present day. Such figments of one man's imagination may be fairly disputed on the ground that they do not harmonise with those of the imagination of any other man who is equally learned in figmentary lore. Each dreamer has an equal right to dream at large and publish the results, and each other dreamer to contradict him.

But inductions like those of Gall and Spurzheim are totally different from these. Being simple statements of the results of observation, they can only be refuted by showing that the observations have been incorrectly made or that the results are incorrectly stated. Any man who objects to them without attempting to do this is simply finding fault with Nature. In setting up his own ideas as superior to these inductions he is virtually asserting that the brain is not properly constituted, as it would have been had he been consulted at its creation.

Another result of this common habit of estimating the merits of Phrenology by comparing its inductions with the visionary preconceptions of the critic, is that modified toleration of Phrenology which is condescendingly adopted by those who tell us that they believe in its general principles, but cannot accept its details ; who believe that the great divisions of the head as marked on the phrenological bust are correct, but question the existence of the smaller divisions of which they are composed. This is about equivalent to saying that they believe in the general principles of modern chemistry, but deny the existence of the chemical elements; that they accept the constellations which astronomers delineate on the celestial globe, but question the existence of the stars of which they are composed.

This dilemma is curiously illustrated in a pamphlet entitled 'Reflections on Gall and Spurzheim's System of Physiognomy and Phrenology,' addressed to the Court of Assistants of the Royal College of Surgeons in London in June 1821 by John Abernethy, F.R.S.

CHAPTER XII

THE UTILITY OF PHRENOLOGY

A FORMAL discussion of this subject demands an apology to those of my readers who have carefully and intelligently read the preceding chapters, as they cannot fail to understand that if Phrenology be the Science of Mind soundly erected on a firm inductive basis, it must, of necessity, be the most useful as well as the highest and most interesting of all the sciences.

My apology is that there are some aspects of this utility that do not present themselves at first sight, and that the principle just stated, although so axiomatic to those who grasp it thoroughly and firmly, is not obvious to all.

To another class of possible readers, who may suppose that I am about to demonstrate the usefulness of obtaining a 'chart' or 'delineation' of character from a manipulating professor, my apology is simply a declaration of the fact that they will be disappointed.

No phrenologist properly so called pretends to read, or delineate, or determine character by a simple examination of the head. He knows that the proportionate development of different regions of the brain is but one of the factors of character, the other being the total of the external influences that have operated on the individual. These include his life-history, his formal and his informal education; what he has been deliberately taught by parents and other avowed teachers, and the still more potent educational influences of the incidents of daily life.

His character is the resultant of these forces.

The majority of mankind have average characters, for the simple reason that they have average brains, and that these brains have been subjected to the educating influences of average circumstances.

So potent are the external factors that, if a dozen reverend

gentlemen taken at random were submitted to phrenological examination, the candid phrenologist might say to the majority of them, 'Gentlemen, you have average brains, and having been educated at Oxford you are average clergymen; but had you been educated in Field Lane you would have been average pickpockets.'

Gross as this appears, it is strictly true; and I express it thus to indicate the charlatanism of those who pretend to delineate character by simple examination of heads, without any knowledge of the history of the proprietors of the heads.

This applies thus strongly to average brains only, and the majority of mankind having such average brains, the professional manipulator, whether he charges a shilling or a guinea a head for his character sketches, dares not to tell the majority of his clients that they are average nobodies, only deviating from this average by the excess of vanity which brought them under his hands.

Such plain truth would be, to this majority, the most exasperating verdict he could possibly pronounce. He must earn his shilling or his guinea by some revelation, some 'hit,' and he generally does so by making statements that merely express the ordinary phenomena of average minds. The average customer recognizes these as an accurate picture of his own internal self, and he tells his friends that the manipulator made wonderful discoveries, and that there must be 'something in it.'

Similar hits and similar discoveries are made by fortune-telling gipsies and the delineators of character from handwriting, hundreds and thousands being gulled thereby. Similar results might easily be obtained from a microscopic examination of toe-nail or finger-nail cuttings by the same means.

When a student in Edinburgh (1841) I witnessed a very amusing exhibition by an itinerant character-monger, a Mrs. Hamilton. After a lecture of very trashy character, spiced with the usual talk about sweethearts and marriage, she undertook to read the characters of any of the audience, and to prove that she had no other guide than the head itself she offered to do it blindfolded; but this was not accepted. Among the audience were several students and a well-known Edinburgh hero of the period, 'Dr. Syntax,' a harmless lunatic who

believed himself to be a man of great learning and one of the shining lights of the University. He was a source of much amusement to the students, who, to their honour, treated him with the greatest kindness, inviting him to suppers where he was always the specially honoured guest, and never passing him in the streets without raising their hats. The poor old man was very happy in consequence, and acknowledged their compliments with dignified suavity.

During the pause that followed the lecturer's offer to examine the heads of all comers, the students raised a cry, 'The Doctor, the Doctor,' and finally escorted him to the platform with their customary demonstrations of profound respect, which the old gentleman received with his usual smiles of condescension.

The lecturer was completely deceived. She evidently supposed that she had before her one of the intellectual celebrities of modern Athens, and manipulated accordingly, describing the indications of original genius and profound learning in such glowing terms that the audience, after a short but stern effort of self-constraint, broke out in a general roar of laughter.

Mrs. Hamilton was amazed at first, but presently grasped the whole incident, and waiting for a pause exclaimed: 'But, —but, ladies and gentlemen, I perceive certain irregularities of development in the region of the domestic affections, which tell me that this gentleman has had a domestic affliction.' She appealed to him, 'Have you not, sir, had a domestic affliction at an early period of life?' The poor old man, having at some such time lost his grandmother, could not deny it, and then she commenced talking about such affliction having disturbed the balance, etc., but was interrupted by an outcry of indignation, one of the audience, a working man and profound admirer of George Combe, loudly denouncing her as 'a Spey wife,' which I afterwards learned was a Scotch name for a fortune-telling impostor.

She retreated, and her visit to Edinburgh terminated abruptly. She was neither better nor worse than the average of these head-readers.

But there are cases where exceptional development of the brain and corresponding shape of the head indicate character very decidedly. This occurs when the personal factor is suffi-

ciently decided to determine the course of life, while external circumstances merely act as slight deflecting forces.

Genius has been described as nearly allied to insanity. There is some truth in this if limited to one form of insanity, viz., monomania, and one kind of genius, viz., special or partial genius. In both cases there is an irregular or abnormal development of brain in one particular direction, which the phrenologist can at once detect, but with such a case before him he cannot tell by *the form of the head alone* whether the result is partial genius, eccentricity, or monomania.

Usually, if the abnormal development be in the intellectual region, genius is indicated, but even here it may become insanity. An example of this came under my own notice some years ago. The mathematical and constructive, or engineering, region was abnormal. The patient constructed a complex machine for the manufacture of embryo planets. At certain times he locked himself in his workshop, set the machine going during many hours, and then, exhausted by his continuous efforts, opened his window and thrust forth an imaginary something, with the exclamation, 'Another world launched into space.' He then calculated the orbit of this new asteroid, named it, and entered it *secundum artem* in his catalogue of the heavenly bodies.

The more common forms of monomania are those connected with excessive development and exaggerated activity of the organs of the propensities and sentiments. A glance at Figs. 30, 31 and 32 will show that these are generally much larger than those of the intellectual faculties, and their influences on conduct and character are proportionately great, and more likely when morbidly active to disturb the general equilibrium of mind and produce extravagant delusions and violence of action.

As an example I may take a rather typical experience, following a lecture on Mont Blanc that I delivered to the patients at the Winson Green Asylum.

A well-dressed and very courteous old gentleman came forward after the lecture and thanked me very cordially for my kindness in taking so much trouble to amuse 'these unfortunate people,' adding that the mountain was on his own estate, which included the whole of Europe, and that he would allow all the patients free access to it and full liberty to

climb it as I had done. When the attendants came to take him to his quarters he obeyed at once, but at the same time ordered them to supply me with wine and other refreshments, adding, with a sort of aside to myself, 'These people are my servants; I am the proprietor of this establishment.'

Self-esteem and love of approbation were excessively developed, especially the latter, as I saw at a glance, but in spite of the extravagance of their manifestations in this case, those of my readers who have had average experience will recognize the resemblance of this poor lunatic to the mountebanks of Mayfair, etc., who constitute what is called 'Society,' and figure outside the shows thereof in the grotesque mummery and make-up of the latest fashions; whose lives are devoted to the business of impressing each other with exaggerated ideas of their rank and wealth.

The phrenologist traces the folly of the poor lunatic of the Winson Green Asylum and that of the inmates of society to a corresponding cerebral deformity, but requires some further indications in order to decide whether the narrow borderland which separates tolerated social imposture from recognised insanity has been passed in a particular case that may be submitted to him.

In the cases already quoted of visits to lunatic asylums (Chapter IV) this indication of degree of cerebral disturbance was afforded by the fact that the heads under examination were patients there.

Much remains to be learned concerning the conditions that determined the crossing of this boundary, whether it be general cerebral weakness or peculiarity of temperament, or strong excitement from external circumstances, or other causes; but this much is known and should be widely understood, viz., that wherever great irregularity of development of brain or abnormal development of particular regions exists, the liability to monomania also exists, and should be watched both by the individual himself and his friends.

When the golden maxim 'KNOW THYSELF' shall be practically acknowledged by making Phrenology the primary subject of the primary education of all human beings, there will be little need for lunatic asylums. Forewarned, we shall be forearmed against the stealthy approaches of the creeping enemy.

The phrenologist may legitimately predicate character from mere examination of the head in cases of this kind, whether of special genius or well-marked special eccentricity or monomania, or in opposite cases of special deficiency.

I have heard George Combe describe his experience in the case of the celebrated 'calculating boy,' George Bidder. When he was brought to Edinburgh a challenge was offered to the phrenologist, which in this case he accepted. He had not yet seen George Bidder, and it was proposed that the 'dux' and the 'dubbie' in the arithmetic class of a large school (Mr. Moffat's, if I remember rightly) should be selected, and these two, together with Bidder, should be presented to Mr. Combe.

The gentlemen who brought them expected to witness an elaborate 'bump'-feeling or head-exploring to precede the decision of the phrenologist, and were accordingly surprised when Mr. Combe, at a single glance from some distance, at once told them which was Bidder, which the dux, and which the dubbie.

They at first suspected that Mr. Combe must have had previous knowledge of the identity of the boys, but were convinced and converted when Mr. Combe explained the mystery of the supposed conjuring.

He showed them the portrait of another arithmetical prodigy, Jedediah Buxton (in Plate 15 of Spurzheim's book), and pointed out the resemblance of the corresponding part of the superciliary ridge in both cases, as well as the contrast with the dubbie and the intermediate development of the dux. After this either of the visitors became able to perform the exploit which had so much astonished them.

But Mr. Combe, who accepted this challenge, emphatically repudiated any pretensions to discriminate by mere examination of heads the characters of ordinary people taken at random.

Besides these exceptional people with abnormal development of particular parts of the brain that overpowers the influence of circumstances, there is another class that create their own circumstances by the dominating power of big brains of high quality and that intensity of action which Combe has described as 'the temperament of genius.'

But these are the least likely of all to purchase certificates of character from the professional head-manipulator, and if

they did he would have only the *size* of head to guide him, *plus* the vague indications of temperament.

Gall, Spurzheim, Combe, and all other sound phrenologists have been specially and scrupulously careful in expounding the law of size to qualify it by stating that 'size is, *caeteris paribus*, a measure of power.' They repeat this qualification, '*other conditions being equal*,' over and over and over again.

They tell all their readers that we may have two brains of equal size in different individuals, and yet these brains may differ immensely in *quality* and consequent efficiency of action; and also that in some cases different parts of the same brain may vary greatly in quality, owing to the circumstances in which the individual has been placed having called certain regions into greater activity than others, just as an athlete may train a certain set of muscles more than others, and thus bring them into better condition. The ultimate result of this will be increase of size, but in the meantime there may be great increase of power due to improved *condition*. The same applies to the brain.

In the case of muscular development we are able to test improved condition by the hardness, absence of fat, etc., revealed by direct examination of the muscle itself. If we could similarly handle the brain itself we might find similar indications. We do find them, after death, both in the brain and the skull; but during life we can only infer such variation of quality by learning the history of the individual and his general habits of life. The phrenological charlatan pretends to require no information of this kind.

The 'temperaments' supply some indications of the kind of activity of brain, and there are certain physiognomical indications of general fibre that are very difficult to define and are so little understood that I will not attempt to discuss them here. Writers of novels and other small talk profess to know a great deal about it; they describe certain features that indicate genius, energy and whatever else the story demands; we meet with intellectual noses, vigorous lips, cruel eyes, etc.; lately the chin is specially favoured, as in the following example from a description of Wagner by one of his worshippers, Van Rensselaer, in 'Harper's Magazine':—

> His head is too large for his body, and his features are roughly and strongly irregular. About the mouth there is a hint of weak-

ness, the weakness of a sensuous, passionate artistic temperament. But in the chin we see all the indomitable strength of will that has fought his long battle and won his great success.

Besides the above-stated objections to the caricature effigy of Phrenology (which vulgar ignorance has set up, and which pedantic charlatanism in its more profound ignorance has superciliously combated) there are certain difficulties which stand in the way of determining cerebral development by examination of the head externally which have not yet been sufficiently attacked even by scientific phrenologists, and of which the carping pedants know nothing whatever, or they would ere this have used them.

But are these difficulties sufficient to justify us in rejecting altogether the physiognomical applications of Phrenology? Do they justify us in assuming that the external examination of the head as *one of the means* of determining character is useless and illegitimate?

Certainly not, I reply, provided due attention is given to the italics in the above. Character, as already stated, is a very complex resultant of innate proclivities and abilities modified or deflected by surrounding influences, and the problem of determining the character of an individual is proportionally difficult, and hence the gross quackery of pretending to describe character from only one of the indications, and without any knowledge of the rest.

The same may be said of the ordinary multitude, who imagine that they can surely determine the true character of men and women by their words and actions.

How many of those whose names appear in the subscription lists of our public charities have subscribed from pure benevolence, and how many for ostentation sake?

How many of those who are to be seen every week wearing their Sunday clothes and gilt-edged dress prayer-books marching demurely on their way to church, are acting under the influence of pure religious feeling, and how many for the purpose of advertising their respectability?

How many among those who make the warmest professions of friendship are our true and disinterested friends, and how many are striving to deceive us for their own selfish ends?

Where is the man or woman that has lived long in the

world and has not been deceived in both directions, who has not wrongfully condemned the righteous, and been victimised by relying on the unrighteous? Even old friends who have been trusted implicitly sometimes prove to be deceivers.

There are men who have never understood the true character of their wives, and wives who are incapable of understanding their husbands. Many parents fail to understand the characters of their own children, in spite of the most careful and earnest study of all their sayings and doings.

Two cases that came under my own observation are examples of this. The first is a typical one of very frequent occurrence, the second exceptional and curious; but both resolvable at once and very easily by combining phrenological investigation with observation of conduct.

The first was the son of a prosperous London tradesman, a model youth, the goodiest of the good; his mother's darling and his father's pride, besides being specially commended by the clergyman. On the testimony of these virtues he was placed in a position of trust at an early age.

At first all was satisfactory, but afterwards it was discovered that some of his chosen companions were not of the most desirable class. His mother excused this on the ground that the good example and virtuous exhortations of her son would reform them. Then came a crash. He was convicted of falsifying accounts, appropriating the money of his employers, and spending it in shameful profligacy.

I knew him, had taken his measure phrenologically, and was not at all surprised. He had a weak brain and flaccid temperament, with dominating love of approbation. While attached to his mother's apron-strings he did her bidding and lived to obtain the praises of those around him. But he afterwards fell among fast companions, whose admiration was supplied to 'jolly good fellows' and 'bricks' who spent their money freely, drank abundantly, and asserted their manhood by precocious sensuality. As a matter of course he craved for their admiration, and from mere vanity became a blackguard.

Had his parents understood but the rudiments of Phrenology they would have foreseen all this, would have understood his lack of moral stamina and have placed him in a position suitable for a youth of spurious amiability.

He was a pretty young man, might have become a charming curate, and thereby have married an heiress.

The second and less common case was as follows. In the house of an eminent Scottish clergyman a curious problem was referred to me. The heir to a Scotch peerage was just coming of age. His father was dead, and his mother, the Dowager Marchioness, and his two sisters looked forward with loving hope to his future career; but they were somewhat troubled and puzzled.

He had done well in his studies, but seemed curiously indifferent to his own success. He was a dutiful and affectionate son and brother, but was cold and reserved. Like the rest of the family he appeared to have strong religious feelings, but was reserved and 'self-contained' even in this. Other anomalies of character were described in detail by his mother and sisters at a luncheon party from which he was absent, and it was arranged that I should meet him at a similar party on the following Saturday, in order that I might examine his head and thereby solve the mystery; but there were serious doubts concerning the possibility of inducing him to permit such examination, and this was a source of some anxiety.

The appointments were duly kept, and we assembled in the drawing-room before going to luncheon. As we were standing and moving about I had ample opportunity of making preliminary observations from all sides.

These were quite sufficient. I was able to tell the ladies without being overheard that such was the case and that the problem was solved.

The young marquis left early, and then I explained that the source of all the apparent contradictions was simply a very unusual deficiency of love of approbation. The head, generally, was of a high type, largely developed in the coronal region and well developed in the higher intellectual region, but the sloping off on each side of self-esteem—easily seen from behind—was quite remarkable.

The effect of this was an indifference to praise or blame, a lack of ordinary ambition, a disregard of the outside world, and a shutting up of the mind within itself. One of the commonest and most demonstrative elements of amiability was thus wanting, and had veneration been also deficient, a

cynical contempt for everybody but nearest friends would have resulted. But veneration being quite as large as self-esteem, there was due respect for others, but no effort was made to show it.

Here then was a case where mother, sisters and tutors were during a lifetime unable to diagnose the leading peculiarity of character which was visible at a glance to the phrenologist.

Such being the case, and the usefulness of such knowledge being so obvious, the natural inference that follows is that professors of Phrenology who may be consulted, as lawyers or physicians are consulted, for a fair professional fee, are very desirable and might do great service in guiding parents in the training of their children, in the selection of suitable trades and professions, and in assisting in the selection of servants and people to fill certain posts, etc.

One of the functions which has been claimed for such professors is that of examining the heads of young people who think of marrying, and telling them whether they are suitable to each other or not.[1] Also that candidates for appointments, etc., should obtain phrenological certificates and that Parliamentary and other such candidates should have casts of their heads taken to be issued with their election addresses, etc.

My reply to this is similar to the celebrated instructions for cooking a hare. I say, first catch your professor or manipulator and examine his head very critically indeed, and all his other qualifications. We have universities and other schools for the education of lawyers, physicians, etc., with a recognised curriculum for each, and special tests in the form of examinations; we have laws regulating the conditions upon which their public practice shall be permitted; and besides this, there exists a code of professional etiquette in all these professions which in some cases is very severe, and has for its main object the exclusion of charlatans and the punishment of malpractice.

[1] This idea has been carried out. The most decisive case that has come under my own observation was that of an old friend who had asked the hand of a young lady who made her consent conditional upon the result of the manipulation of both heads by a professor. The gentleman's head was first examined. The phrenologist on reaching 'constructiveness' pronounced it to be large and said: 'I do not know what is your trade or profession, but certainly you would do for a carpenter.' This settled it; the young lady was a Miss Carpenter.

We have no approach to anything of the kind to prove and sustain the qualification of the consulting phrenologist, while the temptations to charlatanry and corruption are so great that the prospect of mischief is far greater than that of benefit.

The time may come, and I have no doubt that it will come, when Phrenology shall be universally recognised, and its teaching conducted publicly and systematically with effective guarantees for the efficiency and honesty of its professors. When that is the case phrenological consultations will be of great value, especially as the verdict of the expert will be understood by the client, as in that coming good time the ancient and wise injunction 'know thyself' will be obeyed by the teaching of Phrenology to every civilised human being.

In the meantime I recommend all my readers to be their own phrenological clients, to qualify themselves to advise themselves by at once commencing the study of the science and diligently continuing it.

They will find it most intensely interesting, and will be surprised and charmed with its simplicity. It has not yet been polluted by the pestiferous curse of pedantry. Neither Gall, Spurzheim, Vimont, Combe, Broussais, nor any other sound phrenological writer, has yet attempted to pepper his pages with unnecessary mathematical formulae for the purpose of exhibiting his pretended profundity, and—oh, sweet are the uses of adversity!—there are no fat professorships that have tempted a crowd of candidates to write advertisement treatises and original papers on frivolous advertisement researches in which the bottom of the font of truth is hidden not by the depth of its waters, but by the mud of pedantic imbecility with which it is polluted.

This extreme simplicity and plain common-sense character of the whole science is one of its great utilitarian merits, I may say the prime merit that I claim for it.

At my school in Edinburgh, George Combe, though aged and feeble at the time, came twice a week and gave to a large class of children, whose ages varied from ten to twelve years and upwards, an hour's lesson on Phrenology, and every child understood all that he taught.[1]

[1] For further particulars concerning this experiment, and the school generally, see 'Education, its Principles and Practice as developed by George Combe,' by William Jolly, H. M. Inspector of Schools.

In a subsequent chapter I shall discuss more fully the very important application of Phrenology to self-culture; but at present only offer some further illustrations of what I may call the superficial or popular Phrenology, i.e. Phrenology in its physiognomical aspect.

The diagnoses of criminals described in Chapters III and IV teach a melancholy lesson, one that must sooner or latter be learned by our legislators, and acted upon with vigour, in spite of ignorant prejudice and its outcry concerning 'materialism' and 'fatalism.'

We have in the midst of our so-called civilised community a multitude—a sub-nation I may say—of wretched beings who are so organised as to be utterly incapable of resisting the temptations which our complex social arrangements and luxurious displays of wealth continually present to them.

In the midst of our pretended peace we are in a state of continual warfare with this intermingled nation. We have an army of police, of magistrates, of gaolers, of legislators, all fighting against them with no prospect of even a momentary truce. We have carried on this warfare from the earliest beginnings of our social existence to the present time, and still continue without even hoping for anything better than a gradual and small reduction in the numbers of the enemy.

The only principle we attempt to carry out is that of vindictive retaliation and intimidation. We torture the miserable creatures in prisons and strangle some of them.

Here is an example of the wisdom and efficacy of our proceeding, from 'The Daily Chronicle' of January 26, 1891. I might find a multitude of similar cases by searching the files of our newspapers.

MARYLEBONE.

Over 142 Times Convicted.—Johannah Halford, 50, better known as 'Blackie Newman,' a good-looking woman, well known in the dock of this and other courts, was charged with being drunk and disorderly.—William Barrett, assistant-gaoler, gave evidence that the prisoner had been convicted at this court 142 times, besides at other courts. It was no use sending her to a home, for she had been sent to several, and all to no purpose. In fact, everything had been done for her that it was possible to do.—The Prisoner (shouting): Oh, I say! Why, Barrett, you said it was 100 times the last time I was here, and it was 300 times when I

was here four years ago. (Loud laughter.)—Barrett : She's been here for felony, for assault, for riotous conduct.—The Prisoner (interrupting) : What ? I've been in an asylum ? You false-swearing scoundrel !—Mr. Partridge : One month's hard labour.

The effect of the 142 convictions and 142 short terms of imprisonment upon this wretched creature has been merely to prolong and intensify her career. In the course of nature, if left undisturbed, the continual drunkenness and debauchery would have killed her ; but the 142 intervals of enforced temperance and sanitary conditions of imprisonment have simply refreshed her, have improved her physical health and supplied additional vigour to her vicious propensities, and utterly extinguished any sense of moral dignity or decency that might have at one time existed in embryo.

Phrenology demonstrates, by final incontrovertible appeal to physical measurement, that the course of conduct which we call crime is the necessary resultant of two factors : the original organisation and habits of the criminal, and the circumstances by which he is surrounded. These circumstances usually consist of temptations, which, in consequence of his organisation, he is unable to resist.

The remedy is obvious. We must either alter his organisation and habits or change the circumstances, or do both. To do the first immediately is impossible, but we may change the circumstances and *gradually* improve his organisation and habits.

Therefore the proper course is to place the convicted criminal in a suitable asylum where the temptations shall be reduced to a minimum, and the resistance to these shall be enforced, and he must be kept there subjected to continuous moral discipline until his organisation and habits are sufficiently changed to render him capable of resisting the common temptations of ordinary life outside. If his organisation is so low that this is impossible during the period of a lifetime, he must remain in the asylum until he dies.

To the phrenologist, who sees the conformation which is common to the heads of our habitual criminals, the existing practice of sending such men to gaol for a specified period and then letting them loose again is as absurd as capturing a packet of dynamite or other percussively explosive fulminate that had been planted in a public thoroughfare, placing it in

a strong box for a specified term of weeks or months or years, then taking it out of the box and replacing it where it was originally found.

All this is so simple, obvious and demonstrable to the phrenologist that the existing system of complex and costly devices of police and magisterial organisation for the catching and conviction, and recatching and reconvicting, the same criminals over and over again, and affording them opportunities for propagating their like to be similarly caught and let loose again by the next generation, appears like the proceeding of a community of lunatics.

Nevertheless, as everybody knows, if a Bill for treating criminals as above suggested were read in the House of Commons it would be greeted with almost unanimous derision, in which the bulk of the electors would as generally join.

Such illogical folly is a natural result of the popular adoption of the old and orthodox method of studying mental science, i.e., by the examination of one's own consciousness, instead of the observation of outside mental phenomena, and their dependence on cerebral development.

The personal consciousness of the average voter and average legislator tells him that he would rather abstain from stealing than endure twelve months' imprisonment with hard labour, and that he would rather abstain from beating his wife than endure three weeks of such imprisonment, and he therefore infers that the born and bred criminal and the social savage are similarly restrained.

If he understood the functions of the cerebral organs and the consequent necessary results of such a combination as is displayed by the cerebral development of the criminal class in our prisons, he would know that the threatenings of the law can have little more deterrent effect on those men and women than the fear of being bitten has upon the combative propensities of a bulldog.

Here then the condition that must be fulfilled before practical reform can be carried out is that our legislators and those they represent shall accept Phrenology and become acquainted with its elementary principles.

CHAPTER XIII

INDUCTIVE RESEARCH IN PHYSICAL AND MENTAL SCIENCE

The marvellous and beneficent progress of modern science during the last 250 years is a matter of familiar notoriety; but while we all perceive and appreciate it, we do not all rightly and clearly understand the true and fundamental nature of the wondrous awakening of the human intellect, the commencement of which may be dated from about the period of the Elizabethan era.

It was unquestionably due to the application of the inductive method of investigation which was systematically expounded, though by no means invented, by Lord Bacon. I say not invented, simply because it was not a novelty then or at any period subsequent to that of the first dawning of the human intellect.

The inductive method that has achieved such mighty results is simply the method of common-sense applied systematically, and with general co-operation.

The senses are the portals to all knowledge. These under the inductive method are thrown widely open to every visiting impression; the visitors thus received and perceived as objects, facts, and doings, are then classified, their relations to each other, their harmonies of action are determined and generalized, until the multitude of separate observations, at first apparently innumerable, perplexing and chaotic, are reduced to order and expressed in general laws or simple propositions which state in a single sentence an infinity of facts, and expound the fundamental principles upon which the operations of Nature are founded.

Bacon was, in physical science, the great sacrilegious iconoclast, the avowed and fearless down-thrower of the cherished idols of the pedants of his period. Gall's position in reference to mental science is strictly analogous, excepting that

he not only pointed out the road that should be taken, but himself journeyed a long way upon it.

The systematic application of the inductive method of research to physical science has effected such marvellous progress that each branch, as it now stands, is fundamentally and in nearly all its details a new creation. Even astronomy, the oldest of the physical sciences, was but in embryo when Galileo was persecuted and Newton still unborn.

Excluding the very recent innovations of cerebral physiology, the science of mind has made no such progress, no progress at all, beyond multiplying contradictory systems and intensifying the darkness of pedantic obscurity. No general co-operation in the observation of phenomena, no systematic research covering the whole area of animated nature has yet been instituted by the representatives of orthodox academic mental science. The whole subject of comparative psychology, which should be so fruitful in revealing the laws of mental evolution, has been not only neglected, but wilfully ignored and avoided, with results that even the followers of the old methods are compelled to deplore. J. S. Mill ('Elements of Logic,' 4th edit., vol 2, p. 288) says :—

> In the departments of enquiry relative to the more complex phenomena of Nature, and especially those of which the subject is man, whether as a moral and intellectual, a social, or even a physical being, the diversity of opinions still prevalent among instructed persons, and the equal confidence with which those of the most contrary modes of thinking cling to their respective tenets, are proof not only that right modes of philosophising are not yet generally adopted on these subjects, but that wrong ones are.

Kant in the Preface to the 2nd edition of his 'Kritik' says :—

> If we find those who are engaged in metaphysical pursuits unable to come to an understanding as to the method which they ought to follow ; if we find them, after the most elaborate preparations, invariably brought to a stand before the goal is reached, and compelled to retrace their steps and strike into fresh paths ; we may feel quite sure that they are far from having attained the certainty of scientific progress, and may rather be said to be groping about in the dark.

The late J. F. Ferrier, professor of history in the University of Edinburgh (not Dr. Ferrier already quoted so largely), says in his 'Institutes of Metaphysics,' p. 315, that—

The best way of attaining to correct opinions on most metaphysical subjects is by finding out what has been said on any given subject by the psychologists, and then saying the very opposite. In such cases we are sure to be right in ninety-nine cases out of a hundred.

How vast is our indebtedness to physical science for the necessaries, comforts and luxuries we enjoy! How miserably insignificant are the gifts of mental science!

In all our intercourse with the physical world the results of profound and ingenious scientific investigation are brought to our aid; almost every thing we use, even the simplest, has in the course of its production passed through some process which has either been discovered or materially improved by the application of systematic science.

While we are thus indebted to physical science for our means of locomotion, for light, for warmth, for the production and conveyance of food, for water, and even in some positions for air to breathe, as well as for innumerable luxuries, we can scarcely name a single benefit we have derived from any of the recognised systems of psychology, ethics, or metaphysics.

Education, legislation, and all our social and general relations with our fellow-creatures are merely the practical applications of mental science, as directly and positively so as steam engines, electric telegraphs, photography, etc., are practical applications of physical science; and yet the contributions of all our recognised scholastic systems of psychological science to the practical concerns of human welfare are so insignificant as to be simply contemptible; so much so that we should regard as a semi-lunatic the man who should study the works of German, Scotch and English metaphysicians in order to find guidance in the practical business of life.

We now know that in the physical world the action of every atom of matter is definite and regular, is in accordance with fixed immutable laws; that if we learn these laws by observation and experiment we can predicate with certainty what will occur under given definite conditions. Are we to suppose that such is not the case in the world of mental action? Are we to suppose that here it is different—that here we have existences without determinate nature, forces that act indefinitely and at

random—that the world of mind is not a world of law, but a chaos of mere chance?

Either the world of mind is such a chaos, or mental forces, like physical forces, are definite and orderly in their actions and results—are orderly—proceed in accordance with certain general definite laws. If this latter is the case, a knowledge of these laws is attainable by man if he uses his faculties aright in observing, recording, and generalising these regular and definite actions and results.

In other words, we must, in mental science, carry out the Baconian or inductive method which has achieved such mighty results in physical science. Gall did this. Spurzheim, Vimont, Combe, and others have followed in his footsteps, and although the workers have been so few and the new inductive science of mind is yet but in its infancy, the progress already made is of such a character as to justify the expectation that, when its advancement is efficiently secured by general organized co-operation in research, its influence on the moral progress of the human race will be commensurate with that of inductive physical science on our physical progress.

As many, probably most, of my readers may regard this as a rather visionary expectation, I will state as clearly as I can my reasons for firmly entertaining it. They depend on the inherent conditions of the case, and the remarkable parallelism of the results already obtained.

I will first endeavour to show that the pre-Baconian condition of physical science was precisely analogous to the pre-Gallian condition of mental science, and that the fundamental changes effected in physical science by the application of the Baconian method are correspondingly analogous to those already effected on mental science by the application of the Gallian method, the only difference being in their relative degrees of development, necessarily due to the vast relative difference of work at present done.

The pre-Baconian[1] schoolmen in their studies of the

[1] I use this term to roughly indicate the wide difference between the two classes of scientists, without assuming that Bacon has the sole merit of effecting the advancement of science. It is more correct to describe him as the first systematic expounder of the principles of inductive science which he found already in existence, than as its founder. Regarded thus, the 'Novum Organum' was itself an inductive exposition of the phenomena and laws of the scientific method, and a deductive elucidation of the rules that should be followed by its votaries in applying it to the further advancement of learning.

physical world devoted their attention almost exclusively to what they regarded as the essential conditions of physical existence—to the necessary nature of things. Their knowledge of physical facts was of the smallest—much smaller than that of the skilled craftsman of the period. They observed very little, and experimented not at all. Upon their very limited knowledge of facts, supplemented when convenient by fancies, they built up a complex fabric of very elaborate reasoning.

Their descriptions of phenomena were consequently abounding in error, many of their facts being excessively ridiculous. They created from the raw materials supplied by their own imaginations the crystal spheres that carried the sun and moon round the earth, and the planets in their courses, and manufactured the celestial music of the spheres by rubbing them together, even fixing the notes of the celestial gamut. They endowed Nature with certain likings and antipathies, such as her abhorrence of a vacuum; invented experiments which they never tried, but nevertheless described; and having thus settled the results, proceeded to discuss and explain them. The celebrated experiment of placing an eggshell at the foot of a ladder at night, and finding it in the morning on top of the wall against which the ladder leaned, was thus created and explained. Many of their imaginings were demonstrated mathematically, and therefore settled beyond all possible contradiction. Thus they proved that if two masses of stone or metal of different weights were to fall from a height, the heavier would fall more rapidly than the lighter, and when Galileo tried the experiment by dropping two such unequal masses from the leaning tower of Pisa, they turned their backs and closed their ears, lest they should see them falling side by side, and hear them strike the ground together.

Such questions as whether matter always existed, whether it was created out of nothing, whether it can exist without qualities, whether force and motion are identical, the possibility of the existence of a vacuum, whether matter is inert and is moved from without, or whether it owes its qualities and movements to its own inherent activity, were discussed with great ingenuity, and the interest with which such questions were invested appears to have been directly proportionate to the impossibility of answering them, or to the absence of any practical usefulness of the answers, if obtained.

Modern metaphysicians, or psychologists as they now prefer to be called, proceed in like manner by inquiring directly into the nature rather than the phenomena of the mind's action, starting with such questions as whether ideas are innate or acquired, whether all knowledge comes from the senses, whether memory is the result of association or whether association presupposes memory, whether abstraction is a discontinuation of association, and so on. In all this there is a limited element of observation, viz., the examination of their own consciousness, with an occasional excursion into the outer world of mental phenomena, this being usually made in search of confirmation of predetermined hypotheses.

The results obtained by the deductive students of mental science are curiously parallel with those obtained by the old deductive or pre-Baconian students of physical science, and I now propose to show that the changes or development which have been effected by Gall's application of the inductive method in mental science are equally and similarly parallel to those which have resulted from the application of the inductive method to physical science, and therefore that we are justified in anticipating similar practical consequences.

In our attempts to understand the constitution of the material world the first problem that presents itself is the determination of what are the elements of which it is composed. In like manner the fundamental problem in mental science is the determination of the primary or elementary faculties of the mind.

According to the ancient systems of physical science, fire, air, earth, and water are the four elements of the material world; but modern inductive science teaches us that these are not elements, but are modes of existence common to all the elements, states or conditions which either may assume—fire, the state of combustion, or chemical union; air, the gaseous state; earth, the solid state; and water, the liquid state. We now know that every element is capable of assuming all these states.

A precisely parallel departure from the old doctrines was one of the first results of Gall's application of the inductive method of studying psychology. His first mistakes—a specimen of which I have quoted, page 77—arose from the influence of the old philosophy on his mind, and these mistakes

were analogous to those displayed by physical scientists of the transition period.

On his complete emancipation he came to the conclusion that memory is not an elementary faculty, but a mode of action common to all the faculties, that each has a memory of its own; and presently he found that the same is the case with the other elementary faculties of the metaphysicians, with attention, perception, association, conception, imagination, etc.,[1] all, like the physical elements of the ancients, being modes of existence, or modes of action of the elements of mind, properly so called.

Dr. Laycock has well said ('Mind and Brain,' vol. 1, p. 3) that—

> Mental science is the chemistry of human nature. Its principles, and its methods of observation and enquiry, may be taught in the class room; its practical uses, its analyses and manipulations, must be learned and practised in the great laboratory of the world by each man in his own sphere of action. But, under all the circumstances, and amidst all conditions, the phenomena to be finally examined are the phenomena of life and organisation manifested in the brain and the nervous system, and of which the physiology of the brain, considered as the organ of mind, takes cognizance.

The metaphysicians or psychologists of the old schools regarded the subject quite differently. Reid says ('Essays on the Powers of the Human Mind,' vol. 1, p. 204, 1803): 'All we can know of the mind must be derived from a careful observation of its operations in ourselves;' and such was the basis of their systems.

But the question may be fairly asked, 'How is Gall's method applied in solving this fundamental problem of what are and what are not the elementary faculties of mind?'

This question is especially pertinent, as most of the metaphysicians professed and attempted to base their systems on observation, i.e., observations of consciousness, and all the

[1] I am, of course, obliged to speak generally in reference to such doctrines, as nearly everything that is taught by any one of these teachers is contradicted by some of the others. Thus Dr. Thomas Brown, of Edinburgh, whose 'Lectures on the Philosophy of the Human Mind' were published in 1820, adopts a classification of the faculties closely resembling that of Gall; his work altogether is largely inductive, and has been appreciated accordingly by the best of phrenologists. I have before me a copy from the library of my old friend and teacher, the late George Combe, which was presented to me by his executors. It contains marginal notes in his own hand indicating such appreciation.

physiological students of psychology endeavour to be strict followers of the inductive method.

My answer to this question is that the method of Gall is precisely analogous to that which is adopted by the chemist in solving the corresponding problem in chemical science; it is, in fact, the same method, but differently applied according to the difference of the materials.

The chemist applies experimental means of analysis and synthesis to the material in question. If he finds that it is not separable into any constituent elements, into any combination of materials simpler than itself, and that it cannot be formed by combining any such materials, he concludes that, to the best of his knowledge, it is an elementary substance.

The phrenologist proceeds in like manner. Every faculty of the mind, whether intellectual, emotional, or sensuous, being dependent for its action on the development of a certain part of the brain, its elementary character or complex composition depends upon whether one or more parts of the brain are concerned in its manifestation.

To answer this question he compares the manifestations of mind with the development of brain in a large number of individuals. If only one region of the brain is largely developed in all the cases of energetic manifestation, and deficiently developed in all cases of feebleness, and he can find no instance in which there is inequality of development in different parts of this region, he concludes that, to the best of his present knowledge, i.e., as far as his present means of analysis have carried him, the faculty in question is elementary.

If, on the other hand, he finds that the cerebral region which he first observed to be connected with the manifestation in question is irregularly developed, some parts being larger or smaller in some cases than in others, he infers that it is the seat of more than one faculty, that the mental manifestation already observed to be connected with the whole region is a compound result of the action of more than one elementary faculty.

He then proceeds with his analysis of this compound manifestation by carefully comparing its variations with those of the development of its cerebral region, and if he work with sufficient skill, and above all with sufficient caution and

patience, over a large area of observation, he may succeed in such analysis. In this as in physical research he must sternly resist the suggestions of his own preconceptions whenever they come in collision with the observed facts. This particular discipline is more severely demanded in mental than in physical research, inasmuch as preconceptions and prejudices concerning mental action are more abundant and more persistent than those concerning physics.

It should be understood that this proceeding—like that of the chemist—is partly deductive, but the deductions are based on certain inductions of general law previously obtained by observation and generalisation. The chemist assumes that every substance is consistent in its manifestations of properties; that no element can take upon itself the properties of any other. In like manner the phrenologist (having already proved it) assumes *that no part of the brain can perform the functions of any other part, or act inconsistently with itself;* that the organ of self-esteem, for example, can no more perform the functions of its neighbour, those of love of approbation, than lead can assume the properties of gold. As an example of the phrenological method of analytical research, I will first take its application to the most fiercely debated of all psychological questions.

Is the sentiment of religion inherent in humanity, or is it merely a concoction of priestcraft and conventional usage?

If inherent, is it a simple elementary sentiment, or is it a compound of more than one sentiment?

The first question, whether the religious sentiment is inherent or merely a conventional fashion produced by priestcraft, or by governments for promoting the submission of their peoples, is determined phrenologically, not by discussing the opinions or views, or the prejudices or convictions of individual thinkers or disputants, but simply by observation of natural phenomena.

Keeping the above-stated law (see italics) in view, we have simply to ascertain by a sufficiently extended area of observation whether any part of the brain is developed proportionally to the varying manifestations of religious feeling in different individuals of the same species, and whether this portion of brain is not developed at all in animals that are absolutely without the religious sentiment.

