THE RÔLE OF EYESTRAIN IN CIVILIZATION.

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By means of the glimpses I could obtain from biographic and autobiographic writings, I have made a study of the disease of eleven patients who lived in the last century. These were De Quincey, Carlyle, Mrs. Carlyle, Darwin, Huxley, Browning, Wagner, Parkman, Whittier, Herbert Spencer and Nietzsche. If we fuse the data thus gained into a composite clinical photograph the lessons become more clear and striking. The diseases, or rather the symptoms of the one disease common to all, were headache, "biliousness," sick headache, "nervousness," indescribable suffering, inability to do literary work without producing these symptoms, and relief of the symptoms whenever, even for a day or a few hours, literary work was stopped; entire cessation of the characteristic symptoms at about 60 years of age. Here we have a definite clinical picture that differentiates the fundamental pathologic condition from that of any other disease. The symptoms were briefly, and without quotation marks, as follow:

Of De Quincey.—Pain in the head beginning at 14; violent twitchings of the stomach during sleep, at 17; neuralgic affection at 18 or 19; nervous horror, irritation of the stomach, gastralgia, illness, dejectedness, biliousness, wretchedness, dizziness, a nervous malady of a very peculiar character, insomnia. The digestional difficulty was predominant.

Of Carlyle.—Dyspepsia, torture as of a rat gnawing at the pit of the stomach, bad health, nervous disorders, insomnia, biliousness, melancholy, cardiac symptoms. The dyspepsia was the leading complaint.

Of Mrs. Carlyle.—Sick headache, nervous sufferings, insomnia. Hers was a case of life-long sick headache.

Of Darwin.—Dispiritment, pain and palpitation about the heart, sea-sickness, illness, inability to do literary work, disordered stomach, prostration of strength, sick headache, vomiting, insomnia, headache, great weakness. The digestive organs were those principally affected.

Of Huxley.—Hypochondriacal dyspepsia, cardiac symptoms; unaccountable prostration; liver; headache: flatulent dyspepsia; mental depression—a case, again, of almost typical sick headache.

Of Browning.—Headache, confused cerebral symptoms, depression, dizziness, deranged liver, nervous excitability. This is a case of almost simple headache.

Of Wagner.—Feeble stomach, sick headaches, extreme depression, cardiac symptoms, insomnia, shattered nerves, intense irritability, violent headache. A martyr to sick headache.

Of Parkman.—Dyspepsia, stirred-up head, photophobia, the greatest inability to use the eyes in literary work, insomnia, insanity feared on the part of friends and physicians. Mental, ocular, and cerebral symptoms dominant.

Of Whittier.—Delicate health, great weakness, depression, palpitation of the heart, influenza, headache, weariness, rheumatism, cerebral symptoms, neuralgia, insomnia. Headache, physical weakness and sensitiveness were continuous from early manhood to the completion of presbyopia.

Of Herbert Spencer.—Insomnia, inability to use the eyes except for short periods, queer feelings in the head. Insomnia was the chief complaint, others plainly avoided by astute precautions.

Of Nietzsche.—An intensification of almost all the preceding symptoms, especially the ocular and cerebral ones, with final ending in insanity.

The strange mystery of the disease of the eleven must strike one even with a hasty glance over their "biographic clinics." This lack of cause or reason for their sufferings struck each one, and pages of excerpts might be gathered showing their wonder. An unseen and malignant enemy or fatality seemed seated above them or at the very heart of their being—implacable and inexplicable. To their physicians they turned with beseeching question, and imploring aid. Some spent a great part of their lives in going from one doctor to another, or in dipping into quackery, in travelling for hoped relief anywhere, by "change of climate," "change of scene," etc. Most of them tormented themselves all their lives in dieting, and two gave much of their life to the hydropathic delusion. In every case the one fact stands out clearly—and it could be verified by any number of quotations—that their miseries were consequent directly and quickly upon use of their eyes in writing or reading, and yet not one of them,

while repeatedly chronicling the fact with their own pens, ever caught a hint of the causal nexus. That Mrs. Carlyle should have read in bed until the early morning hours and then have taken morphine to stifle the direct results of suffering; that Nietzsche should have taken two big trunks full of books with him when, broken down by eyestrain, he resigned his professorship; that each one told of his torture when he read or wrote, and not have seen that it was the reading or writing which caused it—all this is amazing. But it is the daily story in the oculist's office. That lay scientists and professional observers, as they might be termed, should have been incapable of perceiving the fact is as strange as it is pathetic. That their physicians should not have done so is strange as it was inexcusable. The reason for the blunder of both patient and doctor is to be sought in deficient closeness and accuracy of observation, and consisted in a threefold error.

