

THURSDAY, JULY 5, 1894.

*A LABORATORY FOR PHYSICAL AND
CHEMICAL RESEARCH.*

IT is now about twenty years since the Duke of Devonshire's Commission pointed out that the needs of chemical and physical investigators, upon whose work our national industries so largely depend, were entirely neglected by the Government. Money has been freely lavished that artists may have all they require; biology and archæology have been well equipped, and students of literature have been provided with the finest library in the world; but such is the chaos and disorganisation of our scientific system that many industries are languishing, and some have already left the country because those who are able to foster them by making new discoveries find absolutely no help, and have neither places to work in nor instruments to use, although the sum which the Government has not hesitated to give for one picture would have been more than is needed to correct a condition which is really disastrous from the national point of view.

We rejoice to learn that this state of things, so little to the credit of successive ministries, is now to be partially corrected by the munificence of an individual, Dr. Ludwig Mond, one who, though not an Englishman by birth, has already aided English science by large endowments in other directions.

We learn from a communication which we have received from the Royal Institution, that Mr. Mond last year bought the large freehold house, No. 20 Albemarle Street, contiguous to the Royal Institution, and formerly the residence of the Earl of Albemarle, and has resolved to convey it in fee simple to the Royal Institution. He further proposes to defray the whole expense of converting it from its present uses into a laboratory of chemical and physical research, to be called the Davy-Faraday Research Laboratory, and of equipping it with everything needful for the conducting of scientific research upon a large scale. In addition to this, he proposes to endow the new laboratory first with an income sufficient to defray all local expenses; and, secondly, with a further and of course much larger income, sufficient to pay the salaries and incidental expenses of a trained scientific staff.

Mr. Mond thus realises an idea which engaged the attention of Faraday and Brande and the managers of the Royal Institution half a century ago. In the year 1843 a proposal was made to establish at the Royal Institution a school of practical chemistry, which was not only to give practical and systematic instruction to students, *but was also to provide a place where original researches could be conducted by individuals skilled in manipulation, and where the professors could work out their problems by the aid of many qualified hands.*

In a letter addressed to the managers of the Royal Institution, Mr. Mond writes:—

"I have felt that the need for such a laboratory has become greater and greater since the work of the scientific investigator has become more and more subtle and exact, and, in consequence, requires instruments of precision, and a variety of facilities which a private

laboratory can only very rarely command; and surely this need exists nowhere to a greater extent than in England, and nowhere can such a laboratory be expected to bear more abundant fruit than in this country, which possesses such an unrivalled record of great scientific researches, which have emanated from private laboratories not connected with teaching institutions, and amongst which the laboratory of the Royal Institution stands foremost, and has kept up its reputation for nearly a hundred years.

"It has been my desire for many years to found a public laboratory which is to give to the devotees of pure science, anxious and willing to follow in the footsteps of the illustrious men who have built up the proud edifice of modern science, the facilities necessary for research in chemistry, and more particularly in that branch of the science called physical chemistry.

"I have come to the same conclusion as the promoters of the scheme of 1843, viz. that such laboratory would still have the greatest prospect of success under the ægis of the Royal Institution, that in fact it would be the consummation of the work which this great Institution has been fostering in its own laboratory, with such remarkable results, by the aid of the eminent men whose services it has always been fortunate enough to procure.

"As only want of space prevented the Royal Institution undertaking this task fifty years ago, I took the opportunity which offered itself last year of acquiring the premises, No. 20 Albemarle Street, adjoining the Institution. This property I found very suitable for the purposes of such a laboratory, and large enough to afford, besides, facilities to the Royal Institution for a much needed enlargement of its present laboratory and its libraries and reception rooms, which I should with great pleasure put at the disposal of the Institution.

"Being convinced that the managers of the Royal Institution will give all the encouragement and aid in their power in the foundation and working of such a research laboratory, I hereby offer to convey to the Royal Institution the freehold of No. 20 Albemarle Street, and also the lease I hold from the Institution of premises contiguous thereto, to be held by them for the purpose of a laboratory, to be named 'The Davy-Faraday Research Laboratory of the Royal Institution,' and also for the purpose of providing increased accommodation for the general purposes of the Royal Institution, as far as the available space will allow, after providing for the requirements of the research laboratory.

"I also offer to make, at my own expense, all structural alterations necessary to fit the premises for these purposes, and to equip the Davy-Faraday Research Laboratory with the necessary apparatus, appliances, &c., and to make such further adequate provision as will hold the Royal Institution free from all expense in connection with the premises and the working of the said laboratory. . . .

"I am aware that my offer will not provide for the third object of the scheme of 1843, viz. to enable the professors to work out their problems by the aid of many qualified hands; but I trust that if the laboratory which I offer to found proves successful, others will come forward who will supply the means for attaining this end, by the foundation of scholarships and bursaries to qualified persons willing to devote themselves to scientific work and not in a position to do so without assistance."

It is almost impossible to overrate the importance of the results which may be expected to naturally follow this noble endowment. The new Institute will not fill the gap to which we have previously referred, but it will emphasize its existence. It will not fill it because we suppose that when it is in full work it will not hold as many workers as are to be found in some of the research

laboratories which form an integral part of many industrial establishments on the continent.

