

fundamental properties of living matter. We already know that living matter is not that homogeneous, formless substance which, not many years ago, it was believed to be, but that it possesses a complex organisation.

Practical medicine has been profoundly influenced by the unparalleled development of the medical sciences during the last fifty years, and especially during more recent years. Scientific methods have passed from the laboratory to the hospital. Cases of disease are now studied with the aid of physical and chemical and microscopical and bacteriological methods. The diagnosis of disease has thereby been greatly advanced in precision, and if Boerhaave's motto, *qui bene diagnoscit, bene medebitur*, be true, there should be a corresponding advance in the results of the treatment of disease. Whether or not this dictum of the old master be true—and I have serious doubts as to its entire truth—it cannot be doubted that great progress has been made in medical, and especially in surgical treatment as a result of scientific discoveries, although the treatment of disease still rests, and will doubtless long continue to rest, largely upon empirical foundations.

We are assembled here to-day to assist at the opening of a laboratory which gives the fittest and strongest possible expression to the influence of scientific work upon practical medicine. The generous founder has marked with characteristic insight the direction in which the current is setting.

The conception of a thoroughly equipped laboratory as an integral part of a hospital and intended for the study and investigation of disease is of recent origin. The germs of this idea, however, may be traced back to such men as Hughes Bennett and Beale in Great Britain, and to Frerichs and Traube in Germany, who in their hospital work made fruitful application of microscopical, chemical, and experimental methods. A little over ten years ago, von Ziemssen, in Munich, established a well-conceived clinical laboratory, containing a chemical, a physical, and a bacteriological department, a working library, and rooms for practical courses and the examination of patients. A similar laboratory was secured by Curschmann in Leipzig in 1892.

The growing recognition of the need of such laboratories is the result of the great progress in scientific medicine during recent years. The thorough clinical examination of many cases of disease now requires familiarity with numerous technical procedures, physical, chemical, microscopical, and bacteriological. The laboratory outfit required simply for routine clinical examinations is considerable. A microscope and a few test tubes and chemical reagents for simple tests of the urine no longer suffice. As illustrations of this, I call attention to the clinical value of examinations of the blood, of the contents of the stomach, of fluids withdrawn from the serous cavities, of the sputum and various secretions, of fragments of tissue removed for diagnosis. Such examinations require much time, trained observers, and considerable apparatus. To secure for the patients the benefits in the way of diagnosis, prognosis, and treatment to be derived from these methods of examination, a hospital should be supplied with the requisite facilities.

A hospital, and especially one connected with a medical school, should serve not only for the treatment of patients, but also for the promotion of knowledge. Where this second function is prominent, there also is the first most efficiently and intelligently carried out. Herein we see the far-reaching beneficence of a laboratory, such as this one, thoroughly equipped to investigate the many problems which relate to clinical medicine.

The usefulness of an investigating laboratory in close connection with a hospital has already been abundantly demonstrated. Chemical studies, more particularly those relating to metabolism in various acute and chronic affections, microscopical and chemical investigations of the blood and bacteriological examinations of material derived directly from the patient, may be mentioned as directions in which researches conducted in hospital laboratories have yielded important results and will garner still richer harvests in the future.

There need be no conflict between the work of clinical laboratories and that of the various other medical laboratories. Each has its own special field, but it is not necessary or desirable to draw around these fields sharp boundary lines beyond which there shall be no poaching. It will be a relief to pathological and other laboratories to have certain examinations and subjects relating directly to practical medicine consigned to the clinical laboratory, where they can receive fuller and more satisfactory

consideration. The subject-matter for study in the clinical laboratory is primarily the patient and material derived from the patient. Anatomical, physiological, pathological, pharmacological, and hygienic laboratories must concern themselves with many problems which have apparently no immediate and direct bearing upon practical medicine. In the long run their contributions are likely to prove most beneficial to medicine if broad biological points of view, rather than immediate practical utility, are their guiding stars. The clinical laboratory will concern itself more particularly with questions which bear directly upon the diagnosis and the treatment of disease.

To the small number of existing well-equipped clinical laboratories the William Pepper Laboratory of Clinical Medicine is a most notable addition. It is the first laboratory of the kind provided with its own building and amply equipped for research in this country, and it is not surpassed in these respects by any in foreign countries. It is intended especially for investigation and the training of advanced students. It is a most worthy memorial of the father of its founder.

William Pepper the elder was a very distinguished physician and trusted consultant of Philadelphia, for many years an attending physician at the Pennsylvania Hospital, where he was a clinical teacher of great influence, and for four years the professor of the theory and practice of medicine in this University. He belonged to that remarkable group of American physicians, trained under Louis, who brought to this country the best methods and traditions of the French school of medicine at the time of its highest glory. His diagnostic powers are said to have been remarkable. With his broad sympathies, his lofty ideals, and his active and enlightened efforts for the promotion of clinical medicine, how he would have welcomed such opportunities as will be afforded by this laboratory to contribute to a better knowledge of the nature, the diagnosis, and the treatment of disease!