This is easily done, and has been done effectively. Gall and his successors have shown that a certain portion of the coronal region of the brain is developed in man, and is entirely absent, or only rudimentary, in animals having no sentiment of religion. Also, that the development of this region varies very greatly among different individuals of the human species, so greatly as to produce marked and unmistakable differences in the shape of the head ; and that the manifestation of religious sentiment corresponds to these variations. Therefore, the sentiment is inherent.

The second question, whether the religious sentiment as commonly understood is elementary or compound, demands for its solution the application of phrenological analysis. If compound, the law above stated demands that each of its elements must have a special cerebral region of its own—a cerebral organ, as it is called, upon the action of which its manifestation depends.

This question is answered by ascertaining by observation whether the coronal region in question is always developed as a whole, or in mass, or whether a portion may be developed in excess of another portion. If it is found that the region is subject to partial or irregular development, it is not a single organ, but more than one. We must then observe the differences of disposition which accompany these differences of cerebral development, and having determined these and worked out the elementary character of each, we are able to perform the synthetical operation of combining them and observing whether the religious emotion may be compounded of them in any or many proportions.

All this has been done in the case selected. The coronal group includes, first, veneration at its centre or apex, forming, as some have described it, 'the keystone of the arch or dome.' This is the central sentiment of religious emotion, reverence to the Supreme Being, and consequent devotion, reaching ecstacy in extreme cases. This, by itself, is pure, unselfish, non-utilitarian, religious emotion. (I have already, in Chapter II, p. 35, summarised the history of Gall's discovery of the function of this part of the brain.)

On each side of veneration is hope. This is another element entering into the more complex forms of religious emotion: the hope of a future state of happiness. Lower

down on the sides of the head is ideality, the sentiment which craves for ideal perfection in everything, and supplies the chief element of poetic feeling. This, when well developed, enters into combination with the others as a part of emotional religion. It co-operates with hope in picturing the ideal heaven, and with veneration in the conception of Divine perfection. In front of hope and ideality is marvellousness, the source of faith, and directly in front of veneration is benevolence or charity, and immediately behind hope is conscientiousness or the sense of duty.

Thus we see that the religious feeling may be either simple or compound, and may be variously composed. We may have veneration, hope, and marvellousness greatly developed, with very little conscientiousness and benevolence, and much of the animal propensities. In such cases deep religious sentiment may be combined with gross cruelty and dishonesty, a combination that has been, and is, common enough, and which has puzzled all mankind ; the common explanation attributing it to hypocrisy. The phrenologist has no difficulty in understanding that Louis XI. was sincerely pious in spite of his hideous cruelty and general villainy. The blood-thirsty inquisitors may have been intensely pious and perfectly sincere ; so may the commercial swindler be who devotes a portion of his ill-gotten wealth to the building of a church, or other pious endowment.

During my own lifetime I have met with many cases of atrocious villainy and immorality combined with genuine sincere piety, i.e., with deep emotional religious feeling. The first, when a boy and ignorant of Phrenology, troubled me sadly. It was a woman that I admired and almost worshipped on account of her deep piety. Presently she was convicted of systematically robbing her employer and benefactor ; a diary or cash-book was found, in which she entered her daily thefts on one side and her personal expenditure and ' gifts to Jesus ' on the other. The latter consisted in subscriptions to the chapel in which she was a shining light, to missionary funds, and other religious objects. The immediate effect of this upon my young mind was a terrible reaction, causing me to regard all religion as an imposture and humbug ; but subsequent study of Phrenology explained the phenomena, and has saved me from this form of error as well as from that

of accepting piety as an evidence of morality, or denouncing as hypocrites *all* those who are religious but are not moral. I have been saved from serious mistakes by understanding this, and therefore not accepting testimonials of piety as evidence of honesty or general trustworthiness.

It should be understood that these conclusions are not *opinions*. Opinions are abundant enough; some in accord, some discordant with the above, all debatable *ad infinitum* and equally worthless, because they are *mere* opinions. Any addition to the heap merely exaggerates the ethical nuisance, and adds to the scavenger-work that must be done in clearing the ground upon which the foundations of sound psychological and ethical science must be laid.

I will now take another and a kindred subject, that of conscience or the moral sense. Is this innate, or is it acquired as a result of social institutions? Is it a primary sentiment or instinct? Is the love of right and the hatred of wrong born with us, or is it merely a result of teaching or conventionality, like the proprieties and improprieties of wearing or doffing one's hat in a drawing-room or church, etc.?

Volumes have been written in discussing this subject, and the unfortunate student only plunges deeper and deeper into the quagmire of confusion the more and more he reads.

Reid says ('Essays on the Powers of the Human Mind,' vol. 3, p. 289) :—

> Some philosophers, with whom I agree, ascribe this (abstract notion of good and ill) to an original power or faculty in man, which they call the *moral sense*, the *moral faculty*, or *conscience*. Others think that our moral sentiments may be accounted for without supposing any original sense or faculty appropriated to that purpose, and go into very different systems to account for them.

Hobbes affirms that 'we approve of virtuous actions, or of actions beneficial to society, from self-love; because we know that whatever promotes the interests of society has on that account an indirect tendency to promote our own.' Cudworth maintains that our notions of right and wrong are innate, and dependent on a particular power of the mind which distinguishes truth from falsehood.

Mandeville asserts that, man having a strong appetite for praise, the founders of society have used this by establishing the custom of applauding every sacrifice made for the public

good, and calling this virtue. 'Men are led, accordingly, to purchase this praise by a fair barter,' and the moral virtues are 'the political offspring which flattery begot upon pride.'

Hume, Dr. Smith, Bentham, and the large school of utililarians teach very positively that 'utility is the constituent or measure of virtue.' Aristippus and a multitude of ancient and modern writers contend that virtue is merely the search of pleasure. It gives up one pleasure in exchange for a greater; it sacrifices a present enjoyment only to obtain some future or other enjoyment which in intensity or duration is fairly worth the sacrifice.

According to Dr. Clarke, virtue consists in the regulation of our conduct according to certain *fitnesses* which we perceive in things, or a peculiar *congruity of their relations to each other;* and Wollaston similarly describes it as acting according to the *truth of things*,—in treating objects according to their *real character*.

Paley defines virtue to be 'the doing good to mankind in obedience to the will of God, and for the sake of *everlasting happiness*.' ('Moral and Political Philosophy,' vol. 1, p. 42.) Dr. Thomas Brown says ('Lectures on the Philosophy of the Human Mind,' vol. 4, p. 101) that, according to this,—

> The will of God is our rule, but private happiness is our motive, and therefore our obligation. In short, the inducement or temptation to be virtuous, which is all that constitutes our obligation to be virtuous, is precisely of the same kind with the inducements or temptations to vice, which may be said in like manner to constitute our obligation to be vicious.

The following is Professor Bain's theory of conscience[1]:—'Conscience is an imitation within ourselves of the government without us,' as proved by 'observing the growth of conscience from childhood upwards,' and its character and working generally.

> The first lesson that a child learns as a moral agent is obedience. The child's susceptibility to pleasure and pain is made use of to bring about this obedience, and a mental association is rapidly formed between disobedience and apprehended pain, more or less magnified by fear. The feeling of encountering certain pain is the first motive power of an ethical kind that can be traced in the mental system of childhood.... A sentiment of love or respect towards the person of the superior infuses a different species of dread, which is sometimes a more powerful deterring impulse than the other....

[1] 'Emotions and Will,' pp. 283–6.

When the young mind is able to take notice of the use and meaning of the prohibitions imposed upon it, and to approve of the end intended by them, a new motive is added, and the conscience is then a triple compound, and begirds the actions in question with a threefold fear.

Schopenhauer supplies an analysis of conscience as composed of $\frac{1}{5}$ fear of man; $\frac{1}{5}$ superstition; $\frac{1}{5}$ prejudice; $\frac{1}{5}$ vanity; $\frac{1}{5}$ custom.

I will not weary the reader with further examples, which may be multiplied in proportion to the contents of the bookshelves used for reference, but proceed to show how Phrenology supplies a final means of arbitration in the solution of such problems.

This case is especially interesting and demonstrative, inasmuch as Gall and Spurzheim were at variance concerning it, and their successors might have continued so until now, had they continued *reasoning* about it, without having recourse to organological research.

Gall regarded conscience as the result of the opposition of the dominant character of the individual to his particular actions, and, according to him, there are as many consciences as faculties; while Spurzheim was 'of opinion that repentance, remorse or conscience, must be attributed only to the faculty of justice and duty.'

They discussed the subject at considerable length with the usual result—that of leaving it in doubt, if equal ability were brought to bear on both sides of the argument; or of giving the victory to the best debater, if they displayed much inequality of ability.

It was finally settled by Spurzheim's and Combe's observations of the development of a part of the brain lying on each side of the organ or region of firmness. This was found to vary in different individuals in direct proportion to the variations of their sense of duty, their conscientious scrupulousness, and their love of justice and truth for their own sakes, irrespective of personal interest or popular opinion.

Having thus by observation discovered that what we call conscience is connected with a certain region of the brain, we can then learn the true functions of this part of the brain, i.e., the actual nature of conscience, by further observations

[1] 'Die beiden Grundprobleme der Ethik,' 1st ed., Frankfort, p. 196.

of the conduct of people in whom this part of the brain is developed in different degrees. Such observations have been made, and they show that it is not the seat of an intellectual faculty whereby we determine what is just and true, but of a sentimental desire for justice and truth, an emotional love of these which leads to their determination by urging the intellect to seek them ;—that when the intellect fails to guide correctly and this sentiment is powerful, it may result in bigotry and fanaticism ; or false views of duty, which are carried out in obedience to the commands of the sentiment as imperatively as though they were sound views of duty.

These conclusions are not *opinions*, but *inductions* or generalisation of measurable facts. All that is required for their complete demonstration is that the observations shall be sufficiently extensive to cover the possibility of mere coincidence, and to assure us that the manifestations which we connect with the development of that region of the brain are not displayed at all in animals in whom it does not exist, and that in those in whom it does exist the manifestations are always proportionate to the development.

There is, of course, the possibility that further analyses may dissociate a faculty which was once regarded as simple or elementary into two or more elements, and thereby prove it to be a compound.

This has occurred in Phrenology as in chemistry. Davy dissociated the alkalis and earths, previously supposed to be elements, into compounds of metals and oxygen. Spurzheim dissociated the '*sens d'éducabilité*' of Gall into two faculties, individuality and eventuality.

The reason why the alkalies, the earths, were first regarded as elements, was that under ordinary circumstances, or conditions, their elements are found in combination, and their separation is not easily effected. The phrenological case was similar. Gall's '*sens d'éducabilité*' was, as he explains, the faculty for perceiving and remembering facts, '*sens des choses*,' '*memoria realis*.'

The idea of *a fact* appears to be a simple one, not easily analysed ; but Spurzheim observed differences in the shape of the part of head which Gall had proved to be largely developed in persons distinguished by their power of grasping and remembering facts, and who, therefore, were adepts in educational

competitions, especially when this was combined with large endowment of the *memoria verbalis* connected with the organ of language. He found that those in whom the upper part of this region was most developed had a special memory for events, and a special power of narration of events or story-telling, while those in whom the lower part was most prominent had the best appreciation and memory for individual objects; thus separating the statical facts from dynamical facts, standing things, or individualities, from moving things, or events.

Of course this, like every other question of mental analysis, may be discussed *ad infinitum* if *opinions* are consulted, but Phrenology has no more to do with opinions than botany or astronomy has. It is a science of observation and induction as regards its laws, and of deduction only in reference to its practical applications. Spurzheim's further analysis of the '*sens des choses*,' like Davy's further analysis of potash and soda, was simply a matter of fact.

I will add one more example of our method of mental analysis.

Mr. Combe describes acquisitiveness as 'the sense of property, of which the desire to acquire is the active form,' and he adds that it is difficult to conceive a miser without a great endowment of this propensity, although an individual may be a thief with a moderate portion of it.

My own observations indicate the existence of two distinct organs corresponding to two distinct propensities in the space marked as acquisitiveness on the phrenological busts; one being the propensity to acquire property, and the other the propensity to retain property.

My attention was directed to the subject more than fifty years ago by the absurd proceedings of an apprentice to the eminent mathematical instrument-maker, Mr. Thomas Street. The hours of labour in those days were very different from those of the present. They were 6 A.M. to 8 P.M. in summer, and 7 A.M. to 8 P.M. in winter, with half an hour interval for breakfast, one hour for dinner, and half an hour for tea. This might seem enough for a boy, but it was not so for Treby, the boy in question. The apprentices were allowed to earn pocket-money by doing piece-work in overtime, and Treby worked till supper-time, 10 P.M., nearly every night, and,

being an excellent workman, earned thereby some eight or ten or more shillings per week. On Saturday night he devoted himself to the business of spending this money, which he did most absurdly, usually finishing by cab-riding anywhere until the fare amounted to the remainder. I have known him purchase two shillings worth of lucifer matches (they were expensive then) and station himself on the top of Primrose Hill, and there have his 'fireworks' by striking them all.

I have known him (we were fellow-apprentices) come home on Saturday night after his customary revels, in the cerebral condition thereby induced—and finding a sixpence or a shilling remaining in his pocket throw it out of window, maintaining that he earned his money in order that he might spend it, and that if he failed to spend it his labour was wasted. This argument he used contentiously and jokingly at first, but finally it seemed to carry some degree of conviction to himself. He would solemnly syllogise thus: 'Anything that is misused is wasted. The use of money is that it be expended. Therefore money that is not expended is wasted.'

I observed that the anterior part of the region marked in the busts as acquisitiveness was prominent in his head, while the posterior part was decidedly deficient. I obtained a cast of his head, and still have it in my collection.

I have made many subsequent observations, all of which, so far as they go, are confirmatory, but they are not sufficiently numerous and decided to *establish* the indicated dissociation. The observations on this part of the living head are difficult, on account of the temporal muscle covering the boundary of the supposed subdivision. If I am right, the posterior organ, the desire to hoard or retain, encroaches upon the region assigned to cautiousness in Combe's bust.

I wish to impress upon the reader the difference between this and mere reasoning, and reiterate the lesson, knowing how fatal is the facility of becoming satisfied with the plausibilities of ordinary deductive delusions. Thus one may say, 'Of course there are two faculties: we may have thieves who are not misers, and misers who are not thieves; therefore there must be two propensities, one of which in exaggeration produces stealing, and the other which produces insane hoarding.' Then another may say, 'Oh, no! The acquisitive

propensity is one and indivisible: the thief is thoughtless and impulsive, the miser is extravagantly cautious, and, therefore, the different manifestations are due to the same faculty modified by predominance or deficiency of other faculties. Thus we might argue and argue as our predecessors have done, and remain for ever in the same condition, if like them we were unable to appeal to cerebral development for final arbitration of the question in dispute.

I might go on with more and more examples and show that every question in psychology and practical ethics may be finally brought before this tribunal. If the brain is the organ of the mind, all mental science and practical ethics must be based on the study of its development, and the laws of its action both in health and disease, but especially in health. Gall stands alone in having shown how to do this inductively and soundly by systematically comparing cerebral development with mental evolution.

I have shown above how, by this method, the fundamental problem of psychology and practical ethics, that of determining what are the elementary faculties of the mind, and analysing its compound manifestations, may be solved—how, for the first time, its solution has been practically and soundly commenced.

All the rest must of necessity be based on this foundation.

Psychology without this is in the same condition as the chemistry of the alchemists, who had not yet learned which among the multitude of substances they were handling were elements and which were compounds. Without such knowledge they were unable to analyse any substance and learn its relations to its own constituents clearly and satisfactorily. They were struggling through a maze of ingeniously complicated hypotheses, which their own efforts were continually extending around them, rendering their extrication more and more difficult the further they proceeded.

The psychologists of the old schools are in a similar predicament. Being ignorant of the elementary faculties of the mind, they cannot analyse human conduct, or understand its relations to its own constituent motives. They are involved in a similar maze of contradictory hypotheses, and every fresh contributor of a new or improved system only adds to the area and complication of bewildering paths that lead to nowhere, or double back again.

CHAPTER XIV

PHRENOLCGY AND MORAL TRAINING

I HAVE shown in the preceding chapter that the changes effected by Gall's method of applying inductive research to mental science are curiously parallel to those which have followed the systematic application of the same method to physical science, and have illustrated this by special reference to the discovery of the primary elements of mind and matter respectively.

Inductive research has not only determined which are the elements of the physical world, and how they unite to form the far more abundant compound substances, but it has determined the general laws of action and reaction operating among these elements and compounds.

The result of this has been the vast contributions to human physical welfare to which I have already alluded. Are we justified in looking forward to corresponding results in our moral welfare by similar applications of inductive research in morals?

I believe that we are, and will endeavour to show by a few examples how a knowledge of the elementary faculties and of the laws of action thus obtained, even now in the infancy of Phrenology, may be beneficently applied.

I say, how they *may* be applied; but I know perfectly well that they will not be thus applied during my life, and am equally certain that they will be thus applied at some future time, when the pestiferous accumulations of ignorance, prejudice, and bigotry which now infect our moral atmosphere shall be swept away.

In demonstrating that the moral energies, the intellectual energies, and the sensual energies of man and animals depend on the development of certain regions of the brain, Phrenology brings all of these within the range of general

physiological laws, one of these being that the special growth of any particular organ or group of organs can, normally, only be obtained by special training or healthful exercise of the particular organ or organs in question.

Having established the general law that each region or organ of the brain has its own specific function or functions, and cannot perform the functions of any other part, or be called into action by presenting it with any other objects than those to which it is naturally related, it is evident that until we have acquired a knowledge of these specific functions and objects, we are unable to systematically and scientifically conduct the special exercise or training that is required.

Thus the learning of moral precepts, the reciting of the Decalogue and the Church Catechisms are proved to be, not exercises of the organs of the moral sentiments residing in the coronal region of the brain, but merely intellectual exercises, and of the lowest kind—exercises of verbal memory.

The fear of hell-fire or any other kind of future or immediate punishment affects the function of cautiousness, and by it this organ is exercised, and not those of the moral sentiments.

We can no more cure vice by reading homilies than we can cure costiveness by reading prescriptions, or learn to play upon a musical instrument by reading an instruction book. Everybody understands this. We all appreciate the following in reference to playing on a pipe, but fail to see its direct application to morals.

Hamlet.—Will you play upon this pipe?
Guildenstern.—My lord, I cannot.
Ham.—I pray you.
Guil.—Believe me, I cannot.
Ham.—I do beseech you.
Guil.—I know no touch of it, my lord.
Ham.—'Tis as easy as lying: govern these ventages with your fingers and thumb, give it breath with your mouth, and it will discourse most eloquent music. Look you, these are the stops.
Guil.—But these cannot I command to any utterance of harmony; I have not the skill.

Here we have authoritative command, exhortation, and beseeching followed by special instruction. Thus Hamlet represents the preachers; and their congregrations, like Guildenstern, fail to command their brains to the utterance of

the celestial harmonies of practical Christian morality, simply because they have not the skill :—they have been shown the ventages and taught the mouth-breathing, but have lacked the systematic daily training which is as necessary for genuine moral conduct as for playing on the flute or the fiddle, and for the same reasons. This conclusion is not an opinion to the phrenologist, but a scientific generalisation based on the fact that in both cases the development and co-operation of several cerebral organs are demanded.

In the case of the musician tune and time must co-operate with the cerebral organs on which mechanical aptitude depends, and these must act in combination with the motor and sensory nerves to command and control the movements of the operating muscles. Such co-operation, proceeding with the intuitive facility and unhesitating reliability which are demanded, can only be attained by systematic and long-continued practical training.

So with habitual, intuitive, and spontaneous moral conduct. It demands the co-operation of all the organs of the moral sentiments with the higher—the specially human—intellectual faculties; these must act in combination to command and control the animal propensities—those that impel to outward, or direct, material action; and this co-operation and control must be so firmly established as to become automatic or instinctive in obedience to the dictates of morality, like the automatic or instinctive movements of the musician's fingers in obedience to the written musical symbols.

Everybody knows, who has learned to play the fiddle or other musical instrument, that the early stages of practice are irksome and laborious, and that it is most desirable that this stage of training be commenced early in life. The same is the case in moral training : the discipline demanded is similarly irksome, may even be painful; but when this stage is passed, when skill and spontaneity are attained, the habitual condition of mental harmony thus obtained fulfils the fundamental condition upon which human happiness depends.

I have not yet referred to another of the popular methods of moral teaching, that by force of example. This is of unquestionable usefulness, but not of itself. It is only as a means of starting

and guiding the activity of the organs of the moral sentiments that it is useful. The common mistake is that of substituting it for systematic practical training.

I will illustrate this by an example.

One of the ablest of the many teachers I have known was the late Mr. Rickard, of the King Edward's School, Birmingham, and the Birmingham and Midland Institute. The success of my 'Penny Lectures' on Elementary Science,[1] at the Birmingham and Midland Institute, induced Mr. Rickard to attempt Penny Classes in Arithmetic and Elementary Mathematics. He succeeded admirably in the collective teaching of these subjects to very large numbers, and then made a still bolder experiment, viz., to teach the violin in a similar manner. He started with a class of more than a hundred pupils. His method was very simple. Each pupil being provided with a violin, with only one string in use at first, the teacher showed the whole class how to tune that string by doing it himself on the platform of the lecture theatre, visibly to all. Then he showed them how to draw the bow along that open string, and how this is to be done in order to bring out full tone, etc. Thus he progressed, step by step, all the class simply imitating his performance and following his instructions, and his success was most remarkable.

Thus precept and example were combined; but it was not merely by listening to the precepts and looking at the example: each pupil *performed* the actions of the exemplar, and this *performance* constituted the lesson. By such means all the organs demanded for doing the work were not merely *told* what should be done, not merely *shown* how to do it, but actually and practically exercised in doing it. Still, even with this, some of the pupils failed, while others succeeded. The latter were those who continued the training at home, as well as at the lessons.

This is simple and obvious enough, and everybody will accept it as applied to fiddling; but when the problem is to raise the moral conduct of mankind, and promote harmony

[1] The first course of these (12 lectures) was delivered in the lecture theatre of the old Philosophical Society in Cannon Street, commencing January 22, 1856, the subject being a general view of the great phenomena of Nature, and the laws which operate in producing them; i.e., the subject which has since received the name of 'Physiography.' Much has been written and said concerning the origin of 'Penny Readings.' The first of these followed this course of Penny Lectures, and were given by Mr. Arthur Ryland. Then it was taken up in other parts of the country with great success.

and happiness throughout and between all the peoples of the earth, the method has been neglected, for the simple reason that the professors of morals have been floundering in a deluge of metaphysical dreams, profoundly ignorant of the organic cerebral bases and conditions of mental life and growth.

Even now, when I state the case thus plainly, and without any pandering to established prejudice and superstition, I shall probably raise the booby shriek of 'Materialism.' The boobies will continue to shriek, and the huge and costly organization and mechanism of churches and chapels will continue to blunder on in the dark until cerebral organology is generally acknowledged and understood, and is adopted as the basis of all our efforts to promote the moral prosperity of mankind.

But I must not omit to do justice to the exceptional work of promoting moral progress that has been achieved by the existing machinery. To do this it is necessary to submit its proceedings to phrenological analysis.

Something besides mere verbal teaching, eloquent exhortation, and finger-post indication of example has been done by the churches and the schools, but for the most part this has been done incidentally, and with little or no appreciation of its relative importance.

There is sound moral training in the act of going to school at regular hours. It involves the restraint of the mere animal desires for sensual enjoyment—play, etc. But even this may be spoiled, has been shockingly spoiled, by the ignorance of teachers concerning the elementary faculties of the mind and their functions.

The training of steady attendance at school becomes morally effective when it is performed as *an act of duty*. Its value is quite different when the motive is the fear of the rod, or even when it is the desire for praise. These motives have their proper place, but, unfortunately, in the present stage of human development they are disproportionately dominant. The cerebral organs which we have in common with the lower animals are too much developed already, while those of the higher moral sentiments are usually deficient. Therefore this primary business of school discipline may or may not be fully effective, according to the organs which are the most exercised by the discipline.

The same may be said of devotional exercises. These,

when prompted by pure religious sentiment, are unquestionably elevating by promoting the growth of the organs of the coronal region, already specified as our special human endowment.

But when men and women go to church in order to appear *respectable*, or to beg for divine favours—for advantages in this world, and big rewards in the next—the church service only exercises the same organs as those that have been over-nourished during the week in the business contests for selfish aggrandisement. The religion of the successful 'man of business' is very commonly practised by him as an investment made in this world in order to secure an usuriously large return in the next.

The old churchmen and Mahomet had evidently some notion of the necessity of practical training in morals when they ordered fasting, and other 'mortifications of the flesh.' In these there is disciplinary repression or government of the animal or sensual propensities; and so far as the motive to such self-restraint consisted in a sense of duty and pure devotion to the personified ideal of intellectual power and moral purity, such discipline must act positively in promoting the growth and activity of the organs of the moral sentiments.

But this, unfortunately, is but of rare occurrence. A variety of motives being offered, only those come into operation which are already the most potent in each individual. Thus the devotee with dominating cautiousness will perform pious exercises in order to escape future punishment, and in doing so he exercises and strengthens the organ which specially acquires repression.

With dominating self-esteem and love of approbation we may have various degrees of ostentatious mortification, even up to that of Simeon Stylites, who performed his self-flagellations, his fasting and flesh-penetrating cord torture, on the top of a pillar exposed to public gaze, thereby nourishing the primary sources of the special vices of the individual devotee. So on with other faculties.

Religious exercises may thus have the opposite effect to that for which they are designed. Working in the dark, they only operate as desired on those whose minds are already dominated by the highest sentiments, and in them there is danger of exaggeration, such as the burying alive in monastic cloisters, thus robbing mankind of the services of the best and

purest of men and women, and preventing the paternal and maternal propagation of the highest types of humanity.

Thus it has happened that the highest and most sincere efforts to elevate mankind have failed from lack of scientific knowledge of the properties of the material upon which they have been expended.

The question now before us is, How can this moral growth, this coronal development, be attained, and how does Phrenology promise to aid us in this most important of all human efforts?

So far as the principles upon which we are to proceed are concerned, the answer is simple enough, though the organization of the means or the setting at work of the machinery for carrying out these principles is difficult. If we would develop any set of muscles, say those of the arms, we must give them regular and healthful exercise by steady training. If all are to be equally developed, every possible movement of the arm must be executed in the course of the training, and no one in excess or deficiency. If the requirement is the special development of one particular muscle or set of muscles, say the deltoid, or the muscles of the inner part of the forearm, the training must be specially modified accordingly—for the deltoid, by bending movements at the elbow joints; for the latter, by flexure of the fingers. It is obvious that a knowledge of the respective functions of the muscles must precede any effectual direction of such training.

Phrenology teaches us definitely what are the functions of particular regions of the brain, as myology teaches the functions of particular muscles or sets of muscles, and by the same means, i.e., by observation of the results of their action. The study of the muscular functions is unquestionably simpler and easier than that of the mental functions, being merely mechanical, and assisted by their visible mechanical anatomical relation, but the principle of the respective studies is the same.

Phrenology also teaches us what are the means by which the various cerebral organs may be called into action, or, otherwise stated, what are the appropriate stimuli to each. But to apply this knowledge effectively the training must commence with infancy, and be continued steadily through life, and more especially during the chief period of brain growth. Only a small part of this work can be done in school. It is in the conduct of home life that the exercises which con-

stitute moral training may be most efficiently and practically carried on.

One of the reasons for this is that the training of each child must be modified according to its organization. But parents who are ignorant of Phrenology can neither determine the individual peculiarities of organization, nor prescribe the kind of special training demanded for developing the deficient and repressing the exuberant predispositions.

As it is, the course adopted by the fond and anxious parent is too commonly just the opposite to that which is required, and for a simple reason that a little explanation will render evident.

The parent knows that certain conduct is right and that other conduct is wrong, and therefore very properly strives to guide the child into the right course. Passing over the vulgar brutality of slapping, caning, and other forms of physical torture to which the admirers of the barbaric maxim 'Spare the rod and spoil the child' are addicted, and observing only the efforts of more civilized and intelligent parents, we shall generally find that they obtain the outward observance of the demanded rules of conduct by appealing to the strongest motive already existing in the child's mental constitution, i.e., exercising the most highly developed organ or organs that are available, instead of repressing these, and developing those which are deficient.

A very common example of this occurs where love of approbation is dominant. The facility thus offered is almost certain to be used if the parents and teachers are not phrenologists. Praise and blame, encouragement and scolding, are so effective that they are used in such cases as almost the sole motive to what is regarded as good behaviour. To obtain the praise and avoid the blame the child may become a hypocrite, or even a sneak and a liar, while the parents fondly mistake the manifestations of these vices for moral amiability. The case which I described, p. 264, is quite a typical one, so much so that the moral collapse of 'goody-goody' boys when they are allowed to go at large has become proverbial.

Keeping in view the great principle that moral training consists in the physiological nurture of certain organic structures ('materialism' again), and that this nurture must be effected by their healthful exercise, it is evident that no

schools, no colleges, not even parental supervision and influence, can be so potent in steadily maintaining that exercise as direct personal efforts devoted to the business of self-culture.

This self-culture, which must be the paramount source and most effective practical means of human advancement, demands for its basis a sound inductive science of mind ; and this must be free from the mystifying curse of pedantry, it must present natural truth in its natural simplicity, clearness, and beauty, and thus be intelligible to young children, and become a subject of primary education for all children of all classes, *the* primary subject, the primary business of the primary teacher.

In the old chaos and complexity of mental science this was impossible. Now it is easy. Its facility was demonstrated in Surgeon Square, Edinburgh, when George Combe gave the first course of lessons in Phrenology to the children of 'The Williams Secular School.' I followed him in their continuance,[1] and found no difficulty in doing so.

The full importance of this simple demonstration is not likely to be understood and appreciated until long after I shall have followed my guide, philosopher, and friend in the final lesson of life.

[1] Failing health alone prevented Mr. Combe from continuing, and then I humbly, yet proudly, succeeded him.

CHAPTER XV

PHRENOLOGY AND INTELLECTUAL EDUCATION.

Phrenological analysis of the subject of intellectual training is cruelly iconoclastic of the most popular idols of scholastic worship. Whenever any question respecting the merits of a particular course of study arises, the phrenologist, with a map or model of the intellectual faculties and their cerebral organs before his mind, clearly perceives at once what portion of the brain is exercised by the study in question, and what portion is not exercised.

Any system or course of general intellectual education which is claimed to be complete must cultivate *all* the intellectual faculties by supplying all the organs of the anterior lobe of the brain with the objects that call them into healthful and harmonious exercise. Special or technical education may be, and usually is, limited to the training of a special group or set of organs, but in every case general culture should precede the special or technical education in particular arts or particular professional departments of knowledge.

We are all agreed so far ; but when we attack the subject of what constitutes general culture, the phrenologist stands out and apart from the orthodox crowd as a heretic they would sentence to be stoned.

To him such establishments as those of Eton, Rugby, and Harrow, and their host of imitators, are painfully ridiculous, and the very name of 'Grammar School' a bitter sarcasm. A Word School ! An Academy of Verbiage ! A pretentious, highly endowed, and profoundly respected system of general intellectual education, avowedly limited to the culture of Broca's convolution !

It is true that common-sense has recently assaulted these strongholds of the residuary legatees of mediæval monasticism, and forced some side-doors for the admission of a modicum

of modern science ; but the establishment of a system of intellectual education that shall supply nourishment and exercise to the whole of the anterior lobes of the brain is hopeless so long as the present prevailing ignorance of their functions shall remain.

The extreme narrowness of the popular scholastic exaggerations of the intellectual dignity of linguistic erudition becomes most glaringly obvious when submitted to the demonstration of phrenological mathematics. By measuring the area or cubic contents of the region of the brain that is exercised thereby, and comparing this with the measurement of the neglected region of the higher intellectual organs, the whole system is reduced to an obvious absurdity.

Such analysis enables us to understand at a glance why at this latter end of the nineteenth century the best linguists of Europe are hotel waiters and *valets de place*, and why the compatriots of Shakespeare, Newton, Galileo and Laplace are inferior in this respect to Russians.

I speak here of mere polyglot erudition, not of philology, which is very different. Comparative philology is a branch of mental science. The comparative philologist requires to study the psychological characteristics of all the groups and families of languages that man has spoken, and if properly qualified for this work, he despises the low drudgery of cramming the memory with vocabularies and declensions of individual tongues.

My convictions of the value of Phrenology to the educationist have been profoundly confirmed by conversation with scholastic friends on this subject of language-learning. They discuss it as though the learning of the names of things in more languages than one supplied additional ideas concerning those things, and that learning the different methods by which the relations of words are expressed in different languages (declensions, conjugations, etc.) supplies new ideas concerning the relations of the things themselves. Some have seriously contended that the existence of abstract ideas is due to the use of language ; that man has abstract ideas because he speaks, and animals have not because they have not the faculty of speech.

This is one of the many questions that may be argued for ever and contradicted perpetually unless we have some test

outside of the imagination and the ingenuity of the controversialists. Such a test is supplied directly by the cerebral organization, which, when rightly studied, shows that there is a separate organ for the appreciation of every distinct class of relations of which the human mind takes cognizance, as well as of every sensation and of every distinct class of objects.

The primary business of the teacher is to learn which objects, which relations, which abstractions are connected with each cerebral organ or region. When he understands this he knows which of the intellectual faculties he is nourishing by any particular course of study, and whether his general curriculum of educational work omits the culture of any.

With such a sound scientific knowledge of the elementary faculties of the intellect and of the objects that call each into action, his command of the progress of his pupils' minds will be comparable to the mariner's command of the progress of his ship when he knows every sail and every rope by which each sail is set, and how thereby to make each perform its proper share in the general propulsive co-operation. As it is, our ancient educational institutions are merely drifting down the stream by the ancient route to the same antique and obsolete destination as that of their forefathers; or if here and there they push on a little further and faster by hoisting a sail of modern innovation, it is done most unwillingly and only in dread of mutiny.

I have already stated that with a table before us of the elements which phrenological analysis has demonstrated to be the primary organic constituents of the human intellect, and a knowledge of the functions of each, we are enabled to submit any given course of study to strict scientific criticism; to determine which faculties it calls into exercise, and the degree of demand it makes upon each. I will now proceed to illustrate this a little further in detail.

First we have the organs of the senses. The functions of these were carefully studied before Gall proceeded further, and it has been long known that they are especially active in young children, and most desirably so, as they are the portals of all knowledge. Common-sense naturally suggests that any system of intellectual education that claims for itself the attribute of 'culture' should include the systematic culture

of these. Where do we find such culture (beyond learning the shapes of letters and words) in the recognised or orthodox academic curriculum ?

The origin of this fundamental neglect appears to be that to the non-phrenological mind the senses and their functions are so materialistic that they belong to the body rather than to the mind, that they are physical rather than intellectual organs, and that their culture is more appropriate to the gymnasium than to the school-room.

But the phrenologist who has demonstrated the organic basis of *all* the intellectual faculties includes every form of consciousness as a mental operation, and this conclusion is in no wise disturbed by the fact that parts of the organs of sensation are necessarily placed outside of the skull, and in direct communication with the material activities which call them into action.

Common experience, and more especially scientific experience, teaches all of us that accurate and exhaustive observation is an art that is possessed by very few. Every practical astronomer, every practical chemist, every practical naturalist, who has had pupils or assistants, knows too well that a good observer is about as rare as a logical reasoner. Nevertheless, any approach to systematic training in the art of observing is neither attempted nor dreamed about in the orthodox course of academic '*culture*.'

Outsiders like Wilderspin have attempted something in this direction, and at Board schools and kindergartens object lessons are given ; but these are vulgar, very vulgar institutions, quite outside of the refined precincts of academic '*cultchar*.'

The astronomers, chemists, and naturalists above referred to do not understand the reason why accurate and complete observation is a high art. The phrenologist does. He knows that behind the organs of the senses, external and internal, there are certain regions of the cerebral hemispheres which include special organs for determining and registering in the conscious human self (the *ego*) the various special qualities or affections of the images that are brought to them by the senses. These are form, size, weight (momentum or resistance), colour, order, number, locality, etc., all of them faculties which demand systematic training. Their educability is proved by what may be done in educating artists, engineers,

etc. The primary or general school education of these faculties is of course but elementary as compared with their technical education.

No teacher is competent to undertake the business of primary education who does not understand the functions of these perceptive faculties, i.e., the objects which call them into activity, and the laws of their action. When Phrenology takes its proper place as the accepted science of the mind, the man or woman who shall pretend to be a teacher while ignorant of these cerebral organs and their functions will be regarded as a charlatan, as gross a charlatan as he who should perform surgical operations in ignorance of the structure and functions of the organs on which he operates.

A glance at the phrenological bust shows that the organs of tune and time occupy a considerable area of the frontal lobe. This, supplemented with a knowledge of their functions, shuts up all contentious squabbling about the desirability, or rather the necessity, of including music in the primary education of every human being. To the benighted mind of the mere pedant this implies the teaching 'common people' to play on the piano or the guitar, etc.; but intelligent people endowed with common-sense are able to understand that the primary training of the musical faculty, i.e., the cultivation of musical taste, is not the same as technical education in instrumental performance.

In the same cerebral tier we have locality and eventuality. These receive a fair amount of attention where geography and history are properly taught.

Above them are the reflective faculties; those which are especially concerned in reasoning, properly so-called; that collect analogies and discriminate antitheses; that take cognizance of efficiency in causation, supply the idea of force, and measure the weight of evidence. These faculties operate upon the ideas which are brought to them by the perceptive faculties, and thus supply the thinking power and enable us to elaborate abstractions.

These must be nourished like the rest, and they need the most skilful guidance, being the most liable to erratic wandering.

To the phrenologist the course of study demanded for true and complete culture of the intellect is self-evident and demon-

strable. He sees quite clearly that all the organs of the intellect are directly and necessarily related to the physical objects and forces of the external world, and to the subjective consciousness of man himself. This is as completely the case with the intellectual organs within the skull as with the external organs of sense. The eyeball is an optical instrument, a camera obscura constructed for receiving the rays of light, refracting and conveying them to form a focal picture on the retina. In like manner the inner cerebral mechanism receives this physical picture and converts it into a mind picture—into ideas. The external world—so far as we know it—is nothing more or less than the mental images thus produced, and the internal world of our own consciousness—our desires, emotions, etc.—is a corresponding assemblage of internal sensations.

All these phenomena, all these ideas of physical and mental existence, and all the relations between them which we are capable of understanding, constitute physical and mental science. Thus the human intellect is a scientific machine lubricated by art and poetry, that can only receive its proper culture by doing its proper work, i.e., by the study of science in its fullest breadth—physical and moral science. Every department of natural history is of course included in this: the natural history of the heavens and of the earth, with its plants and animals, all culminating in the physiology and the natural history of man, whose natural history of course includes his social history.

Some curious popular delusions prevail concerning the difficulties and profundities of science. We often hear intelligent people affirm that scientific subjects are too difficult for them. They should say, not that they *are* too difficult, but that they are *made* too difficult by incompetent teachers, by teachers who neither know what to teach nor how to teach.

Genuine science—inductive science—is nothing more or less than common-sense extended by co-operative research, put in order systematically and accurately expressed. There are certain pedantic impostors who would persuade us that science resides only in laboratories, observatories, and universities, and who would set up a priestcraft of science for self-exaltation sake.

It is the duty of all who understand the pernicious fallacy of this to demonstrate and to proclaim aloud that the value

and dignity of science are exactly proportionate to the universality of its diffusion as the common heritage of all mankind, and that its great principles, when properly taught, are intelligible to all healthy minded human beings.

It is true that there are certain developments of science which are very complex, and others that are still obscure, but the complexities are all in matters of detail, not of principle, and the obscurities are simply due to the imperfections of knowledge or pedantic humbug. They reside in the misty borderland which separates the light of science from the darkness of ignorance, the region that is yet but partially cleared by the pioneers of inductive research.

The subject of heat supplies a good illustration of this. Nothing can be simpler than the great general fact that bodies expand when heated. All the laws of such expansion (in quantitative detail if required) can be understood by a child, also the apparent exceptions; but the dreams of mathematical visionaries concerning the imaginary dancing of imaginary molecules, their imaginary velocities, their imaginary collisions, their imaginary 'mean free paths,' and their relations to the imaginary 'luminiferous ether' or universal 'jelly,' have been worked up into a maze of mathematical enigmas, the complications and obscurity of which are purely artificial and visionary, are, in fact, merely an exposition of the mental aberrations of their propounders and expositors, who, if they understood the laws of action of their own brains, would understand that human beings have no faculties which take cognizance of the essential nature of matter *in itself*. We only know its relations to *ourselves* by its operations on the media of communication between it and ourselves, i.e., our senses.

