

attack, has been proved beyond doubt, and favours very definitely the assumption that enzyme and hydrolyte enter temporarily into combination, a conclusion to which H. E. Armstrong and E. F. Armstrong have quite recently again very properly directed special attention; but, unfortunately, we know practically nothing of the composition of the enzymes, as the complete isolation of an enzyme has never been accomplished.

From observations hitherto made, it appears in a measure probable that they are derived from proteins and possess a protein-like character. If this be so, it may be hoped that the experience gained with the proteins will be of service in the investigation of enzymes.

In the meantime, there are other directions in which synthetic chemistry can be of service in elucidating the chemistry of fermentation. In the same way that the artificial glucosides have been of use in establishing the dependence of the action of enzymes on configuration, the synthesised polypeptides are now being used by Abderhalden, Euler, and others to define and measure the activity of the proteoclasts. In a like manner, the synthetic exploration of the purine group has served to direct the recent observations on the fermentative de-amination and oxidation of adenine, guanine, and xanthine. Finally, attention may be directed to the use that has been made of stereochemical considerations in the course of Bertrand's interesting studies of the oxidation of polyhydric alcohols by the sorbose bacterium.

Not only have the methods of organic chemistry proved to be fruitful of results in the case of the proteins, but also when applied to complex derivatives of the latter, such as the nucleo-proteins, for example. Thus we are indebted to the brilliant researches of A. Kossel and his school for our knowledge of no less than four bases of the pyrimidine and purine group obtained by breaking down nucleic acids, and the analytical investigation of the latter has already been carried so far that, in the opinion of H. Steudel, it is to be expected that their synthesis will be effected at no distant date. Similar success may be hoped for even sooner in the case of the lecithins. Structural chemistry, moreover, is slowly acquiring the mastery over cholesterolin by making use of the experience afforded by the synthetic study of the hydroaromatic substances.

Besides the old well-known constituents of the animal body, new substances having quite unexpected properties have been added from time to time. Such are iodothyryl from the thyroid gland—discovered by Baumann—and crystalline adrenaline—isolated by Takamine from the supra-renal capsule—minute doses of which increase the blood-pressure. Judging from analytical results and the synthesis effected by F. Stolz, adrenaline possesses a relatively simple structure. In the opinion of the discoverers, this is probably true of the "pancreatic secretin" made known by Bayliss and Starling's researches, which has the remarkable property of liberating enzymes from the pancreas. May it not also be true of the toxins of many infectious diseases and of the antitoxins used in serum therapeutics, the discovery and systematic investigation of which by Behring, Roux, P. Ehrlich and others, are to be reckoned among the greatest achievements of modern biology and medicine?

The methods of organic synthesis will certainly serve to throw light on the nature of all such substances of animal origin. Equally numerous problems await solution in the plant world.

The great success with which the alkaloids and terpenes have been studied during the past ten years is known to all, but it is only too obvious that much still remains to be done when such substances as quinine, morphine, and caoutchouc remain to be synthesised.

Alizarin and indigo are prepared artificially in huge quantities, and we are well informed as to the structure of hæmatoxylin and kindred substances; but our ignorance is correspondingly great of most of the blood-colouring matters, as well as of many coloured constituents of our own bodies—of the hair, the skin, and the eye.

The fullest recognition must be accorded, however, to recent investigations on the complex colouring matters of the blood and of chlorophyll, which is distantly related to the former, associated with the names of Schunck, Nencki, Marchlewski, Küster, and Willstätter.

In fine, the aid of synthetical chemistry is required in every direction in arriving at a clear understanding of structure and of change. The methods at our disposal in the laboratory are doubtless altogether different from those which come into operation in the living world, but chemists are already trying to effect changes in carbon compounds by means of so-called mild interactions, under conditions comparable with those which prevail in the living organism. It may suffice to refer to the development of a number of catalytic processes and to the comprehensive studies on the action of light on organic substances undertaken by Ciamician. In fact, the effort is already being made to cooperate with biology; it is clear that a section of the forces of organic chemistry is being directed once more towards the goal from which it set out. The separation from biology was necessary during the past century while experimental methods and theories were being elaborated; now that our science is provided with a powerful armoury of analytical and synthetical weapons, chemists can once more renew the alliance both to its own honour and to the advantage of biology. Indeed, the prospect of obtaining a clearer insight into the wondrous series of processes which constitute animal and vegetable life may well lead the two sciences to work with definite purpose to a common end.

