who are acquainted with the minute anatomy of the body and of the various imperfectly, as yet, understood functions of the nervous system.

I mention this here because I fear that practical anthropometry, as generally understood on the Continent and America, as well as in this country, is likely to suffer from a series of ingenious inventions manufactured and sold by the Cambridge Scientific Instrument Company, and advertised in the columns of the JOURNAL as anthropometric apparatus. Now the instruments required for recording the purely physical qualities of the body, that is to say, the stature, the length, breadth, circumference, and thickness of different parts of the trunk and limbs; the weight, strength, and breathing capacity; and of the complexion, as distinguished by the colour of the hair, eyes, and skin, are few in number and inexpensive, and consist of a pair of ordinary callipers, two or three slight modifications of the shoemaker's rule, a measuring rod and tape, a weighing machine, one or two dynamometers, and a spirometer. Not only does the catalogue of the Cambridge Company contain instruments of this description, but many others for testing the keenness of eyesight and appreciation of colour (not the same as have been perfected by ophthalmic practitioners); keenness of hearing, and appreciation of musical pitch; and the numerous qualities of the senses and the mind which are largely, if not entirely, the result of education and individual experience, such as "judgment of the eye [mind?] as regards squareness and angular division; judgment of the eye [mind?] in estimating the division of a line; reaction time to sound and sight; appreciation of slight differences of weight." These are doubtless interesting subjects of inquiry, but they are not anthropometric inquiries in the sense in which the word is generally understood, and to which I think it is desirable to restrict it.

I am inclined to think, moreover, that Mr. F. Galton, who has designed these instruments, does not see what complicated problems he is asking us to investigate under such an apparently simple question, as, for instance, "the judgment of the eye as regards squareness." An instrument for this purpose might serve in a rough way to distinguish between an artist and a barrister, an artisan and an agricultural labourer; but between two persons of equal training and experience the test would be one of the different amount of astigmatism in the two persons under examination. Similar objections occur to me with regard to some of the other instruments in the catalogue; but my object is not to criticise them, but rather to point out to the members of my own profession the proper sphere and the practical utility of anthropometry as generally understood and as was understood by Quételet, who invented the word to cover the series of inquiries which he carried out on the human body, and which are recorded in his work entitled *Anthropométrie ou Mesure des Différentes Facultés de l'Homme* (1870).

When I published my *Manual of Anthropometry*, in 1879, I was soundly rated by the *Lancet* for making such free use of Quételet's observations, but it would be just as reasonable to rate Quain and Gray for appropriating the labours of previous anatomists. Although anthropometry has existed in a slipshod manner for many centuries among artists and sculptors, it was Quételet who first reduced it to a scientific form and applied it to scientific uses; and it is desirable, if any progress is to be made in this as in other sciences—and especially in those which, like anthropometry, so largely depend on collective investigation—that changes in its methods of procedure should not be made without very grave reasons.

Unfortunately for the stability of the science of anthropometry, Quételet was a mathematician and an artist, and not an anatomist, and he gives us in his book only the results of his anthropometric observations, and not the method by which he obtained them. He dealt with the subject as if he had exhausted it, as indeed, for artistic purposes, he very nearly has done so. It is when we come to try to apply his method to the distinctions of the races of man, and to medical, sanitary, and other scientific uses, that it fails us, simply because he has not defined the conditions under which his observations (mostly made by his medical friends) were made, and it was for the purpose of defining these conditions that my essay was published, and this only after a translation of Quételet's work, with the necessary notes, was refused by the Sydenham Society. I mention all this because I wish to impress on everyone who takes up the subject of anthropometry that it is better to get some results by methods which have been found to work fairly well, than to be constantly tinkering the methods and obtaining no results and disheartening others of a less critical turn of mind. *Ars longa,*

vita brevis is a motto especially applicable to this subject. While we are inventing instruments and illustrating mathematical problems by our miserably small collection of anthropometric observations, the French are applying the science in its simplicity to the identification of criminals, the Germans to the differentiation of races, and the Americans to the results of gymnastic and athletic exercises, and to all of them anthropometry has become serious everyday duty and study—as serious, to compare large things with small ones, as the study of micro-organisms is with ourselves. Sufficient work has, however, been done in this country to form a basis for more and better work in future, and sufficient has been done, especially in differentiating sanitary conditions such as the influence of occupations, food, social status, etc., and of the racial elements of the population, to promise great results if the methods of anthropometry we already possess were recognised, and their practice properly encouraged by the Colleges of Physicians and Surgeons and the medical schools.

Simple and easy as anthropometry is in practice, its application to the solution of racial, physiological, and sanitary questions is so wide and comprehensive, that it is hardly within the power of individuals to carry it out. Quételet first described the method but he shrank from the labour it involved, and instead of measuring men, women, and children by thousands he measured them by tens, and so missed seeing some important facts in relation to sexual and racial differences which have since been discovered. Dr. Beddoe has spent a lifetime in collecting anthropometric data for differentiating the racial elements of our British population. Professor Bowditch has with much labour discovered by anthropometric observation the difference in the rate of growth of the two sexes.

