MR. EDWARD ARNOLD announces:—"Lectures on Theoretic and Physical Chemistry," by G. R. Van 't Hoff, translated by Prof. R. A. Lehfeldt; "An Experimental Course of Chemistry for Agricultural Students," by T. S. Dymond; "Elementary Physical Chemistry," by Ch. Van Deventer, with an introduction by G. R. Van 't Hoff, translated by Prof. R. A. Lehfeldt; "An Illustrated School Geography," by Dr. Andrew J. Herbertson; and a new edition of "Animal Life and Intelligence," by Prof. C. Lloyd Morgan.—Messrs. G. Bell and Sons' list includes: "Domestic Hygiene," by Dr. W. A. Williams.—Messrs. J. and A. Churchill's announcements include: "A Synopsis of Surgery," by R. F. Tobin; and a new edition of Squire's "Companion to the British Pharmacopœia."—Messrs. Harper and Brothers' list contains: "A Thousand Days in the Arctic," by F. G. Jackson, 2 vols., illustrated.—Mr. W. Heinemann promises: "A View of the World in 1900," a new geographical series, edited by H. J. Mackinder, in 12 vols.: (1) "Britain and the North Atlantic," by the editor; (2) "Scandinavia and the Arctic Ocean," by Sir Clements R. Markham, F.R.S.; (3) "The Mediterranean and France," by Elisée Reclus; (4) "Central Europe," by Dr. Joseph Partsch; (5) "Africa," by Dr. J. Scott Keltie; (6) "The Near East," by D. G. Hogarth; (7) "The Russian Empire," by Prince Kropotkin; (8) "The Far East," by Archibald Little; (9) "India," by Colonel Sir Thomas Holdich; (10) "Australasia and Antarctica," by Dr. H. O. Forbes; (11) "North America," and (12) "South America," by American authorities.—Messrs. Smith, Elder, and Co. will publish: A new edition, with additional plates, of "Electric Movement in Air and Water," by Lord Armstrong, F.R.S.

THE additions to the Zoological Society's Gardens during the past week include a Green Monkey (*Cercopithecus callitrichus*) from West Africa, presented by Mr. Cecil Alden: a Ring-tailed Coati (*Nasua rufa*) from South America, presented by Mr. W. C. Way; six Spotted Tinamous (*Nothura maculosa*) from Buenos Ayres, presented by Mr. Ernest Gibson; two Chameleons (*Chamæleon vulgaris*) from North Africa, presented by Mr. W. F. H. Rosenberg; three young Lions (*Felis leo*, ♂ ♂ ♀) from Africa, a Sumatran Rhinoceros (*Rhinoceros sumatrensis*, ♀) from Malacca, two Emus (*Dromæus novæ-hollandiæ*), ten Cunningham's Skinks (*Egernia cunninghami*), a Black and Yellow Cyclodus (*Tiliqua nigro-lutea*) from Australia, a Jardine's Parrot (*Pœocephalus gulielmi*) from West Africa, a Red-sided Eclectus (*Eclectus pectoralis*) from New Guinea, two Reticulated Pythons (*Python reticulatus*) from the East Indies, deposited; a Common Sandpider (*Tringoides hypoleucus*), two Little Ringed Plovers (*Ægialitis curonica*), European, purchased.

OUR ASTRONOMICAL COLUMN.

THE LARGE SUN-SPOT.—The spot on the solar disc which appeared on September 3 last at the eastern limb, and which, when on the central meridian (September 9), was the probable origin of the aurora and magnetic storm, has again (September 30) made its appearance on the eastern limb, having been of sufficient dimensions to last a period of rotation of the sun. The spot is accompanied by several others of smaller size, and its umbra is divided into three separate parts, which form objects of interesting observation. Even in one day considerable changes have been noted to have taken place in the smaller spots in its neighbourhood, although the large one has not shown any marked change. It will be interesting to know whether another aurora and concurrent magnetic storm will be observed and recorded when the spot reaches the central meridian (which will take place on October 6), as was the case at its last meridian passage.

NEW TEACHING OBSERVATORY FOR THE CALIFORNIAN UNIVERSITY.—We have received a circular from the director (Mr. A. O. Leuschner) of the students' observatory of the University of California, from which we make the following brief summary:—The trustees of the "Phebe Hearst Architectural Plan for the University of California" have inaugurated an international competition to secure the most suitable plan for the erection of new buildings in place of the present ones on the University grounds at Berkeley. The buildings are to satisfy every need of a modern University of the highest rank. Among these buildings will be an astronomical observatory especially adapted to the training of young men and women for the profession of astronomy in all its branches, and its equipment will be such as best to serve the purposes of the highest instruction in all branches of astronomy. It is stated that the new observatory is not meant to conflict with the Lick Astronomical Department of the University, for there students are only admitted who are supposed to have shown a marked ability for observation and independent research, and who receive from the astronomers a higher inspiration, and are guided by them in their first investigations in such special lines as can be best carried on at the Lick Observatory. While the main feature of the Berkeley department will be to give proper instruction to its students, the equipment of the observatory is proposed to be sufficiently complete to give ample opportunity for the higher work of research that the instructors and advanced students may be in a position to undertake. The object of the circular is, as the writer mentions, "to state in detail my ideas concerning the proposed new observatory, and to seek the advice of men prominent in the science of astronomy and in astronomical instruction elsewhere." That the observatory will be fully equipped and suitable for the work intended to be accomplished there will be little doubt, and the question of cost is evidently a minor detail, for the Trustees of the Plan invite opinion and request "suggestions irrespective of cost which . . . will better adapt the new observatory for the purposes which it is to serve."