Our country has until within a very few years been deprived of the encouragement and opportunities for original investigations in the medical sciences afforded by large and thoroughly equipped laboratories. We can still count upon the fingers of one hand our medical laboratories which are comparable in their construction, organisation and appliances to the great European laboratories. Notwithstanding these obstacles, there have been American physicians of whose contributions to medical science we may feel proud.

But a new era has dawned. Of that we are witnesses here to-day. The value of medical laboratories is now widely recognised among us. To those of us who appreciate the underlying currents in medicine, who follow with eager interest the results of the almost feverish activities in foreign laboratories, who recognise the profound interest and importance of the many medical problems which await only patient investigation and suitable facilities for their solution, and who would like to see our country take the prominent position it should in these investigations, our laboratories may seem slow in coming, but they will in time be provided by enlightened benevolence. The individual or institution or hospital which contributes to the establishment of a good laboratory devoted to any of the medical sciences merits in unusual degree the gratitude of all medical men; yes, of every true friend of humanity. Such gratitude we feel for the generous and public-spirited founder of this laboratory, who has contributed largely to the advancement of medicine in this country, and of whose splendid services to this university I need not speak in this presence.

I congratulate this city and this university and this hospital upon the important addition made by this laboratory to higher medical education and the opportunities for scientific work in this country. May the enlightened aims of the founder, and the hopes of all interested in the promotion of medicine in this country, be fulfilled by the scientific activities which will now begin in the William Pepper Laboratory of Clinical Medicine.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—At the Encænia this year (June 24) it will be proposed to confer the honorary degree of D.C.L. upon Sir Archibald Geikie, among others.

The Rolleston memorial prize has been awarded to Mr. Horace M. Vernon, for his dissertations on (1) the effect of environment

on the development of Echinoderm larvæ, (2) the relation of the respiratory exchange of cold-blooded animals to temperature, (3) the respiratory exchange of the lower marine invertebrates.

CAMBRIDGE.—The Reade Lecture will be given on Wednesday, June 10, in the Anatomy Theatre, by Prof. J. J. Thomson. The subject for this year is "Röntgen Rays."

Prof. Lewis announces a course of lectures and demonstrations in Crystallography, to be given daily during the Long Vacation, beginning on July 8.

A new syndicate, to take the place of that rejected by the Senate last term, has been nominated to consider the question of degrees for women. It consists of the Vice-Chancellor, Dr. C. Taylor, Mr. W. Chawner, Dr. V. Stanton, Dr. F. W. Maitland, Dr. L. E. Shore, Dr. M. James, Prof. Robinson, Mr. J. W. Cartmell, Mr. R. D. Roberts, Mr. W. N. Shaw, F.R.S., Mr. A. W. W. Dale, Mr. A. N. Whitehead, and Mr. A. Berry. This list includes only three members of the Council, and is said to be younger and less partisan than the rejected syndicate.

Meanwhile Dr. Hobson, F.R.S. of Christ's College, has issued a fly-sheet proposing that, as the balance of opinion in the Senate is against the admission of women to full membership, it might suffice to confer on them the "title" of B.A. by diploma. The title, he thinks, should be open to women who have studied at recognised colleges other than Newnham and Girton, provided they pass one of the Tripos examinations. It remains to be seen what reception will be given by Newnham and Girton to this proposal for an encroachment on their monopoly.

The Statute authorising the University to make provision for Advanced Students has received the approval of the Queen in Council. A guide to the courses of advanced study and research at present arranged for, has been prepared by Dr. Donald MacAlister, Tutor of St. John's College, and will be issued in June by the University Press.

A STRENUOUS and persistent effort to endow Barnard College (for women) has just been successfully made. The college some months ago purchased a site adjoining the new site of Columbia University, paying 160,000 dols., of which sum 100,000 dols. remained on mortgage. An unknown benefactor offered to pay the amount of this mortgage, provided others would contribute an equal amount by May 10. It is now known that this benefactor is Mrs. Van Wyck Brinkerhoff. Another unknown donor, who turns out to be Mr. John D. Rockefeller, offered 25,000 dols.; others contributed smaller amounts, but on the morning of Saturday, May 9, there was still a deficit of 23,000 dols. By strenuous efforts, however, this was secured during the day. Among the contributors were Mr. Seth Low, Mrs. F. E. Hockley, and an anonymous friend, who each paid 10,000 dols., and Mr. Jacob H. Schiff, who paid 8000 dols.