In order, as far as possible, to avoid mistakes in this difficult task and to shield ourselves from the disappointment which is the inevitable consequence of exaggerated hopes, we cannot do better than strive to imitate the great example of Faraday, who always, with rare acumen, directed his attention to actual phenomena without allowing himself to be influenced by preconceived opinion, and who in his theoretical conceptions gave expression only to observed facts.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The Public Orator, Dr. Sandys, spoke as follows on Thursday, October 17, in presenting for the degree of Doctor in Science *honoris causa* Geheimrath Emil Fischer, F.R.S., professor of chemistry in the University of Berlin:—

Scientiæ chemiæ professor Berolinensis, purpura nostra (ut videtis) vestitus, ex insperato nobis hodie paulisper affulsit. Novimus tamen quam subtiliter materiam illam investigaverit, quæ cum aqua commixta lanam colore roseo pulcherrimo tingit; novimus, via quam admirabili pedetemptim progressus, sacchari genera multa, aut olim nota aut ab ipso patefacta, in elementa sua prima resolverit, atque atomorum de ordine et positura leges novas illustraverit. Peritis saltem nota sunt plurima alia viri huius inventa, quæ scientiæ intimæ ad ipsa penetralia pertinent. Duo vero laboris eius monumenta multorum oculis sunt manifesta atque aperta. Berolinensibus præsertim patet Institutum illud magnum consiliis eius conditum; talium rerum studiosis ubique terrarum patet opus eius eximium sexies saltem in lucem editum. Virum igitur tam insignem et salvere et valere hodie libenter iubemus, qui Faradai in memoriam orationem inter Londinienses propediem habiturus est, quique, studiorum communium consuetudine nobiscum consociatus, eo artiore nobiscum vinculo coniunctus est, quod filium suum natu maximum Universitati nostræ in scientia chemiæ erudiendum haud ita pridem commendavit.

Duco ad vos virum in scientia chemiæ per orbem terrarum totum illustrem, AEMILIUM FISCHER.

On Tuesday, October 15, Mr. A. Henry, the reader in forestry, gave his inaugural lecture before a large audience. The Vice-Chancellor presided. Mr. Henry dwelt upon the causes which had retarded the scientific development of forestry in Great Britain. He then described the various types of forest and their origin, and the several methods of the management of forests. He also described the rapidly approaching depletion of the forests in the United States and northern Europe, and pointed out the necessity of re-forestation of the waste lands of our country. He dwelt at length on the possible introduction of exotic trees, such as the western larch and the Corsican pine. In conclusion, Mr. Henry described the course he purposed to

pursue in developing the teaching and research in forestry in the University.

The number of students who have just matriculated is 1099, as compared with 1021 who matriculated in October, 1906. Of these, fifteen are advanced students.

The number of first-year students studying medicine is 130, as compared with 122 last year and 117 in 1905.

Mr. R. P. Gregory has been appointed university lecturer in botany in succession to Mr. Hill, as from Michaelmas, 1907 until Michaelmas, 1912, and Mr. A. M. Smith has been appointed demonstrator in the same subject for the five years ending September 30, 1912.

The general board of studies will shortly proceed to appoint a university lecturer in advanced human anatomy in succession to Dr. Hill. The annual stipend is 50*l*. Candidates are requested to send their applications, with such testimonials as they think fit, to the Vice-Chancellor on or before November 5.

OXFORD.—In a Convocation held on October 22, the honorary degree of D.Litt. was conferred upon Prof. E. Meyer, professor of ancient history in the University of Berlin, in recognition of his work on Egyptian hieroglyphs and researches in Egyptian history and chronology, and his general study of history.

The offer of a sum of about 1000*l*. for the foundation of a prize as a memorial of the late Prof. Weldon, and for the encouragement of biometric science, has been accepted by Convocation. The prize is to be awarded every three years for the most noteworthy contribution during the previous six years to biometric science without regard to nationality or sex, biology being interpreted to include zoology, botany, anthropology, sociology, psychology, and medical science.

MR. A. A. HEAD has been appointed professor of metallurgy at the University College of South Wales and Monmouthshire.

At University College (University of London) on October 16, the Chadwick medals for municipal hygiene and engineering were presented to Mr. N. G. Dunbar, Mr. W. D. Reynolds, and Mr. J. R. Wade.

THE Lord Lieutenant of Ireland will open the new Municipal Technical Institute at Belfast on Wednesday next, October 30. In connection with the opening, a conversation will be held in the institute on Friday, November 1.

THE third annual general meeting of the Association of Teachers in Technical Institutions will be held on November 9, at 3 p.m., in the South-Western Polytechnic, Chelsea, S.W. The annual report of the council will be presented, and other business transacted.

At Bedford College for Women (University of London), Reid fellowships for research have been awarded to Miss Tchaykovsky and to Miss C. Saunders. Dr. W. H. Willcox has resigned the appointment as lecturer in hygiene, and Mr. J. A. H. Brincker has been appointed temporarily to take his place.