Three Inaccuracies of the Patients and of their Physicians.—The first was to ascribe the disease to the organ in which the symptoms appeared or seemed to be most manifest. This folly still dominates most treatment to-day and underlies much error in our pathology. Despite a thousand proofs of the fallacy, it seems ineradicable. We acknowledge in words that the organism is a unit with absolutely interdependent parts, and yet we go on practically oblivious of the truth of the old fable of the belly and its members. When we vividly realize that distressing symptoms in an organ may have their origin in other and even in distant organs, we shall make an instant and tremendous advance in practical therapeutics. "Doctor, do you think it is my nerves?" is the primitive pathology of the simple, and is the exact counterpart of that which always traces headache to brain disease only, or digestive troubles solely to diseases of the stomach.

The second faulty observation consisted in thinking that intellectual labour *per se*, or an over-amount of it, caused the symptoms. Patients and scientists forgot that in the great majority of intellectual people it was not and is not so. Humboldt, for instance, is said to have worked with his eyes about 20 hours a day for some 80 years. In the eleven patients mentioned it was not the working of the intellect, or the amount of it, that gave pain, but simply an accident of that labour—a certain mechanical, or, shortly, optical part of it that produced the symptoms.

The third observational mistake occurred in thinking that the "change of scene" everlastingly advised, or "change of climate," or the walking, riding, visiting, etc., of itself caused the relief. Again, this relief was merely an accident of the outdoor life. Thousands of others did not require the change, and the relief of the sufferers was due to non-use of the eyes at near-range work; if the cause was put in action, the symptoms recurred whenever and wherever the patient was. "Black care sits behind us on the crupper."

The Disease was Functional.—De Quincey's physicians said he had "gastrodynia," a name utterly without pathologic meaning to the physicians of the past, or indeed of the present. All the patients had more or less severe gastric symptoms; in some it was the chief, called by various names, such as nausea, vomiting, biliousness, dyspepsia, liver, etc. The modern gastrologist knows nothing of these diseases except as the results of errors of diet or of organic disease. Some modern surgeons would even go so far as to trace them all to gastric ulcer, for which operation is the only cure. In 1903 a grave medical journal has said editorially that even obscure gastric symptoms demand gastrotomy and excision of the ulcers. The answer to that, of course, is first, What caused the ulcers? Secondly, it is surgical monomania. Such a modern surgeon would surely have gastrotomized our eleven patients. That affliction at least was spared them. That the disease of all these patients was functional is demonstrated by the fact that they lived to the average, or more, of three score years and ten, and that it disappeared at the beginning of old age, precisely and illogically when the general vital powers were lessening towards death. The older each lived the freer he became from the peculiar kind of suffering which had made middle life so wretched. In the year 1902 a physician most well informed—at least expert in other matters—traces to climacteric melancholia, *plus* heredity, *plus* neuroticism, the tragedy of one of these eleven, and adds that we call diseases "functional" because we cannot observe the minute anatomic or organic changes which underlie all such conditions. This seems to me a more foolish pathology than that which said simply "gastrodynia," and let it go at that. Are there organic tissue changes in sea-sickness? That is a very real disease while it lasts. Why does it last so short a time? What caused the changes?

The Variation of the Symptoms.—It is a truism of medicine that there is no typical case, even of organic diseases. The "soil" is of as much influence in producing symptoms as the "seed." And of functional disease this is peculiarly true. The symptoms of eyestrain are amazingly complex and differ in some respects with every patient. More than any other morbid cause its effects are multitudinous. When the rôle of vision and the functional relations of the eye with the organism and with life are understood, the reason for the infinite variety of symptoms is seen. The two things that bind all to unity are the certainty of a common cause and the equal infallibility of the therapeutic test. If use of eyes produces any of these results, it is almost surely the cause; if disuse of the eyes relieves, it is doubly sure; if, without disuse of the eyes, the wearing of proper glasses does the same, the demonstration is beyond all question. In every one of the eleven cases disuse of the ametropic eyes did give temporary relief; the paralysed accommodation at about 60 did the same thing permanently, and added great ability to the power of ocular use; these symptoms in thousands of American patients have been instantly extinguished by lenses properly correcting the ametropia. The demonstration is perfect.