WE notice that at the last meeting of the Oxfordshire County Council, held at Oxford on the 12th inst., a proposition was made to devote the sum of £2000 out of a total of £4080, arising from the Customs and Excise Duties, to the relief of the rates; but it was defeated by a large majority. At a meeting of the East Sussex County Council, held on the same day, a resolution was carried that the whole of the funds available for the purposes of technical education be in future devoted to this object, instead of £5000 as heretofore. A similar motion was proposed at the meeting of the County Council for the North Riding of Yorkshire, held on the 6th inst. at Northallerton, and gave rise to a considerable amount of discussion, during which one councillor, a prominent member of Parliament, described the Technical Instruction Committee as the "horse-leech of the Council." Eventually an amendment, "that the County Council devote £6000 of the Local Taxation (Customs and Excise) grant for 1896-7 to technical education," was carried unanimously. By referring we find that during the financial year 1893-4 the total amount available was £6928.

THE last number of the *London Technical Education Gazette* gives some very interesting information concerning the number of scholarships and exhibitions which have been awarded by the Technical Education Board of the London County Council. The total number of the Board's scholars and exhibitors is 1752, of whom 1154 are junior, 118 are intermediate, and 10 senior county scholars. The reports, which the Board receives at regular intervals, show that in the majority of cases the conduct and progress of the scholars are satisfactory. Some scholars have done remarkably well, especially in the case of

the intermediate and senior students. In the case of a few of the junior scholars it has been found necessary to give a caution and to renew their scholarships for a short time on probation. This has in most cases been quite enough, though one or two scholarships have had to be taken away entirely. The scholarship winners are left free to choose any school that appears on the Board's published list. The result is, that at present 913 junior county scholars are in attendance at secondary schools, and 241 at upper standard public elementary schools. The secondary schools most commonly chosen are Roan School, Owen's School, Alleyn's School, and Aske's School, Hatcham, at all of which there are over fifty scholars and exhibitors. The intermediate county scholars are now attending all the principal secondary schools of London, and some are in attendance at institutions of university rank, after having been for a year at a secondary school. The senior county scholars have joined some of the principal universities of the country, two being at Cambridge, at Clare and Sidney Sussex Colleges, and two at Newcastle in connection with the University of Durham.

THE report of the Technical Instruction Committee, which was presented to the May meeting of the West Riding Council, supplies abundant evidence of the good work which has been done during the session which is being completed. As would be expected, a very important place is occupied by the Committee's consideration of the Education Bill, an excellent summary of which forms the opening part of the report. The conclusions to which the Committee have come are that it would be undesirable for the duties connected with the administration of elementary education to be placed upon County Councils and for any expenditure in reference to such instruction to be thrown upon the County rates. The proposals with reference to secondary education are very favourably regarded, but it is pointed out that already the expenditure exceeds the income provided under the Local Taxation (Customs and Excise) Act, 1890, and must necessarily increase; and hence, if the County Council is to utilise the extended powers and carry out the duties to be conferred by the Bill, it is essential that adequate moneys be provided by Parliament. They further recommend that the Education Department should not be endowed with additional powers of control over the County Council in respect of the expenditure of funds provided under the above-mentioned Act, or out of the County rate for purposes of secondary education. We would call especial attention to certain supplementary regulations which have been adopted by the Committee as to the award and tenure of technical exhibitions. In future the Committee will, in considering recommendations for exhibitions, have regard to the preparatory work already done by the student, and as a rule no technical exhibition will be awarded unless evidence can be given by the candidate that he possesses a satisfactory knowledge of the principles of those sciences on which such technological subject is based; for instance, an exhibition in electric lighting and power distribution would in no instance be awarded to a student possessing an inadequate knowledge of applied mechanics and electricity and magnetism. No exhibition will usually be granted for a study of a *technological* subject to an applicant under eighteen years of age. These are but examples of a number of really wise provisions.

SCIENTIFIC SERIALS.

American Journal of Science, May.—Carbon and oxygen in the sun, by J. Trowbridge. The peculiar bands of the arc spectrum of carbon can be detected in the sun's spectrum. They are, however, almost obliterated by the overlying absorption lines of other metals, especially by the lines due to iron. In order to form an idea of the amount of iron in the atmosphere of the sun which would be necessary to obliterate the banded spectra of carbon, the author compared the spectrum of carbon with that of carbon dust and a definite proportion of iron distributed uniformly through it. The carbon dust and iron reduced by hydrogen was formed into pencils suitable for forming the voltaic arc, and containing 28 per cent. of iron to 72 per cent. of carbon. Photographs were taken of the portion of the solar spectrum which contains traces of the peculiar carbon band lying at wave-length 3883.7. The pure carbon-banded spectrum was photographed on the same plate immediately below the solar spectrum, and the spectrum of the mixed iron and carbon immediately below this. It was found that the iron present almost completely obliterated the carbon, and this fact tells in favour of