The further elaboration of these sensations by the other intellectual faculties and the limits of logical scientific speculation open up too large a subject for the present treatise, but I hope to discuss this and the legitimate business of the imagination hereafter. In the meantime I present the reader with the following example of the *illegitimate* use of the imagination, premising, for the information of those who have not studied the subject, that no physical evidence of the existence of any kind of ultimate atom or molecule of any kind of matter has ever been obtained. The molecules of the following rigmarole are all as purely imaginary (and avowedly so) as the gnomes

and sprites and goblins which our forefathers similarly created with the special function of explaining physical phenomena by their antics.

> I shall now give an account of the gyrostatic molecules, crude and improved. The crude one is a fly-wheel inside a massless shell. Here there is no gyrostatic action opposing a motion of translation, but only opposing a motion of rotation. This is the molecule which was stated to give the wrong kind of variation of magneto-optic rotation with variation of wave length. The improved gyrostatic molecule consists of two fly-wheels on one axis. But the axis is cut in two in the middle between them, and the parts fitted together by a ball-and-cylinder joint. The other ends of the half-axes are supported in ball-and-socket joints in the massless shell. So far as rotation of the shell is concerned this acts like one gyrostat, the axis always remaining in one line. But if the shell be frictionless the ether can only give translational movement to it, and the double gyrostat produces a gyrostatic effect when the molecule is accelerated in any direction except along the axis. The special function of this molecule is to explain magneto-optic rotation of the plane of polarization.

This is not copied from the chronicles of Colney Hatch or any other asylum, but from ' Nature ' of April 30, 1885, p. 602. The writer is at large, is a highly educated and very worthy gentleman, holding a high scientific position, and perfectly rational on subjects in which molecules and ether are not concerned.

There are many other eminent scientists in a similar condition. If they only amused themselves and each other by supplying occupation to otherwise unemployed mathematicians they would be quite harmless, but unfortunately their mathematico-molecular mania is becoming an infectious epidemic which is polluting science itself by infesting its whole atmosphere with the germs of pedantry and rendering it repulsive and exclusive.

Pure unpolluted science is essentially simple, and its simplicity is exactly proportionate to its true profundity, i.e., proportionate to our clear and definite understanding of the laws which are expounded, and the depth and breadth and height of their generality. The most profound generalization of physical science, that which is operating everywhere and upon everything material, is the law of gravitation. Every child, every animal, has a common-sense acquaintance with it. Co-operative scientific research has extended our knowledge of

the range of the infinity of this force, and has enabled us to express its action with quantitative accuracy.

There is no difficulty in teaching children that this familiar force operates between all masses of matter, and that its amount is proportional to the masses; nor does it demand a very long lesson to teach them that it varies inversely with the square of the distance between the masses. The boy or girl who understands this, and sufficient of the laws of motion to work out generally the resultant produced by the gravitation of one mass upon the path of another which is moving in space, has a more *profound* astronomical insight than was possessed by the most learned of Newton's predecessors, although the *quantity* of their knowledge was incomparably greater.

Such insight into the simple profundities of natural law which the generalisation of inductive science has revealed, such intellectual concord with the Divine harmonies of Creation, are necessary for the nurture of *all* the intellectual faculties, i.e., for the true intellectual culture that should be the birthright of all human beings.

Intelligent people will understand that this is different from technical science, from the working out of such problems, for instance, as the determination of the orbit and position of Neptune by its perturbation of Uranus.

The greatest of all the great physical scientists of the nineteenth century—the simple-minded Michael Faraday—has left us in his Christmas Holiday lectures to children some truly classic models of how science may be taught by a man whose Alma Mater was the University of Nature, where he studied without cramming, and whose intellect was never befogged by musty traditional exhalations of scholastic verbiage and pretentious pedantry. Thus remaining clear, it was enabled to clearly perceive and clearly expound the profound simplicities of fundamental natural law.

I have already referred to the simplicity of Phrenology and the facility with which it may be taught to young children. So far this has not been spoiled by pedantry. It has not yet been adopted by our ancient universities, and let us hope that it may not be until they have suffered an effectual purgation. They might have taken it under their patronage at the beginning of the century, and it might have thus

become one of the vehicles of scholastic erudition, and thereby accursed for ever; but 'sweet are the uses of adversity'—the priestly persecution that Gall encountered at the outset of his career has saved it from the greatest peril that could have befallen an infant science of such paramount value to all.

True, it has fallen into bad hands, has been taken up by peripatetic character-vendors, by head manipulators on the sands, by phreno-mesmerists and fortune-tellers; but mischievous as these have been, the damage they have done is far more easily curable than would have been the foul infections of pedantry. At one time, when much younger, when I had only sat in front of the footlights, I deplored the exclusion of Phrenology from our universities and the absence of any endowment of a professorial chair thereon; but subsequent experience behind the scenes has convinced me that this was a great blessing.

The following from a review of 'Text Books on Psychology,' the leading article of vol. 46 of 'Nature' (May 5, 1892), indicates what might have happened to Phrenology had it fallen among psychological pedants:—

> The sequence of states of consciousness in the case of (*a*) practical or perceptual, and (*b*) reflective or conceptual, recognition seems to be briefly as follows. Suppose I recognise a man, A, as one whom I have met before, say at a dinner party. Then I have a percept $_{qnzy}^{A}$ where A is the individual in question in the focus of consciousness, and q n z y the fringe generated by his present surroundings, more or less out of focus. This percept is immediately followed by the image $_{srtb,}^{A}$ where A appears amid different surroundings. This constitutes practical or perceptual recognition. In reflective or conceptual recognition there follows an act of introspection (or retrospection) whereby the common central element in the two states of consciousness is explicitly identified. There is no fusion in either case, except in so far as sequent states of consciousness have a central or focal element which is identifiable. If we simply recognise A as someone we have met somewhere, we do not remember where, there is associated with the focal image, A, an indefinite fringe of pastness serving to differentiate from the percept with its fringe of present surroundings; and if, on the other hand, we recognize A as a quite familiar person, whom we have seen again and again amid all sorts of surroundings, there is a fringe which we can only describe as involving both pastness and frequency. In the case of the animal or the child recognition presumably does not pass beyond the practical stage, that is to say, a percept A with this fringe is followed by an image *A* with that fringe. Reflective recognition, involving retrospection and a comparison of the two

images (*A* with this fringe and A with that fringe) and the identification common to both, is a product of conceptual processes of later genesis.

In noble contrast to such affectation of profundity, such muddying of shallow waters to make them appear deep, stand the writings of the great British exponent of Phrenology, George Combe. These may be advantageously studied by all scientific writers as models of pure scientific exposition, in which the writer is always striving to render his subject simple and intelligible to all his readers, and never seeking to display his own erudition—a foul vice that is growing more and more prevalent among modern college-crammed charlatans.

Phrenology will be the science of the multitude, and when this is achieved the efforts of pedantic impostors will fail, as it is only by imposing on the ignorant that they are ever able to succeed. After this it may and will take its place in any or all of our universities, whether ancient or modern, without danger to itself, and with much profit to all.

Some of my readers will probably disapprove of these irreverent strictures and suppose that they are written under the influence of mere quixotic impulse, but this is far from being the case. The highest and incomparably the most important practical usefulness of Phrenology is its application to the business of self-culture as the necessary means of elevating the whole human race.

In order that it may perform this, its special function, it must be a popular science, *the* popular science, the science of the vulgar multitude, the common property of all, down to the poorest of the poor. This will be prevented if it *first* becomes accepted by the aristocrats of learning, or patronised by those who regard our Board schools, etc., as dangerous institutions calculated to render the 'common people' discontented with their condition.

In order that its future progress may be wholesome and fruitful, it is desirable that it may continue for some time longer in a state of invigorating adversity, sheltered, sustained and advocated by the radical democracy of the intellectual world, by those who think for themselves and dare to carry out their convictions, even though they are not in accordance with prevailing conventional fashions. These are distributed

through all classes of the community, and (if my experience is fairly representative) most largely among the more intelligent of our skilled artisans. These will carry out the moral and intellectual discipline which I have sketched in outline in this and the preceding chapter, and will show its fruits by the advancement of their children ; and then, when this basis is obtained, Phrenology may be conventionally accepted and promoted by the 'highest authorities' without becoming enfeebled or corrupted.

Its influence on children may be understood if we reflect on the usual condition of the juvenile mind in reference to its first and most natural ambition—the desire to grow—to grow big—to grow strong—to grow clever—to grow good, etc. The child that begins its education with the study of itself simultaneously with that of the world around it, that learns what are the specially human faculties and what are their functions, how they raise man to his true human dignity, and how their harmonious action produces his happiness, will be supplied from the first with a high and proper direction for its natural ambition, and at the same time will learn how to carry out that ambition successfully by a course of self-culture and self-training.

Once started soundly and firmly in this career, his upward development will become assured, and he will not rest satisfied in merely securing to himself the vast advantages he has thus obtained. He will become an apostle and promoter of progress, and will not rest until all his fellow-men have become working converts.

Such is the natural, the sound, and desirable course of the phrenological propaganda that will ultimately achieve the object which is briefly indicated in the next and final chapter of this section.

CHAPTER XVI

PHRENOLOGY AND HUMAN PROGRESS

The most remarkable and important characteristic of the human being, as compared with other animals, is its peculiar capability of upward progress. The past history of animal life has shown that the general evolution towards its fitness for survival has been effected by changes of species, and taking the mammalia for example, the moral and intellectual advances from species to species have been but very small steps, compared with the physical changes upon which the variation of species depends.

The primitive man of the paleolithic period was, so far as we know, as distinctly human in physical characteristics as the men of to-day, as the greatest of our philosophers; but the moral and intellectual differences are enormous, greater, for example, than those between the lowest lemur and the highest monkey. The same applies to existing savages. We find, generally, that animals which have not been domesticated by man are well fitted to their surroundings, are satisfactorily constituted, do not suggest demands for improvement, and are not liable to any great degree of either advance or degeneration; they usually perform their own special and limited functions consistently. We do occasionally hear of a 'rogue elephant,' a herbivorous creature with the ferocity of the carnivora, a quadruped with a diseased brain; but these are so exceptional that, speaking generally, we may say that the lower animals are rarely liable to any notable amount of moral or intellectual deficiency, to criminality or imbecility.

The lion or the tiger; the seal or the dolphin; even the codfish or the salmon, fulfils its mission, lives in harmony with its surroundings, is a complete animal of its kind. It demands no improvement as lion, tiger, seal, dolphin, codfish,

or salmon, and each individual of the species is a respectable example of its own kind.

Not so with human specimens. The vast majority are miserably degraded, are creatures having the human form without manifesting the special and distinctive moral and intellectual attributes of humanity. I do not refer to savages only, but include the masses of so-called civilised nations, and even the nations themselves regarded as a whole.

Among the 'lower' animals the preservation of the species is continually presented as the great object of the existence and efforts of each individual; with man, even in his most advanced condition, the destruction of his own species constitutes his greatest, his most highly organized, his most highly honoured effort.

Now, at the close of the nineteenth century, we have in *civilised* Europe millions of men skilfully trained, equipped with all the appliances that modern science can supply, and set aside for the express purpose of wholesale and systematic slaughter of their fellow-creatures. The 'butcher's bill,' even in times of what is called peace, is by far the largest charge upon the revenue of every European nation. Those who are not directly set aside to do the butchery are compelled to support the foul business by large contributions from their daily earnings.

What a satire upon our boasted human superiority is presented by the spectacle of a European emperor, the representative of one of the most highly educated of European nations, publicly, proudly, and ostentatiously parading in military uniform!

We profess a religion of universal love and gentleness, erect and consecrate elaborate and costly temples dedicated to that religion, and crowd them with monuments erected to the memory of the most successful slaughterers of our '*beloved brethren*' and fellow-claimants to exclusive human immortality.

One may spend hours in St. Paul's and watch the streams of visitors who pass around and gaze admiringly on these monstrous inconsistencies, and though they shall all be 'professing Christians,' not one among them perceives the desecration.

The same throughout. We have become so familiar with this universal degradation of our own species that we accept it as a matter of course, without sickening or shuddering at the contemplation of its horrors.

Taking a comprehensive view of the human race as it is, considering its capabilities as demonstrated by the development and aspirations of a few, and comparing these with the actual moral and intellectual condition of the mass, we cannot, if we speak candidly and frankly, deny that—so far—the human species has been, and is, a failure.

My own reflections on this subject have led me to the conclusion that the human being is at present only in the course of creation; that we are yet but in the morning of the sixth day; that the chronicle of horrors which constitutes the bulk of human history—the persecutions, the tyranny, and consequent revolutions; the selfish, pitiless and majority-crushing struggle for riches, which, when obtained, are so largely used for the degradation of their proprietors by inflating their pride and vanity or ministering to sensual indulgence—that all these contentions are the agencies that are at work in creating the human being, properly so-called.

Among plants and the lower animals the struggle of natural selection for the survival of the fittest and the extinction of the unfit occurs chiefly between contending species. In the case of man this struggle is practically over; as a mere brute, as a savage or a sportsman, he has hunted and overcome and does hunt and overcome every rival species, and thus his struggles for survival as a species are over, but those for selecting the individuals of the species that are suitable for further survival are still in progress.

At first the struggles in hand to hand fighting served the purpose of extinguishing the physically weak and selecting for survival only the physically strong. Then came machine fighting with 'villainous saltpetre' and its present elaborations, which are giving supremacy to the nations that combine physical with intellectual superiority, as embodied in military engineering, tactics, and generalship.

An internal struggle of similar though bloodless character is proceeding simultaneously and still more efficiently as it is continuous and all-pervading. The struggle for money and social supremacy, like the hand to hand individual fighting of

savages, crushes down the feeble individually and in detail in one direction, and exterminates the sensual and self-indulgent on the other side.

Physical and intellectual selection is operating upon the poor, from among whom only the more vigorous survive and advance, while moral selection is still more destructively at work among the rich. The man who endows his son with a large inheritance supplies him with the implements of suicide, which he will certainly use unless he also inherits more than an average endowment of moral self-control.

This is proved by the fact that nearly all the wealthy aristocracies of the world have died out or degenerated. Our own has borne the fierce ordeal without complete extermination better, perhaps, than any other race, but still the fact remains that, while the Anglo-Saxon race is multiplying so rapidly that it is crowding itself out of its original home-land and overspreading the earth, its old aristocracy cannot maintain its numbers; the British Peerage is only maintained by continual replenishment from the more energetic of the commoners. This is the more glaringly significant from the fact that, with the exception of a small percentage who have entered the peerage by court favouritism, our aristocracy has originated in men who have raised themselves by their superior energy as warriors, or in the professional and commercial competition. If the descendants of these are exterminated in spite of the high quality of the original material, how much more ruthless and cruel is the curse of extreme wealth than the bitterest trials of poverty!

What must happen to a youth who at the age of 21, when all the animal propensities are at fever heat, when pride and vanity, especially the latter, are at their fullest activity, without any effort at earning, becomes the possessor of the means of gratifying every passion, of dominating over his fellow-creatures, and at the same time is deprived of the natural incentives to industry, wholesome ambition and self-denial; the motives which the natural necessity to earn his own livelihood and establish his own social position supply?

In order to escape he must either be feeble and passionless to an extent approaching imbecility—a drawling Dundreary,—or have inherited an exceptionally high moral organi-

zation and have been systematically trained by most skilful education in habits of steady industry and self-denial.

We are now passing through that stage of the creation of the human being, that hour of the morning of the sixth day when these two factors for the extinction of the unfit, extreme wealth and extreme poverty, are most potent. They are especially potent in a nation which has not only excelled in its domestic creation of wealth, but has invested great accumulations of this in foreign loans and foreign enterprises, thereby laying the other nations under tribute. It thus becomes subjected to an exceptionally fierce ordeal, which will either effect its ruin or render it paramount. It will either be corrupted and crushed by luxury, like the old aristocracies—the old Romans and other conquering races, or its naturally superior elements may survive, and these survivors may rise to such a development of moral and intellectual supremacy as shall render them the natural rulers of other races, and the parents of the forthcoming completed human beings whose advent and overspread upon the earth will constitute the completion of the sixth day.

But this high destiny cannot be fulfilled by passive and blind submission to the impulses of outside forces. The meridian period of the sixth day must be inaugurated by the deliberate, conscious, energetic, and systematic effort of all concerned. The whole community and every individual must intelligently co-operate in the work of forwarding the moral and intellectual evolution of themselves and their fellows, and this effort must be the paramount ambition and business of human life.

In the previous chapters I have shown that Phrenology teaches the art of doing this, and supplies the motive for so doing; and such being the case, I am justified in confidently concluding that the benefactions that will be bestowed upon mankind by the applications of the inductive method of research to mental science will be similar to those which man has received from the applications of physical science, with only this difference, viz., that the gifts of mental science will be as much more valuable than those of physical science, as moral and intellectual advancement are higher and more valuable than physical enrichment.

CHAPTER XVII

THE OBJECTIONS TO PHRENOLOGY

GALL AND HIS CONTEMPORARIES

The controversial literature of Phrenology is very voluminous, so much so, that it presents a considerable difficulty in treating the subject at all fully without becoming insufferably tedious. As the reader will learn by some of the quotations that follow, a considerable proportion of the attacks that have been made upon it consist simply of insolent and vulgar vituperation ; and above 90 per cent. of the rest are crude exposures of the ignorance of the writers, the majority of whom have attacked the subject without attempting to master its barest rudiments.

The first of these only require quotation in order that my readers may share the contempt with which I regard them ; the second class only demand some elementary explanation of the nature of the blunders ; the third demand respectful and serious consideration, and shall receive it.

The sixth and concluding volume of Gall's 'Fonctions du Cerveau,' published in 1825, three years before his death, is largely devoted to a discussion of the objections to his system that were published up to that date. His controversies are mostly with continental writers, German, French, and Italian. He refers gratefully to the English contributions of Combe and the British Societies generally, but does not condescend to notice the foul insolence of the 'Edinburgh Review' and its English imitators.

A large part of this volume has now only an historical interest, as it discusses anatomical questions which have since been settled—*all of them in favour of Gall.* Nobody now denies the fibrous structure of the whole of the white matter of the brain : every anatomist now follows the method of dissecting the brain which Gall was the first to systematically

teach, viz., that of following the course of the fibres instead of merely slicing, after the manner of his predecessors. No anatomist now denies the co-existence throughout the medullary matter of the brain of two sets of fibres, the separate existence and general distribution and commissural functions of one set of which Gall and Spurzheim were the first to discover.

Every anatomist is now a disciple of Gall (however unconsciously) in ceasing to describe the 'optic thalamus' as the optic ganglion, in following the optic nerve further backward to the corpora quadrigemina, or, at least, to the anterior pair of these, and in ceasing to confound these, as they occur in birds, with the optic thalami of mammalia. Many other structural details which he and Spurzheim described, and which were denied by some of their contemporaries, and are discussed in this volume, are now established beyond the reach of debate.

As I said above, this volume has an historical interest. This is especially the case as it supplies a crushing refutation of those who have so strangely, so wantonly ignored, and even denied the claims of Gall and Spurzheim as discoverers in cerebral anatomy. The refutation is presented by the fact that eminent and prominent anatomists denied the accuracy of their demonstrations at the time of their publication, without disputing their originality. It completes the refutation and disgrace of those who first denied the accuracy of Gall and Spurzheim's descriptions of certain details of cerebral anatomy, and afterwards, when the accuracy of these descriptions was confirmed, attributed their discovery to Reil and others.

Besides the anatomical questions discussed in this volume is that concerning the respective functions of the grey and the white matter of the brain which I have treated in my first chapter. This still remains undecided, and is therefore unlike the anatomical questions which have been so completely settled in favour of Gall and Spurzheim.

That such settlement of the anatomical questions should precede the physiological is naturally due to the fact that a single and skilfully conducted dissection may settle a purely anatomical question of mechanical structure, while a long series of observations of structure, development, and function are usually demanded for the demonstration of any physiological question.

The fair and candid disputation of the anatomical dis-

coveries of Gall and Spurzheim was due to the fact that their method of tracing the fibres by pressing and stroking them with the handle or back of the scalpel along the direction of their course, instead of lacerating or cutting them across, was not followed, or was unskilfully and impatiently attempted.

The works that are first discussed by Gall in the volume above named are 'Anatomie du Cerveau, contenant l'histoire de son développement dans le fœtus, avec une exposition comparative de sa structure dans les animaux. Par Frédéric Tiedemann, etc. Traduite de l'allemand par A. J. L. Jourdan,' Paris, 1823; a review of the above in the 'Journal universel des Sciences médicales,' tom. xxx., p. 309; 'Grundriss der Physiologie, von Karl Osmund Rudolphi, etc.,' Berlin, 1823; Coster's translation into French of Rolando's 'Saggio sopra la vera Struttura del Cervello dell' Uomo e degli Animali, e sopra le Funzioni del Sistema nervoso,' 1809.

A question of priority arose in reference to this last work, which was published in Italy one year before the great quarto work of Gall and Spurzheim, and in France twelve years later.

Rolando made some bold innovations on the received notions of cerebral structure, and M. Cloquet (a pupil of Rolando's) in his 'Descriptive Anatomy' defends his teacher with commendable fidelity and fairness. He says: 'The course of the medullary fibres that spread themselves out to form the hemispheres of the brain and of the cerebellum, discovered by Rolando, does not differ essentially from the explanation of them which is given by Drs. Gall and Spurzheim.' Rolando himself says that 'One might suppose that I had some knowledge of the exact methods of these ingenious anatomists;'[1] and further on in the same memoir he adds, 'I knew the structure of the brain which I describe, before the Viennese anatomists had published their anatomical observations.' M. Coster,[2] who quotes this, adds:—

I am far from wishing to insinuate by this quotation that MM. Gall and Spurzheim had profited by these anatomical researches of Rolando; I know, on the contrary, that when these two celebrated anatomists published their first works, it was impossible

[1] 'Memoria sulle Cause da cui depende la Vita degli Esseri organizzati' (Firenze, 1807).

[2] 'Archives générales de Médecine,' vol. i., March 1823.

that they should have any knowledge of the work on which I was engaged. It is not the first time that men of genius have found themselves in accord on the same subject, and each being unacquainted with the work of the others.

In reference to this claim of priority for Rolando, Gall writes as follows [1]:—

It was then in 1807 that he announced a new structure of the brain, entirely at variance with all that had been stated previously by the most celebrated anatomists. The first volume of my large work, which contained the anatomy of the nervous system, and especially that of the cerebrum and cerebellum, was only completed in 1809; but many years before my travels, I constantly made at Vienna demonstrations of the structure of the brain in explanation of my discoveries before a large number of spectators of all nationalities. I left Vienna on the 5th of March, 1805, and immediately after, and during the whole of the years 1806 and 1807, we made the same demonstrations of cerebral structure, always in presence of professors, of students, and a great number of exalted personages, at Berlin, at Halle, at Leipzig, at Jena, at Dresden, at Göttingen, at Copenhagen, at Leyden, at Amsterdam, at Heidelberg, at Stuttgart, at Carlsruhe, at Brunswick, at Hamburg, at Munich, at Frankfort, at Zürich, at Berne, at Bâle, at Paris, etc., etc. During my travels many of my auditors published my courses of lectures, and besides these they were reported in journals at the time as subjects of scientific and general interest.

The works of Froriess, of Bischoff, of Ackermann, of Walter, professor at Berlin, and of Walthort, professor at Bonn, of Bloede, of Muller, of Meyer, at Naples, of Demangeon, etc., all containing descriptions of my work, appeared before 1807. Thus in these years (1805 to 1807) such descriptions appeared in the Italian, French, Danish, Swedish, Dutch, etc., languages (as well as in German).

On the 14th of May, 1808, we presented to the Institute of France a Memoir in which our anatomical discoveries were described at length. The report on this memoir by Messieurs Tenon, Sabatier, Portal, Pinel, and Cuvier was distributed in all directions.

Gall does not infer from this that Rolando has been guilty of any wilful plagiarism, but, on the contrary, refutes any possible suspicion of this by arguments which I have translated and appended in the footnote below,[2] for technical readers.

Dr. Gall next discusses the experiments of Flourens on

[1] 'Fonctions du Cerveau,' vol. vi., p. 181.

[2] 'M. Rolando's idea of my anatomical and physiological work is derived from absurd misrepresentations of it by others, refuted by Malacarne. They describe me as maintaining that the brain is nothing more than a mass of

both the cerebrum and the cerebellum. He deals with these mutilations in nearly the same manner as I have treated the experiments of modern mutilators in Chapter VIII. of this volume, i.e., he compares the results of Flourens with those of his predecessors, contemporaries and successors, showing

cellular tissue. I only became acquainted with this caricature (*espièglerie*) by reading it in M. Rolando's book.

'A still more convincing proof that M. Rolando has not appropriated my discoveries is afforded by his exposition of the structure of the brain. The course of the nervous fibrils that contribute to the formation of the hemispheres is very badly indicated in his plates, although long before they were much better delineated by Vieussens and by Vicq-d'Azyr. He is guided by no physiological principle, such for example as the successive development of the brain in animals, and he declares that he had but three brains at his disposal. He must have but small acquaintance with this part who flatters himself to make discoveries therein without having the means of multiplying, repeating and confirming his researches. This accounts for Rolando's inexact description of the passage of the pyramids by the annular protuberance, by the optic thalami, and by the corpora striata. According to Rolando, the nervous bundles of the corpora striata contribute, as stated by his predecessors, to form the great commissure and its dependencies; and he has not recognised the totally different course of the converging and diverging bundles.

'He only knows the corpora striata as they have always been known to everybody; their exterior part, which greatly surpasses that which is seen in the ventricles, has altogether escaped his observation. He still, like all the anatomists before him, makes the optic nerve originate in the optic thalamus, and like many such anatomists, makes the olfactory nerve originate in the anterior commissure.

'Like all our predecessors, he confounds the eminences from where the optic nerves issue in birds with the so-called optic thalami of the mammalia. In like manner he describes the simple swelling of the medulla oblongata of birds as the annular protuberance. Being unacquainted with any law of the organization of the nervous system, he was not able to see that birds, reptiles, and fishes are without this protuberance, which is nothing more than the reunion of the nervous bundles (*faisceaux nerveux*) of the lateral lobes of the cerebellum. As these lateral lobes do not exist in these animals, they can have no apparatus for their reunion. M. Rolando has not the least acquaintance with the formation of this protuberance—this commissure of the cerebellum—of its interlaced passage with the longitudinal bundles of the pyramids. The entire structure of the cerebellum is a great mystery to M. Rolando. M. Altini imagined that he there saw a galvanic pile, the alternating layers of grey and white substance forming the plates thereof. Other anatomists, such as Reil and Rolando, have regarded this fiction as very plausible, and have adopted it. They do not know that the cerebellum is organised in accordance with the same laws as the hemispheres.'

This is followed by a long account of the contradictory results of the mutilation experiments of Fontana, Rolando, Flourens and others, a list similar to that which I have quoted from Ferrier in Chapter VIII. of this book, and which might easily be expanded from a chapter to a whole volume. Gall commences thus: 'In my third volume I have stated my reflections on the report of Baron Cuvier concerning the experiments of Flourens. M. Coster, in translating this work of Rolando, has replied to my observations. At the time they were written I was not yet acquainted with the dissertation of Rolando, nor with the memoir of Flourens itself. Since I have studied these works and the frequent contradictions of results which each has obtained from the same experiments, my conviction that mutilation is the worst of all means of studying the functions of the nervous system has been still further confirmed.'

thereby that, beyond the fact that a general destruction of brain is followed by a general annihilation of sensation, volition, and mind, the results obtained by any one of these experimenters is contradicted by those obtained by some other, and that nothing remains but a sickening chaos of unjustifiable cruelty. My readers will excuse the quotation of further details when I tell them that they extend over seventy pages, concluding as follows :—

> Let us finish as we commenced, by stating that out of a thousand experiments by lesion and mutilation, nine hundred and ninety are either absolutely sterile in results, or merely confuse and perplex us by their interminable contradictions when they are repeated by other hands, and that the remaining ten only serve to confirm what we already know.[1]

The next work which Gall discusses in detail is 'Anatomie comparée du Cerveau dans les quatre Classes des Animaux vertébrés,' par E. R. A. Serres ; Paris, 1824.

Serres disputes all localization of the cerebral functions and contends for the homogeneity and unity of the whole nervous system, and Gall discusses this in detail both as regards structure and function. His heading of the question in dispute, viz., 'Can the function of one sense or of one organ be transmitted to another sense or another organ?' sufficiently indicates that the debate belongs to the past, and that I need not take it up here. The functions of the grey and

[1] The following passage from Gall's criticism of Flourens' method may be interesting to technical readers, as it applies with equal force to all the modern attempts to localize the cerebral functions by lesion of parts of the hemispheres or of the cerebellum.

Flourens says, 'I removed from a pigeon, by successive and carefully dissected layers (*couches*), all the anterior part of the right cerebral lobe, and all the superior and middle part of the left.'

After quoting this, Gall says: 'This mode of experimenting assumes an organization of the brain absolutely contrary to that which actually exists. Where has M. Flourens ever seen the brain of an animal formed in layers (*couches*)? To satisfy us that in his experiments he tried to remove one faculty after another he should have attacked each cerebral part, each division in bundles, from its origin in the medulla oblongata and spinal cord, in the annular protuberance in the optic thalami, in the corpora striata; he should have followed this same bundle, or this same organ, on to its final expansion (*épanouissement*), and afterwards, on returning, to its internal commissure. This is the only mode of procedure that would be conformable to the true organization of the brain. To do this is impossible; and M. Flourens had not even the idea of doing it; consequently all his experiments, even though he presented us with millions of them, could never have the smallest value in demonstrating the seat of any propensity, any instinct, or any faculty whatever. He mutilated all the organs at once, he weakened all, he extirpated all at once.' ('Fonctions du Cerveau,' vol. vi., p. 256.)

white matter which I have already treated is also discussed between Serres and Gall, and whether the nervous system is formed from the centre to the circumference or from the circumference to the centre.

I may safely add that the subsequent progress of science has settled all the questions here discussed by Gall completely in his favour.

The next book that is quoted and discussed by Gall in this volume is the 'Mémoires du Dr. F. Antommarchi, ou, Les derniers Moments de Napoléon.'

From this work he quotes the following objections, which, as he says, 'offer more interest from their source than from their intrinsic force or value':—

Lady Holland sent a parcel of books, in which was found a small box containing a plaster cast of a head covered with divisions and figures relating to the craniology of Gall.

'Here, doctor,' said Napoleon, 'this is in your domain; take it, study it, and tell me all about it. I should like to know what Gall would say if he felt my head.'

I set to work accordingly, but the divisions were inexact and the figures badly placed; I had not yet re-arranged them when Napoleon called me. I went and found him in the midst of a mass of scattered volumes reading Polybius. He said nothing to me at first, but continued to run through the volume in his hands; then threw it aside, came to me, and staring fixedly took me by the ears, saying:

'Eh bien! dottoraccio di capo Corso [Now then, Corsican-headed old doctor], have you examined the box?'

'Yes, sire.'

'Studied the system of Gall?'

'Somewhat.'

'Do you understand it?'

'I think so.'

'You can apply it?'

'Your majesty shall judge.'

'Can discover my inclinations, estimate my faculties, by feeling my head?'

'Even without touching it.' (He laughed at this.)

'You are an adept at it?'

'Yes, sire.'

'Very well, we will talk about it when we have nothing better to do. As a last resource it will do as well as anything else; it is amusing sometimes to see how far stupidity (*la sottise*) may be carried.'

After walking awhile he resumed.

'What thinks Mascagni of the German fancies? Come now,

speak frankly as though you were conversing with one of your confrères.'

'Mascagni greatly admired the manner in which Gall and Spurzheim developed and demonstrated the various parts of the brain; he even adopted their method as the best fitted for affording us a knowledge of this interesting organ. As for the pretension to judge the vices, the tastes and virtues of men by the protuberances, he regarded it as an ingenious fable that might please common people, and was not supported by anatomical examination.'

'There, now, is a wise man, a man who can appreciate the merit of a conception and separate from it the fallacies with which it has been contaminated by charlatanism; I regret that I did not know him. Corvisart was a great partisan of Gall's; he praised him, he patronised him, he did his utmost to introduce him to me; but there was no sympathy between us. Lavater, Cagliostro, Mesmer, have never pleased me; I felt an instinctive aversion to them, and I carefully excluded their followers from among us. All these gentlemen are skilful, talk well, and trade upon the demand for the marvellous that prevails among common people; and they give an appearance of truth to the most false theories. Nature does not betray herself by external forms. She hides, she does not deliver up her secrets. Whoever pretends to understand the characters of men by such superficial indications is either a dupe or an impostor. The only way to become acquainted with our fellow-men is to watch them, to associate with them, to test them. One must study them for a long time in order not to be deceived. We must judge them by their actions, and even this is not infallible.'

In the 'Mémorial de Sainte-Hélène,' by Count Las Casas, is the following further sample of the customary criticisms of Phrenology by this same Napoleon, whose knowledge of the subject is similarly representative:—

I have done much towards settling Gall (*J'ai beaucoup contribué à perdre Gall*). Corvisart was a great disciple of his; he and his like have a great love of materialism, it magnifies their science and their influence. But Nature is not so poor. If she were so gross as to display her secrets by external forms, our work would be easy and no wisdom demanded. But her secrets are more subtle and delicate, more evasive; they baffle us all. A little hunchback proves himself a great genius; a big handsome man only a fool. A large head and big brain is sometimes void of ideas, while in a little one there may be vast intelligence. Now observe the imbecility of Gall; he attributes to certain bumps (*bosses*) propensities and crimes that have no existence in Nature, that are merely the products of society and conventionality. What would become of the bump of theft if there were no property? of the bump of drunkenness if there were no fermented liquors? of that of ambition if there were no society?

Gall replies to this with some very caustic remarks on the facilities which the self-conceit of an ignorant despot supplies to the courtiers who are interested in humbugging him, and tells us how and by whom the fine phrases above quoted were prompted to Napoleon at Leipzig during his first visit to Germany, and how savagely, on his return to Paris, he rebuked the Members of the Institute who had so enthusiastically received the new demonstrations of the structure and functions of the brain.

Gall continues :—

> This was a thunderbolt from Jupiter that struck down the pigmies. Suddenly my discoveries became rubbish, charlatanry, absurdities ; the journals obeyed and became the slavish instruments for heaping ridicule on the so-called bumps. They persuaded their credulous master that Gall was sufficiently imbecile to invent a bump or organ of drunkenness.

Something else, which Gall does not mention, happened at the same time, and much increased the exasperation of the Corsican. The Academicians, who were men of science and gentlemen, and therefore unintelligible to Napoleon, had received Sir Humphry Davy in Paris with open arms, and awarded to him a prize for his chemical discoveries. At about the same time Cuvier had received Gall and Spurzheim with great politeness, had requested them to dissect a brain privately for him and a few of his learned friends, and had attended a course of lectures which the German doctors had delivered to a party of Cuvier's selection. In an article in 'The Foreign Quarterly Review,' by Richard Chevenix, F.R.S., the result is thus described :—

> When the First Consul was apprised that the greatest of his comparative anatomists had attended a course of lectures by Dr. Gall, he broke out as furiously as he had done against Lord Whitworth ; and at his levée he rated the wise men of his land for allowing themselves *to be taught chemistry by an Englishman and anatomy by a German.*

I have quoted these objections of his Imperial Majesty because, as Gall says, they fairly represent the ideas and prejudices of the vulgar opponents of Phrenology. In replying to them a considerable heap of such material will be swept away.

First of all Napoleon tells us that Lavater, Cagliostro, and

Mesmer never pleased him. I find that this statement is copied by many other writers who have attacked Phrenology. Cagliostro is one of their regular and indispensable stage properties, the bringing forth of whom is a blatant proclamation of their utter ignorance of the whole subject. Neither Lavater, Cagliostro, nor Mesmer knew or pretended to know anything of the anatomy of the brain, while Gall and Spurzheim were the greatest of teachers of cerebral anatomy that have ever lived. They are the fathers of cerebral anatomy as it is now understood, and every modern teacher follows their methods of dissection and teaches their great fundamental discoveries, though too many ignore their claims, either from ignorance of the history of their own subject, or the shameful motive of pandering to superstitious prejudice. Neither were Lavater, Cagliostro, nor Mesmer cerebral physiologists, nor professed to be. Phrenology is simply a system of cerebral physiology which has no more connection with the nonsense of Lavater, Cagliostro, or Mesmer than astronomy has with fortune-telling or chemistry with conjuring. Napoleon and his imitators in attempting to associate Gall with these gentry place themselves side by side and on an equal footing with the learned costermonger whose speech is reported in my introductory chapter; the only difference being that which I specified in the last words of that chapter.

Then we have Napoleon's ideas concerning the diplomacy of Nature. That he should have regarded her as an 'evasive' artful dodger was perfectly natural to a man whose whole history betrays not only an incapacity to appreciate the dignity of truth and candour, but a positive contempt for anybody who would make the smallest sacrifice for the sake of truth, for anybody who should be so poor as to hesitate for a moment to become a liar if any advantage could be gained by lying.

It is perfectly natural that the ideal of such a man should be 'subtle and delicate' and 'evasive,' in order that she may baffle us all,' that she should cunningly crawl and shuffle and hide and falsify, and never display her proceedings or intentions truthfully. *Napoleonic Nature* was necessarily Napoleonic; she could be no other than a sneaking evasive and lying goddess.

Science in all its departments denies all this; proves the contrary most absolutely. It reveals in every direction an

universality of arrangements, of special devices for the display of all the doings of Nature to intelligent men. All our knowledge of the properties of matter consists of responses to our inquiring senses. Her swift-flying light travels alike from the nearest objects of the earth and the distant orbs of space to enter our eyes, where it bends itself to paint a faithful picture on the expanded nerve which carries its stimulus to our brain and leaves its imprint there as a part of our conscious selves. Thus Nature displays her form, dimensions, positions, order and movements. Her voice is in like manner conveyed freely and spontaneously to our ears, her odours to our nostrils, her flavours to our palate, her resistances to our touch. All our senses are constructed with special fitness and adaptation to receive her freely and bounteously proffered revelations of herself and her doings, and all our inner cerebral organs to record, to analyse, to generalise, to understand and remember them.

It is only to the ignorant boor, or the blind, prejudiced, self-sufficient bigot, that she refuses to reveal her secrets, and this only because such inferior creatures are incapable of receiving them. Napoleon was an exaggerated example of the latter class.

The idea that any of our faculties is a consequence of society is an obvious fallacy. It assumes that society preceded humanity. A little reflection must teach every logical thinker that society and all its institutions are results of the operation of the human faculties, although these results, like all other results, react upon their own causes. If I kick a football, the ball reacts upon my toe and may leave a sensible impression there, but it is not, therefore, correct to say that the ball kicked me. A moving billiard ball strikes another ball that was at rest and sets it in motion ; in doing so the moving ball suffers deflection of its own course by the reaction. So with the social instincts which originally created society. They are deflected or modified in the direction of their action by influences which society returns upon them.

The determination of the primary functions of the social instincts is a subject demanding systematic inductive research. It is not a subject that can be settled by the opinions or ideas of Napoleon or any other dictatorial dreamer, however learned he may be, or however Napoleonic in proclaiming

his own psychological dreamings in pedantic volumes of any thickness.

Napoleon's talk about big heads and brains and little heads and brains has been repeated *ad nauseam* by every critic of Phrenology whose ignorance of the subject is similar to that of Napoleon. The reader may demonstrate for himself the depth and utterness of this ignorance by simply examining any of the phrenological busts which are so abundantly displayed in shop windows, or the profile diagram thereof as shown below in Fig. 34, which is copied from the frontispiece of Combe's 'System of Phrenology.'

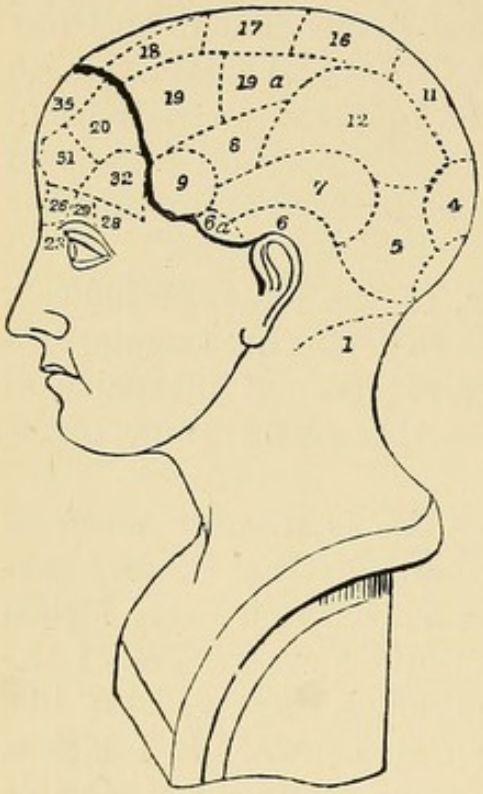


FIG. 34.