Further, here at last we have from one who is both a practical man of affairs and a successful student of science, a distinct endowment of research such as was advocated now many years ago to deaf ears.

We believe that Dr. Mond's noble endowment, for which all true lovers of science must thank him, will have far-reaching effects.

THE HISTOLOGICAL INVESTIGATION OF DISEASE.

Methods of Pathological Histology. By C. von Kahliden. Translated and edited by H. Morley Fletcher, M.D. With an introduction by G. Sims Woodhead, M.D. (London: Macmillan, 1894.)

HISTOLOGICAL methods have become so perfected during recent years that we are apt to forget that there was an age of discovery when microtomes, special dyes, celloidin and paraffin were unknown. In the days of Max Schultze, of Schwann and Virchow, tissues were cut free-hand with an ordinary razor; for the purpose of embedding, pieces of carrot and liver were used, and stains were not dreamt of. Solutions of salt, acetic and mineral acids and iodine were the only reagents employed, and gradually carmine came in use. Yet that age turned out its heroes in such men as von Bär, Remak, Schwann, Max Schultze, Johannes Müller and Virchow, who with tools and media which we are unable to use now, observed appearances and processes which have remained the corner-stones of normal and morbid histology. We are apt to forget their deeds as being antiquated. Gradually stains were introduced, and these led to fresh discoveries. Dr. Klein's work on histology, begun in Stricker's laboratory, is a permanent testimony of what a practised hand can do without our modern microtomes, embedding methods, and multitude of stains. Hæmatoxyline and carmine were the only dyes used. Since then various kinds of microtomes, simple and complicated, have been designed, and every laboratory possesses apparatus for cutting in paraffin, celloidin or ice, and instead of two simple stains, almost numberless reagents are a necessity for the modern worker.

On reading Dr. Morley Fletcher's edition of von Kahliden's book on "Methods of Pathological Histology," we cannot help being struck with the great strides made in histological *technique*. While fully acknowledging the brilliant work of our predecessors, and even regretting that the simpler methods of examination of unstained tissues have practically been forgotten, we feel that every histologist, however modest, should make himself acquainted with the *ars technica* of microtomy. With simple methods it is possible only to study simple processes, and these often with difficulty. The minute structure of the nervous tissues in health or disease, the pathological changes of the blood or of infective lesions, can only be approached, if the necessary staining methods have been fully mastered. Stains are chemical reagents, and their action must be properly appreciated. There exists in our midst a large number of "histologists" who have accustomed themselves to one stain, and whatever comes into their hands is treated in the same manner,

and they even acknowledge their inability of recognising tissues or lesions stained in any other way. Carmine specimens often trouble those who have become the slaves of hæmatoxyline. We cannot sympathise with them; their methods are at fault, and they have not appreciated the value and *raison d'être* of staining. Many great and important discoveries have been made by morbid histologists such as Weigert, Ehrlich, and others, by methods which at first sight appear to be empirical, but are based on sound chemical principles, discoveries which have proved as useful to the physiologist and anatomist as to the pathologist. It is von Kahliden's merit to have collected the most important histological methods, previously scattered and hidden away in archives and journals, and thus to have made them more accessible; and we are indebted to Dr. Morley Fletcher for having given us a readable English translation of a work which rightly enjoys great popularity abroad.

The few critical remarks which we shall make apply chiefly to the German original. The methods of embedding in paraffin and celloidin, and of preparing sections by means of freezing, are well described, and if to some the hints given appear incomplete, it should be remembered that as the work is meant to be a guide for the pathologist, some knowledge of histological methods may reasonably be assumed to exist. The Cambridge rocking microtome was deserving of more than a short reference, at least in an English edition, for with us paraffin is much more *en vogue* for delicate work than celloidin. A few notes might have been added stating for what tissues and stains each embedding method should be used, for the inexperienced have generally difficulties in deciding how to proceed with tissues supplied to them for examination. For the staining of bacteria in tissues, for instance, the paraffin method is the only satisfactory one. The "metal lifter" is a piece of rough apparatus we object to, and recommend a strip of cigarette paper as being the most delicate carrier for transferring sections from water or clearing medium to the slide. Under "double staining" no allusion is made to acid fuchsine, a most selective and beautiful stain. We have little to add to the section on bacterial staining, but venture to offer an important suggestion. When examining for bacteria in albuminous or gelatinous media, it is advisable to remove the ground substance by means of acetic acid. From personal experience we do not agree that Gabbet's method is the best for the detection of tubercle bacilli in sputum. Ziehl's and Van Ketel's methods are far more certain. In the latter the bacteria are previously treated with carbolic acid, which destroys them, so that there is no danger of disseminating infective matter, while at the same time the staining power of the micro-organisms is greatly increased. Carbolic acid should be added to all microbic material, so as to avoid all possible risk of infection. Moreover, treated in this manner any material may be kept indefinitely for histological examination.

The chapter on blood examination is excellent, and must prove extremely useful also to the physician. The systematic study of the blood at the bedside is still too much neglected in this country, though in cases of anæmia it is of the utmost importance, and without a