The Result in Lost Time and Opportunity.—If De Quincey's opium eating, as I have no doubt, was due to his eyestrain, then a large part of his life was certainly wasted from that cause. Surely three-fourths of Carlyle's working time and ability were spent in horseback riding, walking, and in recovering from the exhaustion of writing. He produced during his working life about one-half page a day. Much of Mrs. Carlyle's life was spent in thirty-hour or sixty-hour continuous vomiting and in suffering, and if this could have been avoided, the time and much good white paper, spoiled by critics and biographers concerning her and her husband, would have added greatly to the national income—especially in the saving of paper! Darwin was able to read or write only about two hours a day, and his literary product was less than that of Carlyle. The rest of his waking hours—those he did not waste fighting insomnia—were spent walking like a dumb animal about his "sandwalk," or more foolishly enduring the brutal water cure. Fortunate it is that if he could not read and write, he could think and observe. The output of great minds is to be measured qualitatively, of course, not quantitatively, but ours is the grievous loss, nevertheless.

Just at the climax of Huxley's sufferings, at the zenith of his powers and at the moment presbyopia would probably have given him relief, he was compelled to resign and take to the moors. For 45 years his life and power of work had been greatly crippled by his sick headache. What a tragedy! What a loss for science! Browning avoided suffering by avoiding eye-work, by going to Italy, by living in the open air, and when he could not do this, in living, as his biographer says, "upon the surface," and by "countless social engagements."

Wagner came near committing suicide many times owing to his tortures. He also squandered a large part of his life in hydropathy, diet, and walking, until relief came all at once from three apparently supernatural sources.

Parkman himself estimated that 75 per cent. of his life had been wasted by his inability to use his eyes. He avoided the agonies of the others by simple renunciation. Not being ingenious Yankees they never had a "gridiron" nor recognized the need of it. Parkman's output for 14 years was about 6 lines a day, and his life product was but little greater. The hideous waste of his superb powers and valuable time was, I think, fully 90 per cent.

All the newspapers which Whittier edited until he had to quit all literary work except verse-making had to be discontinued because of his bad health. He was forced to renounce his splendid ability as statesman and reformer, and for the rest of his life retire to the farm to nurse his health and write a little poetry.

Spencer avoided suffering by cunning precautions in non-use of his eyes; more deftly still, he hid his lack of scholarship (German, metaphysics, etc.), which was denied him because he could not study.

The havoc wrought by eyestrain in a genius the natural peer of any, the superior of most, in the German professor at 24—the incomparable Nietzsche—is so pitiful and awful that one can scarcely speak of it with restraint.

The result in suffering is incalculable and horrible. There are, and will be, biographies of these people which will not allude to it, and physicians and medical editors have been known who smile ironically at the "exaggeration" of "vivid

imaginations"; there are numberless asses who think they are excused from all sympathy with a Carlyle or a Nietzsche and have no need of a thousandth of their nobility of character, because they, the ignoble long-eared, disbelieve in something the great men have said or taught. "Let us be contemptible because their philosophies are so," one seems to overhear. The misery of the pain of one attack of the nausea of sick headache has not been equalled except in some mediæval or Oriental torture-chamber. When for some profound reason the dominant and oldest instinct of the organism—that for food and nutrition—is violently reversed, it should be plain, even to the stupidest lay mind that the deepest wrong exists, and that the very springs of life are being drained. Add to this another symptom almost equally terrible—intense pain in the brain, the organ controlling both character and life-processes, and what disease could be more desperate? How many of our patients had sick headache is impossible to tell, owing to the disinclination, especially in writing and biographies to speak of vomiting. Probably most of them did have it more or less. Of Mrs. Carlyle, Huxley, Wagner, and Darwin it was almost constant when the eyes were used in near work. Whittier, Nietzsche, De Quincey, and Carlyle suffered from it also. Spencer, Browning, and Parkman escaped, undoubtedly by means of not driving the eyes to the degree of use that would produce it. But headache alone without the "thirty-hour or sixty-hour retching" is bad enough. Then it must be remembered that for geniuses like these upon whom was laid the awful duty of world regeneration and enlightenment, the mental anguish from knowing their life-work frustrated was greater than any simply physical suffering could be. This comes out with tragical emphasis in a hundred quotations that I must omit. Until insanity came to his rescue the mental and physical agony endured by Nietzsche is one of the most terrible spectacles one can imagine.