Mr. F. Galton has illustrated in a similar way some important facts relating to the hereditary transmission of physical characters, and I have endeavoured to establish standards for comparison, and to define some of the results of the "conditions of life" on the development of the body, while in another field Hutchinson's investigations have become classical.

But not only does all this work want revising and extending, we want also a profession which can understand and appreciate its value, which we have not got at present, and which, I fear, we never shall have till the heads of the profession, as represented by the colleges and schools, recognises its importance as equal at least to those of comparative anatomy, chemistry, and botany, and, indeed, as superior to them in its educational value, the mathematical and statistical accuracy which anthropometry demands being of supreme importance as a check on the imagination of the student, and a suitable training for other investigations necessary to the progress of medicine and surgery in our day.

HOW TO REFORM THE DENTAL DEPARTMENTS OF OUR HOSPITALS.

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THIS is a problem I took in hand at Guy's Hospital, and now that the experiment has resulted well and nearly two years have been allowed to lapse as a time-test, I bring the matter forward in the hope of inducing other hospitals and other dentists to adopt necessary changes.

I do not advocate that each medical school should be a school for dental students; at present this is impossible. Let dental students seek special training at special hospitals, but those who hold the dental surgeoncies to hospitals should show their operations and the scope of their subject as the other specialists do. The status of dental surgery, though improved, is far from what we would see it, and from what we think it deserves. What can be more damaging to our profession, which, above all, rightly claims to be a branch of surgery, than the lamentable fact that medical men so frequently feel obliged to admit utter ignorance of the subject? Hence it becomes a frequent source of complaint amongst dentists that the importance and value of their work is inadequately appreciated, and the medical fraternity is blamed for possessing little or no knowledge about teeth. The work done at the dental hospitals is admirable, but busy medical practices cannot give the time to attend there, and they go into practice with the idea that the extraction of teeth and their replacement artificially form the limit of our practice and science.

The fault lies with those dentists connected with hospitals who

do not take practical means to dissipate this illusion. The position of ophthalmic surgery would not be what it is if the eye-surgeons treated every hospital case by excision of the eyelid. The schools would condemn such teaching and practice as a barbarous exhibition of bad science.

If each hospital dentist devoted one sitting a week to extractions, and one sitting to the other operations of dental surgery, the difficulty would be overcome. No one is called upon to treat all the diseased teeth of his district, but it does not follow that nothing whatever should be done or taught. I do not consider two sittings a week too large a demand upon the time of those who occupy the responsible position of connecting link between dentistry and surgery.

I will now briefly run over the arrangements made at Guy's Hospital. There are two dental surgeons' dressers; they hold office for two months. A fresh dresser is appointed each month, who becomes "senior" during his second month of office. The dressers attend daily at 12.30 to see out-patients. In very urgent cases they are at liberty to give "gas," but of course the administrator must be a qualified man. General practitioners are very frequently asked to give "gas" for dentists, and it is to be regretted that they so often find themselves lacking in practical knowledge upon this subject.

At first I had to do nearly all the extra work of the new department myself, owing to the absence of my then senior colleague, Mr. Moon, but of late I have had the assistance of a present student, Mr. Wynne Rouw, an ex-house-surgeon at the Dental Hospital of London. He attends on Tuesdays at 1.30, and I on Thursdays at the same hour for out-patients, and these are our afternoons for gas extractions and surgical cases. Nitrous oxide gas should be given as a matter of routine in our severer operations, and in the numerous cases where the health of patients renders them physically incapable of enduring pain without severe suffering. An anæsthetic so safe should always be at hand, and is more suitable for many patients in the wards of the hospital than ether or chloroform when a tooth has to be removed. On Friday afternoons at 1.30 we both work, doing anything except extractions. It is on this afternoon that we see patients under treatment for fracture of jaw and children wearing regulating plates, and we frequently have cases where plates are required to restore parts removed by operation for surgical diseases. All such patients are supplied with mechanical appliances and plates, for which the hospital pays the senior dental surgeon £40 a year. I am informed that this sum represents an equivalent fixed by Mr. Salter. The rest of our time on Friday is devoted to "stopping," including gold.