It will there be seen how small a portion of the whole head is occupied by the organs of the intellectual faculties: just the forehead, having for its boundary the line which separates the regions marked 32, 20, and 35 from 9, 19, and 18.

The rest of the head is occupied by the sentiments and the propensities. The proportion varies greatly in different heads, but, speaking roughly and generally, the size of the intellectual region is about one fourth of the whole, or from that to one third.

This being the case, a very moderate amount of intelligence is sufficient to show that, according to the phrenological location of the faculties and the law of size and power, a man with great intellect, combined with little sentiment and passion, should have a small brain and small head, while, on the other hand, a man of strong passions, great impulsive energy and strong sentiment should have a large head, whether his intellect be strong or feeble. In spite of the simple obviousness of this, I frequently meet people who do not expect me to treat them with contempt, although they sneer at Phrenology because they have known clever men with small heads and stupid men with big heads. In most cases this is simply the

silly inference of a flippant chatterer, and is bad enough, but not so bad as the direct falsehood of the 'Edinburgh Review' (June 1815, p. 247), which says, 'Gall and Spurzheim, in fact, in affirming that the vigour of the intellect is always proportional to the size of the head, seem to be desirous of trying how far their effrontery might be carried.' Gall and Spurzheim never said so, but, on the contrary, repeatedly denied it in the works under review.

As my readers already know, I agree with Napoleon in regard to the necessity of observing the actions of men in order to understand their character, and I may add to this that Phrenology teaches us that there are certain faculties which supply a special aptitude in the discrimination of character by enabling us to understand the natural language which is expressed in actions and gesture. Napoleon owed much of his success to his aptitude in this, but had he studied the works of Gall, and added to this insight the further knowledge of character derivable from observation of cerebral development, his success would have been still greater.

It is well that he did not.

CHAPTER XVIII

SPURZHEIM'S RECEPTION IN THIS COUNTRY

THE INSOLENCE OF THE 'EDINBURGH REVIEW'

In my last chapter I referred to the insolent and vulgar vituperations of Phrenology, and explained the manner in which I propose to treat them. In accordance with this I present the reader with the following samples from an article in the 'Edinburgh Review' of June 1815, with the italics, grammar, and punctuation of the original. I select them from this magazine at this date as displaying the character of the greetings which Spurzheim received from some of the leaders of the British Press when he first visited this country, and published his first English work in 1815.

The 'Edinburgh Review,' referring to this work and to the quarto work of Gall and Spurzheim, says :—

> The present publications have not only confirmed our original judgment with respect to him [Gall], but led us to extend the same opinion, without the slightest modification, to the partner he has since assumed, Dr. J. G. SPURZHEIM. We look upon the doctrines taught by these two modern peripatetics, anatomical, physiological, and physiognomical, as a piece of *thorough quackery* from beginning to end; and we are persuaded, that every intelligent person who takes the trouble to read a single chapter of the volumes before us, will view them precisely in the same light.
>
> There are a certain number of individuals, however, in every community, who are destined to be the dupes of empirics; so it would be a matter of surprise, if these itinerant philosophers did not make some proselytes wherever they come.
>
> That Drs. GALL and SPURZHEIM, however, should have brought over any of the better informed in the island, particularly from among those with whom anatomy and physiology are either favourite or professional pursuits, into a belief of any of the amazing absurdities they are bold enough to teach, is, we should hope, a thing really impossible. There is nothing, indeed, in the shape of reasoning, calculated to mislead, in their whole writings; not one clever sophistry to captivate, nor even an occasional induction to redeem;

—nothing but a perpetual substitution of assertion for demonstration, and conjecture for fact. Were they even to succeed in shaking off the suspicion of *mala fides*, which we apprehend is inseparably attached to their character, we should not hesitate to say, that we do not know any writers, who, with a conceit so truly ridiculous, and so impudent a contempt for the opinion and labour of others, are so utterly destitute of every qualification necessary for the conduct of a philosophical investigation.

The reviewer then describes his objects in reviewing the books, explaining that—

> The second, and by far the most important, is to save the purses of our readers if possible, before it be too late, by satisfying that curiosity which might otherwise lead them to purchase the books themselves, or attend the lectures of these cunning craniologers.

This lofty mercantile object, 'by far the most important' mission of the 'Edinburgh Review,' is further indicated in other parts of the article, where it describes the followers and admirers of Gall and Spurzheim as their '*customers*,' in italics.

Further on (p. 233) this very high-minded and truthful magazine tells its readers that—

> There seems to be a schism in the copartnery; the house is divided against itself; and it would by no means surprise us to see, in the course of a twelvemonth, a quarto or two put forth by GALL against SPURZHEIM, and as many by SPURZHEIM against GALL.

This is followed by an enumeration of the phrenological faculties, interspersed with feeble flippancies printed in italics to enable the reader to discover that they are intended to be sarcastic or witty, and to tell him when to laugh. Such guidance is quite necessary.

The following commentary concludes this part of the Review:—

> Such are the opinions of Drs. GALL and SPURZHEIM on the *Functions in general* of Man, and on his *Intellectual Faculties* in particular. We have been more minute in our sketch of them, that their absurdity might be more apparent. To enter on a particular refutation of them would be to insult the understandings of our readers. Indeed we will flatter the authors so far as to say, that their observations are of a nature to set criticism at defiance. They are a collection of mere absurdities, without truth, connexion, or consistency; an incoherent rhapsody, which nothing could have induced any man to have presented to the public, under a pretence

of instructing them, but absolute insanity, gross ignorance, or the most matchless assurance.

As an example of the capacity of the 'Edinburgh Review' to understand the subject which it thus vituperates, I quote the following lucid account of the function of adhesiveness, which is supplied to its readers as one of the things which 'the said Drs. Gall and Spurzheim declare' (p. 240) :—

When a person forms an attachment to punch or to poetry, as very worthy men will sometimes do, he only *manifests* in a pleasing manner the faculty of *adhesiveness ;* but the faculty of *adhesiveness* exists in that man whether he has actually given in his *adhesion* to the bowl or not.

Here are some more samples of insolence :—

Such is the trash, the despicable trumpery, which two men calling themselves scientific enquirers have the impudence gravely to present to the physiologists of the nineteenth century, as specimens of reasoning and induction. (P. 250.)

Further on this highly respectable and courteous periodical proceeds to say that—

The writings of Drs. GALL and SPURZHEIM have not added one fact to the stock of our knowledge, respecting either the structure or functions of man ; but consists of such a mixture of grossness, extravagant absurdities, downright misstatements, and unmeaning quotations from Scripture, as can leave no doubt, we apprehend, in the minds of honest and intelligent men as to the real ignorance, the real hypocrisy, and the real empiricism of the authors. (P. 268.)

We are so heartily tired of the mass of nonsense we have been obliged to wade through that we could most willingly have done. But the *Anatomical Discoveries* of Drs. GALL and SPURZHEIM yet remain to be considered ; and these are on no account to be passed over in silence. It appears to us, that in this department they have displayed more quackery than in any other ; and their bad faith is here the more unpardonable, that it was so much more likely to escape detection. These gentlemen are too knowing not to have perceived, that the science of anatomy is in general cultivated with most zeal, by those that have the least leisure to devote to it ; that is by persons who are toiling with weariness through medical practice ; and that those whose *profession* is to improve this department of human knowledge, are usually content to bequeath it to their sons, just as it was handed down to them by their fathers and grandfathers. They calculated, no doubt, that as the number of individuals is inconsiderable, who are not only zealous in anatomical pursuits, but, by a fortunate combination of circumstances, are enabled to bestow their whole time upon them, the chance that a

few bold affirmations respecting the structure of a delicate and complicated organ would be put to the test of experiment is comparatively small. (P. 254.)

Further insolence in the form of accusations and insinuations of wilful imposture and falsification occur in reference to anatomical details, as in the following, from p. 256 :—

> Let us now see what Drs. GALL and SPURZHEIM say upon this subject. They affirm without scruple, that it is possible to demonstrate the White Matter to be fibrous in all parts of the Brain, merely by tearing or lacerating the different portions of this organ, while it is yet in a recent state, with the handle of a scalpel, and without previous coagulation of any sort. We not only maintain, however, that this is incorrect, but that they must have known it to be so. There are many portions of the White Matter, without doubt, which tear more directly in one direction than another ; and this direction, we have found, corresponds to the direction of the fibres which appear in the same part when coagulated ; but we deny that there is any unequivocal, far less uniform, appearance of fibres, on the lacerated surface, even in these instances.
>
> Over a great extent of the brain, on the other hand, the White Matter seems to tear as readily in one way as another, and in all these cases there is not the slightest appearance of a fibrous structure. It must be remembered too, that a fibrous appearance, and a fibrous structure, are two different things ; that the former is not always caused by the latter ; and therefore, though the fibrous appearance were quite obvious and invariable, the cause of it might still be a matter of conjecture. The fact then, at present merely is, that when a recent cerebrum is dissected with the handle of a scalpel, certain portions of its White Matter separate more readily in one direction than in another.

This denial of the fibrous *structure* of the white matter of the brain by the 'Edinburgh Review,' however ridiculous it may appear to the modern anatomist, is but an expression of the state of knowledge of cerebral anatomy which prevailed generally previously to Gall and Spurzheim's demonstrations of the actual fibrous *structure* of *all* the white matter of the brain and nerves, which they displayed by carefully separating or scraping them with a blunt instrument, such as the handle of a scalpel, instead of the clumsy slicing previously adopted. A fibrous structure of both white and grey matter (of the latter especially by Reil) had long been *supposed* to exist ; but Gall and Spurzheim *demonstrated* it in the white matter, and taught their pupils how to do this themselves, and how not only to prove the existence of the fibres, but also to

trace their course from the medulla oblongata to the various ganglia of cerebrum and cerebellum, and, after due reinforcement by the grey matter of these, to the cerebral cortex. The vulgar venomous abuse of the 'Edinburgh Review,' by thus expounding the orthodox views of the period concerning cerebral anatomy, supplies unwilling testimony to the merits of Gall and Spurzheim in reference to their discoveries in this direction.

This highly respectable magazine adds to the above the following characteristic foot-note :—

> We suspect that when our authors are desirous of *demonstrating* to their less knowing pupils, that the White Matter is fibrous, they exhibit some portion of the brain, where, in consequence of the alternations of the two kinds of Matter, the White is disposed in threads through the Brown.

In chapter i. I have referred to the discoveries of Gall and Spurzheim in reference to the general distribution of commissure fibres throughout the interior of the brain.

The 'Edinburgh Review' not only denies their existence, but describes Gall and Spurzheim's announcement of their discoveries as a deliberate intentional fraud and misrepresentation (p. 261) :—

> Such is the grand system of the *diverging* and *converging fibres* of the brain, of which Drs. GALL and SPURZHEIM are the sole inventors and proprietors ; a discovery truly, which, at some future time, may throw light on the most obscure operations of the microcosm. In the meanwhile, it is our painful duty to remark,—that the system is a complete fiction from beginning to end. The incorrectness, too, of these gentlemen, on this occasion, admits of no explanation or apology on the score of ignorance ; their unceasing professions of the time and labour they have bestowed on the dissection of the brain, entirely preclude this excuse ; we must ascribe their inaccuracies solely to intention.
>
> It is a wilful misrepresentation in them, therefore, to affirm, that in portions of the brain which are composed purely of White Nervous Matter, either *diverging* or *converging fibres* can be shown by the method they have described.

It is satisfactory to know that the British Press may no longer be defiled by such excretions as those above quoted. They would now render the proprietors and publishers of the periodical liable to severe punishment under the laws of

libel. They are not criticisms, but false and criminal accusations, written with intent to injure both Gall and Spurzheim by representing them as dishonest adventurers engaged in the public perpetration of deliberate fraud. That the 'Edinburgh Review' remained in existence as an influential magazine many years after the perpetration of this disgraceful diatribe is a sad evidence of the degraded condition of journalism and literary public opinion at that period.

The following illustrates the *truthfulness* of the 'Edinburgh Review.' After describing generally the two first plates of Spurzheim's work, and more especially that which represents the under surface of the brain (Fig. 1), it goes on to say:—

> It deserves, also, to be remarked, that not a single number is to be seen on the medulla oblongata, or the annular protuberance, or the peduncles either of the cerebellum or the brain proper, or the mamillary eminences, or the infundibulum; or, in short, any of the parts which lie between the middle lobes.

I here present to my readers a facsimile copy by photogravure process of this plate, the plate especially referred to by its number. They will there be able to *see* the falsehood of the above statements, to see that on the medulla oblongata are the figures 5 and 1, besides the letters *a* and *e*; on the annular protuberance the letters *b b*; on the mamillary eminences the figure 16; on the infundibulum the figure 22. Instead of no numbers being on 'any of the parts which lie between the middle lobes,' there are, as the reader may see, no less than seven numbers there, viz., 15, 16, 17, 18, 19, 21, and 63. All these are more distinctly marked in the original lithograph than in my copy, which is somewhat blurred by reproduction.

This article being published anonymously in editorial form, the magazine in which it appeared is fully responsible for all its contents.[1] It soon became known, however, that the author was Dr. John Gordon, a lecturer (extra-mural as regards the university) in Edinburgh on anatomy and physiology, and an aspirant to further advancement in the university and infirmary. At the time of the publication of this article he had been recently appointed to a junior surgeonship in the infirmary, but advanced no further. The 'Edinburgh Review'

[1] In 1826 Lord Jeffrey used it as his suitable vehicle for describing the researches of Gall and Spurzheim as 'crude,' shallow,' 'puerile,' 'dull,' 'fantastic,' 'dogmatic,' 'incredibly absurd,' 'foolish,' 'extravagant,' and 'trash.'

was then in its prime, had great influence, and many followers and imitators among other magazines. These, of course, played the usual game of 'follow my leader,' and sneered at the German anatomists, especially at Spurzheim, who dared to cross the Channel, and presumed to teach anatomy and moral philosophy to the infallibles of our ancient universities.[1]

Dr. Spurzheim was in London when Gordon's attack appeared, and he at once determined to visit Edinburgh in

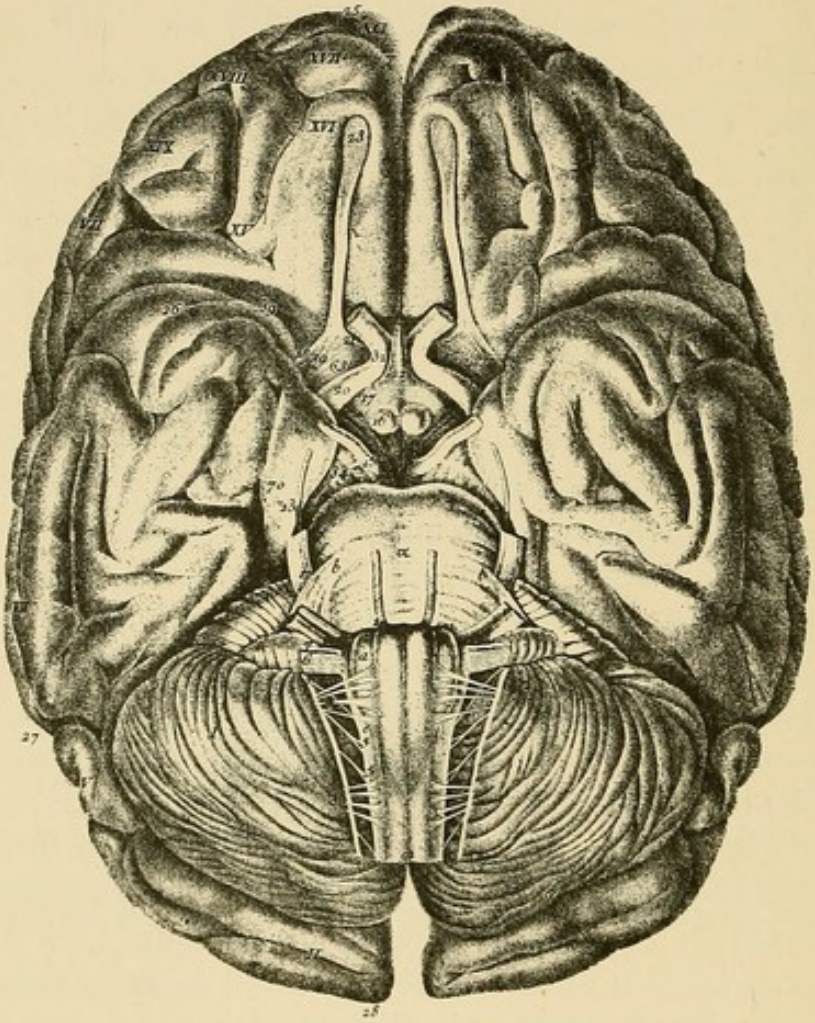


FIG. 35.

order to refute his antagonist by the best possible method, viz., that of demonstrating the falsehood of his statements by dissecting a brain in the presence of competent witnesses, the anatomists connected with the eminent medical school of that city. The result is thus described by Chevenix ('Foreign Quarterly Review,' No. 3):—

[1] The 'Quarterly Review' (No. 25) politely designated Dr. Spurzheim as 'a fool.'

He procured one letter of introduction to that city, and but one; that was to the reputed author of the vituperating essay (Dr. Gordon). He visited him and obtained permission to dissect a brain in his presence. The author himself was a lecturer on anatomy, and the dissection took place in his dissecting room.

Some eyes were a little more, or a little less, clear-sighted than others, for they saw, or thought they saw, fibres. A second day was named. The room was as full as it could be, particularly as an intermediate bench was reserved for Dr. Spurzheim to carry round the subject of enquiry to every spectator. There, with the 'Edinburgh Review' in one hand, and a brain in the other, he opposed fact to assertion. The writer of the article still believed the 'Edinburgh Review,' but the public believed the anatomist; and that day won over near five hundred witnesses to the fibrous structure of the white substance of the brain, while it drew off a large portion of admiring pupils from the antagonist lecturer.

The following is Dr. Spurzheim's own account of the incidents:—

From the beginning I requested these gentlemen not to lose an opportunity of getting a brain. The partner of the reviewer, surgeon of the military hospital (Dr. Thompson), furnished me with arms to combat them in their own lecture room. Indeed, I could never have expected such a gratification. The whole happened accidentally, but I could not wish it more favourably. I gave notice to a few of my friends, that the opposite party might not be alone. The reviewer was to lecture at *two* in his class. I intended to cease and continue after; but he was so kind as to yield his hour to me; so that I had the pleasure of demonstrating the brain *to his own class* at his lecture table in presence of himself, Drs. Thompson, Barclay, Duncan Junr., Irwin, Emery, and many others.

There could not have been a better brain, everything was clear and satisfactory. The poor reviewer was in a most disagreeable predicament. However, as I was at his table I did not wish to appear impolite. I did not mention him; and it was not necessary, as he was known to the audience. I only stated: *This is denied*,—and then made the preparation. We are accused of such a thing, or blamed for showing such or such a structure. And then I presented the structure in nature. At the same time I had our plates at hand, and asked the audience whether they represented the preparations as I had made them. The answer was always affirmative.

The reviewer avoids me entirely. After the lecture he went immediately to his little room. His partner spoke to me, and mentioned that now he will study our plates.

You perceive by this that I have taken a strong position, and am no longer on the defensive. My friends who are in opposition to the reviewer's party tell the story everywhere; and I continue to invite everyone to procure me an opportunity of showing what we

maintain. As to the anatomy, complete victory is no longer doubtful, because competent judges were present; and with that gratification I shall begin to speak to the public in November. The poor reviewer, as physiologist, can scarcely avoid to come. I shall invite him, and he must be prepared to undergo a severe discipline. I certainly shall provoke him to appear, if he like candour and faith.

An ordinary foreigner would have taken it for granted that the great 'Edinburgh Review' represented the character of Scotchmen generally, and would have judged them accordingly; but Spurzheim was an adept in the estimation of character, and said to them:—

> You are slow, but you are sure; I must remain some time with you, and then I'll leave the fruit of my labours to ripen in your hands. This is the spot from which, as a centre, the doctrines of Phrenology shall spread over Britain.

The prophecy has been fulfilled, as proved by the labours of the Combes and the establishment of the Phrenological Museum and Library with the aid of the Henderson bequest.

Other accounts of these demonstrations were published by writers who witnessed them. I add the following extracts from a communication from Edinburgh to the 'Medico-Chirurgical Journal and Review' of May 1817.

After describing the 'petulant, shallow, and dogmatical' character of the 'Edinburgh Review' article, the writer goes on to state that—

> Dr. Spurzheim sank not under this cruelty of criticism, which he bore with a serenity of deportment worthy of a man of science. On the contrary, his moral character appeared more bright in the eyes of those who knew him, simply by being contrasted with the foulness of the epithets that had been thrown upon it. He came to Edinburgh, therefore, not to indulge feelings of personal irritation, but in a spirit of meekness, anxious to find out his opponent, for no other purpose than that he might convince him, by ocular demonstration, of the peculiar structure of the brain which he had described in his works and plates.
>
> I had the good fortune to be present at his first demonstration, which took place before a considerable number of eminent anatomists; the person also was there whom rumour alleges to be the author of the offensive article in the Review. I marked the conduct of that individual, and if the outward deportment could be viewed as an indication of what was passing in the mind, he was certainly labouring under suppressed emotion; and more than once tried to disembarrass himself by pulling from his pocket and reading, or pretending to read, the superscription of a letter. He generally

contented himself with distant hurried glances at what was demonstrated, and upon the whole seemed both uneasy and inattentive.

I am the more minute as to these facts, because he has since alluded to this demonstration as being by no means satisfactory; he was probably, however, the only individual to whom it was not satisfactory.

In reference to the second demonstration this writer says:

The scene was most interesting to the audience. Dr. Spurzheim, in his usual most masterly manner, proceeded in the demonstration, and, like the Admirable Crichton, sustained for upwards of *four hours and a half*, and in a language which was foreign to him, a public disputation with his adversary, explaining himself in terms at once philosophical and perspicuous, and very successfully and coolly ridding himself of the disingenuous cavilling about words with which it was sought to embarrass him. During this public disputation, it is pretty generally admitted there was, in one quarter, a right plentiful lack of temper, as well as of argument.

The writer goes on to state that—

Attempts have been made to misrepresent the feelings and judgment of the audience, which were unquestionably in favour of Dr. Spurzheim, in the proportion of at least twenty to one. It would have been too much to expect perfect unanimity on a question and an occasion of this sort.

Since this notable occasion, Dr. Spurzheim has dissected the brain before the Royal Physical Society, and repeatedly to mixed audiences; and it is but bare truth to say, that I do not know any man of sense or candour who does not bow to the correctness of his pathological views, and admire the beautiful accuracy of his demonstrations.

The writer adds:—

I conclude by saying, that I have no connection with Dr. Spurzheim, and he knows nothing of my having taken this step. To my respect, as to that of every other man, he is entitled by his superior talents as well as his excellent and amiable character; but upon me he has no particular claim, save that which I am ever ready to allow to injured merit.

The editors of the 'Medico-Chirurgical Journal' state that the writer is known to them, and that 'his character is beyond suspicion of misrepresentation.'

In the fourth volume of this Journal, pp. 53 and 117, is another able review of the controversy between Dr. Spurzheim and Dr. Gordon, including an account of Gall and Spurzheim's chief anatomical discoveries. In this Dr. Gordon's delin-

quencies are unsparingly treated, and the conclusiveness of Spurzheim's dissection of the brain is stoutly maintained. The writer says :—

> We have not taken our notions from hearsay or verbal descriptions, but have several times witnessed, with the closest attention, Dr. Spurzheim's demonstrations of the *recent unprepared brain*, and can vouch for the truly satisfactory, as well as able, manner in which they are performed. We have also repeated in private the dissections after his manner, and the result has been a belief of their entire correctness.

I have before me a small volume entitled a 'Memoir of the Life and Writings of John Gordon, M.D., F.R.S.E., late Lecturer on Anatomy and Physiology in Edinburgh, by Daniel Ellis, F.R.S.E.,' and also a copy of Dr. Gordon's 'Observations on the Structure of the Brain, comprising an Estimate of the Claims of Drs. Gall and Spurzheim to Discovery in the Anatomy of that Organ.' This was published in 1817 by Blackwood & Co., Edinburgh, and T. and J. Underwood, London.

Readers who desire to enter further into the details of this controversy should read these.

They present an amusing contrast between the two Gordons: the dictatorial, vituperative Gordon of the 'Edinburgh Review,' who evidently supposed that the fulminations of this literary dictator would crush the foreigners; and the Gordon of the 'Observations,' the Gordon that had been publicly whipped in his own class-room.

But amusement will be exchanged for another feeling when the reader analyses the device by which the reviewer seeks to exculpate and avenge himself. In the 'Review' Dr. Gordon describes the anatomical doctrines of 'the two modern peripatetics' as 'quackery from beginning to end,' as 'amazing absurdities'; states that 'in this department (the anatomical) they displayed more quackery than in any others, and that their bad faith is here more unpardonable that it was so much more likely to escape detection,' etc., and that they stated falsehoods concerning cerebral anatomy intentionally and deliberately, and supported them by trickery in the use of the handle of the scalpel, and deceived their less knowing pupils concerning the fibrous structure of the whole of the white matter by selecting portions where fibrous appearance was due

to alternations of white and grey matter, etc. After all these libellous denunciations of Gall's and Spurzheim's descriptions of the brain in general, and of the fibrous structure of the white matter in particular, by the Dr. Gordon of the 'Edinburgh Review' in 1815, the other Dr. Gordon devotes page after page of his 'Observations' in 1817 to show that Gall and Spurzheim borrowed their ideas from Reil and other anatomists.

Poor Dr. Gordon seems to have been incapable of perceiving the illogical absurdity of his position; of understanding that if the anatomical statements of Gall and Spurzheim were borrowed from Vesalius, Tulpius, Petit, Hunauld, Morgagni, and Reil, all these must be charlatans, impostors, tricksters, men of bad faith, who, taking advantage of the ignorance of their dupes, describe as truth what they know to be false; and all their anatomical work, especially that of Reil (who is described as the true author of most of Gall and Spurzheim's ideas), must be 'thorough quackery from beginning to end.' Instead of this, Dr. Gordon expresses profound admiration of Reil and of his anticipations of the discoveries of Gall and Spurzheim (that is, of their trickery, charlatanism, bad faith, wilful imposture, etc., etc.), and states his intention of making his (Reil's) labours better known to British anatomists by means of a translation. This intention, however, was not carried out.

In his 'Examination of the Objections made in Britain against the Doctrines of Gall and Spurzheim' (1817) Dr. Spurzheim demolishes all these afterthought accusations of plagiarism, and exposes the means by which Dr. Gordon obtains sections of the corpus dentatum, etc., which differ somewhat in shape and colour from those displayed in the plates of Gall and Spurzheim, as well as the absurdity of the petty criticisms of their other plates—details of ridiculous insignificance compared with the accusations of wholesale fraudulent misrepresentations of the whole anatomy of the brain, so insolently asserted in the 'Edinburgh Review.'

I have reprinted part of this pamphlet of Spurzheim's in my appendix. It has now become a classical landmark in connection with the history of discovery in cerebral anatomy.

I have already quoted Reil's own testimony to the merit of Gall as an anatomist. Professor Bischoff, who records

this, adds further testimonies and particulars from Loder, given in a letter to Professor Hufeland :—

> Now that Gall has visited Halle, and that I have had the opportunity of not only attending his lectures, but also of dissecting with him, sometimes alone, sometimes in presence of Reil and of many other of my friends, nine human brains and fourteen brains of animals, I believe that I am able to form a judgment of his doctrines.

Then follows a long eulogy, which I need not quote, as my present object is to show the truth concerning the relations between Reil and Gall.

Referring to these attempts to attribute the discoveries of Gall and Spurzheim to Reil, Gall says ('Fonctions du Cerveau,' vol. ii., p. 19) :—

> Let them compare the early works of Reil with those he has published since he attended our dissections at Halle (in 1805), and let them also compare the successive improvements in both the lectures and books of Richerand, Beclar, Blainville, Serre, Georget, Lallemand, Tiedemann, Carus, etc., etc., and they will be astonished at the progress which has been made (*l'intervalle qui a été franchi*) since the appearance of my expositions.

On p. 14 of the same volume Gall says, 'The enthusiasm with which Reil and Loder have received my discoveries are well known.'

There were differences between Gall and Spurzheim and Reil concerning some details of cerebral structure, and these were freely discussed between them without any sacrifice of their mutual esteem. All three were gentlemen, not 'Edinburgh Reviewers.'

CHAPTER XIX

LORD JEFFREY'S ATTACK

After its discomfiture and disgrace in 1815 the 'Edinburgh Review' wisely dropped the subject for eleven years, when it again resumed the offensive in 1826, the author at this date being Mr. F. Jeffrey, afterwards Lord Jeffrey. The general tone of this is very different from the vulgar scurrility of Dr. Gordon's attack. It takes the form of a review of the second edition of G. Combe's 'System of Phrenology,' and commences with many phrases which are verbally complimentary to the author, but they are such compliments as a man of Mr. Combe's moral nature could not accept as anything better than veiled insults. This will be understood by the following, which is the conclusion of the complimentary opening paragraph. After expressing admiration of Mr. Combe's dexterity in evading weak parts of his subject—in cooking it generally—the reviewer says of Phrenology, that its

> radical absurdity is so glaring that, in spite of his zeal and earnestness, we really have great difficulty in believing the author to be in good faith with us, and suspect that few reflecting readers will be able to get through the work without many starts of impatient surprise, and a general uneasy surmise that it is a mere exercise of intellectual ingenuity or an elaborate experiment upon public credulity.

It is evident from this description of zeal and earnestness combined with imposture that the moral 'zeal and earnestness' of George Combe were as unintelligible to Jeffrey as the harmony of colour to a blind man, and for corresponding organic reasons.

Combe, of course, promptly and scornfully denied the accusation of modifying or accommodating the Phrenology of Gall and Spurzheim, of 'balancing the opinions of Gall against those of Spurzheim, or compounding out of them a *tertium quid*,' or

'the reconcilement of the schisms which seem already to threaten' Phrenology, to which object Jeffrey with gross falsehood dared to say that 'no inconsiderable portion of it (Combe's "System of Phrenology") is dedicated.' Mr. Jeffrey's claim to sit in judgment on cerebral physiology may be estimated by his preliminary or fundamental assertion (p. 256), that 'the only organs of the mind of which we have hitherto had any knowledge are those of the external senses'; and again (p. 257)—

> The truth, we do not scruple to say it, is that there is not the smallest reason for supposing that the mind ever operates through the agency of any material organs except in the perception of material objects, or in the spontaneous movements of the body which it inhabits; and that this whole science rests upon a postulate or assumption for which there is neither any shadow of evidence nor any show of reasoning.

The postulate or assumption referred to is that the brain is the organ of the mind. As I have already explained, Gall, Spurzheim, Combe, and the early phrenologists had to struggle with this denial of psychic cerebral function, and to present to their readers a large number of facts in order to prove that the brain is something more than a sponge for the absorption of the pestiferous humours of the body, that it is the organ of the mind. In my chapters on the evidences I have not repeated any of these arguments, for the simple reason that the subsequent progress of science has rendered the denial of this fundamental 'postulate or assumption' of Phrenology too ridiculous for serious discussion. I shall therefore dismiss the subsequent dozen pages in which the reviewer struggles with much verbosity to show that most of the faculties enumerated by phrenologists cannot have cerebral organs, because they are not physical sensations.

I must deal almost as summarily with the next thirty-one pages, 263 to 294, which are devoted to showing that the primary faculties of the mind, as described by phrenologists, are not in accordance with what Mr. Jeffrey thinks they ought to be. If the facts are not in accordance with Mr. Jeffrey's preconceptions, so much the worse for the facts. He says, in summing up *his* view of the primary faculties (p. 224): 'If these things be, as we humbly *conceive them to be*, it is plain enough that the phrenological theory *cannot possibly be true*' (the latter italics are the reviewer's).

It would, however, be unfair to describe these thirty-one pages as entirely occupied with such argument, the fact being that a large acreage of the 165 pages of the whole article consists of what is called by governesses 'literary composition,' and of melancholy strivings to be funny.

Mr. Jeffrey's estimate of the value of inductive evidence in comparison with that of metaphysical dreaming is shown in the following (p. 268) :—

> And is not the absurdity of their metaphysics sufficient to excuse us from any examination of the *evidence* relied on by the phrenologists? If any man can believe that there are, or can be, so many distinct powers and faculties as we have now referred to, he may possibly be justified in seeking and be satisfied as to the existence and locality of their material organs. For ourselves, we see no occasion to go further.

This disregard of evidence is well displayed by the reviewer's denial of Mr. Combe's statement 'that there are persons who have the sense of vision, and yet are almost destitute of the power of perceiving colours' (p. 287). This is supposed to be refuted by Mr. Jeffrey's metaphysical reasoning, as follows:

> Colour in short is the only quality of light by which we are made aware of its existence, and to say that we do not see colour by the eye, is in reality to say that *we do not see* at all, for the strict and ultimate fact is that we never see anything else.

'Now, can any person, with the least capacity of reflection, really suppose that hope is a primitive independent faculty?' is the sort of argument by which the multitude of careful observations of the kind I have described in Chapter IV are refuted by this critic, whose metaphysical refutation of this part of Phrenology is summed up as follows (p. 293) :—

> (1) That there is not the least reason to suppose that any of our faculties, but those which connect us with external objects, or direct the movements of our bodies, act by material organs at all, and that the phrenological organs have no analogy whatever with those of the external senses; (2) that it is quite plain that there neither are nor can be any such primitive and original faculties as the greater part of those to which organs are assigned by the phrenologists; and (3) that if the 36 faculties, with the organs of which they have covered the whole skull, are admitted to exist, it seems improbable to refuse a similar existence to many hundreds or thousands of the same kind, for the organs and operations of which they have, however, left no room.

I might continue such quotations as this and the preceding *ad nauseam*, all showing that Mr. Jeffrey's objections to Phrenology simply amount to showing that the inductions based on the life-long researches of Gall and Spurzheim, and their confirmations and extensions by Combe, do not agree with the preconceptions of Mr. Jeffrey, and, therefore, they must of necessity be unsound.

As examples of ignorance, or worse, I quote the following:—

> That the *mere* bulk or quantity of matter in such wonderful and delicate structures should be the *exclusive* measure of their value, *without any regard to their quality or condition*, certainly must appear, on the first statement, a very improbable allegation (p. 301).
>
> According to the phrenologists, character should always be indelible, or affected only *by accidents on the head* (p. 310).
>
> The diseased state of an organ, it seems, does not disturb or impede, but increases and improves, the action of the faculty to which it ministers. . . . A diseased state of the organ *always* makes its operations more vigorous and energetic; and no instance is mentioned in which the occasional obscuration of any faculty is referred to such a cause. This, we think, is tolerably ridiculous (p. 305).

It certainly is. The cases quoted from phrenological sources in my chapter on 'Aphasia' and in Chapter VII will sufficiently indicate who is the perpetrator of the absurdity. Mr. Jeffrey's reputation for originality is well sustained throughout the article, which abounds in similar inventions. The following is an outrageous example (the first sentence of the last paragraph on p. 296):—

> It is very material to remark here that the phrenologists do not even pretend to have been guided to the discovery of these organs by any direct observation of their being actually used when the faculties which they serve are exerted.

To justly characterise this assertion demands the application of an epithet which the conventional demands of common courtesy alone prevent me from using. It is rendered the more flagrant by the fact that Combe's 'System of Phrenology,' which this article pretends to review, contains detailed particulars of the history of the discovery of some thirty of the phrenological organs, and every one of these thirty descriptions directly belies the above-quoted assertion.

Here is an example of the profundity of Mr. Jeffrey's knowledge of the subject:—

A man's head, according to the phrenologists, is embossed all over with the protuberant organs of his different faculties, and other people admit that it exhibits the organs of at least four such faculties. If, in a common boxing match, he get a closer on the eyes, it requires no nice medical skill to know that the sight will be injured, or that a good blow on the ear will make him deaf for a longer or shorter time. Accordingly, from the beginning of time these effects have been known to follow from these injuries. But blows light at least as often on other parts of the head as on the eye or ear. They *must* light, therefore, according to the phrenologists, on the organ of some other faculty; and the question is, how, if the phrenological system were true, it could at this time of day be doubted whether other specific faculties were injured by such blows, or how there could possibly be any need, or still less any difficulty, in producing evidence of that plain proposition? So far from being a matter of rare occurrence, or as to which there can be any room for cavilling about cases in point, it is obvious that cases in point must have been occurring every day, in the sight of almost every man in existence. To say nothing of battles—and the hacking of troopers' heads with sabres and broadswords—there is not a wake or fair in Ireland at which cases of injury on all the thirty-six bumps may not be obtained in multitudes.

No reader will expect me to enter upon a serious discussion of such contemptible drivel as this.

One of the fundamental propositions of Phrenology is that —*other conditions being equal*—the size of an organ measures its functional energy. Mr. Jeffrey makes many references to this, and carefully misrepresents it in every case, by asserting, as in the quotation I have already made from p. 301, that the phrenologist says that the size of organs 'is the *exclusive* measure of their value, *without any regard to their quality or condition*.'

It is in reference to this subject that Mr. Jeffrey's much-quoted masterpiece—his great explosion of wit and humour—occurred. He tells his readers that—

The grandmamma wolf, in the fairy tale, does indeed lean a little to the phrenological heresy, when she tells little Red Riding Hood that she has large eyes to see her the better, and large ears to hear her the better. But, with this one venerable exception, we rather think it has never been held before that the strength of vision depended on the size of the eye, the perfection of hearing on the magnitude of the ear, or the nicety of taste on the breadth of the tongue or palate.

Setting aside the funny business of this by assuming that its wit and humour are duly appreciated and admired, there

remains the fact that Mr. Jeffrey's denial of the principle of the law of size and his misrepresentation of its exposition by phrenologists are fairly representative of its treatment by all the similarly ignorant opponents of Phrenology, i.e. by the great majority of them. This being the case, and the law being fundamental to Phrenology—that upon which its chief inductions are founded—its full discussion is demanded in a treatise such as this. I cannot better supply this demand than by reprinting in full the admirable reply that was made by Dr. Andrew Combe in the second chapter of his 'Observations on Mental Derangement,' published in Edinburgh in 1831. The importance of the subject and its admirable treatment are my excuse for the length of this quotation.

Even to those who are acquainted with physiology, but whose attention has never before been directed to the observation of the mutual connection of mind and matter, and who are not aware of the actual extent to which the mental manifestations are affected by every change in the condition of the brain, no part of the phrenological doctrines seems at first sight so 'inherently absurd' and destitute of foundation as that fundamental principle which affirms power or energy of function to be always, *caeteris paribus*, in exact relation to the size of the organ; and yet, so far is this from being 'contrary to the analogy of all our known organs,' as is generally supposed by the unthinking, and taught even by men of known reputation, that, *on careful examination, it is found to be, in reality, a general law of nature, pervading all created objects, animate and inanimate*, and, consequently, affecting the brain in common with every other part of the body.

The principle of size, as maintained and demonstrated by the phrenologists, it must be observed, is, not that organic size is the *only*, but that it is *one* condition, *and a most important one, in producing energy of function*, and that hence, WHERE ALL OTHER CONDITIONS ARE EQUAL, there increase of size will invariably indicate increased intensity of function. Now it is no small presumption in favour of the inherent truth of this proposition, that no one has yet ventured either to deny or dispute it, without having first misstated or misrepresented its meaning. For, instead of fairly grappling with it as laid down in all phrenological writings, those of the writers against Phrenology who have ever attacked it, and the 'Edinburgh Review' among the number, have chosen uniformly to represent it as affirming that organic size is the *only* and *exclusive* condition of energy of function, and have brought wit, fact, and argument into play to upset, not Dr. Gall's statement, but this, their own absurd misrepresentation; and, having succeeded in this very easy attempt, they have done their best to make the world believe that they had actually withdrawn the prop that alone supported the phrenological edifice, and that, of course, the latter was fast crumbling to its fall.

How much they have erred in this proceeding, and how little consistency of truth is to be found in such statements and opinions, as, in support of their cause, they have hazarded in regard to the organs of sense and animal nature in general, will presently appear, when I shall have shown that the principle in dispute, instead of being contrary to, is in reality in strict harmony with 'the analogy of all our known organs.'

In physics, the relation between size and power is universally acknowledged, and is susceptible of mathematical demonstration; for it is nearly synonymous with the hitherto undisputed axiom of a whole being greater than a part. Every large organ is, *caeteris paribus*, made up of a greater number of integrant parts than a small one; and if, in the small one, each of these parts is equivalent in force to a given quantity, it necessarily follows, all other circumstances being equal, that the force of the large will exceed that of the small organ by the united quantity of all the additional individual parts; and no way of escaping this conclusion can be got, except the unfair one of keeping the *caeteris paribus* out of view. If this is not the case, we would as soon expect to see a breach effected in the massive walls of a fortification by a rapid and sustained discharge of musketry, as under the reiterated blows of heavy artillery. But it is the animal kingdom which chiefly concerns our present argument, and to it I therefore proceed.