Some of the instruments suggested are: an equatorial refractor of an aperture not greater than 16 inches; four smaller telescopes ranging from 6–10 inches aperture, one being a reflector; complete accessories for visual photographic, spectroscopic and photometric work; a 4-inch meridian circle, and four transit and zenith telescopes. The circular gives also details of the sizes of all the rooms for the instruments, laboratories, lectures, library, &c., which it is proposed to build.

ANNUAL REPORT OF THE CAMBRIDGE OBSERVATORY.—In his report to the Observatory Syndicate, which covers a period twelve months ending May last, Sir Robert Ball states that the meridian instrument of the observatory has been devoted especially to the perfection of a complete catalogue (which is ready for the press), by re-observing stars of which a single observation had only been obtained. It has also been employed in the determination of accurate places of a list of occultation stars at the request of Colonel Tupman. The Northumberland equatorial has been occasionally used for examining fixed stars and planets, but is chiefly employed when visitors are admitted.

The work of the Newall telescope has been continued by Mr. H. F. Newall on the same lines as in former years, namely, the determination of the velocities of stars in the line of sight as measured photographically. The stars chiefly used were those of the solar type. In all 111 photographs of sixty minutes' exposure each were obtained, giving material for the determination of velocity of forty-four stars. Twenty of these stars were of magnitudes greater than 2·5, and are included in the Potsdam observations made in 1888–91; the remainder lie between magnitudes 2·5 and 4·0, and were fainter than could be successfully dealt with at Potsdam. Of these plates eighty-three have been measured once, and twenty twice.

The report further states that the new photographic telescope is now finished at Sir Howard Grubb's works, and that the building to house it has been practically completed.

ANNUAL PUBLICATION OF THE OBSERVATORY OF RIO DE JANEIRO FOR 1898.—This yearly publication of the Astronomical Observatory of Rio de Janeiro is the fourteenth of the present series, and will be found to contain a great deal of useful information in addition to the ordinary data usually found in astronomical almanacs. There will be found tables for the reduction of meteorological observations, and for calculating altitudes from barometric observations by the methods of Laplace, Bessel, Cruls, Weilenmann: meteorological observations for several towns, such as Rio de Janeiro, Santa Cruz, Uberaba, contained in Part vi., which also includes the magnetic ele-

ments observed at Brazil by the Holland Commission. The last section is devoted to some miscellaneous data, and contains, among other matters, tables for determining, rapidly and approximately, the elements of a triangulation by the method proposed by Mr. Francis Galton.

RECENT ADVANCES IN SCIENCE, AND THEIR BEARING ON MEDICINE AND SURGERY.[1]

THE honour of being invited to deliver the second Huxley Lecture has deeply moved me. How beautiful are these days of remembrance which have become a national custom of the English people! How touching is this act of gratitude when the celebration is held at the very place wherein the genius of the man whom it commemorates was first guided towards its scientific development! We are filled not alone with admiration for the hero, but at the same time with grateful recognition of the institution which planted the seed of high achievement in the soul of the youthful student. That you, gentlemen, should have entrusted to a stranger the task of giving these feelings expression seemed to me an act of such kindly sentiment, implying such perfect confidence, that I at first hesitated to accept it. How am I to find in a strange tongue words which shall perfectly express my feelings? How shall I, in the presence of a circle of men who are personally unknown to me, but of whom many knew him who has passed away and had seen him at work, always find the right expression for that which I wish to say as well as a member of that circle itself could? I dare not believe that I shall throughout succeed in this. But if, in spite of all, I repress my scruples it is because I know how indulgently my English colleagues will judge my often incomplete statements, and how fully they are inclined to pardon deficiency in diction if they are convinced of the good intentions of the lecturer.

PROFESSOR HUXLEY'S WORK.