It is a mistake to suppose that medical students are not interested in even tedious operations. I have had abundant proof of how keen an interest they take in our work, and have been astonished at what good men apply for dental surgeon's dresserships. At one time I had an ex-house-surgeon as senior and a F.R.C.S. as junior dresser. Advanced students do not require much teaching, and I am not sure to what extent their services might not be available in filling simple cavities with "plastic" stoppings. That aspect of the subject I will pass over as "not proven." Suffice it to show what work can be done by two dental surgeons, and how. The time may come when we may be able to cope with all the decayed teeth that require attention, and I will admit that the question is one of national importance, which may some day affect the supremacy of the Anglo-Saxon race, and I quite sympathise with those who would demand State aid for dental hospitals, and that in the army and navy, and wherever medical supervision is provided, salaried dental appointments should be invariably added. But at the present time these considerations must be deferred, and what dentists have first to do is to educate the medical profession, and through them the laity, in the merits and bearing of their science.

Those who are opposed to those suggested changes in our hospital practice plead that they could not devote the time to the increased work. In the first place, I only suggest two attendances a week for each dental surgeon, and one cannot say that is an excessive claim on their time, or that it reaches the average period spent in the hospital by the dentist's colleagues. Granted, metropolitan schools are undermanned as regards dentists. Such important hospitals as London, St. George's, University, King's, and Charing Cross, have only one dental surgeon each. If these need aid they can ask that assistant dental surgeons be appointed. There are young men available for future appointments ready to devote part of their time to a hospital, and to rise thereby in a

way usual amongst members of a staff. If possible, the "assistants" should hold independent appointments, as at Guy's. The *Medical Directory* shows that there are in London 86 "hospitals" and 67 "dispensaries." Some of the latter are very large, and one shows an annual attendance of 24,000 patients. We know it is the exception for a London hospital or large dispensary to be without an appointed dentist. This gives an idea of what could be done if each dentist attended twice a week, and reserved part of his allotted time to operations other than the extraction of teeth. It is a noteworthy fact that some dentists hold two appointments, and I may be permitted to add that I resigned my post on two hospitals in order to devote adequate attention to one.

The matter of necessary funds should be considered, although, to avoid probable delay and obstacles in what had something of the nature of an experiment, I made the additional expenses at Guy's a personal affair. Accepting £40 a year as the equivalent of the "artificial work" done, I should estimate the cost of "gas" for the past year at £50, and the instruments, stoppings, etc., about £30. Thus I judge the expenses of the department are at present about £120 per annum. With the result of my experiment I am satisfied, and do not desire any alteration of existing conditions as affects myself; but I am of opinion that, when new dental appointments are made by hospitals requiring efficient dental departments, the cost of the instruments, materials, etc., should be defrayed by the institutions benefited. If the dental surgeons were to express willingness to do the better work, and the hospitals were to decline to provide the expenses, the onus of bad dental departments would be entirely thrown upon the authorities. But there is now a great competition amongst the hospitals, each vying with the other as to which shall have the most complete administration and the best teaching, and as they undoubtedly wish to improve their dental departments, I have yet to learn that they will demur to furnishing the means. At St. Bartholomew's all the working expenses are supplied at the cost of the hospital, and an annual sum of £250 is divided amongst the four dental surgeons appointed, made up thus: the Treasurer pays £50 a year to each senior, and £25 to each junior; and the school pays an additional £25 a year to each of the four. On the one weekly occasion when each senior attends he is assisted by his corresponding junior, and between them they see twenty or thirty patients, and they do what they can to preserve some of the teeth at this sitting by stopping. Having so many patients to see, many of whom require gas, it is obvious that little can be done in the way of stopping. I recently made a formal visit to St. Bartholomew's on the day when my friends Mr. Paterson and his junior, Mr. Ackery, were sitting. They did not profess that their stoppings done under such conditions were up to the standard of their work in private practice, and no gold fillings were attempted. Each assistant also attends three times a week for extractions. The assistant dental surgeoncies are dependent appointments.

There is, of course, an advantage in numerical strength, though it leaves them still hopelessly unable to cope with even a small percentage of their cases. And there is this drawback: such a corps could not expect to be placed on the staff of the hospital, and, in fact, no dentist at St. Bartholomew's has a seat on the staff committee. The number seems to me more than sufficient for the requirements of a general hospital and school for medical students, yet insufficient for a dental hospital and school for dental students. Such a staff of dentists could well afford to keep their extraction cases separate from their other operations and could then do their best work. They are, however, utterly unable to give dental students the practice and teaching offered by the dental hospitals, as a cursory visit to one of those institutions will show. Yet, London, St. Bartholomew's, and some other hospitals have the right to sign-up dental students for the dental practice required by the College of Surgeons. This privilege, if ever exercised, imposes a grave responsibility on the dental department of such a hospital. London Hospital, in its Calendar, says: "The attention of dental students is particularly directed to the fact that the Council of the College of Surgeons recognises the dental department of the London Hospital as a school at which may be obtained the dental practice necessary to qualify a student for the examination for the dental diploma."

In the foregoing sketch I have tried to show how a creditable dental department can be carried on by two dental surgeons, and at very moderate cost. Doubtless other hospitals will take the matter up, and will see that dental surgery is duly represented amongst the special branches of surgery.