Insomnia.—There were but two of the eleven patients who were not extreme sufferers from inability to sleep. Of some it seemed the chief complaint, and the bitterness and reiteration of the trouble by most was so great as to make this symptom of exceptional interest to physicians and physiologists and to demand a scientific explanation. For thirty or forty years several, one would judge, could get on the average but two or three hours of sleep a day; a full night of sleep was hardly ever, or never, secured, and the attempt to rid themselves of noise constituted their greater trials and expenses of practical life and dominated all plans and methods of domestic economy. Oriental cruelties, physiological laboratories, etc., have demonstrated the absolute necessity of sleep, the fatality of enforced wakefulness, and every one knows from personal experience how all health and happiness are dependent upon that strange lapsing of consciousness. There is an unconscious divinity of physiology, one at least whose consciousness is so different from ours that we call it unconscious, though it is more ingenious and purposeful than man's most exalted and scientific vision can ever suspect.

Is it not true that the biologic divinity never sleeps? Is it not simple fact that for sixteen hours a day he lends to our consciousness, as temporary engineer-in-charge, the marvellous machine we call the human body and brain? Is it not as evident that even while we as engineers are in charge, his attention is always present in every bolt and bar, in every cell of every organ? One of his little, but to us as physicians conspicuous, functions we have named *vis medicatrix Naturæ*, the healing power of Nature, the wonderful art of instinctive unconscious repair, the amazing and perfect proof of the very presence of God. Is it not, again, the oldest of physiologic truths that in highly complex and differentiated organisms like ours, the conditions of repair and healing are intermediated by cerebral and neural control? In other words, our derived or subordinate consciousness works by means of the cerebral mechanism loaned to us by the sleepless chief engineer for two-thirds of the twenty-four hours. Follow the logic one link further and it is seen that while the locomotive is put in our hands, it cannot be repaired. It must stop running and go into the shop for repairs. It is noteworthy that even if no repairs are needed an ordinary railway locomotive gets tired and must literally be rested. A simple bar of steel, it seems, needs sleep, rest from continuous strains. More strikingly does the human machine require the lapsing of our engineering control and so of our consciousness. This or something like it, is the philosophy of sleep. And now for the application to our subject: the astigmatic and aniso-

metropic eye can scarcely rest from muscular or innervational strain for a second of the sixteen waking hours. The heart rests every beat, every organ and every muscle rests, because no muscle can be steadily innervated for more than a few minutes without painful effort. The safety of the organism, the "making a living," requires this sixteen hour restlessness of the astigmatic eye. Nothing like this denial of this absolute law of physiology exists in any other organ of the body. The eye dare not be injured, and the natural injury to it must be reflexly shunted to the brain or to other organs: in extreme cases of overuse, the fundamental conditions of organismal existence, nourishment, and cerebral control are denied, and the organism itself is profoundly hurt or even destroyed. That, or something like it, is the philosophy of eyestrain and of reflex ocular neuroses. Lastly, the injury to the cerebral and neural mechanism and its exhaustion and injury is so great by the sixteen-hour struggle, that when at night it is given over to the chief engineer, the repairing is such an active process that there is no rest possible, and the human consciousness is aroused, is awakened, by the very stir and din of the repairing process. That, or something like it, seems to me the philosophy, or rather physiology, of the insomnia of eyestrain.

It may be of interest to note in this connexion that eyestrain commanded all of our patients to reverse the proverb as to the value of the "midnight oil" to the student and literary man. The eye and brain, tired and disordered by the day's struggle, cannot work at night, and especially by the poor rushlights and candles of the last century. It cannot do so even with the best poor lights of our time. Only in the early morning hours could all of the eleven find enough resilience of mind and strength of eye to do any original work.