THE President of the Board of Education, Mr. McKenna, on October 18 laid the memorial stone of a new girls' high school at Gloucester. The cost of the school buildings alone is to be 13,615*l*. Subsequently, Mr. McKenna delivered an address to a large meeting of persons interested in education, and directed attention to a modern tendency in educational administration by which is being realised the American conception of a single type of public school for all classes of the community.

THE report read by the principal, Mr. H. B. Knowles, at the distribution of prizes to the students of the Salford Royal Technical Institute on October 18, referred to several points of interest to administrators of technical institutions. Mr. Knowles directed attention to the fact that the Board of Trade requires that a candidate who seeks to qualify as an engineer in the mercantile marine must have served as an apprentice for at least four years. Time spent in a suitable technical school may, however, be accepted as equivalent to artisan service in the ratio of three years in the technical school to two years' artisan service. The Board of Trade has recognised the day

mechanical engineering courses at Salford as giving suitable training for this purpose. During last session all applicants for admission to the Salford institute under sixteen years of age were required to give evidence that they possessed a satisfactory preliminary knowledge of English and mathematics, and, failing this, were advised first to attend special courses preparatory to the work of the institute. Sixty per cent. of the applicants for admission were thus rejected. Courses of study are now arranged suitable for persons engaged in the chief industries of the district, based upon attendance at the institute on three evenings per week.

SPEAKING at Wakefield on October 17 at a public meeting held in connection with the Wakefield Education Guild, Mr. Haldane said that higher education is of great value to those engaged in industrial pursuits, in fact it is of value to the whole nation. Learning for learning's sake is a great evil, and it does not shut out the utilitarian side. The profits of industrial enterprise go to the man of brains, to the man with the power of direction. This shows that it is vital to those engaged in industrial enterprises that they should have command of science and as much knowledge as they can get. Unless knowledge is spread among the people there cannot be equality of opportunity. There is only one leveller, only one man who does anything substantial to make people equal, and that is the schoolmaster. Education in this country will never be right until the elementary school, the secondary school, and the university are linked together. The British people perhaps need education more than any other nation. We are very prosperous; we are very self-reliant; we have magnificent energy; if we had not, we should have been distanced in the race. But we are competing against science and the increasing science which science gives. We are being more and more handicapped in the race, and it is our own individual powers that have enabled us still to get to the goal in front of our competitors. Let us learn before science makes still further advances, and before they are appropriated by foreign nations, to bring ourselves at least up to their level.

SOCIETIES AND ACADEMIES.

LONDON.

Entomological Society, March 2—Mr. C. O. Waterhouse president, in the chair.—**Exhibits.**—Commander J. J. Walker: Living specimens of the heteromeric beetle *Sitaris muralis*, first discovered at Oxford in 1903 by Mr. A. H. Hampe on old stone walls in the vicinity of Oxford inhabited by the mason bee, *Podalirius (Anthophora) pilipes*, on which it is parasitic in its early stages.—G. T. Porritt: Black specimens of both sexes of *Fidonia atomaria* from the Harden Moss Moors, Huddersfield, illustrating the melanic tendency of Lepidoptera in the district.—H. St. J. Donisthorpe: *Apion semivittatum*, taken at Deal; *Magdalis duplicata* from Nethy Bridge, the first record of the species for Scotland; *Formica sanguinea* from Aviemore and Nethy Bridge, the first record for Scotland; and *Piezostethus formicetorum*, taken with *Formica rufa* at Rannoch, a species not recorded since 1874.—A. H. Jones: A case of butterflies taken this year from Herculesbad, South Hungary, including specimens of *Erebia melas* from the Domogled, which bore a remarkable resemblance to *Erebia alecto*, var. *nicholli*, Oberth., from Campiglio, and *Erebia lefebvrei*, Oberth., also shown for comparison by Mr. H. Rowland-Brown. Mr. Jones also exhibited examples of *Chrosophanus dispar*, var. *rutilus*, and *C. alciphron*, from the neighbourhood of Budapest, both species of great size and brilliant colouring.—Dr. F. A. Dixey: Specimens from Uganda of the African Pierine genus *Mylothris*, showing an almost complete gradation between *Mylothris chloris*, Fabr., and *M. agathina*, Cram.—M. Jacoby: Several fine forms of the ab. *ceronus* of *L. bellargus* taken this autumn at Folkestone, and one example of the ab. *cinnides*, Stgr.—Norman Joy: A specimen of the rare beetle, *Cryptophagus subdepressus*, Gyll., taken near Garva, Ross, on August 4 last.—W. J. Lucas: Two specimens of *Deilephila euphorbiae* bred by Mr. Nicholson and Mr. Summers from larvæ found in Kew Gardens. Mr. Lucas also exhibited several examples of predaceous insects with