I may assume that such a task would not have been allotted to me had not those who imposed it known how deeply the feeling of admiration for Huxley is rooted within me, had they not seen how fully I recognised the achievements of the dead master from his first epoch-making publications, and how greatly I prized the personal friendship which he extended towards me. In truth, the lessons that I received from him in his laboratory—a very modest one according to present conditions—and the introduction to his work which I owe to him, form one of the pleasantest and most lasting recollections of my visit to Kensington. The most competent witness of Huxley's earliest period of development, Prof. Foster, presented in the first of these lectures a picture of the rapidly increasing extension of the biological knowledge, which must have excited not only our admiration, but also the emulation of all who study medicine. Upon me the duty is incumbent of incorporating with this presentment the newer strides of knowledge and of stating their influence upon the art of healing. So great a task is this that it would be presumptuous even to dare to attempt its accomplishment in a single lecture. I have decided, therefore, that I must confine myself to merely sketching the influence of biological discoveries upon medicine. In this way also will the example of Huxley be most intelligible to us. I must here make a confession. When I tried to ascertain how much time would be required to deliver my lecture as I had prepared it, I found, to my regret, that its delivery would occupy nearly double the time assigned to me. I had therefore to reduce it to about half of its original dimensions. This could only be done by means of very heroic cuts, seriously damaging in more than one place my chain of ideas. If, therefore, you should find, gentlemen, that my transitions from one point to the other occasionally are of a somewhat sudden and violent character, I trust you will bear with me and remember that, if you should take the trouble of reading my address afterwards, you will be less shocked than you may be to-day by my statements when they appear in print.

THE BEGINNINGS OF BIOLOGY.

Huxley himself, though trained in the practical school of Charing-cross Hospital, won his special title to fame in the domain of biology. As a matter of fact, at that time even the name of biology had not come into general use. It was only recently that the idea of life itself obtained its full significance. Even in the late middle ages it had not sufficient strength to struggle through the veil of dogmatism into the light. I am glad to be able to-day for the second time to credit the English nation with the service of having made the first attempts to define the nature and character of life. It was Francis Glisson, who, following expressly in the footsteps of Paracelsus, investigated the *principium vitæ*. If he could not elucidate the nature of life, he at least recognised its main characteristic. This is what he was the first to describe as "irritability," the property on which the energy of living matter depends. How great was the step from Paracelsus to Glisson, and—we may continue—from Glisson to Hunter! According to Paracelsus, life was the work of a special *spiritus*, which set material substance in action, like a machine; for Glisson, matter itself was the *principium energeticum*. Unfortunately, he did not confine this dictum to living substances only, but applied it to substance in general, to all matter. It was Hunter who first announced the specific nature of living matter as contrasted with non-living, and he was led to place a *materia vitæ diffusa* at the head of his physiological and pathological views. According to the teaching of Hewson and Hunter, the blood supplied the plastic materials of physiology as well as the plastic exudates of pathology. Such was the basis of the new biological method, if one can apply such an expression to a still incomplete doctrine, in 1842, when Huxley was beginning his medical studies at Charing-cross Hospital. It would lead too far afield were I to recount in this place how it happened that I myself, like Huxley, was early weaned from the pernicious doctrines of humoral pathology.

THE DEVELOPMENT OF BIOLOGY.

When Huxley himself left Charing-cross Hospital, in 1846, he had enjoyed a rich measure of instruction in anatomy and physiology. Thus trained, he took the post of naval surgeon, and by the time that he returned, four years later, he had become a perfect zoologist and a keen-sighted ethnologist. How this was possible, any one will readily understand who knows from his own experience how great the value of personal observation is for the development of independent and unprejudiced thought. For a young man who, besides collecting a rich treasure of positive knowledge, has practised dissection and the exercise of a critical judgment, a long sea-voyage and a peaceful sojourn among entirely new surroundings afford an invaluable opportunity for original work and deep reflection. Freed from the formalism of the schools, thrown upon the use of his own intellect, compelled to test each single object as regards properties and history, he soon forgets the dogmas of the prevailing system and becomes first a sceptic, and then an investigator. This change, which did not fail to affect Huxley, and through which arose that Huxley whom we commemorate to-day, is no unknown occurrence to one who is acquainted with the history, not only of knowledge, but also of scholars. We need only point to John Hunter and Darwin as closely-allied examples. The path on which these men have achieved their triumphs is that which biology in general has trodden with ever-widening strides since the end of last century—it is the path of genetic investigation. We Germans point with pride to our countryman who opened up this road with full conviction of its importance, and who directed towards it the eyes of the world—our poet-prince Goethe. What he accomplished in particular from plants others of our fellow-countrymen achieved from animals—Wolf, Meckel, and our whole embryological school. As Harvey, Haller, and Hunter had once done, so these men began also with the study of the "ovulum," but this very soon showed that the egg was itself organised, and that from it arose the whole series of organic developments. When Huxley, after his return, came to publish his fundamental observations he found the history of the progressive transformations of the contents of the egg already verified; for it was by now known that the egg was a cell, and that from it fresh cells, and from them organs, arose. The second of his three famous papers—that on the relationship between man and the animals next beneath him—limned in exemplary fashion the parallelism in the earliest development of all animal beings. But beyond this it stepped boldly across the border-line which tradition and dogma had drawn between man and beast. Huxley had no hesitation in filling the gaps which Darwin had left in his argument, and in explaining that "in respect of

[1] The second Huxley lecture, delivered by Prof. R. Virchow at the opening of the winter session of Charing Cross Hospital Medical School, on October 3. Reprinted from the *Times*.