The digestional reflex, next to insomnia and headache, was the most pronounced and constant symptom of the eleven patients, and of nearly all was the most crippling and dangerous. The rôles that biliousness and dyspepsia have played in civilization, and are still to play, are, indeed, far from "play," are as serious a part as those of any, possibly of all infectious diseases combined. That, I know, seems exaggeration at first sight, but not when one reconsiders the fact that denutrition is the fundamental preparation of the "soil" for the reception of most organic and infectious diseases. It is, indeed, a dangerous thing to "explain," or, rather, to attempt to explain, the mechanism of intimate physiologic and pathogenic processes. Most physiology of this kind is crudity and error, guessing at best. In two thousand years I cannot find that the medical profession knows at all certainly what biliousness and dyspepsia really are, and we are surely further still from knowing their causes and the mechanisms of the causes. Rough observation, crude clinical facts, are about as far as we have got. One shrinks from too much parading of his own clinical experience, but each day of sixteen years, and many thousands of patients, have convinced me that eyestrain is the almost sole cause of the awful disease sick headache, that it causes a vast deal of so-called biliousness and of dyspepsias of many kinds, and that correction of eyestrain relieves these troubles suddenly and as if by magic.

I frankly confess that, despite all pondering over the fact and study of the physiologies, I am in doubt as to the mechanism. In a general way and usually the head is an inhibitory organ to the so-called vegetative or unconscious processes of the body, but eyestrain is such a peculiar disturbance of cerebral function that one doubts if it is essentially an exhaustion and depletion, or an excitement and irritation. Certain observers have thought that some types of diarrhoeal diseases are due to it, but the distinct evidence of the eleven cases studied, and of my own clinical experience, leads me to think it is usually, if not always, inhibitory to the digestional process. The vomiting would argue for this also very strongly. Physiologically both the diarrhoeal and constipational processes may, I understand, be results of the same initial inhibitional and indigestional cause. Indeed, the symptoms of essential excess and deficiency of nerve force, of hypersthenic and asthenic disturbance may be the same apparently, or so similar as to end in confusion. Irritation and exhaustion sometimes seem mere names denoting phases of a single underlying morbidity. Several of our patients and quite a number in private practice have exhibited palpitation of the heart, lapsed beats, irregular rhythm, etc., as an undoubted result of eyestrain. If stimulation of the pneumogastric nerve, as we are taught, results in increased rapidity of the cardiac

beat, it is by no means clear that this inhibitory acceleration will explain the cardiac complications of eyestrain. It is a disturbed rhythm and irritability, a disordered function rather than an acceleration, with which we have to do. The study of the headaches of eyestrain, the migraines, the localization and almost infinite varieties of them, and of the mental or psychic functions, also leads us into the mysteries and contradictions of cerebral function, and localization of function, which are so far beyond the unravelling of science. Choreas, twitchings and tics are proofs of sthenic irritation and disorder, while pareses and even paralyses, sometimes also due to eyestrain, are of course only explainable on the theory of exhaustion and inhibition. But facts, accurately observed, precede philosophies, and sufficient unto the day is the evil thereof.

"Irritability" and "Nervousness."—The biographies and letters of almost every one of the eleven patients are filled and overflowing with evidences, expressions, and facts, going to show cerebral and emotional irritability, what, for want of a better word, may be called nervousness. The passion for activity, the desire for change and movement, are often uncontrollable and the words used to express it are painfully intense. It rises to morbid extremes just in proportion to the amount of eyework demanded or completed. In every one it took the form of physical exercise, usually of walking. Carlyle walked numberless miles and rode one horse some 20,000 miles. De Quincey walked around his "measured circuit" 1,000 miles in 90 days: during his life he averaged 15 or 20 miles a day in walking, often far into the night. Darwin trudged about his "sandwalk" all the time he was not hydropathizing. Huxley's only relief was 10 or 15 miles a day. Browning, Parkman, Wagner, Nietzsche, even Whittier, were forced to the same plan of life, each in his special way. Even Mrs. Carlyle says she walked from 6 to 10 miles a day for 10 years. Parkman's early fiery athleticism is positively morbid in its intensity; in his youth De Quincey ran to vagrancy for years, and Darwin's devotion to sports in his college days was the despair of his father; and so on. There can be no doubt that this commanding impulse made Darwin take the *Beagle* voyage, made Huxley join the *Rattlesnake* expedition, and turned both from other studies and living to natural history and science. When Parkman was denied the power of reading and writing, and when he could not live among the wilds or go into the army, he devoted himself to horticulture for 14 years (by means of low stools and rolling chairs), and when he could not do this he rowed or practised sedentary gymnastics. Spencer avoided danger by recreation, and because Nietzsche denied the need of walking and action so much, forcing his eyes to a relentless fury of study, he positively went insane. Wagner felt he would literally go mad unless he should relieve himself by exercise, and he deeply cursed the "damnable organ of sitting still." That all lived to ripe old age, that their health improved as they grew older, that when very old most of them could outwalk all the young men—all this shows that their hearts were not organically diseased, that they were essentially physically sound, and that their ailment was essentially functional. The demand and ability to carry out lifelong physical exercise also points to an overplus of nerve force and an undeniable necessity of draining the surplus innervation to the large muscles of the body. But it also points more surely and clearly to the fact that only by this means could the eyes be rested and the source of reflex irritation shut off. That, or something like it, appears the plain philosophy of the "nervousness" of eyestrain sufferers and their absorbing need for physical activity. The greater number of literary men and intellectual workers show no such uncontrolled necessity, because these have no eyestrain. Whenever one has such patients, or reads of such men being great walkers, look out for eyestrain. Truant schoolboys are to be studied from the same standpoint. When 50 per cent. of epileptics have unsymmetric astigmatism, it is suggestive of a possible ocular origin of their disease, even though when epilepsy is fully established and extreme it may not be curable by glasses. When young criminals are found to have an enormously high average of high hyperopia—such as would absolutely interdict study and handwork—what can they do, if poor and naturally unmoral, what can they do but drift into crime?