It will scarcely be disputed that the strength of the bones is always, *caeteris paribus*, proportioned to their size; and the slightest consideration will satisfy everyone that the same principle applies equally to the muscular system, which, indeed, its structure sufficiently demonstrates. Muscles are composed of a great number of nearly parallel fleshy fibres, each equal in itself to a given force. If, then, the bulk of the muscles be increased, either by a greater thickness or by an additional number of such fibres, it is physically certain, even *à priori*, that the amount of force which they are capable of exerting will be increased in exact proportion; and, accordingly, the left ventricle of the heart, which sends the blood to the remotest parts of the body, is at least double the thickness of the right, which requires only force enough to send it through the lungs. But, although muscular, like cerebral size is, *caeteris paribus*, a measure of strength, still it is by no means the *only* condition. There are circumstances in which vigorous motive powers are required in combination with as small muscular bulk as is possible to be attained, and there are others where bulk is of no consequence. To effect the former modification, a beautiful arrangement is made by nature, and in strict accordance with the principle we are now proving.

Motion is the result of muscular contraction; but muscular contraction takes place only in consequence of the stimulus of the will conveyed by the nerve, whose ramifications form a part of the muscle itself. Hence, strong contraction may arise either from large muscles and moderate stimulus, or from moderate muscle and strong stimulus. Thus in fishes, which live and move in a medium almost

in equilibrium with their own bodies, and which, of course, require no active effort to support themselves in a position different from that given by the ordinary laws of gravitation, and in which, consequently, increased bulk is attended with no material disadvantages, the power of motion depends, in a high degree, on the great size of the muscle, and, in a small degree, on nervous excitement or size of nerve. But in man and other animals, who require a constant effort to preserve their upright position, and in whom increase of muscular bulk would add directly to the sum of the difficulty by adding to the weight, the same end is accomplished by an increase in the supply of nervous excitement, or, in other words, by a relatively much larger nerve in proportion to the muscle which it is destined to supply. In birds, again, where the disproportion between their own gravity and that of the air is so strikingly great, and where, consequently, every additional muscular fibre would but add, by its weight, to the difficulty of rising from the ground, the same relative increase of nerve over muscle is carried to a still greater degree. But, in this arrangement, the law of size is still in force; for, in all these instances, wherever the supply of nervous energy and other conditions are found to be equal, there size of muscle invariably indicates the degree of power. Had the power of motion in birds depended on size of muscle *alone*, and these organs been proportionally as large as in fishes, they must of necessity either have remained for ever chained to the surface of the earth like man, or they must have perished from absolute inability to fill the place which nature had destined for them in the scale of creation; and size in one part of the organ has thus been given to obviate the disadvantages which it would have entailed had it been possessed by the other.

It may be objected that the biggest men are not always the most powerful in bodily strength; and that a maniac, or an individual in the delirium of fever, is often able to overcome the united efforts of several persons to restrain him. But this is in strict accordance with our principle, for the other conditions are not the same. In these instances there is intensity of nervous excitement, giving intensity of action to the muscles, and it is quite certain that if a big muscular man were subjected to a proportionate amount of excitement as the smaller, he would display an energy of motion greater than the other, in exact proportion to the greater size of his muscles; and it is no exception to this to produce a bulky individual of a weak, lymphatic constitution, made up of water and fat rather than of muscle, and to say that he has less bodily energy than another individual of smaller size, but of a bilious and firm habit, and in whom the muscular system is at its highest pitch of perfection. The very contrasting of such individuals, without attending to the *caeteris paribus*, is a total departure from the principle which we are advocating, and, consequently, need not now occupy our attention.

That the law of size holds in regard to the blood-vessels and heart is self-evident to everyone who knows that a tube of three

inches diameter will transmit more water than a tube of only one inch. And the same may be said in regard to the lungs, liver, kidneys, and every other part. If a liver, suppose of four cubic inches, can secrete four ounces of bile, it is perfectly manifest that one of eight cubic inches will be able, all other things being equal, to secrete a quantity greater in proportion to its greater size. If this law did not hold true, what would be the advantage of large and capacious over small and confined lungs? There could be none.

In regard to nerves or organs of sensation also, which in function and structure approximate more closely to the brain, the disputed proposition of size being a measure or element of power is easily demonstrable.

Speaking generally, there are, as already shown, two classes of nerves distributed over the body, those of motion and those of sensation or feeling. In accordance with our principle, the nerves of motion are, in most instances, greatly smaller than those of sensation, and for this reason: in producing motion the muscle is the essential or chief apparatus, and the nerve is required only to communicate to it the impulse or stimulus, but in sensation the reverse is the case; the nerve itself is the chief instrument, and the part on which it is ramified is merely a medium for putting it in relation with the specific qualities which it is destined to recognise. Thus the eye-ball is merely an instrument constructed in accordance with the laws of light, by means of which the proper impression may be made on the optic nerve and thence transmitted to the mind. In accordance with this principle of size being a chief element in power, we find that the olfactory, the optic, and other nerves of sensation, have a constant and often enormous excess of volume over the muscular nerves, or those of motion, in the same animal; and that, as a general law, the nerves of sensation are always proportioned in size to the extent to which sensation is possessed. It is stated by a late very able writer,[1] that in the spinal nerves of man, for example, the dorsal roots, or those belonging to sensation in the nerves supplying the arm, have at once an excess of volume and of surface at least *five times greater*, both for each individual fibre and for the bundle resulting from them, than the anterior roots or those belonging to motion. And the rationale of this is evident, for it is in the hand that the greatest power of touch resides, and it is by these nerves that the hand is supplied.

Another fact, mentioned by the same author, shows clearly the universality of the disputed principle. The roots appropriated to sensation in the spinal nerves going to the arm are five times larger than the corresponding roots at other parts of the spinal cord, which, it must be observed, are distributed to parts where touch is imperfectly preserved. He adds that, comparing the size and mass of each kind of nerve with the extent of the skin and muscle on which each is ramified, the nerve of sensation will be found in the mammalia often more than a hundred times more

[1] Desmoulins, 'Anatomie des Systèmes nerveux des Animaux à Vertèbres,' p. 775.

voluminous than that of motion, and that, allowing for the greater thickness of muscle, this disproportion will be enormously increased. And, as an instance, he mentions that the single nerve of feeling ramified on the tactile extremity of the proboscis of the elephant exceeds in size the united volume of all the muscular nerves of that organ.

Having just shown that in animals possessed of acute sensation the corresponding nerves greatly predominate over those of motion, I may now add, in corroboration of our principle, that in other animals, in which muscular power greatly predominates over feeling, the balance between the nerves becomes changed. In the horse and ox, for example, which, from the nature of their covering, have very imperfect sense of touch, with great bodily strength, the sum-total of the muscular roots in the nerves going to the four limbs exceeds by at least one third that of the sensitive roots, where, in man, the proportions are inversely as five or six to one. In like manner, in birds and reptiles with scaly skins and limited touch the same preponderance of the nerve of motion over that of sensation obtains. And, what is curious enough, wherever nature has given a higher degree of sensation or touch to any particular part, there the corresponding nerve is invariably increased. This is observed, for example, in the nerves of the tail in some species of monkeys, in those of the wings of some bats, and in those of the claws of some species of birds, and the increased size is confined exclusively to the part possessed of the increased function.

We come now to consider particular modifications of sensation exhibited in the organs of the external senses ; and here, also, we shall have little difficulty in establishing the existence of the law of size.

In studying the influence of size on the functions of the external senses, we must take special care not to confound accidental with essential circumstances, or to mistake a part for a whole. Thus every external sense is composed of, first, an instrument or medium on which the impression is made ; and, second, a nerve to conduct or transmit that impression to the mind and brain. But as these two conditions are variously modified, and not at all necessarily proportioned to each other in different animals, it follows that, if we take one part as a type of the whole, and argue from it under this supposition, we shall inevitably err. And here, as we shall presently show, is precisely the source of the notable blunders committed by those who deny the principle of organic size having relation to functional power.

All the external senses, being modifications of general sensation, depend primarily and essentially on the presence and activity of a special nerve for the exercise of their functions ; but, besides this, something more is required by which the special nerve of each sense may be brought into communication with the particular qualities of external objects which it is destined to feel. This medium is what is generally called the *organ* of that sense. Thus, the external ear, the tympanum, the vestibule, and the canals of the internal ear, are the parts by means of which the vibratory properties

of the atmosphere from which sound arises are brought into relation with the auditory nerve. These parts, then, are the seats of the impressions made by the atmospherical undulations, but they are no more. It is the *nerve* that is ramified on them which alone feels the impression and transmits it to the brain. In like manner, the eye with all its humours and membranes is merely an apparatus formed in relation to the properties of light, and on which the luminous image may be depicted and its qualities brought under the cognizance of the *nerve* of vision. The ear, the eye, the membrane of the nostrils, the tongue, and the skin are thus only *media* or instruments, in a great measure only passive, having natural relations to the different properties of sound, light, etc., by which the respective *nerves* ramified on them may become acquainted with their own objects; and they differ from each other in structure, only because light, sound, and sapidity differ from each other so essentially, that light might shine on the ear or nose, or the air vibrate on the eyeball, to the end of time without conveying an image or suggesting a sound to the mind. The nerves are thus the true organs of the senses, as they are of sensation in general; and, consequently, if the principle of size applies to them, extent, acuteness, and power of function ought to be looked for, *caeteris paribus*, in connection with size of nerve more than with mere size of the passive part of the apparatus. Such, accordingly, is the uniform and invariable fact, and, when the real functions of the other component parts of the respective organs are kept in view, there also increase of size will, *caeteris paribus*, be invariably found accompanied by increased energy of function. To show this, let us examine each sense in detail, and begin with the mechanism of smell.

The organ of smell consists in man, and in most other animals, of three distinct parts, each performing a distinct function, and each contributing to the perfection of the united whole. These are, (1) the external projecting part known familiarly as the nose; (2) an internal cavity communicating with this external appendage, and containing what are called the spongy or convoluted bones, over which is spread the thin, fine membrane on which the odoriferous particles make their impression, and which, from its discoverer, or rather its describer, is called the Schneiderian membrane; and (3) the olfactory nerve, which is ramified over that membrane, and which receives and transmits the impressions of smell to the mind. All of these concur in increasing the intensity of the sense, and each concurs with an energy or power, *caeteris paribus*, exactly proportioned to its size; and the opposite of this can be maintained only by confounding one part with another, and by viewing the external appendage as the real seat of the function. A moment's reflection will demonstrate what has been said.

The external nose adds to the energy of smell only by directing a greater volume of air loaded with odoriferous particles into the nasal cavity than could otherwise have reached it. Its situation, form, and size, relatively to the internal nostrils, fit it admirably for this purpose, as, from their lightness, odours tend to arise, and

in their progress are thus intercepted by the broad base of the nose opening downwards. It is quite certain, then, that this offers no exception to the phrenological principle of size being a condition of power; for it is indisputable that, according to all physical laws, a larger funnel will receive and concentrate a greater sum of atmospherical particles than a smaller one. And it is observed that, in accordance with this, those who have the external nose flattened, small, or destroyed by disease, have a corresponding inferiority of function; and it has been noticed that individuals in whom the sense of smell has been impaired by the destruction of the external appendage, have regained their former state by assuming noses of wax, pasteboard, or silver, for the sake of ornament only; and as neither wax, pasteboard, nor silver is naturally endowed either with nerves or any power of sensation, it follows of necessity that both the original and the substitutes act not from any special quality, but merely as physical agents under physical laws, or, in other words, that they are not themselves the seat of smell, but passive conductors leading to the latter.

The true seat of smell, or part on which the odorous particles make their impression, is the pituitary membrane lining the internal nares; and, so far as it is concerned, nothing is more certain than that, *caeteris paribus*, it is always proportioned in surface and extent to the intensity or power of function. Even in the different tribes of man this coincidence is so remarkable as often to arrest attention. Blumenbach speaks in his 'Decades' of the internal nares of the North American Indian being of an extraordinary size, and adds that he has observed the same excess, though in rather less degree, in a number of Ethiopian skulls, which differed from each other in almost every other respect. Soemmering makes a similar remark, and adds that these anatomical observations are in perfect harmony with the wonderful acuteness of smell possessed by these savages.

In animals, in like manner, the intensity of smell depends greatly on the extent of surface presented by the internal nares and Schneiderian membrane; and a curious mechanism is observed in many of them, whereby this condition may be carried to an enormous extent, without adding much to the bulk of the head or face. Among the Mammalia, man and monkeys present the smallest extent. The dog, the wolf, the bear, the elephant, and even the cow and horse, present a very large surface, formed by an immense number of convolutions or folds of the spongy bones, and by a large variety of cells and sinuses in the other adjoining bones, and all of which are lined by the pituitary membrane. Dr. Monro *primus* states, that most quadrupeds have the spongy bones large, and divided into a great number of excessively fine thin lamellæ; 'and that the sensibility seems to increase in proportion to the surface in this and all the other senses'; this we conclude, he says, not only *a priori*, but from actual experience. In many fishes the same predominance of the organ and power of smell is remarkably conspicuous, while in animals of feeble smell the moderate extent of

the nasal cavities is in equal accordance with the more imperfect function.

The influence of size on the function of the third part of the apparatus is not less palpable. I allude to the olfactory nerve, which perceives and transmits to the brain the impression made on the membrane. As a general rule, it bears a fixed relation to the extent of surface over which it is distributed, and it was long since proved by Drs. Gall and Spurzheim that its size is always proportioned in the different species to the power of smell. Hence it is small in man and in the monkey tribe; scarcely, if at all, perceptible in the dolphin; large in the dog and horse, while in some animals the ganglion whence it arises is so large, as to have been mistaken for the brain itself. In the mole it is of extraordinary size, while the optic nerve is very small. In the eagle the reverse is observed, the optic being very large and the olfactory small.

The organ of hearing, like that of smell, consists of three distinct parts: (1) an external ear, auricle, or instrument for collecting and concentrating atmospherical vibrations; (2) an internal ear or appartus, destined to receive the mechanical impressions of sound; and (3) an auditory nerve to perceive and transmit these to the brain or mind. Like the external nose, the auricle or external ear is an accessory only, and not an essential part, and in many animals it is not to be found. Where it does exist, however, it invariably executes its peculiar function with a force, *caeteris paribus*, proportioned to its size, and therefore forms no exception to the general law. Each of the other parts, also, when considered in relation to its own uses, invariably presents an intensity or power of function proportioned, *caeteris paribus*, to its size, and is thus in strict harmony with the phrenological principle alluded to.

Thus it can be physically demonstrated that, all other things being equal, the external ear or auricle will receive, concentrate, and transmit to the internal organ a number and mass of atmospherical vibrations exactly proportioned to the extent of its development. A beautiful and apposite illustration of this is to be seen in the enormous development of that part, said to equal in size that of a section of the whole body in some species of bats, which are known to possess extraordinary delicacy of hearing. The principle is, in fact, practically acknowledged and daily acted upon, even by men who theoretically deny it, and who, when they become dull of hearing, do not scruple to lessen the defect by artificially increasing the size of the despised auricle by means of the hand placed behind it, or by the still more methodical use of an ear-trumpet, which is neither more nor less than a large auricle of a peculiar shape and great dimensions. But as the auricle is not an essential part, so neither is the power of hearing, in every instance, proportioned to its size alone; for in some animals it is altogether wanting, and in many others, possessed of acute hearing, it is scarcely perceptible. Where it does exist, however, it adds to the perfection of this sense in exact proportion to the extent of its development, and it is on this principle that Dr. Monro primus states that the 'external

ear, in different quadrupeds, is differently framed, but always calculated to the creature's manner of life,' and that 'thus hares, and such other animals as are daily exposed to insults from beasts of prey, have LARGE ears directed backwards, their eyes warning them of danger before,' etc.

The internal ear, or true receptacle of sonorous impressions, obeys the same law of size, but it is so complicated and variously modified in structure to suit the wants and habits of different kinds of animals, and the uses of its numerous constituent parts are still so imperfectly known, that it would take up too much room to prove the reality of the relation between its size and energy of function. But here, as in every other instance, if we keep in view the *caeteris paribus*, the rule will be found invariable, and it is, in fact, admitted on all hands that, in many animals whose superiority of function is proverbial, the vestibule and semicircular canals are both much larger and more perfect than the corresponding parts of the human ear.

In regard to the auditory nerve, or part which perceives and transmits the impressions made on the ear, it is equally certain that size is, *caeteris paribus*, a measure of intensity. In accordance with this, we find Desmoulins declaring that its proportion increases in exact relation to the difficulties of the medium in which the animal lives, and to the feebleness of the impressions which it requires to recognise, and that it is for this reason that the auditory nerve is *twenty times* more developed relatively to the size of the animal in fishes than in the mammalia or birds. It has long been known also that most of the mammalia far exceed man in the acuteness of their hearing, and that they equally excel him in the proportional size of the auditory nerve. This is generally admitted, and may be readily verified by comparing the great size of the nerve in the sheep, the cow, or the horse with its moderate size in man. So far, then, as hearing is concerned, the phrenological principle of size is clearly unexceptionable.

We come now to the sense of taste, and here also we must distinguish existing differences. The tongue and palate are merely the surfaces on which the impressions are made, and the gustatory nerve is the real organ of this sense. Dr. Spurzheim, then, was quite in harmony with the soundest physiological laws when he stated that 'the principal condition to an acute taste is certainly large gustatory nerves spread over a considerable surface,' and inferred that, therefore, the acuter taste of many animals was sufficiently accounted for by their larger nerves spread over a larger surface. Comparative anatomy indeed puts this proposition beyond doubt, and shows that the nerve of taste is proportionally much larger in most animals than in man. The nervous papillæ disseminated over the pharynx, the palate, the tongue, the interior of the cheeks and lips are both much larger and more numerous. And in many animals, on purpose to extend the surface of the organ of taste, the palate is lined with a membrane disposed in furrows, and sown with nervous papillæ; and, generally speaking, the

apparatus which serves for eating is larger in them than in man. And when we reflect that, in accordance with this, their chief enjoyment arises from the unceasing gratification of this sense, it will not be easy to deny them a corresponding superiority of function.

The fact that many birds possess a very acute taste shows that it is not to the tongue alone that we must look for its seat. The palate of some birds of prey is very copiously supplied with nervous filaments in exact conformity to their acuteness of sense. Blumenbach has found in the duck the organs of taste very largely developed, more so than in the goose; and it is quite ascertained that the former possesses the power to an exquisite degree.

The same observation of greater size giving greater power to taste has been noticed by physiological writers even in man himself. Thus Rullier assigns the excess of the development of the mouth and its contents in Negroes as the condition which confers on them the acuteness and extent of taste for which they are remarkable [1]; and it is, moreover, perfectly ascertained that the abridgment of this extent of surface by disease, by the loss of the tongue, for example, is followed by a corresponding diminution of function, and the sense is not altogether destroyed only because the tongue is not alone the seat of its operations. It must, however, be remembered that the tongue is an organ of motion as well as of taste, and that it is as essential for deglutition as for the reception of the sapid impressions; and, hence, that it is, properly speaking, the relative size of the gustatory nerve, and not the absolute size of the tongue, that regulates the intensity of taste.

Again, the venerable quadruped grandmamma wolf, whose physiological opinion is so contemptuously treated by the Edinburgh Reviewer, was equally sound when she affirmed that she had large eyes to *see* the better, and the error that the reviewer advocates in denying this has obviously arisen from confounding distinct parts as a common whole. Wherever the general plan and structure of the organ of vision are at all analogous, there increased size invariably indicates increased function. The scarcely perceptible eye of the mole, and the scarcely more evident eye of the bat, are in exact harmony with their imperfect vision, while the large eye of the cat, the eagle, and the falcon, and of most fishes, are remarkably in unison with the strong visual powers of these animals. But here also the *caeteris paribus* must never be lost sight of in estimating the influence of organic size.

Considered physiologically, the apparatus of vision must be divided into two distinct parts—the eyeball, or recipient of luminous rays and impressions, and the optic nerve and retina, which perceive and transmit these impressions to the brain and mind. The former, like the corresponding part of the auditory apparatus, is, in a great degree, a passive instrument, which fulfils its function, not from any vital properties, but in consequence of the physical qualities of its component parts, and therefore in obedience to the

[1] 'Dictionnaire de Médecine,' vol. x. p. 309.

ordinary laws of matter. Its function is to receive and to refract the luminous rays directed upon it, so as to form a distinct image upon the retina; and the proof that it is purely passive in doing so is, that the eye of an ox, or any other animal, will, after death, and after being separated for some hours from the head, form an image on the retina almost as perfectly as during life, and consequently the eyeball comes strictly under the general physical law of increase of size, all other things being equal, giving increase of power.

Keeping in view then its peculiar function, it becomes an undeniable proposition that a large eye will, all other circumstances of convexity, structure, and proportion of parts being equal, admit a greater quantity of luminous rays than a small one, and thus contribute to the perfection of vision by taking in a *wider field* at one time; but to add *acuteness* or *intensity* to extent something more is required, as I shall now show.

To feel or to perceive, as we have already pointed out, is a function of the nervous system, and hence all the external senses require, as their *essential* condition, the presence and operation of a special nerve. In the case of vision this is the optic nerve. Now, if the phrenological principle applies to all the senses without exception, *acuteness* or *intensity* of vision ought to be indicated, *caeteris paribus*, by the size of the optic nerve. Accordingly, the most extensive investigation proves this to be the case. The eyeball, being constructed in relation to the physical properties of light, serves merely to place the nerve or real organ of sensation in communication with the luminous rays; and thus, while the *passive* or *recipient* power is proportioned to the size of the eyeball, the *active* or *percipient* bears a uniform relation to the size of the nerve and its expansion in the retina.

When, for instance, we compare the organs of vision in the falcon, the eagle, or the vulture, which perceives at a glance and from the greatest conceivable altitudes, and in a horizon of several miles, a hare, a partridge, or a reptile, often, from its colour analogous to that of the soil, invisible to us at half-gunshot, with those of other birds, as some species of geese and swans, which rise to equal heights, but which, like man, do not distinguish minute objects, but are guided in their flights by general outline, by rivers, mountains or plains; we find the difference of function in the former to depend chiefly on an enormous preponderance of the nervous apparatus belonging to the eye, and the regular gradation of which, in relation with the function, is very remarkable. In the stryx flammea, or screech-owl, for instance, whose sight is imperfect, the ganglions from which the optic nerve arises are estimated by Desmoulins as not exceeding in size one-twentieth, while in the eagle the same parts represent at least one-third, of the whole encephalic mass, the nerves themselves being in the same ratio.

In like manner, according to Desmoulins, in the gallinacea, which see little more than the surface with which they are in actual contact, the eye is proportionally much smaller, the nerve thinner and longer, and the optic lobe also much smaller than in the duck

tribe, whose sight is proportionally more acute ; and in the falcon the organ, nerve, and power of vision, all reach their maximum of development. In birds of prey with piercing sight, the optic ganglions are said to exceed in size those of birds of ordinary vision by at least five or six times. Indeed, it was the great size of these very ganglions in birds in general that led to their being mistaken for the optic thalami, until Gall and Spurzheim pointed out the error and its cause.

I have heard the celebrated ornithologist M. Audubon give an account of the habits of the vulture, which accord precisely with the doctrine here laid down in regard to the influence of organic size both on sight and smell. It has been a very commonly received opinion that vultures, and other birds of prey, are attracted to the carrion by the smell which it emits. But nothing, said M. Audubon, could be more erroneous than this, as the power of smell is in these animals extremely imperfect, while vision is remarkably acute. To prove this, M. Audubon had repeatedly left dead animals under a sort of shed, by which they were screened from the sight, but to which any bird could have easy access ; and although they remained till the stench became perfectly intolerable, no vulture or other bird ever approached them ; but if in this state the carrion was exposed to view, it invariably happened that in the course of a few hours it was attacked and devoured.

To prove that it was vision alone that enabled these birds to distinguish their prey, M. Audubon next made a train from the shed to a little distance with fresh blood, and although no smell was perceptible, it invariably happened that in a very short time the bird was attracted to the spot, and, following the line of blood, entered the shed and devoured the flesh, still too recent to emit any odour. But if any considerable space was left between the visible trace and the concealed object, however strong the odour which it emitted, the bird never seemed to suspect its presence. And, in accordance with these facts, and with the law of size giving energy of function, M. Audubon mentioned, and indeed it is generally known, that these predatory birds are almost as remarkable for deficiency in the size of the nerve of smell as we have shown them to be for excess in that of vision.

To effect the purpose of increasing the size of the optic nerve in these animals, without adding injuriously to that of the eye itself, an admirable contrivance has been resorted to. Instead of forming a single membrane lining the inner surface of the posterior chamber of the eye, as in man and animals of ordinary vision, and, consequently, only equalling in extent the sphere of the eye to which it belongs, the retina in these quick-sighted birds of prey is found to be composed of a great number of folds, each hanging loose into the eye, and augmenting, in an extraordinary degree, not only the extent of the nervous surface, but the mass of nervous matter ; since, according to the statement of Desmoulins, from whom I take this account, the actual thickness of the membrane of the retina is, with few exceptions, equal in all animals, from man and the ox to

the eagle and the duck; and, consequently, the nervous mass in the eye of the eagle, for example, exceeds in proportion that of man by the quantity which goes to form the folds already alluded to. This structure exists at its maximum in eagles, vultures, and falcons, and surely this is in harmony with their noted acuteness and intensity of vision.

The utility of disposing this increase of nervous matter in folds is obvious enough. Had the additional mass gone merely to add to the thickness of the retina, a great part of it would, from its opaqueness preventing the transmission of the luminous rays, have existed in vain; but, by being thus disposed in folds, formed of layers sufficiently thin and transparent to allow of the passage of the rays of light through to their ultimate extinction in the choroid coat, every nervous point is brought into direct contact with the light, and from the sum of the whole arises the intensity. Desmoulins calculates that, in the royal eagle, four folds exist in a space that in an ordinary eye may be counted one; and, as each fold consists of a membrane folded on itself, and thus presents in reality four sides, every ray of light comes in contact with sixteen points of nervous surface instead of two where the retina is, as in man, a single membrane. This calculation may be erroneous, but it is more than sufficient to establish the relation existing between size of organ and energy of function, which it is our present object to prove.

In further corroboration of the same principle, it may be mentioned that, when these quick-sighted animals are deprived of the exercise of the sense of vision, in so far as regards objects placed at great distances, and for the perception of which alone strong vision is required, the nervous folds begin to diminish, and ultimately disappear, leaving the retina single, as in animals of ordinary vision. M. Desmoulins observed this diminution in the otherwise healthy eyes of a royal eagle, which died at the menagerie in Paris; and in another, which became blind before death from ophthalmia, he found the retina quite smooth, without a vestige of any fold, and the optic nerves reduced in size by two-thirds. That this atrophy resulted from the diminution and privation of function was proved by Magendie producing the same phenomena in the eye of a pigeon, by simply excluding it from the light for twelve consecutive days; and, this being the case, can the relation between size and energy of function be for a moment reasonably doubted?

Dr. A. Combe goes on to quote the authority of Cuvier and other eminent naturalists and anatomists, who, as a matter of course, have applied this principle of size to the brain itself. As Dr. Combe says, this principle has been virtually acted upon in all ages by the most celebrated authors in reference to the brain, '*and has never been called into question except for the interested and prejudiced purpose of opposing Dr. Gall.*'

CHAPTER XX

PHRENOLOGY IN THE 'ENCYCLOPÆDIA BRITANNICA'

After the foulness and flippancy of the 'Edinburgh Review' it is refreshing to couch the goose-quill lance in tourney with a scientific, honourable, and chivalrous antagonist, especially one who hails from modern Athens. Such is Professor Laycock, the writer of the article 'Physiology' in the 'Encyclopædia Britannica,' 8th edition. The following are his criticisms of Phrenology. After enumerating the phrenological faculties, he says :—

> The objections to this division of the mental faculties are, first, its complexity; and, according to the phrenological system, one faculty is considerably influenced by others; so that compound characters may be easily manufactured at will, and thus numerous sources of fallacy thrown open. Second, it is redundant, for instance, in having two organs for form and size, for combativeness and destructiveness, for causality and concentrativeness. Each of these two, if not identical, are, at all events, closely allied. It is deficient in having no such faculties as memory, reasoning, and judgment, which every man is conscious he possesses. But it is said every organ has a power of remembering, reasoning, and judging,; so that there are other faculties which govern or attend upon all the thirty-five organs. There are also obvious deficiencies in the propensities or instincts, for mankind not only love, steal, fight, kill, secrete, and build, but run, swim, walk, talk, sing, learn, and so on, which have no place in the phrenological system. Perhaps there is no instinct so strong in man and animals as that of self-preservation, and yet this has no organ ascribed to it by the phrenologists. As a philosophical and metaphysical system of the mental faculties, therefore, the classifications of Stewart and Brown seem to us greatly superior, especially in all the higher proportions of the intellect; although, so far as the instincts and passions are concerned, they are, perhaps, inferior.
>
> If our knowledge of what the faculties of the mind really are, and how they should be divided, is so imperfect, it may appear unnecessary to attempt to determine in what part of the brain each is situated. As might be expected, all such efforts have failed.

That the brain furnishes the conditions necessary for the evolution and manifestation of mind, we have seen is established; and that the grey matter originates, whilst the white matter conducts, the influences generated, we have also shown to be highly probable. But we have no facts that point out that memory, consciousness, judgment, reasoning, or similar faculties belong to one part of the cerebral convolutions more than to another. Gall and his followers have localized all the thirty-five faculties into which they have divided the mind. He observed that certain individuals who displayed mental powers, moral feelings, or particular propensities, had a fulness or prominence in a certain part of the anterior, middle, or posterior third of the cranium. By paying attention to the principal characteristics of remarkable men, and the living habits of animals, he found that this fulness or prominence coincided in a number of cases; and he concluded from this that the function of the brain which existed below the prominence was the organ giving rise to the characteristic faculty. He thus sought to confirm his theory by anatomy, physiology, and pathology; and he and his disciples have accumulated an immense number of these coincidences, which they believe sufficient to establish the phrenological theory.

But, proceeding to the principles which the phrenologists themselves have laid down, it is easy to show that the exceptions are as numerous as the coincidences; whilst the other modes of inquiry to which we have alluded, namely, anatomy, the results of experiments on living animals, and the observations of the symptoms of disease as compared with the appearances presented after death, not only give us no support, but are directly opposed to the views of Gall. Thus, some remarkable skulls in the museum of the University of Edinburgh are, on the principles of the phrenologists themselves, entirely opposed to their doctrines. Of these, among many, we would point to the skulls of Burke, Pepe, and Haggart, the two former remarkable murderers, with destructiveness small; and the latter a most dexterous thief, with acquisitiveness small. Anatomy proves that, while the lower vertebrate animals possess the anterior and middle lobes of the brain well developed, which are said to be the seat of the intellectual faculties and moral sentiments, they are deficient in those parts where love of offspring, adhesiveness, destructiveness, and combativeness are found, facts wholly incompatible with the theory of Gall. In the same manner, the great majority of facts derived from physiological and pathological research give no support to Phrenology. Although, therefore, this doctrine is unquestionably founded upon a large number of data, it cannot lay claim to a correct localization of the mental faculties in any way superior to other systems, which, like it, have been advanced by ingenious men, have excited attention for a season, and ultimately been abandoned as inconsistent with the present state of our knowledge. The names of Gall, Spurzheim, and Combe, notwithstanding, ought ever to be registered amongst those whose labours have greatly contributed to advance our knowledge of the physiology of the brain.

To the first objection, viz., the complexity of the faculties and their supposed excessive number, the phrenologist simply replies that neither their complexity nor their number is of his creation. It is quite true that they are more numerous than the elementary faculties of some of the metaphysicians, more so than those quoted by the writer of the article from Stewart, viz., 'consciousness, perception, attention, conception, abstraction, association of ideas, memory, imagination, and judgment or reasoning,' supplemented by 'affections, desires, self-love and the moral faculty.'

The modern chemist is in the same plight as the phrenologist, but deeper. Instead of the four elements of the ancients, he describes about seventy of them and is continually adding to their number. So is the astronomer. Formerly the members of the solar system were very satisfactory to those who had decided for themselves how the universe *ought* to have been created. They were just limited to the mystic and sacred number of *seven*. Now they are over 300, and are shockingly irregular. They violate all the cherished ideals of mathematical propriety, in a manner that would have been utterly disgusting to the old astronomers, who demanded harmonious perfection in the celestial courses, and insisted upon the paths of the heavenly bodies being circular, the circle being the most perfect of figures. But modern inductive astronomy tells us that not one of these three or four hundred heavenly bodies of our solar system moves in any such symmetrical path, but in ellipses of varying eccentricity, not one of which is even a true ellipse; all these celestial orbs are subject to irregularities both in their courses and their velocities, and some of these irregularities are very gross.

The critic who objects to these arrangements and demands some difference practically asserts that the universe is not properly constructed, as it might have been had he been consulted when it was created.

The inductive philosopher humbly and patiently strives to discover what *is*, and to teach this when he has discovered it; the deductive visionary propounds his own notions of what should be, and then struggles to prove that it is so.

As I have already stated, Gall was a typical inductive investigator, one who denounced the 'perfidy' of *à priori* reasoning. Had he found 300 faculties, or only three, instead of thirty, he would have taught accordingly.

His followers have but one answer to all who find fault with either the number or the complexity of the elementary faculties, which is, the assertion that they are facts revealed by observation, and that no reasoning, no *à priori* logic however acute, no objections however plausible, can overthrow the inductions derived from such observations, if the observations are correctly made and the inductions are sound.

The objection that it is redundant to have two organs for form and size is purely speculative; the writer supposes—or, say, firmly believes—that the perception of a form includes that of its size or of size includes form, and bases this upon his own consciousness. I, on the contrary, upon similar basis firmly believe that the perception of a form does not include its size, that my idea of a circular or elliptical or other more complex form does not specify or determine whether the circle has a diameter of a foot or a mile. My idea of the form of a man does not specify whether the man is 5 feet or 6 feet high, and so on. According to my ideas the knowledge that a field has an area of a dozen acres does not define its shape, whether square, oblong, circular, or irregular. Both of us having healthy brains, neither of us can *feel* any cerebral action, we cannot tell by physical sensations whether one or two cerebral regions are at work when we examine the sizes and forms of objects, or when we imagine or conceive forms and sizes. We may go on arguing these and similar questions on the basis of individual preconceptions for another two thousand years, as they have been argued for two thousand years prior to the era of Gall, and we shall still remain in the position of the metaphysical predecessors of Gall unless we can find some direct method of comparing mental evolution with organic development, such as I have already described.

Having learned—by observation—the physiognomical differences produced by large and small developments of the convolution assigned to form, and that which is in the region of size, the question under consideration can be soundly and crucially tested by selecting individuals in which the respective developments of these regions differ considerably, and then testing their respective powers as regards the functions assigned to each convolution. The convolutions of form push the eyeballs outwards or produce the appearance of a swelling on each side of the root of the nose, just above the inner

corner of the eyes. The prominent development of those of size is indicated by a pushing forward of the internal extremity of the arch of the eyebrow, thereby—in adults—displaying the frontal sinus by causing it to project outwards from the forehead, instead of inwards to the brain, as in persons in whom this and the adjoining organs are deficient.[1]

The question whether there is any redundancy in regarding combativeness and destructiveness as separate elementary faculties located in different regions of the brain must be similarly determined. This is much more easily done than the discriminating between form and size. It is easy to find both individual and national examples of men who are combative, bold, and aggressive, without being vindictive men; who enjoy a contest without desiring the destruction of their opponent. The English boxer, who struggles for hours until so absolutely exhausted as to be no longer able to stand, may not be desirous of killing his antagonist or even of seriously injuring him.

Typical examples of this are to be found in the north of England and in the Black Country, where men fight, and fight desperately, for amusement sake, and without the least vindictiveness, even when severely punished and unequivocally thrashed. One of the most pathetic sights I ever witnessed was the sequel to a fight between two such men. One fell heavily, striking the back of his head upon a stone, which apparently fractured his skull. He remained lying on his back stark and insensible. His opponent at first waited in fighting attitude for him to rise and 'come on again,' but finding that he did not, stooped over him, tenderly raised his head, and when it dropped apparently lifeless gazed on his fallen foe with an expression of horror and remorse on his bruised and bleeding face that I can never forget, and then sobbed and wept and fondled the head of the prostrate Hercules like a mother over a dead child.

On the other hand, we may find vindictive bloodthirsty cowards who will sneak and stab, either with daggers or false accusations, and crawl or run away if exposed to the risk of fair and open fight.

[1] I should add, in reference to this discrimination, that these organs which lie above the orbit and behind the superciliary ridge are the most difficult to diagnose.

To determine the question whether combativeness and destructiveness have separate organs in the brain, as asserted by phrenologists, we must compare the heads of such men and make a number of such comparisons sufficient to exclude the risk of mere coincidence.

Attempts to settle this question by comparing the consciousness of individuals will certainly fail, as those in whom these two faculties are nearly of equal development will not be conscious of the difference—would not fight unless provoked sufficiently to be malignant, and would not be cowardly in seeking revenge. On the other hand, those of either class above described would be conscious of two distinct and unequal states of feeling.

The discrimination between the cerebral development in these cases is as easy as that between the manifestations.

The question whether causality and concentrativeness are separate faculties need not be discussed; they are totally different, as perusal of the definition of their functions given in any sound elementary treatise will prove. The writer must have gravely misunderstood this, or could not have selected them to illustrate his argument.

The writer is altogether mistaken in stating that Phrenology is deficient in having no such faculties as memory, reasoning, and judgment. From his point of view—i.e., as an admirer of Stewart's and Brown's classification of the intellectual faculties—the phrenologist is redundant here, inasmuch as he gives to every one of his intellectual faculties a memory of its own, and also its own special reasoning and judging power. I have already narrated (p. 77) the circumstances which led Gall to this conclusion. I selected it as a typical example of Gall's method, showing how his preconceptions derived from book-lore were corrected by the testimony of Nature.

The reviewer's statements concerning Burke, Pepe, Haggart, and the skulls in the museum of the University of Edinburgh are not correct, and the source of error is well known, and the errors have been completely refuted. They are founded on certain measurements made by Mr. Stone, the absurdity of which I shall demonstrate presently (see p. 426). They crop up again and again, being quoted by every opponent, who merely copies the statements of other

opponents without examining their original source. This must have been the case with the writer of this article, who is too intelligent to have read and examined the original statements of Stone's measurements without perceiving their very gross absurdities.

His statement that 'mankind not only love, steal, fight, kill, secrete, and build, but run, swim, walk, talk, sing, learn, and so on, which have no place in the phrenological system,' is curious.

Running, swimming, and walking are muscular functions, not mental actions, though they are under mental control and may be used as servants of the mind. To this extent they do have their 'place in the phrenological system.' This I have already shown in a previous chapter as regards the connection between certain mental faculties and certain muscular movements, and I may here add that the phrenological system does include a special faculty concerned in the appreciation of gravitation, viz., '*weight*,' which, acting with '*locality*'—or the perception of direction—enables us to balance ourselves in the upright position, and is doubtless concerned in the control of our muscles in the complex operations of walking, running, etc. Weight and locality, especially the first, are excessively developed in such men as Blondin and other rope-dancers, and in all gymnasts that perform balancing feats.

The writer is utterly wrong as regards talking, singing, and learning. For the first we have language, for the second tune, and for the third all the intellectual faculties—each of which enables us to learn all that is learnable in reference to its special range of cognition.

He says, in reference to the coincidence between manifestation and development, 'that it is easy to show that the exceptions are as numerous as the coincidences.' This being a definite statement of pure fact, I cannot discuss it, but I can and do *most positively deny* it. A score of volumes and a hundred-and-one articles have been written against Phrenology during the present century, and not *one such exception has yet been established.* Assertions like the above have been abundant enough, but they have never been proven. Men like Dr. Andrew Combe and Vimont have sought fairly and industriously to find such exceptions, and the result has been that they became enthusiastic converts.

The writer of the article is wrong again in stating that the instinct of self-preservation 'has no organ ascribed to it by phrenologists.' It has two organs—*cautiousness*, which is the instinct for avoidance of injury, the sense of danger; and *the love of life*. The first of these is well established and very easily observed in the living head—one of the easiest, as it occupies a large portion of brain, and its position is definitely marked by the centres of ossification of the parietal bones. The second is still under investigation, only regarded as probable—the reason for this being that it can only be *satisfactorily* observed after death, being situated at the base of the brain. Its position and extent (which is considerable, in accordance with the general law of magnitude and psychic influence) have been suggested by comparing the brains of suicides with normal brains. When Phrenology is fully recognised the difficulty of direct examination of brains after death will be much smaller than at present, and thus this question, and others demanding such examination, will be satisfactorily settled.