Apathy and Exhaustion seem at first sight utterly at variance with a synchronous exhibition in the same patient of nervousness and an impulse—not to be disobeyed—towards activity. In Whittier the exhaustion, anaemia, and apathy

were more pronounced than in any of the others. In Darwin the psychic fatigue and depression coexisted with the spurred and jaded body. In Wagner and Mrs. Carlyle it came to a feverish coexistence, and alternation of exhaustion and activity, both morbid. In the others it phased itself in varying degrees of predominance and alternation. The intense melancholy and depression of Carlyle, Whittier, Darwin, Wagner, etc., and of most "dyspeptics" is proverbial, and has even provoked many absurd pathologic sayings, themselves pathologic, such as "Genius breeds upon a dyspeptic soil," etc.

One heartrending result of their exhaustion was the desire or fear of death, or of worse than death—insanity. Darwin was always on the edge of despair, and at one time in middle life made his will, in view, as he thought, of approaching death. Carlyle often shuddered at the apparent uselessness and fatigue of life, and the advisability of death. Wagner was constantly tempted to suicide, and at one time seems to have resolved upon it. Whittier, Nietzsche, Wagner, all were convinced, in youth or mid-age, that their lives had been lived out, and that nothing was left to do—at least no ability to do it. The peculiar nature of eyestrain, the rapidity with which it produces morbid reflexes and is relieved easily explains the facts of the coexistence and alternation of exhaustion and irritation. They are mere aspects of one neural and psychic fact.

(To be continued.)

SOME OPEN SCHOLARSHIPS AND PRIZES.

It is probable that more men, especially among those recently qualified, would be glad to try for some of the numerous scholarships and prizes offered both in this country and abroad in open competition, if they knew of their existence, or if, knowing of them, they were made aware of their conditions. It has been a cause of surprise to find how many men even the Murchison Scholarship, the Astley Cooper Prize, and the Jacksonian Prize were unknown. Although some of the scholarships and prizes are of value on account of the substantial pecuniary aid they afford in protracted and costly researches, there are others whose intrinsic value is small, but which, however, have a high importance on account of the distinction they confer.

SCHOLARSHIPS AND PRIZES FOR STUDENTS.

The Medical Schools with hardly an exception offer Entrance Scholarships to all students intending to begin their medical curriculum. Most of the London hospitals offer some five, ranging in value from £150 to £50. The University of Edinburgh offers every third year one of the value of £300, a Vans Dunlop Scholarship of £100 for three years, the next award of which will be in April, 1904. Some of the entrance scholarships, including exhibitions, are awarded for proficiency in the arts and others for knowledge of the preliminary sciences of the curriculum. Particulars in regard to them will be found in the Educational Number of the JOURNAL. It is understood that the successful candidates will take up the full course at the hospital in question, but there is no reason, as far as we are aware, why intending students should not compete at two or more medical schools simultaneously.

The Murchison Memorial Scholarship in Clinical Medicine, which perhaps confers the most distinction of all purely medical scholarships in Great Britain, is open to students of medicine or recently-qualified men who have been educated in London or Edinburgh, having been registered students in either place for not less than five and not more than seven years. It is of the annual value of 20 guineas, and is awarded alternately in London by the Royal College of Physicians, and in Edinburgh by the University of Edinburgh. In 1904 the examination will be held in London.

At Owens College, Victoria University, there is an annual open Scholarship in Physiology and Comparative Anatomy called the Robert Platt Physiological Scholarship of the value of £50 for two years. Its award mainly depends on the results of an examination, but aptitude for original research is taken into account.

The Jenks Memorial Scholarships are of the value of £27 per annum for five years. One is awarded annually by the Royal Colleges of Physicians and Surgeons alternately, preference being given to students leaving Epsom College.

The Barker Anatomical Prize, of the value of £21, is offered by the Royal College of Surgeons in Ireland, and is open to all medical students of the United Kingdom. The prize is awarded for the best dissection of a specified part, which must

be sent before March 31st to the Curator of the Museum, Royal College of Surgeons, Dublin, from whom further particulars may be obtained.

ENDOWMENT OF GENERAL RESEARCH.

The British Medical Association has instituted two Research Scholarships awarded annually, but capable of being continued for three years, each of the yearly value of £150. These are for the encouragement of research in anatomy, physiology, pathology, bacteriology, State medicine, clinical medicine, and clinical surgery. They are awarded by the Council of the Association on the recommendation of the Scientific Grants Committee.

The Association has also established an Ernest Hart Memorial Scholarship of the annual value of £200, the holder of which is required to devote himself to the study of some subject in the department of State medicine. Forms of application for these scholarships may be obtained from the General Secretary of the Association, and should be sent in on or before October 4th.

The Grocers' Company have instituted three Medical Research Scholarships, open to all British subjects, of the annual value of £250. They are intended as an encouragement to the making of exact researches into the causes and prevention of important diseases. Particulars should be obtained before the end of April in each year by application by letter to the Clerk of the Company at Grocers' Hall, Princes Street, E.C.

At Cambridge there are several valuable Studentships and Scholarships in Science, each of the annual value of £200, and tenable for three years. One is the Balfour Studentship for original research in biology, and especially in animal morphology; and the other the John Lucas Walker Studentship for original research in pathology. At Trinity College the Coutts Trotter Studentship is open in physiology and experimental physics. Others which should be mentioned are the George Henry Lewes Studentship in physiology, and the Allen Research Scholarship, of the annual value of £250, for research in several branches of study, of which medicine may be one.

In connexion with the Lister Institute of Preventive Medicine a Studentship of the value of £150 has been offered. It is open to all British, including Colonial, subjects; it is tenable for one year, and is renewable for a second year. It has been instituted for the purpose of research in pathological chemistry. Applications must be sent in to the Secretary to the Governing Body not later than October 1st in each year.

The Salters' Company Research Fellowship, of the annual value of £100, is for the promotion of research in pharmacology. It is awarded by the Company on the nomination of the Treasurer of St. Thomas's Hospital and a Committee of Selection. It may be held for a term of three years, and the research must be prosecuted in the laboratories of St. Thomas's Hospital.

In connexion with the University of Liverpool, are the Alexander Fellowship in pathology, which was instituted in 1899 for a period of five years, and is of the annual value of £100, and the Colonial Fellowship in pathology and bacteriology, for which there is a preference for members of Colonial universities and medical schools.

The Riberi Prize, which is of the value of £800, is offered by the Royal Medical Academy of Turin for original work in anatomy, physiology, pathology, or pharmacology. Research on the history of medicine since the Renaissance may also be submitted. The account of the research must be written in Latin, French, or Italian, and is to be sent to the Secretary of the Academy. The prize will next be awarded for work done during the five years 1902 to 1907. Further information may be obtained from the General Secretary, Dr. B. Silva.

The Gross Prize of the value of £200 is awarded by the Philadelphia Academy of Surgery as trustee of the late Dr. Emanuel Gross for original research in Surgery, the prize essay to be published in book form.

Grants in aid of scientific research are made after due consideration both by the British Medical Association and by the Royal Society.

INCENTIVES TO SPECIFIED RESEARCHES.

The Weber-Parkes Prize is awarded by the Royal College of Physicians every third year for an essay on some subject connected with the etiology, prevention, pathology, or treatment of tuberculosis, especially with reference to pulmonary consumption in man. The prize consists of 150 guineas and a silver medal. A similar medal is also awarded to the essayist