The great phrenological collections, such as those of Gall, of Spurzheim, of Vimont, of Deville, of the Edinburgh Phrenological Museum, have never in a single case been selected with the view to exclusion of exceptions. Skulls have been preserved and casts have been taken of *every obtainable* case of remarkable character or remarkable configuration. The splendid collection of national crania—skulls of all races of men, ancient and modern, in the Edinburgh Museum simply includes *every skull that has been presented*, without any selection whatever, and the same has been the case in collecting the casts of executed criminals. Of these *every obtainable case has been obtained* and carefully preserved, for the simple and scientific reason that all such heads present *instantiæ ostentivæ*, extreme cases with a published history that must glaringly confirm or glaringly refute phrenological conclusions. It is true that some cases of known criminals are wanting, but this is not the fault of phrenologists, but that of the prison authorities, who have lately resisted our efforts to obtain casts of the heads of criminals.

If our legislators and their executive servants were men of decent scientific attainments, or endowed with sufficient intelligence to understand the requirements of science, the skulls

of all executed criminals would be preserved; also casts of their heads would be made for scientific disposal.

The absence of certain criminal heads from phrenological collections is not due to any rejection on the part of phrenologists, but to the action of the opponents of Phrenology such as that which called forth the following protest in 'Punch' of October 26, 1861:—

INCREDIBLE HUMBUG

The following statement with regard to the prisoner Cogan, who was hanged the other day at the Old Bailey, protesting his innocence to the last, occurs in the 'Times':—

'The body was removed after being suspended the usual time. An application was afterwards made for permission to take a cast of the head and face; but, acting on the advice of Mr. Gibson, the prison surgeon, that in his opinion such a proceeding was unnecessary for any purpose of science, the Sheriffs declined to assent to it.'

The reporter of the foregoing must have made a mistake. No surgeon, surely, could have expressed the opinion attributed to Mr. Gibson. There are few people who do not think that there is something in Phrenology. It is a matter of notorious fact that the heads of criminals exhibit in general a peculiar conformation, being dwarfed in front and at top, and enlarged below and behind. It is obviously a question of some scientific importance whether or no this coincidence between type of head and character implies connection. Such may not be the case. Phrenology may be not even so much as partially true, but all stuff and nonsense. But whether it is all humbug or not is a question only to be determined by such proceedings as taking casts of heads of malefactors and others, by such a proceeding as that which Mr. Gibson is represented, no doubt erroneously, as declaring to be unnecessary for any purpose of science. Such a declaration would become a shuffling bishop, desirous of stifling theological investigation, but is quite unworthy of any enlightened surgeon, the minister and interpreter of Nature and truth.

An account of the efforts of phrenologists (some successful, others failures) to obtain authentic casts or, in rare cases, skulls of notorious criminals would form a curious chapter in the history of science. One of the lowest types of human brutality in our collection is that presented by the cast of the head of Steventon, executed for murder at Shrewsbury in 1830. I have the skull of this man, but am not at liberty to tell how it was obtained. If anybody could produce such a cast or such a skull, and prove that it belonged to a well-conducted

moral and intellectual man, he would overthrow Phrenology at once. Nothing approaching to this has ever been done. We maintain that the existence of such a creature is impossible. Steventon might have passed through life as an ordinary savage with purely savage surroundings, where hunting, and stabbing, and scalping were ordinary and honoured pursuits; but the creature with such a brain was utterly unfit to be left at large amid the temptations of ordinary civilised society: he could not under such circumstances be other than a criminal. This, of course, is a very extreme case, but the evidence it supplies is proportionally strong. If correspondence between the form of this head and that of the brutal career of the man were a mere coincidence we ought to be able to find among our bishops, our statesmen, our philanthropists, our men of science, etc., one or more examples of similar organisation, these being so much more numerous than the executed criminals; but no approach to this has ever been found.

I here refer only to a single example, but in the Edinburgh Phrenological Museum are casts of executed criminals. All of these, with three or four exceptions, are heads of a certain type—the criminal type—distinguishable at a glance from the artisan type, the shop-keeper type, the professional type, the aristocratic type, etc. To prove this we have only to place the criminals in a row and then place an equal number of casts of non-criminals taken from various other classes in another row.

But how about the three or four exceptions? the reader will justly ask, as the laws of Nature, correctly stated, admit no exceptions. The answer to this is perfectly simple. These exceptions to the criminal type are casts of the heads of murderers who were not habitual criminals, who had committed one murder under circumstances of peculiar or extreme provocation or temptation, but had otherwise lived without crime.

I have already discussed the subject of cerebral pathology in reference to mental disease, and have narrated a number of cases which directly contradict the statement made by the writer of the article.

In reference to this subject we must not forget that physicians who are not phrenologists are incapable of testing Phrenology pathologically: in order to ascertain whether any

particular function is deranged they must know what that function is.

This is well illustrated by the history of the 'crowbar case,' which I have narrated (p. 149). This case has been quoted again and again as one of injury to the brain without mental injury. The physician whose stock of ideas concerning the faculties of the human mind has been acquired by studying the standard books on the subject would find that the faculties of attention, perception, association, memory, reasoning, etc., etc., or whatever other list his author enumerated, were manifested after the accident, and therefore conclude that the man retained all his faculties; but the phrenologist, finding that the crowbar emerged at the organ of veneration in such a manner as to inflict most serious injury on, if not destruction of, that organ or region in *both lobes* of the brain, would examine the man in especial reference to that, or if at a distance in time and place, as I am, would do as I have done in the chapter referred to, would examine his history. The result of such examination is that injury or destruction of the man's sentiment of veneration was equal to the injury or destruction of the region of the brain which the phrenologist assigns to the manifestation of that sentiment.

The usual history of the cases concerning which it is affirmed that there was extensive injury to the brain without any disturbance of mental functions is that the patient, while in the hospital, gave rational answers to all the questions that were put by the surgeons and nurses,—such questions as the following: 'Have you slept well?' 'Yes, sir.' 'Do you feel any pain in your head?' 'Not much, sir.' 'Any giddiness?' 'No, sir.' 'Has your medicine operated?' 'Yes, sir.' To those who still believe that the mind acts as a whole in every mental operation—the soul-unity doctrine, the violation of which brought so much persecution upon Gall—this sort of evidence of mental sanity may be sufficient; but as a means of testing the condition of the mental faculties enumerated and described by phrenologists it, or any extension of such catechism, is supremely ridiculous. Phrenology, in order to be tested fairly, must be tested *in accordance with its own principles*, and not according to the vague fancies of those who are ignorant of its principles. The simple fact that it assigns intellectual functions to only about one fourth of the

whole brain reduces the probabilities of intellectual derangement as a result of local cerebral injury to one case in four, or three to one in favour of emotional disturbance, to disturbances of feelings that are not displayed while the patient is lying in bed, and even if they were, would demand a previous knowledge of the habits and the conduct of the patient to determine whether any change had occurred.

Take such a common case as that of a man or of a woman falling backwards, striking the back of the head and injuring the occipital or hinder region of the brain. This would affect philoprogenitiveness primarily, and might extend to adhesiveness; but how could nurse or hospital surgeon determine whether the patient manifested more or less love of children and devotion to friends than was habitual before the accident? The like with the other affections, passions, and sentiments.

Even in the diagnosis of intellect the non-phrenologist is utterly incompetent to determine the sanity or unsoundness of the phrenological faculties. His book-lore would teach him to look for the faculties of perception, attention, memory, judgment, reasoning, etc. As these are merely modes of action of every faculty according to Phrenology, one half of the intellectual faculties might be destroyed, and yet all these so-called faculties would remain in connection with the other half. I will illustrate this by an interesting example.

At one of the 'circumtabular' tea parties that were held on Thursday evenings during the Edinburgh season at Mr. G. Combe's house in Melville Street, Mr. Combe told us that in the course of that morning a workman who had to put up some shelves brought his materials tied together and cut the string. Mr. Combe, who saw this, remonstrated with the man for his lack of thrift in cutting thus hastily, instead of patiently untying the knot. The man replied: 'My master charges you 8*d*. an hour for my time; now 8*d*. is 2*d*. for a quarter of an hour, 1*d*. for $7\frac{1}{2}$ minutes, or one halfpenny for $3\frac{3}{4}$ minutes, which is about the time I should have lost in undoing that knot. Thus the bit of string, which is not worth so much as one farthing, would have cost you one halfpenny. Where is the economy in that, sir?'

Mr. Combe commended the man for his sound logic and admitted his own error, but found on further conversation that the general intelligence of the workman was of a very

low order. Why was this ignorant man in this case so decidedly superior to the trained philosopher? Mr. Combe explained this to us. His own organ of number was very small, so small that the keeping of ordinary accounts was a tedious and difficult work. The workman, as he observed at a glance, had a large development of this region. The reasoning was purely numerical; the logic of numbers pure and simple. All this logical superiority depended on the action of a very small portion of the anterior lobe of the brain, situated within the lower angle of the forehead near the outer extremities of the eyebrows. This workman might have had his forehead crushed in, have lost a large quantity of brain from the anterior lobe, from the region of the higher intellectual faculties, might have become idiotic in reference to these faculties, and still have retained his superiority to Mr. Combe in reference to numerical logic.

This frequently repeated argument against Phrenology is obviously without any weight in any and every case where an exhaustive investigation of the condition of *each and all of the thirty-five* faculties enumerated by phrenologists has not been made; and that investigation must include a comparison between the condition of each of these faculties before and after the injury or disease of the brain.

If the whole brain acted in the manifestation of each of the faculties of the mind, then an injury or disease of any part of the brain must produce a correspondingly partial injury or disease of *every faculty*. There is a positive comicality in the position of those who assert this unity and entirety of cerebral action in every mental act as against the phrenological principle of functional localization, and then state these cases of local injury of brain, with alleged non-injury of mind, as an argument against Phrenology. These cases, if they did exist, must obviously be fatal to their own view of the necessity of the whole—the one and indivisible brain for the manifestation of every function.

I have reprinted and thus discussed in detail the objections contained in this article, first, for the reasons stated at the commencement of this chapter, and secondly, because it may be fairly accepted as a revision of the attack on Phrenology which was made in the same cyclopædia forty years before, in

the article 'Cranioscopy,' by Dr. Roget, which is too verbose and tedious, too much composed of mere 'padding,' for such reproduction.

It nevertheless received some attention at the time (1817) and excited some discussion. Dr. Andrew Combe replied to it in the first volume of the 'Edinburgh Phrenological Journal.' I have hesitated as to whether I should reprint this reply, but fear that it would be tedious, as all the arguments that are not now quite out of date are dealt with in other parts of this section. In the preceding chapter I have reprinted Dr. A. Combe's masterly defence of the law of size. Mr. Jeffrey in denying this was merely a follower of Dr. Roget.

As an example of the out-of-date arguments of Dr. Roget I may quote the following, which he brings against all localization of cerebral functions. He says that 'nerves perform the double office of volition and sensation; but no anatomist has yet separated the different bundles of fibres which convey each impression,' and therefore any part of the brain may perform either or all of the functions which it manifests, or the whole may be employed in performing any one.

CHAPTER XXI

DR. SEWALL'S 'EXAMINATION OF PHRENOLOGY'

Among the comparatively respectable attacks on Phrenology is a small book entitled 'An Examination of Phrenology. In two lectures delivered to the students of the Columbian College, District of Columbia, February 1837, by Thomas Sewall, M.D., Professor of Anatomy and Physiology,' published by J. S. Hodson, 112 Fleet Street, 1838.

In the first lecture is a sort of historical sketch, not of the physiology of the brain, but of the writers who are supposed by Dr. Sewall to be the predecessors of Gall, and whose actual relations to Gall are about equivalent to those of Galeotte, Louis XI.'s Astrologer, to Mr. Christie, Her Majesty's Astronomer Royal. The sentences with which Dr. Sewall introduces his little history are very amusing and indicate the general profundity of his own phrenological attainments. He says, speaking of Gall :—

> Whether he was the orginator of the science, or derived his first intimations upon the subject from some previous writers, is a question which I shall not discuss. Certain it is that ideas in many respects similar to those of Gall were entertained and promulgated long before his time.

Then he describes the gratuitous imaginings of Aristotle, and tells us that Galen, Bernard Gordon in 1296, and Archbishop Albert of Ratisbon followed Aristotle. He might have added that the general host of scholastic worshippers of Aristotle did the like. Their methods, their whole proceedings and the results thereof are typical examples of everything most diametrically opposed to the methods, proceedings and results of Gall, as of all other inductive philosophers.

He mentions Montagnana, Servetus, Ludovico, Dolci, Baptista Porta, Willis and Swedenborg, and especially refers to the work of Baptista Porta (a copy of which I have in my library) entitled 'De humana Physiognomia,' published in

Leyden, 1586 (my copy, in four books, is dated Hanover MDXCIII.), and states that in it 'there are contained so many of the principles and illustrations of the phrenology of the present day, that it may well be questioned whether hints have not been drawn from this source by later writers.'

The absurdity of this is shown by the fact that less than one-tenth of the book is devoted to the head, and this includes the hair; the rest to the eyes, nose, mouth, ears, neck, breast, arms, fingers, etc., etc., down to the toe-nails, all of which have equal physiognomical significance according to resemblances to oxen, lions, pigs, monkeys, dogs, birds, etc., etc. The pictures are amusing. Over the inscription '*Magnae aures*' is the profile of a man with large ears side by side with a resembling donkey. '*Valde parvae aures*' are illustrated by comparison of a human portrait with that of a monkey; '*Parvae et protensae aures*' are represented by profiles of a man and greyhound; '*A summo crassus nasus*' is depicted by parallel pictures of a youth and a pig; '*Extremum nasi acutum*,' by similarly presented faces of a warrior and house-dog; '*Nasi extremum gracile*,' by comparing the pointed nose of a naked old gentleman with the beak of a bird; '*Rotundus nasus, et extremum obtusum*' are proved to indicate extreme magnanimity —in accordance with Aristotle—by the counterfeit presentment of the face of a fierce and bearded warrior side by side with that of a lion, the noses of which are closely resembling. The book is filled with similar nonsense similarly illustrated; the great authority quoted throughout being '*Aristoteles in Physiognomonicis*,' supported by the lesser lights of Galen, Plato, Albertus, Polemone, Adamantius, Pythagoras, Virgil, etc.

Dr. Sewall does not, however, include in his list the work of Cornelio Ghiradelli of Bologna, which is a dissertation on physiognomy limited to the head and face, incomparably superior in all respects to that of Baptista Porta. Its full title is 'Cephalologia Fisionomica. Divisa in dieci Deche, Dove conforme ai documenti d' Aristotile, e d' altri Filosofi naturali, con breve discorsi e diligenti osservationi si esaminano le Fisionomie di Cento Teste Humane, che intagliate si vedono in quest' opera, dalle quali per più segni e congetture si dimostrano varie inclinationi di Huomini e donne. Di Cornelio Ghiradelli Bolognese, il Sollevato Academico Vespertino' (published in Bologna, 1678).

The 100 pictures are there, each one heading a chapter and under each an appropriate sonnet. I have a copy of this work and have gone through it in search of anything that might confirm or illustrate Phrenology, but in spite of its great superiority to the work of Baptista Porta, which is so continually quoted by the second-hand followers of Dr. Sewall, I have been disappointed.

The author evidently regards the brain as the organ of the mind generally, and displays some knowledge of its anatomy and that of the senses, as understood at the period. He discourses on the temperaments and refers some of the physiognomical indications to the brain, as in the following: 'When we see a person with swollen eyes and the upper eyelid moistened as though full of humour, we conclude that he is a heavy sleeper (*un gran dormiglione*) and that his brain is largely charged with humour' (p. 287).

Other features are said to indicate dryness of brain, etc. Dr. Sewall then proceeds with a sketch of what he describes as 'some of the leading principles of Phrenology,' and he does this evidently in good faith, but not without falling into some of the mistakes that are so prevalent among those who criticise Phrenology before studying it.

The fifth proposition of his enunciation of the principles is thus expressed: 'That the brain is a multiplex organ, and composed of a definite number of compartments or sub-organs.'

This is a very bad beginning, especially after his preceding declaration, in italics, of his main object, viz., 'to ascertain how far these principles (that is, the principles of Phrenology as expounded by Dr. Sewall) *are sustained by the anatomical structure of the parts more immediately concerned.*'

Now this idea of 'compartments' in the brain is a gross and ridiculous travesty of the phrenology of Gall, Spurzheim, Combe, or any other respectable phrenological authority. They all distinctly affirm that no such compartments, or any approach to such compartments, exist. Combe says ('System of Phrenology,' vol. 1, p. 119):—

> No lines of demarcation between the organs have yet been discovered in dissecting the brain. But the same difficulty presents itself in regard to the spinal marrow. The fact that one column of the spinal marrow serves for voluntary motion and another for

sensation is admitted by the best physiologists as indubitable; yet no line of demarcation between them has been pointed out.

I may add to this that every nerve of the body is a compound organ; it performs both motor and sensory functions, but there is no division on the trunk of the nerve between its motor and sensory fibres, and the anatomist is incapable of separating them, though he knows from physiological or functional evidence that they are both there.

The case is precisely the same with the phrenological organs of the cerebrum, and those who assert, as Dr. Sewall does on page 37, that 'neither the cortical nor fibrous part of the brain reveals upon dissection any of those *compartments or organs* upon the existence of which the main fabric of Phrenology is based,' are not attacking Phrenology at all, but are simply refuting their own blunders.

I may add to Dr. Sewall's statements concerning the absence of 'compartments,' that many phrenologists—myself among the number—regard the term 'organ' as rather an unfortunate one, on account of the mechanical idea it conveys to superficial people, to those whose ideas are governed by words rather than by the facts, which the words are used to express. My readers may have observed that in the present work I commonly use the words 'organ or region.' If I were a phrenological autocrat or dictator, I would go still further and describe all these organs or regions as '*centres*.' If I live long enough to write a comprehensive elementary treatise on Phrenology, I shall state fully my reasons—very weighty reasons—for insisting on this innovation. In the meantime I am dealing with Phrenology as it is in its present stage of progress.

Some critics have carried their mechanical notions of mental organisation even further than those of Dr. Sewall. They ask for anatomical or microscopic revelations of differences of structure corresponding to the differences of function described by the phrenologist, but do not define what sort of differences they demand—whether they require microscopic cradles in philoprogenitiveness, microscopic prayer-books in veneration, and microscopic daggers in destructiveness. Thus Dr. A. Wilson, in a recent attack on Phrenology published in 'The Gentleman's Magazine' of January, 1879, makes it a serious complaint against Phrenology that 'the scalpel of the

anatomist can nowhere *discover* in the full-grown brain an organ of veneration or of hope, or of language, or of any other *mental feature.*

Further on, p. 37, Dr. Sewall says :—

> Upon removing the dura mater, there are exhibited to the eye numerous convolutions rendered distinct by grooves, which separate them to a greater or less depth ; but *these convolutions do not in any respect correspond in form, size, or position with the bases of the phrenological organs as mapped out in the figured skull. Phrenologists do not pretend that there is any relation between the one and the other.*

The statements contained in that part of the above which I have put in italics are not only false, but they are directly opposite to the truth. The convolutions *do* correspond in form, and in size, and in position with what Dr. Sewall asserts they do *not* correspond, and phrenologists do not merely pretend, but positively and continually assert, that there *is* a relation between them.

In Gall's large quarto work (vol. 3, p. 71, 1818) is the following, which is repeated in the 'Fonctions du Cerveau,' vol. 3, p. 193 (1823) :—

> I had long been in the habit of marking on skulls the form and position of the organs, as I proceeded in their discovery. Afterwards I began to examine to what extent these regions of the skull corresponded with the subjacent parts of the brain. One may imagine my joy and my astonishment when I saw that the form of each of the external indications which I had discovered was necessarily such as it must necessarily have if it were formed by the protrusion of the cerebral part below it. In the case where the protuberance is the segment of a sphere, it covered convolutions rolled into spiral prominence like the organ of construction ; when the exterior indication is conical or pyramidal, the convolutions below it wind in a conical or pyramidal form like the organ of the relations of sound. In some cases the external prominence is single, in others double, still according to whether the corresponding parts of the two hemispheres of the brain are near or distant, like the organ of the love of offspring. The same occurs as regards the direction in which the organs extend, whether perpendicular, horizontal, oblique, forward or backwards, up or down.
>
> In all these instances we observed carefully whether the elevated or prominent parts of the skull corresponded with prominent regions of the brain. We never found an exception to this in *healthy brains of subjects of moderate age.*

(The italics are mine for further reference presently.)

Spurzheim says the same. Combe ('System of Phrenology,' vol. 1, p. 120) says:—

> The forms of the organs delineated on the bust are, however, not arbitrary. When any particular organ predominates in size over all those in contact with it, it gives a particular form to a part of the skull which covers it, and the forms thus evolved have been copied in the bust and on the plates. No *one* natural head can show the forms of all the organs distinctly, because they cannot all predominate in one head; but if a sufficient number (of heads) be appealed to, complete evidence will be obtained that the forms are not imaginary, but natural. Firmness will show its form in one skull (that of King Robert Bruce, for instance), conscientiousness in another (Mrs. H.), benevolence in a third (Jacob Jervis), and so forth.

This author next proceeds with another of the falsifications of Phrenology which is repeated *ad nauseam* by nearly every writer who has attacked it, repeated in spite of the distinct protestations to the contrary by Gall, Spurzheim, Combe and every other scientific phrenologist.

I refer to the pitiable blundering that is thus perpetrated respecting what Dr. Sewall calls 'the counteracting and neutralising influence of the individual organs on each other,' which he illustrates as follows (p. 30):—

> For example: if the organs of combativeness and destructiveness are very full, and those of veneration and conscientiousness are also very full, the latter will so counteract and neutralise the former that the individual may live all his days in quiet, and not once manifest the smallest disposition to combat or murder. Or, if the organ of acquisitiveness is very large and that of benevolence is also very full, the two propensities being thus counterpoised, there may be no especial desire of accumulating wealth manifested, and as little of the spirit of liberal giving.

Nothing could be invented or conceived more diametrically opposed to the fundamental philosophy of Phrenology than this. Every organ supplies mental energy of definite quantity and quality, which, when exerted, does its own work proportionately to its intrinsic quality and energy; but this force, like every other force in nature, may have its effects deflected by the operation of other forces. Whenever this occurs all the original forces remain in precisely the same quantity as before, though every one is deflected by the operation of all the others and is displayed in the resultant.

Thus, if a body at rest at *a* becomes impelled by a hori-

zontal force which would carry it in a given time to *b*, and at the same moment is impelled by another force which would in the same given time carry it perpendicularly to *c*,



it will travel from *a* to *d* by the path indicated by the line between *a* and *d*. Thus it will do both journeys: it will travel a horizontal distance equal to *a b*, and a vertical distance equal to *a c*, by taking this diagonal path—otherwise stated, both the horizontal and the vertical forces are exerted and conserved, though the path that would have been produced by either acting alone has been changed.

The operation of moral forces is the same. Taking the illustration supplied by Dr. Sewall, the combined operation of acquisitiveness where both are dominant will produce such a resultant as displayed by the action of that true nobleman, Mr. Peabody, and by others of the same class, whose benefactions are distributed throughout England and Scotland. These noblemen have acquired great wealth, but instead of heaping it all in primogeniture, and thereby supplying their eldest sons with the means of inordinate sensual self-indulgence, they have founded hospitals, colleges, museums, sanitary homes, etc., etc., for the benefit of their fellow-creatures at large.

The conventional useless aristocrat is influenced by the lower propensity of self-esteem in the form of family pride; the true aristocrat, after a life of usefulness in which acquisitiveness has been a powerful factor, proves the simultaneous action of benevolence by the use he makes of his acquisitions, a benevolent use that must, in most cases, have been in contemplation throughout his acquisitive career.

All Dr. Sewall's talk about *neutralising* and *counterpoising* faculties is not phrenology at all, but nonsense of his own invention or borrowing.

His selected instance of combativeness and destructiveness combined with veneration is finely illustrated by Oliver Cromwell, Luther, and other reformers; in our own time by honest John Bright. He was a lover of peace and a splendid fighter,

a deeply religious iconoclast, a devoted Conservative in defence of the constitution of the Empire, and a progressive Radical in forwarding its development. To people whose intellect has been enslaved by mere words these appear inconsistent, but all who are able to reason on the things themselves can understand the perfect consistency of such a combination.

The opponents of Phrenology on such grounds as those above stated by Dr. Sewall are the slaves of mere words ; they have read the *names* of the faculties and know nothing more about them.

This is further shown by such a sentence as the following by Dr. Sewall : 'And all the organs may be so accurately balanced, that the good shall counteract the evil desires.'

This very vulgar talk about the good organs and the bad organs, or the good and evil desires, is all in direct contradiction to the first principles of Phrenology, according to which there are no bad organs, no bad faculties. All are good, and the perfect human character is that in which all are well and harmoniously developed, and well trained or educated to their proper uses. Destructiveness, which is the vulgar bugbear, is as necessary to the perfect character as benevolence, conscientiousness or veneration, and this is taught by Spurzheim, Combe, and all the other philosophical phrenologists, though *at first* it was not understood by Gall himself. His examples were cases where the faculty had been misused with criminal results ; his stern devotion to facts and refusal to go beyond them, so necessary in that stage of his researches, excluded for a while the broader generalisations which in this as in all strictly inductive sciences have followed at a later stage of progress.

In Chapter XIX. I have referred to Gall's observations of what he calls '*la mimique*,' or 'natural language,' and the confirmations of his results by modern experiments in the local faradization of the hemispheres. The readers of this chapter will be able to properly appreciate Dr. Sewall's illustration of this when he says :—

> For example : If the action of amativeness be strongly excited, and especially if the organ is large, the head will be thrown backward, because the base of the organ is situated in the lower and back part of the brain ; and which is the reason, also, that lovers are prone to bring the back parts of their heads in contact, when they approach each other.

On p. 34 Dr. Sewall writes the following as the sayings and doings of phrenologists :—

> If a small head is connected with a powerful intellect, it only proves that the brain, though small, is well organised, and acts with uncommon energy. If an individual has a particular propensity strongly marked in his character, and there is no corresponding development in his brain, it is said that the organ is not being thrown out by indulging its desires ; but if there is a large development of an organ, and no corresponding propensity, then it is contended that the germ of the propensity is there, but that it has been repressed by education, or other circumstances ; or it is found that some counteracting organ is fully developed which neutralises the first. For example : if the organ of covetousness is large and the person has no uncommon love of gain, and the organ of benevolence is also large, it is urged that the action of the one neutralises that of the other.

My reply to all these statements is very simple, viz., that EVERY ONE OF THEM IS UTTERLY FALSE. Dr. Sewall does not attempt to support or justify any one of them by any quotation from any phrenological work. They are either his own gratuitous inventions, or second-hand repetitions of the inventions of others. I believe them to be the latter, as Dr. Gordon's falsehoods had been perpetrated and copied, and varied by a multitude of unscrupulous paragraph-mongers, long before 1838, and this part of Dr. Sewall's book has altogether a second-hand character, though sincere and well intended. These and similar misrepresentations of the principles of Phrenology and the practice of phrenologists are followed by other second-hand objections based on the size of *the whole* head and its non-coincidence with intellectual power. I have already discussed this objection, which, in spite of its obvious fallacy, is repeated again and again, even to the present day.

In reference to this part of the subject (strength of intellect and whole size of brain), Dr. Sewall adds :—

> If the relative size of the brain be intended, then it is necessary to know with what it is to be compared ; whether *with the dimensions of the face, the size and length of the neck, with the size of the spinal marrow, the cerebral nerves, or with the volume of the whole body.* Upon this point phrenologists have not been explicit.

False again, shamefully false ! Phrenologists have been most explicit upon this point. Gall is most explicit, Spurzheim is most explicit, Vimont is most explicit, Combe is most

explicit, Broussais is most explicit, and so are all other respectable teachers of Phrenology. To enable the reader to judge whether I am justified in denouncing the falsehood of this statement I have marked in italics the special relations named by Dr. Sewall, and quote the following from Gall and Spurzheim with the titular heading as given in the original. My apology for the length of these quotations is that Sewall's blundering has been copied and repeated *ad nauseam* by all the charlatans who, in the plenitude of their ignorance, have attacked Phrenology since the publication of Sewall's book.

On the Absolute Size of the Brain [1]

The greater number of natural philosophers, being convinced that the brain is the organ of the soul, have concluded that its functions must be proportionate to its size. The brain of man was accordingly found larger than the majority of tame animals, as the horse, ox, etc. Without therefore examining living beings more strictly, the superiority of man was at once attributed to the absolute size of his brain. Thus, according to Erasistratus, Aristotle, Pliny, Galen, Portal and others, man has the largest brain.

Modern discoveries, however, have shown that the brains of whales and elephants are larger than that of man. Those, therefore, who measure the faculties of animal life according to the absolute size of the brain must err; for whatever the understanding of the elephant may be, and though the whale be declared king of the inhabitants of the sea, no one will attribute either to the one or the other those superior faculties which constitute the distinctive character of man. Besides, if we more closely study nature, we find that the brains of the monkey and dog are smaller than those of the ox, ass and hog, yet the former come more nearly to man in respect to their intellectual faculties. Moreover, different animals, as the wolf, tiger, sheep, roe, may be ranged in the same class with regard to the size of the brain; yet their qualities are quite different, and in some respects even opposite. It is the same with the sparrow-hawk, cock and pigeon. Finally, we see that Nature produces the most surprising effects by means of very small brains. Observe the honey-bees, contemplate their interior economy, their local memory, the care they take of their progeny, their anger and revenge, their natural language. Is there anything more curious than the conic hole of the pyrmicoleon, or the web of the spider? Do we not observe in the cock the jealousy of the stag; in the redbreast the propensity to fight of the wild boar, etc. If, therefore, the absolute size of the cerebral mass were capable of being employed as a measure of the moral sentiments and intellectual faculties, all animals which have the same quantity of brain ought to manifest absolutely the same faculties, and the faculties of

[1] See Spurzheim's 'Physiognomical System of Drs. Gall and Spurzheim' (1815).

animals could differ only in energy. It would then be inexplicable why one animal lives in society and another in solitude; why one takes care of its progeny and another does not; why one constructs, another sings, etc. It is not, however, possible, even in individuals of the same kind, to measure their faculties according to the absolute size of the brain. Hence it is necessary to look for other means of determining the degree of the faculties of the mind.

Of the Size of the Brain Compared with that of the Body

The brain of the elephant and the whale is larger than that of man; but their bodies are also much heavier than that of man. This circumstance seemed to prove the superiority of the human brain; and anatomists no longer said that man had *absolutely* the largest brain, but only that he had the largest brain in *proportion to his body*. According to the principle admitted as to the origin of the nerves, it was easy to explain how the moral sentiments and intellectual faculties were indicated by the size of the brain, compared with that of the body; for all nerves were said to be prolongations of the cerebral mass and to be proportionate to the body; and consequently in a large body the greater part of the nervous system must be employed for the purpose of bodily functions, and there must remain a small portion of the brain for the superior faculties.

The brains of reptiles and fishes are also very small in proportion to their bodies; a crocodile twelve feet long, a serpent eighteen feet long, a turtle that weighs from three to five hundred pounds, have brains that scarcely weigh one drachm. There are insects in which the nerve of one single sense exceeds the size of the brain: the great vulture of the Alps (Lammergeier) has a brain almost as small as that of the raven, and the turkey-cock has no more brain than the parrot. It was concluded from these facts that the faculties are in the proportion of the brain to the body.

This conclusion was drawn too hastily, and was not grounded upon a sufficient number of observations. Accordingly Wrisberg, Soemmering, Blumenbach, Cuvier and other anatomists wished to verify this principle; but found that the sparrow, canary-bird, linnet, red-breast, bullfinch and several species of monkeys have, in proportion to their body, more brain than man. The intellectual faculties, therefore, of these animals ought to surpass those of man, or at least to approach them, and rats and mice ought to have more understanding than the horse, stag, dog and elephant, because the former have, proportionately to their bodies, a more considerable quantity of brain. According to this principle, it should also be impossible to discover any difference as to the faculties of different species of animals whose brain bears the same relative proportion to their body. Moreover, it would be very difficult to determine the just proportion of the brain to the body and to the nerves. The proportions noticed by Cuvier are evidently incorrect: in adult men

he admits the proportion of one to thirty-five; we believe the proportion of one to forty, or fifty, or even sixty, to be more general; for if we suppose that a grown man weighs only a hundred and twenty pounds, and his brain two to three pounds, the proportion fixed by Cuvier is incorrect. Besides, this anatomist does not say how he had separated the brain from the other parts; whether he left smaller or larger portions of the nerves and membranes; whether the blood-vessels were empty or filled; or at what age his comparisons were made.

Here follows a further discussion of the views of Haller, Soemmering and Cuvier in connection with the relative size of the brain and the body at various periods of life and conditions of health and disease :—

The Size of the Brain Compared with the Nerves

Wrisberg and Soemmering thought they might proceed in a surer way, if they determined the faculties according to the proportion of the brain to the nerves. They observed that the nerves are much more considerable in many animals than in man. This proportion, however, though more plausible than that of the brain to the body, is not yet universal. The seal has, proportionally to its nerves, a larger brain than the house-dog, and the porpoise more than the orang-outang; yet we do not observe the same proportions in the faculties of these animals.

It seems that Soemmering, in some women, found smaller nerves than he was accustomed to see in men; and from these observations he concluded that, as the brain of woman is smaller than that of men, the proportionate size of their nerves is preserved; in other words, that although the brain is ordinarily smaller than that of men, yet they possess the same degree of understanding, because their nerves are also smaller than those of men. Having been particularly attentive to this subject, we find that there is neither any proportion between the nerves of the five external senses, nor between the nerves and the brain; neither is there any general rule in respect to the sexes; sometimes one, sometimes another pair of nerves is large or small in men or in women, and that without any relation to the brain. For the same reason, it is also found that the function of these different parts are in no proportion one to another. There are individuals whose senses are very weak, and who yet manifest great energy of moral sentiment and intellectual faculty, and *vice versâ*.

The Comparison of the Brain with the Spinal Marrow

admitted by Soemmering, Ebel, and Cuvier,[1] is not more exact than the other proportions I have mentioned. Cuvier himself quotes exceptions; for instance, in the porpoise. Blainville, also, is entirely

[1] 'Leçons d'Anatomie comparée,' tome ii., p. 150.

wrong in saying that the occipital hole is proportionate to the medulla oblongata, and not at all to the spinal marrow. Besides, there is no proportion between the spinal marrow, nor even the occipital hole, and the brain; the brain may be large, and the occipital hole or the spinal marrow small, or *vice versâ*. This is the case not only in different species of animals, but even in different individuals of the same species.

On the Proportions between the Brain and the Face

Some physiologists, for example MM. Soemmering, Cuvier,[1] Richeraud,[2] Burdin,[3] Dumeril,[4] measure the brain in order to determine its proportion to the face; and maintain that from this point of view man has, of all animals, the greatest encephalon, and that animals are as much more stupid and as much more ferocious as their jaws are greater in comparison to their brains. This results, they say, from the fact that the olfactory and gustatory nerves are greater in proportion to smallness of the brain compared with the face; but they add that the senses of smell and of taste are just those which dominate in animals, because hunger and love are the irresistible impulses which urge them to blind fury and unlimited cruelty. Therefore the proportion of the size of the brain to that of the bones of the face furnishes an exact measure of the faculties of animals, of their instincts, and of their intelligence; and the study of this proportion is of primary interest to the naturalist. M. Cuvier, in order to measure exactly the magnitude of the outspread (*épanouissement*) of the olfactory nerve and the nerve of taste, makes a vertical section through the middle of the skull and the upper jaw, and then compares the height of the skull with that of the bones of the face.[5]

The ancients, continues M. Cuvier, appear to have understood that a large forehead compared with the face indicates high intellectual endowments, and accordingly have represented their heroes, their philosophers, their demigods, their Jupiter with a forehead very prominent and very large in proportion to the face.

This idea has been very widely accepted, but it is not true, is not based on experience. It is not the proportion of the brain to the bones of the face, for where there is a great development of the anterior lobe, whether placed over a large or a small face, it will always—other conditions being equal—be accompanied with a proportionate manifestation of intellectual power.

Who has not met with men of vast talent with large faces, prominent cheek-bones, and jaws, both upper and lower, large and prominent? Leo X., Montaigne, Leibnitz, Racine, Haller, Mirabeau, Franklin and others had both very large heads and very large faces.

[1] 'Leçons d'Anatomie comparée,' tome ii., p. 4.
[2] 'Eléments de Physiologie,' 8th edit., tome ii., p. 119.
[3] 'Cours d'Etudes médicales,' tome i., p. 26.
[4] 'Traité élémentaire d'Histoire naturelle,' p. 367.
[5] Cuvier, 'Leçons d'Anatomie comparée,' p. 9.

Bossuet, Voltaire, Kant, and others had, on the contrary, little faces with very large heads. These proportions vary equally among women, and M. Soemmering is mistaken when he states that women have, in comparison to their faces, larger heads than men.

The sloth and the seal have, in proportion to their brains, much smaller faces than the stag, the bull, or the horse. The bones of the face of a cat are smaller in proportion to the size of the brain than those of a dog.

Other examples are named showing, as Gall states, in accord with common-sense, that the proportion of the jaws to the brain depends upon the nature of the food of the animal, upon whether it masticates its food, as the horse does, or swallows it whole, as the seal does, and so on, and that—

There is no proportion whatever between the relative magnitude of brain to jaws or gustatory or olfactory nerves, and the energy of the intellectual faculties, the instincts, and propensities of animals, and consequently the scale of measurement in question is useless.

Gall and Spurzheim's section is headed—

On the Proportion of the Head to the Neck

Bichat[1] and M. Richeraud have resuscitated a mode of measuring the intellectual faculties which was suggested by Plato, according to whom animals and men with long necks have weaker faculties than others, because their brains, being more distant from their hearts, will be less excited by the blood.[2] Here the authority of Plato only proves that a man who enjoys a great reputation should be proportionally careful to avoid the expression of random ideas, as, however erroneous they may be, they may continue to be repeated for centuries on his authority.

Swans were scarce in Plato's time, and he had no opportunity of testing the intelligence of giraffes in the Zoological Gardens of Athens.

I must again apologise for the length of these quotations, but the everlasting repetition of the talk about big heads with little intellect, and big intellect with little heads, as refutation of Phrenology, compels me to adopt the course which prevails among the trainers of monkeys and quadrupeds. When the animal is intelligent a very little thrashing is required to cure it of any particular vice it may have inherited or acquired; when, however, the animal is

[1] 'Sur la Vie et la Mort.'

[2] 'Nouveaux Eléments de Physiologie,' 7th edit., tome ii., p. 134.

exceptionally stupid, the flogging has to be painfully prolonged and often repeated.

Dr. Sewall fills a whole page of tabulated figures stating the proportions of the size of the brains of different animals to that of their bodies, many of the figures being the same as quoted by Gall and Spurzheim in 1812 (and repeated in their subsequent works) in refutation of their opponents. He says :—

> This table shows that four species of monkey, the dolphin, and three kinds of birds (the canary bird, sparrow, and cock) exceed man in the proportion of the brain to the body, and that various other animals are nearly on a level with him.
>
> The doctrine, therefore, that man owes his intellectual superiority to an excess of brain derives no support from his comparison with the lower animals.

The childlike innocence of poor Dr. Sewall in thus refuting his own ignorance of the subject by repeating the statements of Gall and Spurzheim is very amusing, and is a fair sample of the customary erudition of some of the lecturers in some of our minor medical schools, who, when they reach the cerebral part of their course, repeat the customary flippancies against Phrenology and apply the customary kicks to the sick lion, and by such a display of heels enable those among their students who already know anything of zoology and of the writings of Gall and Spurzheim to name the class of the family *Equidae* to which their professor belongs.

After specifying more materials of the same kind concerning the weight of brains of 'literary and intellectual men of high grade,' he proceeds (p. 42) to discuss the question 'how far it is possible to ascertain the volume of the brain in the living subject by measurement or observation.'

He then tells his readers (p. 43) that—

> Phrenologists have provided two instruments for this purpose, viz., the craniometer and the calipers. The former of these is the instrument principally in use, and by it we are told that we can not only measure the volume of brain, but determine also the size of the individual organs.

Dr. Sewall does not say by whom 'we are told' this, and I may add that throughout the lectures similar statements are made of what we are told, or what phrenologists teach or state, without any attempt being made to quote any authority, and nearly all such statements are utterly false. He could not

have failed to discover this had he made any attempts to verify his statements, but still, compared with the rest of the tribe of Phrenology-revilers, Dr. Sewall 'is an honourable man.'

He describes this craniometer in detail and has it engraved in his frontispiece. It is Nicol's craniometer, one of a multitude of failures. It is represented and described in the earlier editions of Combe's 'Elements of Phrenology.' Mr. Combe concludes his description by saying that 'it has not come into general use.' This in the third edition, 1838. At the present time, or at any time during the last half-century, it would be correct to say that it is not used at all. Calipers are used to determine the general size of the head, not for measuring any individual organs.

I now come to the original part of Dr. Sewall's work, the great originality of which is shown by the following copies of his Plates V., VI., and VII., and his descriptions thereof on p. 45.

Fig. 36 is a copy of Dr. Sewall's Plate V., which he thus describes :—

> Plate V. represents a horizontal section, which has been furnished by Professor Smith. It is that of an adult male, and averages nearly three-fourths of an inch in thickness, *and is of ordinary and healthy structure.*[1]

Fig. 37 is a copy of Dr. Sewall's Plate VI., which he tells us—

> Represents, by a vertical section, an adult male skull from the cabinet of Professor Smith. It averages nearly one inch in thickness, *and appears in every respect healthy and natural.*[1]

Fig. 38 is a copy of Dr. Sewall's Plate VII., described as follows :—

> Plate VII. represents, by a vertical section, the cast of a skull which is from the cabinet of Spurzheim. It was kindly procured and sent me by Professor Warren of Boston.

Dr. Sewall then proceeds to say: 'The history of the intellectual character of the individuals whose crania are here delineated I shall not detail.'

Why not? the reader will naturally ask. As Dr. Sewall is not within reach to answer this question, I will answer it for

[1] The italics are mine.

him, by saying very positively that such answer would overthrow the object for which he says they are presented, viz., to furnish 'impressive evidence of the impossibility of ascertaining the volume of the brain by the rules of Phrenology.'

One of these rules, a fundamental rule, is that the size of brain or parts of brain *can only be ascertained by external ex-*

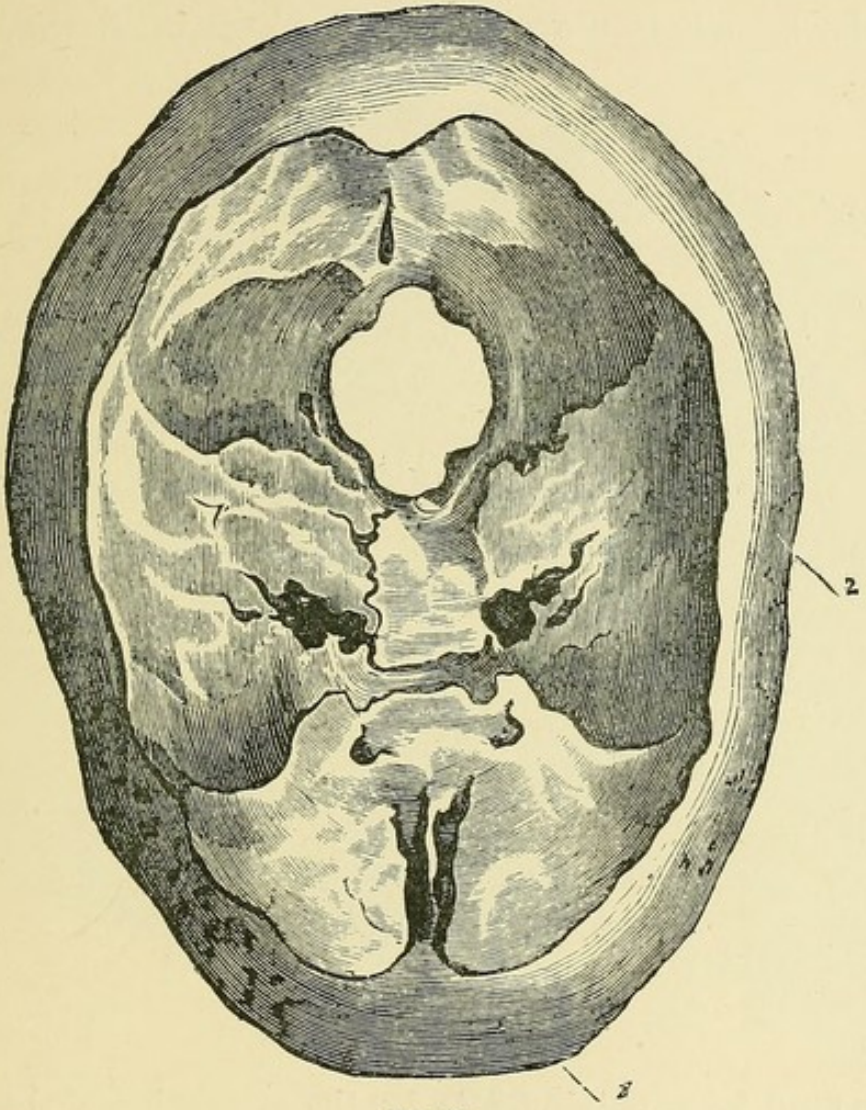


FIG. 36.

amination of the head in cases of healthy individuals of moderate ages.

This rule is laid down over and over and over again and most emphatically in every respectable phrenological treatise. Now, in spite of Dr. Sewall's endeavour to conceal 'the intellectual character of the individuals' whose skulls are represented, I have no hesitation in asserting that they were all lunatics; and without any further imformation than that

contained in the above quoted sentences and displayed in the drawings, I may safely venture to go further, to diagnose the form of insanity in each case as that of general dementia, either morbid or senile.

Had Dr. Sewall acquired even the most rudimentary knowledge of the subject he presumes to discuss, he must have known that all such cases are absolutely excluded from that particular branch of phrenological diagnosis where the living

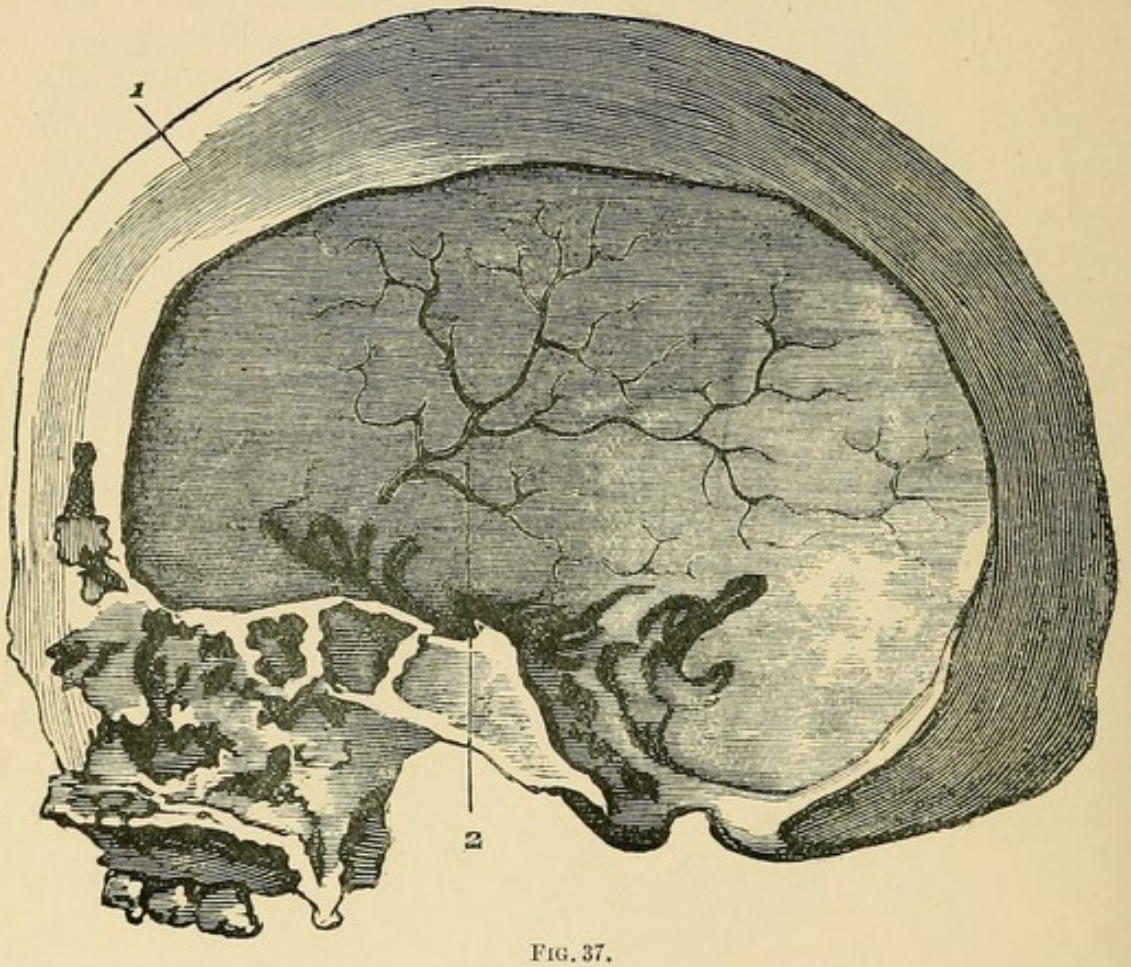


FIG. 37.

head is used for supplying data for the estimation of the form and size of the brain.

When Dr. Sewall tells his auditors and readers that the skull represented in Plate VI. 'averages nearly one inch in thickness, and appears *in every respect* healthy and natural,' he simply advertises his own incompetence as an 'M.D.' and a 'Professor of Anatomy and Physiology.'

Gall and Spurzheim have gone into this subject of the correspondence and non-correspondence of the form of the skull and the brain most minutely and fully. They have, in

fact, treated this subject more fully and more ably than any of their predecessors, contemporaries, or successors have done, so fully and so well that students of anatomy, physiology, and pathology who desire special information on this branch of their subject will do well to read their works.

Spurzheim, in his epitome of the quarto work of Gall and Spurzheim, says :—

Old and decrepit persons do *not* serve to confirm the doctrine of organology, because in them *it is impossible to judge accurately*

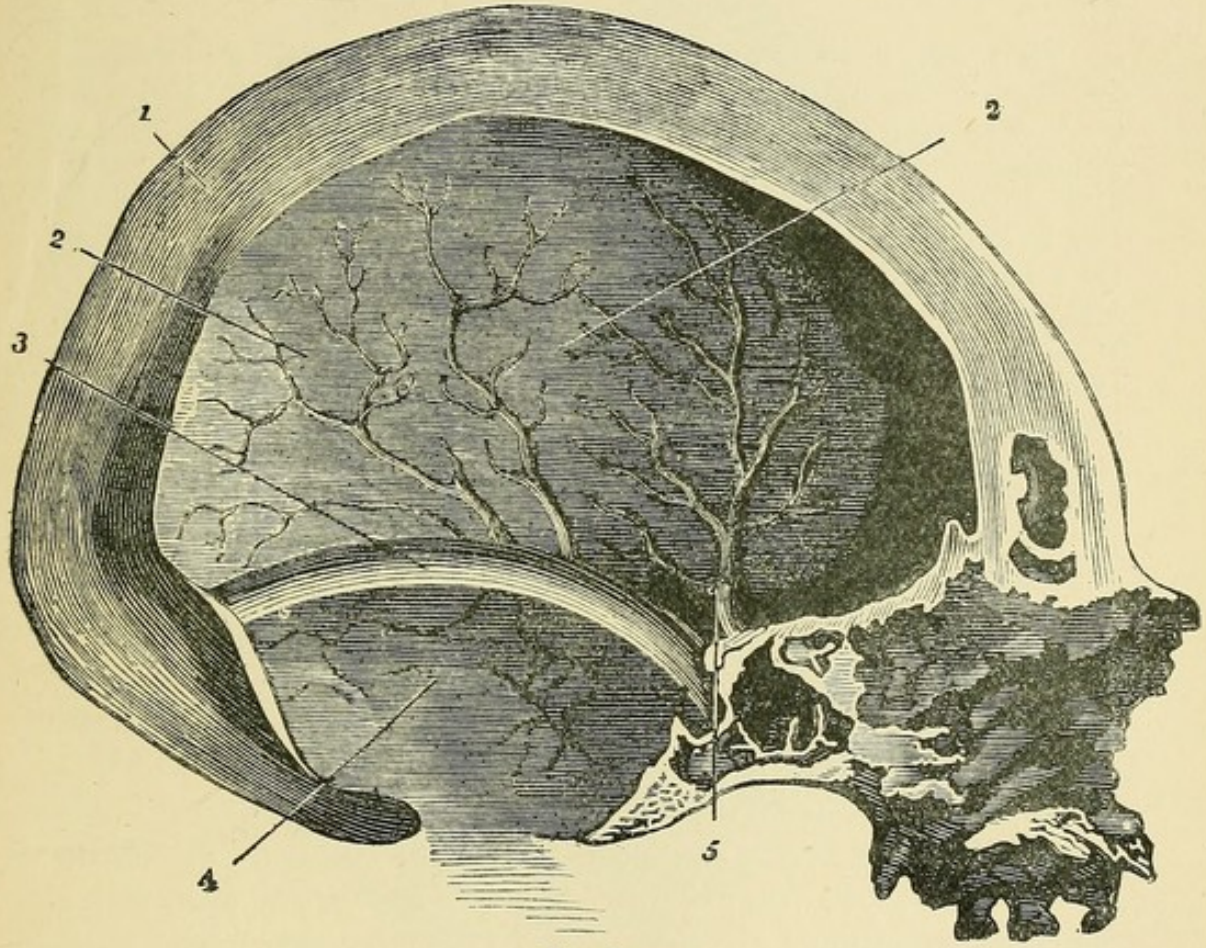


FIG. 38.

of the size of the brain from the size of the head. Moreover, the organs do not continue to be very active at this age. It is, therefore, evident that, in order to establish the physiology of the brain,[1] we must confine our observations to young and grown-up persons in the flower of their age.

Another circumstance which impedes our determining the size of the brain according to the size and form of the head is that which

[1] The reader should note that here, and throughout the works of the founders of Phrenology, the question is not whether or not we can tell people's characters by examining their heads, but whether we may thus 'establish the physiology of the brain.' The first question is merely a vulgar excrescence created and discussed by vulgar-minded outsiders only.

occurs in certain cases of chronic insanity. In this state the brain diminishes in size, as the other nerves do when long diseased: the internal table follows the size of the brain, while the external table preserves its usual position; and on this account the skulls of fools and madmen are often very thick, yet their texture is not very spongy, but hard and dense like ivory.

Following this is a discussion of details concerning varieties of skull-thickening.

Combe says in vol. 1 of his 'System of Phrenology,' p. 125:—

> There are, however, cases in which it is *not* possible to discover the form of the brain by examining the skull. These are instances of disease and old age. In disease the skull may be enlarged or diminished in volume by other causes than changes of the brain, and in old age the inner table of the skull sometimes sinks, while the outer table preserves its original size, and an extraordinary thickness is produced; *in such cases the true development of the brain cannot be accurately inferred from the appearance of the head.* It is a common trick with the opponents of Phrenology to collect these thickened skulls, and to represent them as average specimens of healthy crania under the middle period of life; but this is pure deception, practised on that portion of the public which is unacquainted with anatomy.

On leaving Dr. Sewall's skull-pictures, I may say a word of warning to students who desire to learn the normal structure of the skull. They should understand that most of the museum specimens are abnormal curiosities. Not one per cent. of the skulls (probably not more than one or two per thousand) which are opened in dissecting-rooms for demonstration of the anatomy of the brain are preserved in anatomical museums, and these usually on account of some abnormal peculiarity. Museum specimens are usually derived from cases where, on account of symptoms of cerebral disease, the brain and skull have been subjected to post-mortem examination.

I was greatly surprised a short time since in finding that a very intelligent young Australian surgeon, who had recently passed his anatomical examinations with distinction, maintained very positively that the average thickness of ordinary human skulls was between $\frac{1}{4}$ and $\frac{1}{2}$ inch. When I showed him the opened skulls in my own collection (dissecting-room specimens taken at random) he was surprised, and supposed them to be abnormally thin. Their average thickness is below $\frac{1}{4}$ inch, shown

in the section that is usually made for the removal of the brain.

Another specimen of Dr. Sewall's anatomical teaching is displayed by his Plate VIII., of which my Fig. 39 is a correct reproduction.

He tells his hearers that this 'Plate VIII. shows the form, *size*, and situation of the frontal sinuses, by a horizontal sec-

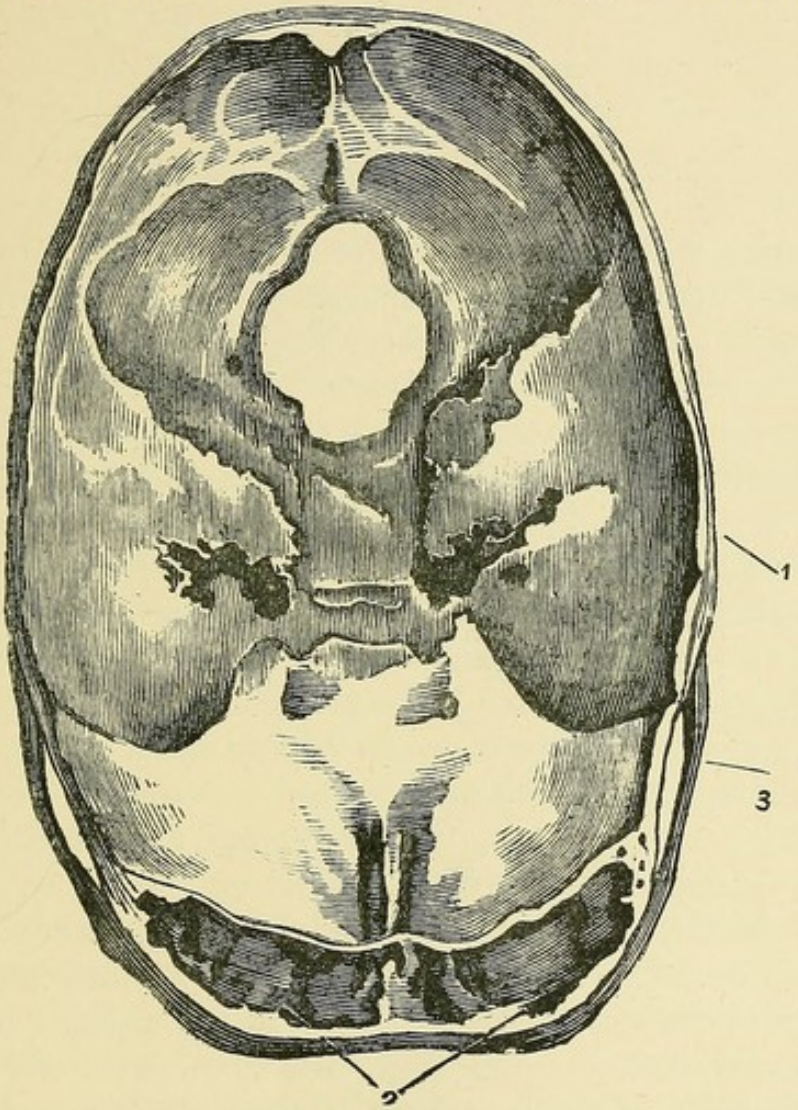


FIG. 39.

tion of the skull.' This from a '*Professor of Anatomy and Physiology*,' in lectures delivered 'to the students of th Columbian College'—medical students, I presume. If so, what must they have thought of their teacher when, in the course of practice, they shall have opened many skulls, and thereby have learned the actual dimensions of the normal frontal sinuses, and the natural thickness of human skulls, and have compared them with Dr. Sewall's representations?

CHAPTER XXII

MR. THOMAS STONE'S ATTACK

The early attempts to refute Phrenology mainly consisted of theological denunciations or metaphysical arguments. The phrenologists always concluded their replies to these by demanding *facts*, by asking for evidence based upon observation, maintaining the very simple and obvious thesis that if the cases described by phrenologists, and illustrated by their collections of skulls and casts, are merely due to chance coincidence between the cerebral development and the mental manifestation, it must be very easy to find other heads as positively contradictory as those in the phrenological collections are confirmatory—or, more properly speaking, it must be incomparably easier to find such contradictory cases, seeing that the phrenologists chiefly rely upon cases of extreme development or deficiency corresponding with extremes of mental development or defect.

To illustrate this let us suppose that such extreme cases of abnormal development of *some one* part of the brain exist in one head out of one hundred. Then if a man manifest an extreme or abnormal energy of any faculty the chances are one hundred to one against his displaying an extreme or abnormal development of *any* part of the head. But the phrenologist enumerates 35 localizations on the brain; thus the probabilities against mere accidental coincidence of the cerebral development of the particular region with the energy of this man's particular faculty becomes 3,500 to 1. This represents but a single case; but what shall we say to the following?

Mr. James Deville, the grandson of a Bernese protestant—who quitted his native country early in the last century to escape religious persecution—was born in 1777, and after many

struggles for a livelihood became a successful moulder and modeller in plaster of Paris, working in London. In 1817 he was employed by Mr. Donkin in making casts of masks, and heads and skulls, that were to be used for testing the truth or falsehood of Phrenology. He had then heard nothing of Phrenology, nor did he until some time after, when he enquired of Mr. Donkin why he took so much trouble and incurred so much expense in making such a collection, so void of any beauty or artistic value. The explanation interested him; he studied the subject, and took up the work of extending the collection on his own account.

In 1841 he had made a collection of 2,400 casts and skulls, which were freely exhibited in London. Of these, 150 were from criminals; 500 were moulds, casts, and crania (about 150 real skulls) of different nations; about 50 were 'casts of persons devoted to religion, the majority of them having abandoned their occupations or professions for religious pursuits, amongst them several remarkable cases'; 40 casts of distinguished artists, painters, sculptors, and architects; 30 casts of navigators and travellers; 80 of poets, authors, and other literary characters; 70 of musicians, composers, and amateurs of singing; 25 of pugilists, several of them called the champions of their time; 140 illustrating changes in the form of the head at different ages corresponding to changes of occupation; 350 of noblemen, legislators, judges, barristers, lawyers, astronomers, engineers, actors, etc.

Deville was omnivorous in collecting heads. He was intimate with the hangman and the other officials concerned in public executions, and never lost an opportunity of obtaining the cast of an executed criminal. He pounced upon every man within his reach who was distinguished for anything, from prize-fighters upwards, begging the favour of imbedding their heads in plaster of Paris in order to obtain a mould from which casts could be taken. Considering the very disagreeable nature of this temporary entombment (I speak from experience), it is wonderful that he should have obtained so many. When the encasing of the whole head was refused, he begged the favour of smothering only the face, in order to obtain a mask including the forehead. Besides these, his collection included above 3000 illustrations of comparative Phrenology.

Deville maintained, and the phrenologists who visited this collection supported him, that *all* these were confirmatory of the cerebral localization of Gall and Spurzheim, and that *none* were contradictory to it. My mathematical readers may calculate the probabilities of such correspondence being mere coincidence. The millions of millions of millions to one reduce the proposition to an absurdity.

If the collection of such confirmatory cases is at all possible, the utter and hopeless refutation of the pretensions of the phrenologists is incomparably easier, supposing they are based on mere coincidences. If it was worth while to write long articles in the 'Edinburgh Review' and scores of other publications of the period, it was surely worth while to collect a *few* damning facts.

On the opposite page are pictured two heads, one of an hopeless idiot and the other of the highly intellectual philosopher Bacon. The difference needs no comment. If it is due to mere coincidence, then the opponents of Phrenology can easily find an intellectual man with a head like the idiot, and a poor mindless idiot with such a head as Bacon's, or some approximation to these.

This is the sort of challenge which has been again and again repeated by British phrenologists from the time of Spurzheim's arrival in this country. Up to 1828 no attempt was made to raise the glove. At that date, however, a doughty champion appeared and read a paper 'at an extraordinary meeting of the Royal Medical Society of Edinburgh.' He afterwards published this under the title of 'The Evidences against the System of Phrenology,' by Thomas Stone, Esq. This was followed in 1829 by another pamphlet (75 pages), entitled, 'Observations on the Phrenological Development of Burke, Hare, and other Atrocious Murderers; measurements of the heads of the most notorious thieves confined in the Edinburgh Jail and Bridewell, and of various individuals, English, Scotch, and Irish, presenting an extensive series of facts subversive of Phrenology. Read before the Royal Medical Society of Edinburgh by Thomas Stone, Esq., President of the Royal Medical Society.' [1]

[1] Dr. Gordon was also a President of the Society. Its high-sounding title has been paraded by the opponents of Phrenology to impose upon their readers by exalting the dignity both of Dr. Gordon and Dr. Stone; therefore I am com-

This effort 'brought down the house,' especially the gallery. It was received with acclamation by all the opponents of Phrenology. In the sixth volume of the 'Edinburgh Phrenological Journal' are many quotations of their jubilations, from which I quote the following as a few characteristic samples.

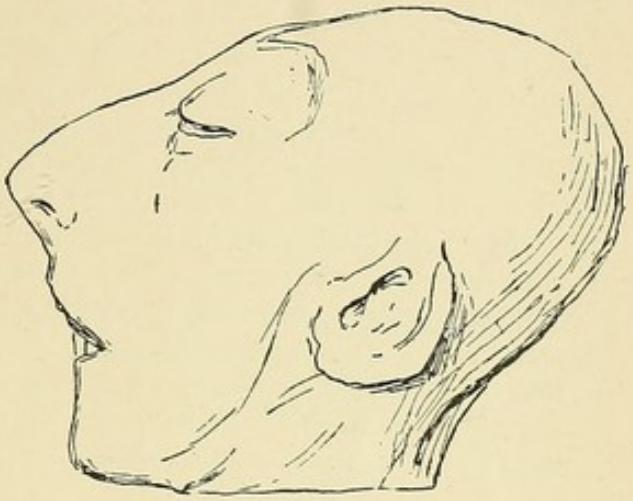


FIG. 40.—Idiot.

In No. 8 of the 'Foreign Review' we are told that 'Mr. Stone, avoiding all psychological or physiological arguments, proceeded to an induction of facts, and by a plain series of measurements has succeeded in exploding the whole theory'; and then adds, 'Mr. Stone will forgive us, no doubt, for thus endeavouring to give a wider circulation to the results of his truly Baconian investigation.'

The 'Observer' of May 1, 1829, after reference to the first pamphlet, said of the second :—

> This last one we regard as the most brilliant of all; and if the phrenological champions do not make a good rally and speedily regain the position from which he has dislodged them, we suspect that they will be regarded as having tacitly agreed to an unconditional surrender.

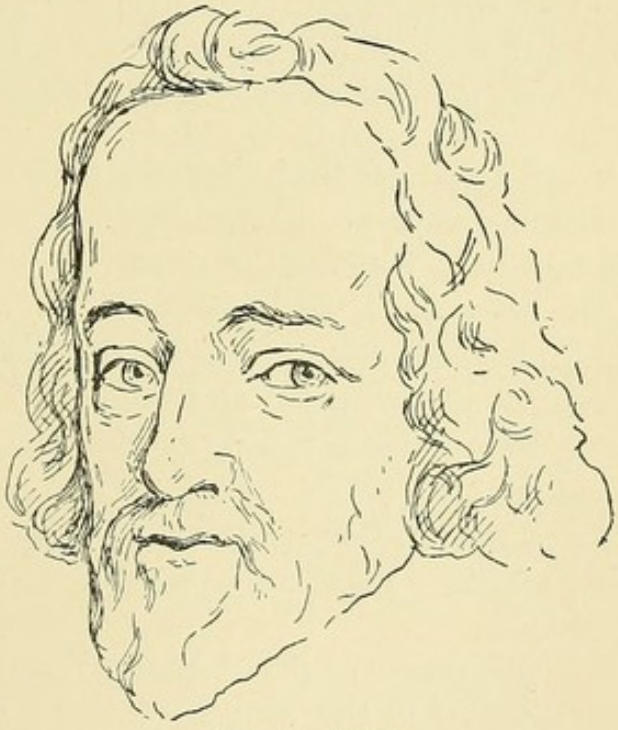


FIG. 41.—Bacon.

The 'Edinburgh Literary Journal' of the following day said :—

pelled to explain that it was simply a society of medical students, a sort of debating club where papers by students and others were read and discussed—a very useful society, that has done good work in bringing forward young men of promise, but not one whose membership constitutes any special scientific distinction.

This is one of the most efficient knock-down blows that Phrenology has yet received. Nobody can read this pamphlet and believe in Phrenology; we question whether Mr. Combe himself can. We should not be surprised to hear of his abruptly terminating his lectures in Dublin, and going into retirement for the rest of his life. 'Assail our facts, and we are undone; Phrenology admits of no exceptions' has been his continual exclamation. 'Eh bien,' says Mr. Stone, 'we'll take a look at your facts, and see how they answer.' Mr. Stone's former pamphlet on the same subject was a learned and an able one, but this is a thousand times more convincing, because there is no theorising in it, nothing but plain statements and incontrovertible deductions. He has 'assailed their facts' with a vengeance, and has succeeded in making it perfectly clear that there is no such thing as a well-established *fact* in the whole science. We do not speak rashly, nor do we speak partially.

The 'Edinburgh Evening Post' of May 9, 1829, said:—

Mr. Stone has done his duty, and it only remains for phrenologists to do theirs. *How* they will be able to defend themselves, and *when* we cannot guess, but at present they seem to be 'taken all aback.' Their philosophy (if it be a philosophy) has its foundation in nothing but credulity and wilful delusion; it is a false theory, *a petitio principii*, which avoids the test of fact and experience, a system of plausibility which, when probed to the bottom, is found to be altogether so fallacious and superficial, that it is almost universally rejected. We are inclined to think that it has now got its last quietus.

I may add that, instead of retiring from public life, Mr. Combe replied immediately and demolished completely, and to the satisfaction of all who chose to read both sides of the discussion, the whole of Mr. Stone's conclusions, and a number of other writers supplemented his reply. Other replies accompanied and followed Mr. Combe's.

Nevertheless these pretended *facts* of Mr. Stone have been referred to again and again by writers in cyclopædias, by anatomical and physiological lecturers in medical schools, and by magazine and other writers up to the latest dates of such attacks.

The name of Sir William Hamilton is repeatedly used by Mr. Stone in the course of these 'truly Baconian investigations.' He appears alternately as Mr. Stone's coadjutor, assistant, and patron, and served to bait the trap into which so many of these writers and lecturers have so pitiably fallen. Another, and even more attractive bait than this is the learned display of hundreds of tabulated figures showing

measurements of organs and heads in decimals to hundredths of an inch, and ratios of these to thousandths of an inch, and the weighing of brains to hundredths of a grain, and the proportions thereof to the thousandth of a grain; the profound Baconian cleverness of such weighings being further displayed by the fact that Mr. Stone never handled or ever saw any one of the forty-nine brains thus *accurately* and *minutely* weighed.

The phenomenal extent to which these gentlemen have been imposed upon and entrapped by Mr. Stone's pretensions is my apology for burdening my pages with the following refutation.

As the '*conscientiousness*' of Mr. Stone's investigations has been specially eulogised by his disciples, I will firstly quote the following example from the first-named pamphlet.

On p. 26 Mr. Stone tells us that—

> Haslam relates the case of a young woman, aged twenty, whose insanity was occasioned by religious enthusiasm, and a too frequent attendance on conventicles. She was in a very wretched and unhappy condition, and terrified with the most alarming apprehensions for the safety of her soul. She sang, wept, and prayed alternately; and after continuing for some time in this forlorn and pitiable state, she died. Here, we may presume, the phrenologists would have inferred disease of the organ of veneration. On examination, the pia mater was found inflamed, and an extravasated blotch, about the size of a shilling, was seen upon the membrane in the middle *of the lateral side* (sic) of the right lobe of the cerebrum. There was no effusion between the membranes, or into the ventricles, but a general determination of the blood to the contents of the cranium.

The vague references given by Mr. Stone to 'Haslam on Insanity,' and to 'his own Memoirs,' are well calculated to prevent an ordinary reader from referring to the original, but Mr. Stone's pamphlet fell into the hands of an expert who knew where to find Haslam's account of the case, viz., in his 'Observations on Madness and Melancholy' (1809), pp. 97 to 99. His description of the examination of the brain is as follows:—

> On examining the contents of the cranium, the pia mater was considerably inflamed, and an extravasated blotch, about the size of a shilling, was seen upon that membrane *near the middle of the right lobe of the cerebrum.* There was no water between the membranes nor in the ventricles, but a general determination of the blood to the contents of the cranium. The medullary substance, when cut into, was full of bloody points. The consistence of the brain was natural.

The reader will see by the italics that Haslam's description is essentially altered by Mr. Stone, who has interpolated the words '*of the lateral side*.' Haslam's description of the diseased blotch, '*near the middle of the right lobe of the cerebrum*,' indicates the position of the organ of veneration (which, like all the other organs, is double—a right and a left organ), which is situated as nearly as possible on the middle of that lobe. Thus, as it stands in the original, it affords a striking pathological verification of the phrenological localization. But this would not suit Mr. Stone, and therefore this 'conscientious' critic has altered it by the insertion of a falsification in his own peculiar English.

Mr. Stone's quotations are mutilated in other details, concerning which I will merely quote the comments of the 'London Medical and Surgical Journal,' No. 5, p. 444:—

> As it stands in Mr. Stone's version, however, the case is shamefully disfigured: *first*, by the exclusion of some important symptoms; *secondly*, by the interpolation of a palpable forgery, '*the lateral side*,' with the design of making the dissection disagree with the *presumed* phrenological theory of the symptoms; and, *thirdly*, by the suppression of these pathological circumstances, 'the medullary substance, when cut into, was full of bloody points; the consistence of the brain was natural,' thereby making an *imperfect* dissection still less perfect, and much less adapted to support a phrenological explanation of the accordance of the necrotomical with the symptomatical appearances.

A large part of Mr. Stone's first pamphlet is devoted to subjects I have already discussed, such as comparing the assertions of Aristotle and the old scholastic physiognomists with Dr. Gall's researches, and the oft-repeated demand for some visible walls, or spaces, or something (undefined) between the different cerebral centres that shall suit the mechanical notions by which the conception of a cerebral organ is limited in the mechanical-minded objectors, who are incapable of perceiving the analogy between cerebral structure and that of the rest of the nervous system, and of learning the lesson which is so plainly taught by the fact that an ordinary nerve trunk is a compressed organ, a motor nerve and a sensory nerve bound up in one sheath, with no more visible separation than exists between the different centres or organs of the brain.

The recent progress of cerebral physiology has rendered these and all the other objections that Mr. Stone brings against *any* and *every* localization of cerebral functions so utterly unworthy of notice *now*, that I will not weary my readers by further discussing them, though in conjunction with the customary Aristotle business they are spread over more than thirty pages. Mr. Stone's general denial of any localization of cerebral disease accompanied with partial disturbance of mind, and his positive assertion (p. 27) that 'the pathological appearances, in every case of partial insanity, afford, on the contrary, very clear indication of the unity of the brain's action,' may be compared with the cases I have narrated in Chapter VI., and with the results of recent demonstrations of hundreds of cases of disease of 'Broca's convolution,' accompanied with aphasia (see p. 194.)

Those who accept Mr. Stone's arguments against Gall's localization of cerebral functions, and his positive dictum that he whole brain acts as a single organ, one and indivisible, in the performance of every cerebral function, must also deny all the results of every other physiologist who has investigated the subject of cerebral localization—all the motor and sensory 'centres' that are now in such high fashion.

As a matter of course, Mr. Stone repeats the customary misrepresentation of Phrenology by asserting that Gall and Spurzheim have stated that the strength of the intellectual faculties is proportionate to the size of the whole head. He tells his readers, p. 103, that Keats's head, according to Leigh Hunt, 'was a puzzle to phrenologists, being remarkably small in the skull, a singularity that he had in common with Lord Byron and Mr. Shelley.'

It seems to be the inevitable fate of every scribbler who attacks Phrenology that he should fall into this grossly palpable trap, and thereby display his utter ignorance of the whole subject, even of its barest rudiments.

In the course of his struggles therein Mr. Stone makes some extraordinary statements. On p. 32 he says that the opinion of Wenzels, that the brain does not increase in size after seven years of age, is corroborated by the experience of hatters.' To prove this he supplies on the opposite page a table 'obtained from an eminent manufacturer,' which is as follows :—

Table of Mean Diameter of Heads

For a child of 1 year	$5\frac{5}{8}$ inches
„ 2 years	$5\frac{7}{8}$ „
„ 4 „	$6\frac{1}{8}$ „
„ 7 „	$6\frac{5}{8}$ „
„ 12 „	$6\frac{3}{4}$ „
„ 16 to 18 „	$6\frac{7}{8}$ „
Adults	$7\frac{1}{6}$ „
Largest	$7\frac{3}{4}$ to 8 „

Let us now examine these figures. Giving Mr. Stone all he asks, viz., that the hatter's measurement represents the mean diameter of the head, what is the true signification of a growth from $6\frac{5}{8}$ mean diameter to $7\frac{1}{6}$ mean diameter?

For facility of calculation let us reduce these fractions to a common denomination, to decimals, then

$$6\tfrac{5}{8} = 6{\cdot}625$$
$$7\tfrac{1}{6} = 7{\cdot}166$$

Now, the dimensions of solid bodies vary with the cubes of their mean diameters. Taking only two places of decimals, we get

$6{\cdot}62^3 = 290{\cdot}775397$ cubic inches at 7 years of age
and $7{\cdot}16^3 = 367{\cdot}985256$ „ „ when adult

Showing that, according to Mr. Stone's own figures, the adult head is twenty-seven per cent. larger than the head at seven years of age.

This is corroboration with a vengeance. The statement that there is no growth at all after seven years of age corroborated by figures showing a mean growth of 27 per cent.!

The 'London Medical and Surgical Journal' (No. 2, p. 153), referring to the first-named pamphlet, 'The Evidences,' justly says:—

> Their author withholds all pretension to zeal for the increase and extension of useful knowledge; his exclusive aim is to 'put down' Phrenology. Inflated with this magnificent conception, he denounces the science itself as an incongruous tissue of error and delusion, and reviles its advocates as a set of dull, credulous, hypocritical impostors.

In this effort to put down Phrenology and vilify its advocates, he goes so far as to describe every physiologist who affirms the brain to be the organ of the mind as an enemy to

morality, and endeavours to expose them to theological odium. He says (p. 106) :—

> When that delicate organization (the brain), which, from its peculiar structure and activity, gave rise to perception, memory, and judgment, falls into decay, the mind, it must be presumed, will inevitably perish with it, and sink into the blank and dreary void of hopeless annihilation.

He tells his readers that 'here all responsibility ends,' and proceeds with further appeals to vulgar ignorance and theological prejudice, as in a note to the same page, where he says :—

> The mind is made to result as an effect from a certain condition of organization ; and when, therefore, that organization is itself destroyed it must be inferred that the mind, instead of being destined to 'flourish in immortal youth,' will perish with it, 'even as a vapour which appeareth for a little time, and then vanisheth away.'

I have already, on p. 402, quoted some of Mr. Stone's mathematics, but his great achievements and his remarkable originality are displayed in their greatest brilliancy in the second pamphlet, which includes what Dr. A. Wilson ('Gentleman's Magazine,' January 1879, p. 79) describes as 'a most laborious and conscientious series of observations,' and which have been similarly extolled by the majority of those who have attacked Phrenology since 1829. These gentlemen must have been playing the very popular literary and scientific game of 'follow my leader,' for, as I shall now proceed to prove, no man of ordinary intelligence could have placed himself in the humiliating position of becoming sponsor to such a series of observations had he carefully read the original record thereof.

The paper commences in the customary style of Dr. Gordon's disciples and followers. Thus Mr. Stone tells his readers that—

> Astrologers, metoposcopists, physiognomists, and chiromancers have in every age arrogated to themselves a peculiar and superior insight into human nature; and, by pretending to predicate, by external signs, the faculties and dispositions which influence the destiny of mankind, they have not failed to impose repeatedly on the understanding of the ignorant, and by appealing to accidental contingencies, which for a moment seem to favour their empirical speculations, they have occasionally taken by surprise the judgment of better educated individuals, who, after receiving the grossest

fictions, in the belief that they are the soundest facts, become prepared to listen with a kind of religious gravity to the most ludicrous and incongruous assertions.

He then goes on to 'simply maintain' that phrenological indications 'can as little be relied on as any of those old physiognomical superstitions, *of which they originally formed a part.*'

The italics are mine, to further indicate the 'conscientious' character of Mr. Stone's observations.

He then proceeds to the chief business of the paper, which is to show that 'Burke, Hare, and other atrocious murderers' and 'most notorious thieves' have heads which present 'an extensive series of facts subversive of Phrenology.'

To do this he gives, 'first, the *absolute* size of the several organs; secondly, their *relative* size, or the proportion which each bears to the contents of the skull or the weight of the encephalon.'

Starting with Burke, he tells us that 'the size of Burke's cranium is 18 inches,' while the average size of the crania in Sir William Hamilton's collection is 18·2 inches (pp. 8 and 9).

Here we have another specimen of Mr. Stone's mathematics, of equal originality. He measures the size of skulls by taking their length, breadth and height, and ADDING them together. He thus obtains his 18 inches of Burke's skull, and the 18·2 inches average of the collection.

The size of a cube of 6 inches diameter, according to Mr. Stone, is 6 inches length added to six inches breadth and 6 inches thickness, i.e., 18 inches.

Here, then, Mr. Stone not only refutes the phrenologists, but shows that all our mathematicians 'have not failed to impose repeatedly on the understandings of the ignorant,' and 'have occasionally taken by surprise the judgment of the better educated,' for these mathematical impostors assert that the size of such a cube is $6 \times 6 \times 6$ inches $= 216$ inches, instead of 18 inches.

But Mr. Stone is altogether beyond the reach of their seductive illusions, as the sequel will still further prove.

Carrying out his 'most laborious and conscientious series of observations' on these lines, he measures 'the absolute size of the several organs' by taking only *one of their dimensions*, and wilfully and *avowedly* omitting all the

others. Thus he represents the magnitude of a cone by the length of a line drawn from base to apex, *deliberately* and *intentionally* omitting the area of the base or the angle of the sides. Even this one dimension—as I shall presently prove—is measured with absurd inaccuracy, though stated in his tables to hundredths of an inch. He thus obtains the 'absolute' dimensions of Burke's destructiveness and states it as 5·35 inches, while in thirty-seven crania which he has similarly measured he takes the average dimensions of this organ as 5·6.

Now comes the application and results of Mr. Stone's original system of mensuration. This is displayed on p. 21, where the same system is applied to the head of Hare, the murderer associated with Burke, and by far the worse of the two, although he escaped by supplying 'king's evidence.'

In this case Mr. Stone had the advantage of measuring the living head on the evening before the murderer was liberated.

The following are Mr. Stone's measurements, as stated on p. 21 :—

Size of the head	13·8 inches
From the ear to lower Individuality . .	4·8 ,,
,, ,, Philoprogenitiveness . .	5·0 ,,
,, ,, Benevolence . . .	5·4 ,,
,, ,, Conscientiousness . .	4·6 ,,
From Destructiveness to Destructiveness .	5·95 ,,
,, Acquisitiveness to Acquisitiveness . .	5·55 ,,

The proportion of Destructiveness to the size of the head is as 1 to 2·319.

The proportion of Benevolence to the size of the head is as 1 to 2·555.

The proportion of Conscientiousness to the size of the head is as 1 to 3.

The mathematical erudition displayed in these measurements and the scientific value of the proportions thus determined will appear in the form of a *reductio ad absurdum* by simply adding these ratios together, which is best done by reducing the fractions to decimals.

$$\frac{1000}{2319} = 0{\cdot}431$$
$$\frac{1000}{2555} = 0{\cdot}391$$
$$\frac{1}{3} = 0{\cdot}333$$

The sum of these = 1·155

Mr. Stone has thus made the remarkable discovery that

the dimensions of the three organs, destructiveness, benevolence and conscientiousness, in Burke's head exceed those of the whole head. The same result comes out if, instead of adding the ratios, we add the so-called 'absolute sizes.'

Inches			
5·4	'Absolute size'	of	Benevolence
4·6	„	„	Conscientiousness
5·95	„	„	Destructiveness
15·95			

Thus the absolute size of these three organs is 15·95 inches, while that of the whole head is but 13·8 inches.

Such being the method of proceeding, the following conclusions, which have been so triumphantly used by so many writers as the great inductive refutation of Phrenology, are not astonishing even to phrenologists themselves. I retain throughout this quotation, commencing on p. 22, Mr. Stone's own italics. They specify his real meaning very distinctly.

On comparing Hare's organ of Destructiveness with my table of Englishmen (twenty-eight in number) I find—

Eleven have it in its *absolute* size *larger;* six in *absolute* size the *same* as Hare.

Twenty have it, in proportion to the size of the head, larger.

The average *absolute* size of the organ of Destructiveness in the twenty-eight Englishmen is 5·953.

Its average proportion to the size of the head is as 1 to 2·282. The result is: the organ of Destructiveness in Hare is, in its *absolute* size, *not above* the average; in its relative size, or in proportion to the dimensions of the head, it is below the average.

In examining my table of Scotchmen (twenty-five in number) I find—

13 to possess the organ of Destructiveness in its alsolute size *larger* than Hare;

6 the *same.*

Twenty possess it *larger* in proportion to the size of the head.

The average absolute size of Destructiveness in the twenty-five Scotchmen is 5·97.

The average proportion to the size of the head is as 1 to 2·276.

The result is that, compared with my table of Scotchmen, the organ of Destructiveness in Hare is nearly the same in its absolute size as the average, the former measuring 5·95, the latter 5·97 *inches;* but in proportion to the size of the head, Hare's organ of Destructiveness is below the average.

He then proceeds in the same way—nearly the same

words—with the measurements of Hare's destructiveness compared with twenty-seven Irishmen; and, further, with benevolence and conscientiousness.

The reader may have noted that the 'size of the head,' i.e., of the living head, of Hare is stated to be 13·8 inches (p. 11), while 'the size of Burke's cranium,' given on p. 8, is 18 inches. As a matter of fact (proved by the published casts), Hare had a larger head than Burke. The differences in Mr. Stone's measurements are his own copyright, due to his original methods of measurement. Instead of applying to the living head his sapient proceeding of taking the breadth, length and height, and adding them together, as he did with Burke's *skull*, he omits the height of Hare's head altogether, and only *adds* the length to the breadth. Thus he makes Burke's skull bigger than Hare's living head. He tells us that he makes this omission because he finds it impracticable to gauge the depth of the living head. Nevertheless he gauges the depth of benevolence, conscientiousness, lower individuality and philoprogenitiveness in the living head, and gives this as their sole measurement by measuring them from the ear. If so, why not measure in like manner the intermediate region, i.e., the top of the head of Hare?

On p. 24 Mr. Stone refers to 'the general lowness of the head of Hare,' and thereby reveals his true reason for refusing to measure its height, the which measurement would have destroyed his leading points, even though the through measurements were merely *added* together, and would have reversed them had they been multiplied for cubic measure. Therefore this measurement had to be cooked by omitting the height altogether, although in other cases, where he supposes that it serves his purpose, he measures heights or depths of living heads or organs by spanning with calipers from the opening of the ear.

He tells us that he follows the method 'adopted by hatters, who add together the length and breadth for the purpose of taking the mean diameter,' but he does not follow them. They are sufficiently learned in simple arithmetic to know that the mean of two quantities is equal to their sum divided by two, and apply the rule accordingly; but Mr. Stone must have left school before he came to this rule, for although he says (p. 22) 'I have adopted the method to which the

hatters have recourse, for the purpose of giving the proportions of the organs to the diameter of the head,' he states in all his tables the *sum* of the length and the breadth, making 'the *diameter* of the heads of the twenty-five Scotchmen' to *average* 13·694 *inches*.

The fallacy of relying upon hatter's measurement—which, whether cooked or otherwise, entirely omits the height of the head and the dimensions of the coronal region (the seat of the specially human faculties)—in a phrenological measurement of the human head is too obviously absurd to need any discussion. This is especially the case in the examination of criminal heads, in which the deficiency of the coronal region is the primary characteristic. As this deficiency is shown by the want of height, the wilful and systematic omission of any measurement of height of the criminal heads, and of the ordinary living heads with which they are compared, throughout this 'most laborious and conscientious series of observations' is eminently characteristic.

A specimen of Mr. Stone's average Scotchman with a head 13·694 inches in diameter would be a very interesting object, not only to the phrenologist, but also to the hatter.

The reason for such cooking of hatter's measurement is easily seen by reference to Mr. Stone's elaborate tables. Had it been honestly applied the result would have been evident even to the arithmetical faculties of Sir William Hamilton and the rest of Mr. Stone's disciples, as the proportion of Hare's destructiveness to the size of the whole head, hatter's measure, would have come out as 1 to 1·15, or, stated in vulgar fractions, the whole head but three-twentieths larger than destructiveness alone, which would indeed have represented a most murderous development.

In the measurement of skulls, or, as he calls it, of the 'encephalon,' Mr. Stone does adopt a sort of cubic system, which he thus describes on pp. 7 and 8:—

> I have referred to the capacity of the cranium, or the weight of the encephalon contained in each, which is ascertained by filling the skull with sand, weighing the quantity which each contains, and reducing the specific gravity of the sand to the specific gravity of the brain.

He thus obtains the average 'weight of the encephalon of thirty-seven skulls as 20,471 grains. (See Table I.)

Then to obtain the 'proportion of destructiveness to the encephalon,' the 'proportion of benevolence to the encephalon,' and the 'proportion of conscientiousness to the encephalon,' he divides this number of grains by what he calls the 'absolute size' of each of these organs respectively measured in *inches* linear.

Thus the average 'proportion of destructiveness to the encephalon' is obtained by *dividing* 20,471 *grains by* 5·6 *inches*, giving the curious result as $\frac{1}{3634 \cdot 261}$. The weight of the encephalon divided by the length of benevolence $\frac{20471 \text{ grains}}{5 \cdot 011 \text{ inches}} = \frac{1}{4089 \cdot 288}$, which is stated as the 'proportion of benevolence to the encephalon.' In like manner, 20,471 grains is divided by 4·462 inches, to show that the 'proportion of conscientiousness to the encephalon' is $\frac{1}{4585 \cdot 414}$.[1]

Here we have a further display of originality. Ordinary anatomists and physiologists when measuring the capacity of a skull fill it with small peas or tares,[2] and then pour these into an ordinary glass measuring-jar, graduated to cubic inches. This is much simpler than the method above described, but does not appear so learned, and therefore might have 'failed to impose repeatedly on the understanding of the ignorant,' i.e., upon Mr. Stone's disciples.

Besides this, Mr. Stone's display of mathematical originality, his ratio—his quotient obtained by dividing grains by inches could not have been displayed; he must have been content with the very vulgar fraction obtainable by dividing inches by inches.

Mr. Stone defends his preference for measuring by incommensurables ('Rejoinder to the Answer of Geo. Combe, Esq.,' p. 10) as follows:—

> I would refer him (Mr. Combe) to the first proposition of the sixth book of Euclid, where he will find it demonstrated, that triangles having the same altitude are proportional to their bases, although the former are areas, and the latter merely straight lines.

Thus, according to Mr. Stone's mathematics, the expres-

[1] The resultant figures are correctly copied from the table quoted, though not quite correct. (Editor).

[2] The peas are used because the anterior part of the skull (the sphenoid and ethmoid region) is largely perforated by the holes through which the optic and other nerves emerge. When *ordinary* mortals attempt to fill an ordinary skull with *ordinary* sand, it riddles through these, especially at the posterior angle of the orbital cavity, where the thin bone is so liable to fracture and further perforation.

sion of the area of a rectilinear body in terms of its sides (as when we say that the area of a square figure, with a side of three inches, is equal to nine inches) is equivalent to dividing grains by inches.

I now come to the primary basis upon which all the conclusions of Mr. Stone's 'most laborious and conscientious series of observations' are founded, viz., his method of measuring the 'absolute size' of the organs.

He begins by deliberately and avowedly omitting the most important of their dimensions, viz., the space which they occupy on the surface of the brain, or, otherwise stated, the quantity of the grey matter of their convolutions. I have already explained how this extension of the cortical matter at any given region of the hemispheres effects a deeper folding and greater extension, rotundity, and prominence of the convolution or convolutions involved.

I have said that Mr. Stone 'deliberately and avowedly' omits the breadth of the organs. This is shown in his rejoinder to Mr. Combe, p. 4, where he says :—

> Not only have I distinctly stated that I have not given the *breadth* of these imaginary organs, but have explained the reason which compelled me to make that omission, viz., that their boundaries are purely *ideal*, and depend in *every* instance on the *fancy* of the manipulator.

The italics are Mr. Stone's, and the statement that he makes, and thus emphasises, is simply *false*, as in *every instance* where the organ is prominently developed its boundaries are as evident as the boundaries in any highly developed muscle of the surface of the body, or as the boundaries of a hill or mountain. When a particular organ or a particular muscle is not highly developed, its boundaries, though existing just as definitely, are not so evident, but are approximately traceable even then. A man as ignorant of myology as Mr. Stone proves himself to be of Phrenology, and an equally bad observer, might be unable to trace the boundaries of the muscles in the 'torso de Michael Angelo.'

Mr. Stone thus asserts, first, that he cannot measure the organs, that they are '*imaginary*,' that their boundaries are '*ideal*,' and then he gives their 'absolute measurements' in inches and decimals to two places, i.e., to hundredths of an inch, and their 'relative measurements' to three places of

decimals, and bases his refutation of Phrenology on these avowedly impossible measurements.

As a further example of Mr. Stone's mathematical superiority to common mortals I quote the following from his 'Rejoinder' (p. 7). Mr. Combe says that 'Mr. Stone would measure the length of A.'s little finger, omitting the breadth, and call this its "absolute size",' to which Mr. Stone replies:—

> But no; he would take the breadth were it possible to do so; but if the fingers sprouted up in the form of cones, with their bases uppermost, as is represented to be the case with the pretended phrenological organs, he would in that case certainly take their length, and refer Mr. Combe again to any elementary book on mathematics to discover that, in rising from its *apex*, the base of a cone must increase with its length. The ancient Pythagoras permitted no one to enter his academy without a knowledge of geometry.

Mr. Stone—the modern Pythagoras—then proceeds to state that he excludes phrenologists from *his* academy because they cannot understand how the contents of a cone can be measured by its altitude *only*—by the length of a line which has neither breadth nor thickness; and this modern Pythagoras and improver of Euclid schools Mr. Combe as follows on p. 6:—

> Every organ is represented as being an inverted *cone*, with its *apex* in the medulla, and its *base* at the surface of the brain. It is evident, therefore, that the breadth of an organ must augment with its distance from the medulla, as in increasing the length of a cone from its apex we must necessarily increase its breadth. Mr. Combe, perhaps, is not aware that if the increased area of these organs were multiplied into one third of the length, it would give the solidity.

Then why did not Mr. Stone thus multiply them? Had he tried to do so, and presented the result to his admirers, its absurdity would have been obvious even to them. The result would have been in every case one third of nothing, i.e., $\frac{0}{3}$. Mr. Stone's cone having no sides with any angle between them, having no area at all, being merely a line without breadth or thickness, its 'increased area' is 0. Now its whole length multiplied by 0 is equal to 0, and one-third of this $= \frac{0}{3}$.

In the case of Hare's destructiveness the length of this line is stated by Mr. Stone to be 5·95 inches, and $5{\cdot}95 \times 0 = 0$, and $\frac{1}{3}$ of this is $\frac{0}{3}$.

Mr. Combe was not enlightened by Mr. Stone's learned

references to Euclid, but Sir William Hamilton and the rest of Mr. Stone's disciples have evidently accepted Mr. Stone's mathematical lessons, and thereby become qualified to enter *his* academy, and have done so with most exemplary docility.

An attempt may possibly be made to escape from this series of absurdities by affirming that, although Mr. Stone speaks of 'absolute measurement' again and again, and still again, he does not mean what he says—that he merely uses his peculiar measurement of the *length* only of the organs as a datum for comparison with other dimensions. In his rejoinder to Mr. Combe he devotes nine of its eighteen pages (from p. 5 to p. 13 inclusive) to an attempt to get out of the muddle by something of the sort, but he does it so clumsily that it is quite unintelligible.

This refusal to measure the cortical extension of the phrenological organs is especially cruel to the disciples and admirers of Mr. Stone, as according to their view of the function of the grey cortex it amounts to an omission of all.

According to the popular galvanic battery analogy (which I have already discussed) the peripheral extension of the grey matter which Mr. Stone refuses to measure at all represents the plates and cells of the battery, the white fibres which he pretends to measure being merely the conducting wires. Every electrician knows that the available energy of a given voltaic battery varies *inversely* with the length of its conducting wires—the longer the wires of given diameter, the weaker becomes the working efficiency of the combination. In spite of this, Mr. Stone's disciples—most of them teachers of the galvanic battery theory—accept his measurement of the *length* of the conducting wires *only* as representing the working energy of a cerebral region. In their eagerness to pander to blind prejudice they seem willing to accept anything.

But Mr. Stone's measurement of even this one dimension of the hypothetical cone does not measure it all. It measures something which is totally different. In order to demonstrate this I will first quote the elementary statements of Spurzheim and Combe.

Spurzheim says:—

> The organs are not confined to the surface of the brain; they extend from the surface to the great swelling of the occipital hole (medulla oblongata), and probably include even the commissures;

for the whole mass of the brain constitutes the organs. . . . The convolutions then are the peripheric expansions of the internal nervous bundles, and they are therefore in proportion to them, so that it is possible to determine the whole mass of the organs according to the convolutions.

Combe says: —

The length of an organ, including its supposed apparatus of communication, is ascertained by the distance from the *medulla oblongata* to the peripheral surface. A line passing through the head from one ear to the other would nearly touch the *medulla oblongata*, and hence the external opening of the ear is assumed as a convenient point from which to estimate length. The breadth of an organ is judged of by its peripheral expansion.[1]

As the measurement of destructiveness and acquisitiveness in the murderers and thieves, and the comparison of those measurements in the heads of all the other 169 heads and crania, are the great guns with which Mr. Stone and his disciples bombard Phrenology, I will examine his mode of measuring his one dimension of these.

Fig. 42 is an accurate copy of Fig. 2, Plate VI., of Spurzheim's 'Anatomy of the Brain,' in which convolution of destructiveness is marked VI. and that of acquisitiveness is marked VIII. The upper part of the medulla oblongata, where the apex of the hypothetical cone is situated, is indicated by a small *a*.

The reader should note that this is considerably below both acquisitiveness and destructiveness (VIII. and VI.), and therefore if Mr. Stone had intended to truly measure even his single dimension of these organs—the length of the hypothetical cones—he would have measured them *downwards*, 'from their surface to the great swelling of the occipital hole,' as Spurzheim says.

But how does he measure them? Just *horizontally across the head!* 'from destructiveness to destructiveness' and 'from acquisitiveness to acquisitiveness,' as he states in the heading of all his tables. Can anything be more atrocious than this measurement *across a cone* in order to determine its height, or the length from base to apex?

The atrocity becomes still more atrocious when we look into and examine it further, for then it is clearly visible that Mr. Stone's cross measurement of destructiveness and acquisitiveness is actually one measurement of the breadth of the

[1] 'System of Phrenology,' vol. 1, p. 146.

organs of the moral sentiments and the higher intellectual faculties.

This is shown by Fig. 43, which is a rough copy of the marked bust froming the frontispiece to Spurzheim's 'Phrenology' (1825), where the position of destructiveness is indicated by arrows and that of acquisitiveness by the figures 8 and 8. Mr. Stone measures across from 8 to 8 and from point to point of the arrows.

Now it must be obvious, even to admirers of Mr. Stone,

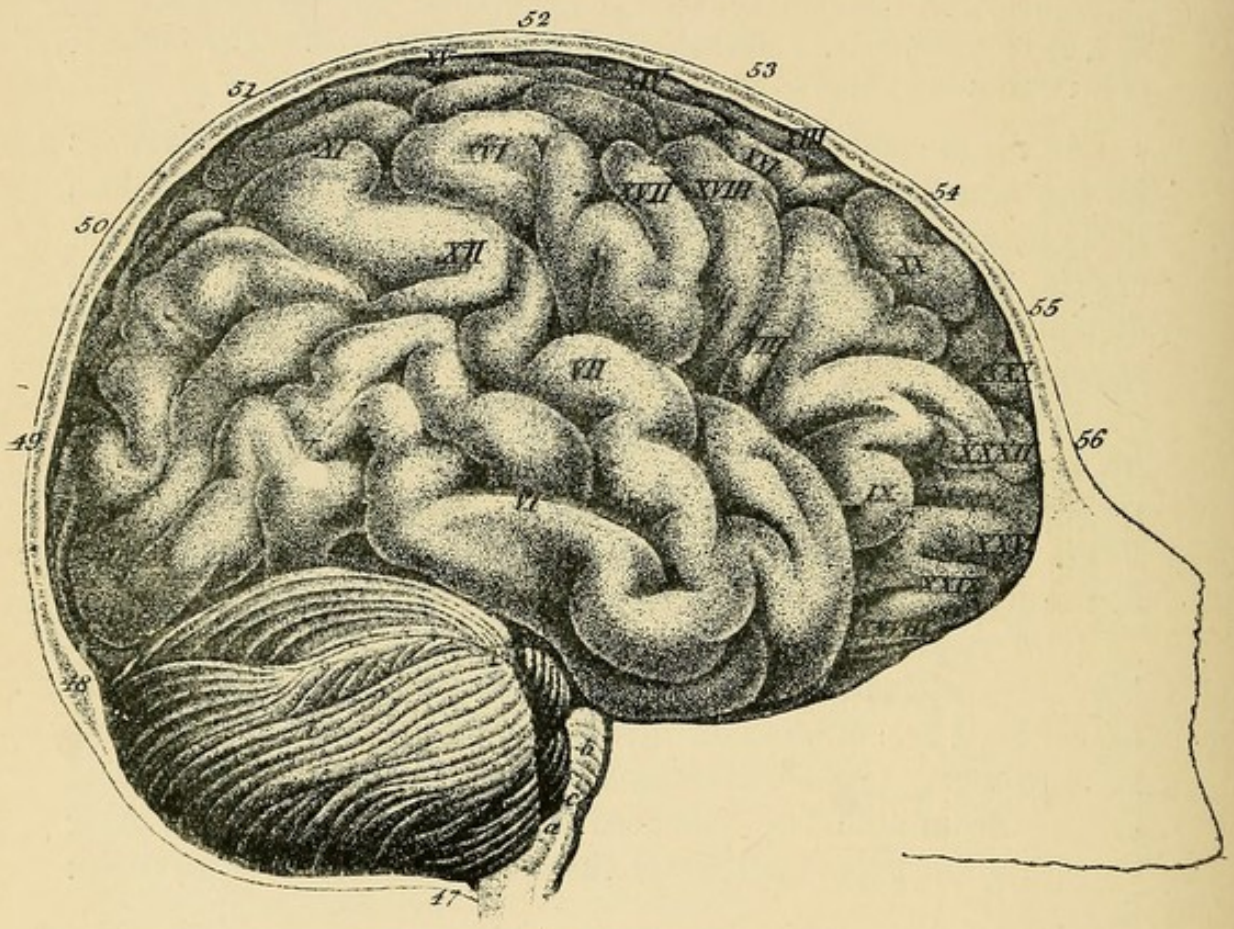


FIG. 42.

that if all the organs are inverted cones extending from the surface to the occiput, which is below both acquisitiveness and destructiveness, every one of these cones belonging to the organs situated above acquisitiveness and destructiveness must in their downward course pass through the space across the head extending 'from acquisitiveness to acquisitiveness' and that 'from destructiveness to destructiveness,' which Mr. Stone so 'laboriously and conscientiously' measures as the respective lengths of these two organs.

Thus the measurements which Mr. Stone describes as 'the absolute size of destructiveness' and 'the absolute size of acquisitiveness' include the lower or mid-breadths of Veneration (No. 14), Hope (No. 17), Benevolence (No. 13), Imitation (No. 21), Marvellousness (No. 18), Ideality (No. 19),

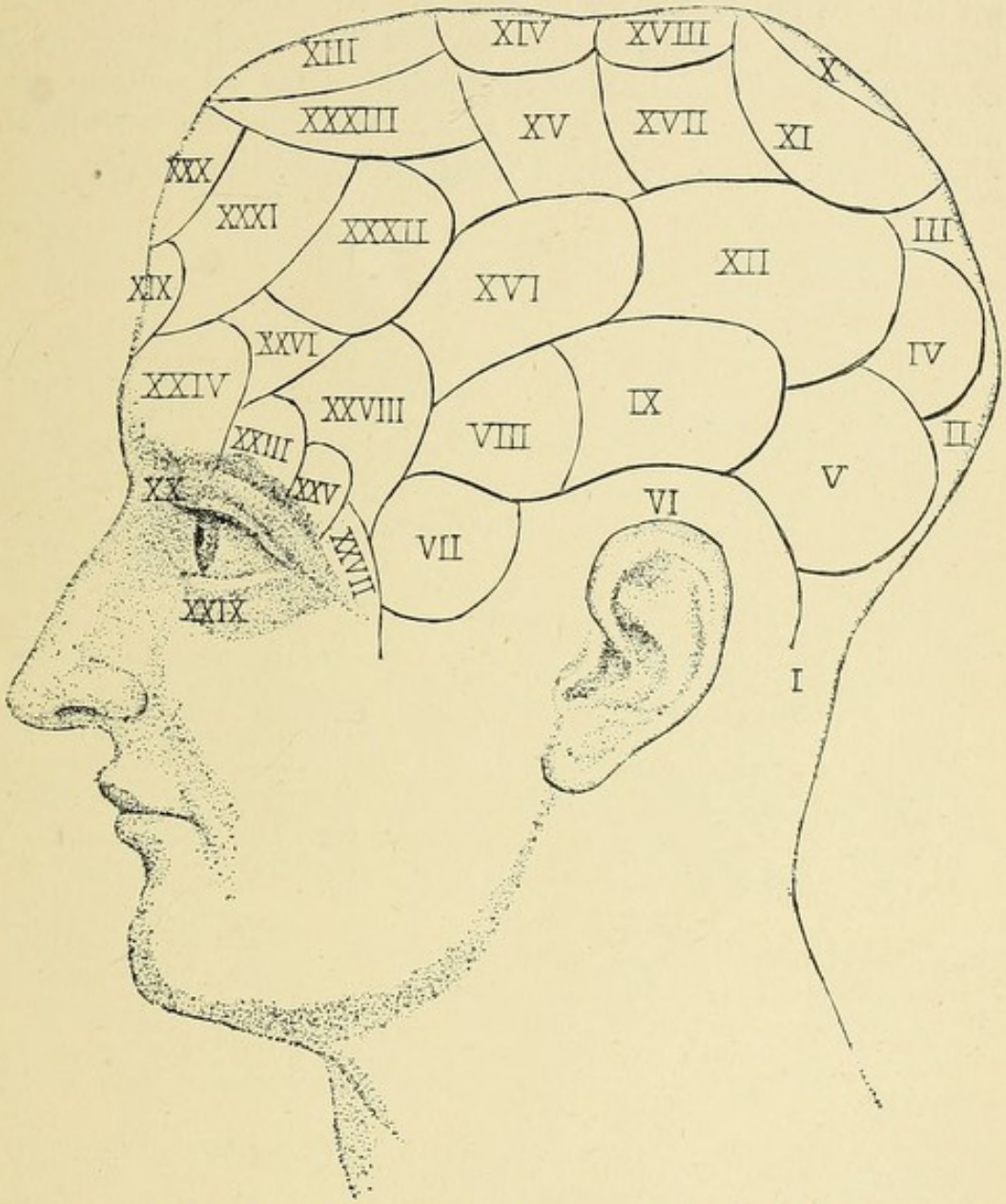


FIG. 43. Spurzheim Bust showing Localization of Organs of Brain.

Comparison (No. 34), Causality (No. 35), Wit (No. 20), and others not shown in front view.

The whole of the dark and dirty history of the lowest forms of bigotry and blind prejudice can show nothing more deplorable than the humiliating position in which the pseudo-scientists, who in their eager efforts to obtain popular applause and

orthodox capital by attacking Phrenology have (since 1819) blindly re-echoed each other's admiration of these measurements of Mr. Stone and the conclusions based upon them.

We must never forget that they are the most largely and generally, I may almost say universally, quoted and lauded of all the anti-phrenological literature. The enemies of Phrenology all agree in placing the keys of their anti-phrenological academy in the hands of Mr. Stone! They all exclaim with one accord *Tu es Petrus, et super hanc petram* we build our 'inductive'—our 'Baconian' refutation of Phrenology.

APPENDIX

[See p. 339.]

Extract from Dr. Spurzheim's 'Examination of the Objections made in Britain against the Doctrines of Gall and Spurzheim.'

THE most grave accusation, and which, if true, were indeed formidable, remains to be repelled. At the end the Historian positively states (p. 187) that Reil has been defrauded; and in p. 99 that Reil has the sole merit of having revived the investigation of the fibrous structure of the brain in modern times; that he is the original discoverer of our ideas, and that we have borrowed them from his writings.

How will the conscientious Reviewer here extricate himself? Why did he deny such things as we maintain in our works, since his Historian asserts that Reil has discovered them, and refers to his 'Archives of Physiology' for the year 1809 and 1812? The Dissector himself, in writing his book on the brain, *forgot* these essays of Reil. But why have we not acknowledged that we owe our anatomical information of the brain to the writings of Reil? The reason is simple; viz., because it is not the case. The proof of this assertion is equally simple: I have only to state the history of our investigations.

While at Vienna, we spoke of the great leading points of our anatomical demonstrations; viz., of the aggregation of various cerebral parts, and their connexion with the medulla oblongata; of the proportion between the grey and white substance; of the diverging and converging fibres; and of unfolding the convolutions.

In the year 1805, the 6th of March, we left Vienna for Berlin, where we repeated our anatomical demonstrations in presence of the medical Professors and numerous auditors. Outlines of our anatomical and physiological propositions were published, during that spring, by Prof. Bischoff. From Berlin we went to Potsdam, then to Leipzig, where Dr. Knoblauch published an account of our doctrines on the brain. Then the usual demonstrations and lectures were delivered in Dresden, and Mr. Bloede published outlines of our anatomical and physiological views. From Dresden we went to Halle, where Prof. Reil and Loder, and numerous gentlemen of the profession, honoured us with their presence at the public lectures and demonstrations. With Loder we repeated several times the

anatomical demonstrations, and once we dissected with Reil a brain *quietly* in his own room. He was so much pleased with our demonstrations, that he gave to Dr. Gall some drawings with which he was formerly occupied, *de structura nervorum et cerebelli*. Thus, I beg to observe that in the summer of 1805 we demonstrated to Reil the same leading points in the anatomy of the brain which we still maintain. We then continued to lecture and to demonstrate the brain, that very same year, in Weimar, Jena, Göttingen, Braunschweig, Hamburg, Kiel, and Copenhagen.

In the year 1806, anatomical demonstrations were made in Bremen, Munster in Westphalia, Amsterdam, Leyden, Frankfort upon the Main, Mannheim, Stuttgart and Freiburg im Breisgau. In the year 1807 we went to Marburg, Würzburg, Munich (where we had the pleasure of conversing with Soemerring), Augsburg, Ulm, Zürich, Bern, Bâle ; and in the autumn of the same year to Paris, where we dissected the brain, first in presence of Cuvier, Fourcroy, Geoffroi de St.-Hilaire, Dumeril, Dr. Démangeon, and others, and successively in many learned societies. Meanwhile numerous publications had appeared in Germany. Dr. Démangeon, who had attended the lectures in Hamburg, published in Paris, 1806, his *Physiologie Intellectuelle*, and mentioned our anatomical views.

In March 1808 we delivered our Memoir to the French Institute. The commissioners declare, at the beginning of their report, that they have hesitated a moment whether they should examine our paper ; because there is a rule, 'de ne point émettre avis sur les ouvrages *déjà soumis au grand tribunal du public* par la voie de l'impression, et l'on pouvait croire que la doctrine anatomique de Mr Gall a reçu, par l'enseignement oral que ce professeur en a fait dans les principales villes de l'Europe, et par les nombreux extraits que ses disciples en ont répandus, une publicité à peu près équivalente à celle d'une impression authentique.' They, however, add, that Gall had not given his sanction to any one of the publications, and that this circumstance was one of the motives which induced them to examine our Memoir.

After this, Reil published, in his Archives, views, essentially the same as ours, of the aggregation of cerebral parts, of diverging and converging fibres, and of the possibility of separating the convolutions in the middle line. He does not state that he was the first who has conceived such general ideas ; nor does he mention us as the inventors. He does not, and could not, say that we have learned them from him ; he merely describes and represents them in engravings. As we had been in almost every remarkable town, and at all the universities, in Germany, our countrymen knew how to estimate the proceeding of Reil ; and it is only the great publicity of our demonstrations that can excuse Reil for not mentioning them.

It is true, Reil has chosen other names ; he calls our apparatus of formation *Hirnschenkel-System*, and our apparatus of union *Balken-System ;* our diverging bundles are his *Stabkranz*. We

speak simply of fibres, he of various convexities, obtuse and acute angles of the fibres, of laminæ, fossæ, and radii of the white substance; of wings, mountains, lobules, teeth, of a comb, and of similar mechanical denominations. These minute descriptions of mechanical forms, and such names, may appear interesting to a mechanical Dissector, who is attentive to every little cul-de-sac, and declares the anatomy of the brain unnecessary to physiological and pathological views. We, on the contrary, think that there would be no end of such mechanical details in comparative anatomy. If, for instance, in the gradation of animals, every new additional part in the cerebellum is to be named, who will learn all the names? and of what use will such a study be? We therefore point out the structure of each part, well aware, however, that each part is modified in the individuals of different species, nay, in the different individuals of the same species.

This short account is sufficient to prove that there is no occasion whatever for us to apologise in the least with respect to the publications of Reil. A few years ago the Historian might have been easily pardoned for his ignorance of historical details; but, in the present situation, what his merits are, let others decide.

The learned Historian insinuates that Reil and Gall had agreed that the former was to examine the cerebellum, and the latter the brain proper. But I affirm that nothing of that kind happened, nor could happen, because our general views of the brain were discovered before we met Reil at Halle, in the year 1805. Reil, with such brains as he operated on, did not succeed by our method, and therefore thought it insufficient, and preferred maceration in alcohol or acids. His words are: 'The brain is too pulpy and too deliquescent to be examined in connexion without preparation.' He then made frequent use of laceration with the fingers, or of scraping. Thus, the essential difference between Reil's proceeding and ours is, that he prepares the brain artificially, while we prefer a good brain in its fresh state. With this narration I beg the reader to compare the following passage of the candid Historian, where he says (p. 188): 'Reil's expectations of assistance from Dr. Gall were altogether disappointed, so much so, that he seems not to have considered that person's investigations as worthy of attention; but pronouncing his method inadequate, extended his own inquiries to the department thus fruitlessly assigned to another.' This Historian and Critic is told by Reil that he had tried our method and did not succeed, and hence concludes that we have defrauded him. A finely contrived story!!!

The Pamphleteer (p. 9) finds it 'amusing to hear the committee of the French Institute occasionally named as supporters of our anatomical doctrines.' Cuvier, however, was too well acquainted with the German and European literature to accuse us of plagiarism. He allowed that our method of dissecting the brain is preferable to that commonly used in the schools; that we are the first who have shown the swellings in the spinal cord of a calf; the proportion between the brown and white substance in the brain; the true

origin of the optic and other nerves; the certainty of the decussation; the successive reinforcement through the pons, crura, optic thalami, and corpora striata; the two sorts of fibres in the brain, and the generality of the commissures. As the Report is printed, even translated and inserted in the *Edinburgh Medical and Surgical Journal* for January 1809, the reader, *in perusing the Report*, may satisfy himself. I also ask the Historian why he has omitted to tell his readers that Cuvier, in the Annual Report at the end of 1808, published that our Memoir was by far the most important which had occupied the attention of the class?

Before I finish with the Historian, I have still to reply to his remarks on our Plates. He relates (p. 2) that he has compared our descriptions and engravings *strictly with nature;* and, according to p. 165, he has found, that in our Plate IV. which represents the basis of the brain in a female, the medulla oblongata points directly backwards, instead of downwards; and the anterior surface of the annular protuberance downwards, instead of forwards; that the anterior lobes are too broad, the surface neither concave nor sloping enough, the middle lobes too wide and not pointed enough, and the forms of the convolutions not natural.

Ans.—Who has ever shown or seen a brain, in which, when taken out of the skull, deprived of dura mater, and placed on its upper surface, the parts of the basis remained in the same position as in the skull? Do not the parts sink more or less, according to the firmness of the brain? I beg the reader to compare with our plate that of Vicq d'Azyr, and see which is the better. I say the basis represented by Vicq d'Azyr looks like a soft, collapsed, and flat deliquescent mass. Indeed, no philosophical mind will, and no mechanical Dissector ought, to cavil about minute changes in relative situation of the cerebral parts, when taken out of the head; since these, like all other bodies, must follow the laws of gravity. I also maintain that a Dissector who adopts one general measurement and one general form for all brains, and their parts; who does not know that each lobe in every person, as to size and form, is modified, while each, even the minutest part of the brain, as well as of ears and noses, offers modifications, cannot have compared many brains. The important consideration, that each part is modified, is general, and applicable to the parts of every system. It has been well detailed by Dr. Barclay with respect to the blood-vessels, in the preface of his Description of the Arteries, and will be admitted with respect to the nervous system by all those who compare the parts in different individuals. The anterior lobes, as they are represented in our Plate IV, may be larger than those of the *accurate* Historian; but they are too small for those men to whom the medical school of Edinburgh is indebted for its first celebrity. I also assert that the females of Edinburgh, who are known for their talents, have the anterior lobes of their brains larger than those which we have copied.

The remarks of the Historian on our fifth plate can be made only by one who is accustomed to cut the brain mechanically, and

who does not consider the parts in connexion, but thinks that all brains, and each part in every brain, are quite the same, without the least modification. I repeat that we have represented nature, and do affirm, that the general structure of the brain, and its parts, will be found as our plates indicate ; but that the modifications of each part are infinite. Such a configuration, however, as the Historian has given of the pons, in his Plate I. (Fig. 2), can only be seen in a putrid brain ; or, if he gives it as the exact appearance of this part in a fresh brain, he must never have seen the real structure.

As each part in each brain is modified, how can the Dissector maintain that in Plate VI. our representations are not natural ? The corpus dentatum, and the arborescent appearance of the cerebellum, seem to him exceedingly incorrect. The former is represented in five different brains and sections, and the latter is shown in seven different brains, partly in the same, partly in different sections ; and in each the appearance is modified, for no other reason but because it was so in nature. It was, indeed, more difficult to copy exactly nature than to make the appearance always the same. I rely on the decision of every anatomist who has had the opportunity of comparing brains.

In the VIIIth, IXth, Xth, XIth and XIIth Plates the representations of the skull are particularly blamed, and declared fictitious or imaginary, so that they never could have been drawn from nature. In reply, I propose to the Dissector to open the head of a young man, of a very old person, and of a third who had been long maniacal, and he may then tell us whether there is one and the same appearance in the bone. Those who will examine my collection may convince themselves that still greater varieties occur in nature than we have represented in our plates.

In Plate VIII. he finds fault with the outline of the cranium, particularly towards the forepart of the basis ; he has never seen an occipital bone of such a form and of such dimensions ; such arrangements of lobes and lobules were never observed ; the cerebellum is even called a case of monstrosity. Such assertions may be made by a Dissector who never has examined the differences of heads ; who thinks that children of seven years have the full growth of their brains (the contrary of which, however, any maker of hats might have told him), and that the brains of women and men in general do not show any constant difference. We maintain that the anterior lobes, their basilar convolutions, and the cerebella, vary as well as the other parts, and for that reason we have copied them different in size and form, as they occurred.

Plate XVII. is said to be in contradiction to Plate XII. The Dissector cannot easily conceive how they may be reconciled. The answer is, that each brain was different, and in the former the bundles were larger, in the latter smaller, and in the latter the bundles are traced to a greater extent towards the convolutions.

In short, he who has not yet observed that the arrangements, size, and form of the different parts of the brain present various

modifications, instead of speaking of unnatural forms, fictitious appearances, too large or too small, too wide or too narrow, too thick or too thin, too perpendicular or too horizontal, or similar representations, ought to learn to distinguish the generalities from the particularities, and that one brain is no more the standard of all brains than the feelings and dispositions of one man are the standard of the whole race.

The conscientious Reviewer complained (p. 154) that he was heartily tired of the mass of nonsense he had been obliged to wade through in my work. I only depend on the constant laws of nature. What has happened will happen, and everyone has the right to observe and to examine for himself. In anatomy the eyes deserve more confidence than the ears, demonstration than fancy.

I cannot finish this chapter without calling the attention of the reader to a comparison of the statement of the critical Reviewer, the mechanical Dissector, and Historian. To the latter I am under great obligation; and I give him my public thanks for having entirely refuted the conscientious Reviewer, by proving that our anatomical views of the nervous system are not new, and, by detecting the ignorance of that empiric in criticism, teaching him that, not our assertions, but his, are 'mere nonsense, amazing absurdities, nay trumpery, and wilful misstatements.' The Historian also gives a lesson to the mechanical Dissector, and shows him how improper it is for anyone not to quote preceding authors, when he writes professedly on a subject. Supported by the Historian, my labour has become easy. According to him, the teachers and practitioners in medicine of Edinburgh do not know anything about the anatomy of the brain, and not one has eyes to see, or even to distinguish brown from white; yet he has not ventured to affirm this of all the medical men of Europe; and as it is proved above that we have not borrowed anything from Reil, we may continue to speak of our discoveries in the anatomy of the nervous system.

There is another great literary tribunal which has condescended to speak of our doctrines. These quarterly judges, however, do not display great anatomical knowledge. They confine themselves to mere general expressions, and are perfectly willing to give us praise in this respect; to allow us every merit for our method of dissecting the brain; for having shown that the nerves of the body have their origin in the respective parts of it, and not in the brain; and for having stated the morbid phenomena of hydrocephalus much more clearly than has been attempted heretofore. How merciful! Indeed I am obliged to their kind judgment. But as the chief judges of these inferior courts are at variance, we appeal to the great tribunal of the public.

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