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SIR HENRY ROSCOE'S REMINISCENCES. The Life and Experiences of Sir Henry Enfield Roscoe, D.C.L., LL.D., F.R.S. Written by Himself. Pp. xii+420. (London: Macmillan and Co., Ltd., 1906.) Price 12*s.* net.

SIR HENRY ROSCOE, who is known to us all as one of the most genial figures among the band of great discoverers who gave a peculiar distinction to the reign of Queen Victoria, has been persuaded by his friends to give to the world a charming book of memories, which were written originally, as he tells us, for the use of his family. Now Sir Henry Roscoe is, it appears, a "Sport" among the Roscoes in his taste for science, and the result is that we get from him, on this occasion, not a mere history of chemistry, nor even a mere record of scientific affairs in his own times, but something which will appeal, and appeal strongly, to a far wider audience than that provided by his scientific friends and admirers, numerous, indeed, though these must be.

We suppose many of our readers are aware that whether Sir Henry Roscoe is or is not a "Sport," as he puts it, in his taste for science, he comes of a family which for a century and a half has been distinguished for the literary power and for the capacity for affairs exhibited by many of its members, and that in spite of his joke upon the subject, even scientific power has not been altogether unknown among them, his grandfather, William Roscoe the historian, being still so well remembered among botanists that Sir Henry had the odd experience, only a few years ago, when on a visit to Egypt, of being mistaken for the former, by a professor, who thought he recognised in the great chemist the author of a monograph on the Monandrean plants published so long ago as the year 1826.

The William Roscoe alluded to above, Sir Henry's grandfather and the founder of the reputation of the family, is, however, far more widely remembered as a historian than as a botanist. In the former capacity he achieved a European reputation by laying the foundations of a new era in the history of the Renaissance, and will long be remembered for his "Lives of Lorenzo de' Medici and Leo X." He was the first man of real mark in literature produced by the city of Liverpool, and his unique position in that city led Washington Irving to describe him in the "Sketch-book" as the literary landmark of the place, where, "like Pompey's Column at Alexandria," he towered "alone in classic dignity." Sir Henry Roscoe's father was also a man of great powers; he became Judge of the Court of Passage at Liverpool, but died young, leaving his son at the age of three to the sole care of his mother. This lady, like her son's father and grandfather, evidently possessed not a little literary ability, as is shown by her "Life of Vittoria Colonna," which was published in 1868 by Messrs. Macmillan and Co., and with it a capacity for affairs which enabled her to preside over the early education of her son with singular judgment and success.

Most of those who have read Lord Roberts's "Forty-one Years in India," must have been struck, as they perused its pages, by his singular good fortune in meeting interesting people and making delightful friends at every turn—a feature of his life which was due, no doubt, to his possessing the happy gift of a quick eye for what is best and brightest in those with whom he is thrown in contact. As one reads Sir Henry Roscoe's experiences, one cannot but conclude that he too was born under a happy star; for not only does he appear to have met "good fellows" at every stage of his life, a fact which we may venture to ascribe to his own genial temperament, but some good fairy seems to have presided over his affairs, with the express object of making him a chemist, and to have taken care that at every stage he should be flung against real chemists, makers of discoveries, and enthusiastic teachers, just the men, in short, who were best calculated to keep alive in him that capacity for asking "foolish" questions, which often worried his maternal grandfather, and to excite in him the secret desire—which we suspect every discoverer of Sir Henry's rank has hugged to his heart at an early age—to make, some day, just one discovery, at least, in his favourite science. But, however that may be, it is clear that from Balmain, the discoverer of boron nitride, Roscoe "picked up his love of chemistry" in the laboratory of the High School of the Liverpool Institute, and that his scientific tastes could not have been fostered by better guides than Thomas Graham and W. C. Williamson, whom he found at University College a few years later, and Bunsen, his life-long friend, with whom he worked and did great things at Heidelberg, when he betook himself in due course to that beautiful home of science to be soaked in research in the splendid German manner. At Heidelberg Sir Henry Roscoe's progress was rapid; after six months' work he passed the examination for the doctorate "summa cum laude," this being the first time this highest degree was granted to an Englishman, and it was here, partly in 1855 and partly in later years during vacations, that he carried out his well-known work on the chemical action of light. In 1857 he became professor of chemistry at the Owens College, and thereafter, as everyone knows, he played a leading part, for well-nigh half a century, in English science, and in not a few departments of public life connected therewith, helping on pure science by his researches and by his books, promoting the usefulness of chemistry in education by his "Little Roscoe," as it used to be called, which has been the guide, philosopher and friend of thousands upon thousands of English students, and advancing generally national efficiency in a dozen different directions by his public labours both in and out of Parliament.

But considerations of space forbid us from pursuing the attractive theme provided by Sir Henry Roscoe's manifold activities, and compel us to return to the subject of his latest book. Briefly, we may say that

all who read it will find it delightful. It is full of information about men and matters, an epitome in non-technical language of that part of the history of our own times in which Sir Henry has played a distinguished part. It is enlivened with many good stories, especially of his great master and lifelong friend Baron Bunsen, and adorned with many excellent portraits of the scientific giants of the nineteenth century. Though written, as we have said, for the use of his family in the first instance, this book of memories is essentially a public document, a record of many matters, not commonly known, during an important period. For details of these the book itself must be consulted, since a mere enumeration of the names of those with whom its author has worked in public affairs, or a list of the debates, scientific, educational, industrial and political, in which he has taken part would overcrowd the space available for this notice. In its pages will be found records of student life in Germany in the distant days when it was scarcely possible, or at any rate very difficult, to become a chemist in any other country; stories about University College in the heyday of its youth, when De Morgan, Sharpey, Graham, Liston, and others of equal eminence were among the professors, and Lister, Farrer-Herschell, Bagehot, Jessel, Hutton, Henry Thompson, and Edward Fry were, or recently had been, among its students; much about the early history of Owens College, which, when Roscoe joined the staff, could boast only of thirty-five students, of whom but fifteen were at work in the laboratory, and of the gradual growth of the college in size and dignity until it became the first of the new English universities; a rich mine of information about the progress of technical education from the year 1883, when a Royal Commission consisting of "Mr. Bernhard Samuelson, Mr. John Slagg, Mr. (now Sir) Swire Smith, Mr. (now Sir) Philip Magnus, Mr. William Woodall, and Sir Henry Roscoe" was appointed to study and report on the then state of technical education at home and abroad, and, again, about the recent history of the University of London, of which Sir Henry was for some time Vice-Chancellor, and many other important matters. The book closes, as such a book should, with a few pages which give us a glimpse of the life of Sir Henry and Lady Roscoe at Woodcote Lodge, their Surrey home.

Apart from his scientific work, and the part he took in founding Owens College, Sir Henry Roscoe's share in the labours of the Royal Commission on Technical Instruction and his subsequent labours on behalf of technical and secondary education represent the great feature in his public life. Sir Henry and his colleagues not only spent many months travelling in this country and all over Europe for the public good, but they did this at their own expense; and, after their report was published, many of them spared neither time nor trouble in spreading abroad the knowledge they had acquired of what was being done by our competitors in other countries. One trembles to think what might still be the state of technical education in this country but for them and their unstinted labours. We should like to quote a few passages from this part of the book, but want of space makes this impossible. But there is one side of the matter to which attention may well be directed at this moment, when the question of national defence, or some part of it, goes daily into the pot, and daily comes out of it again.

It has often been said that the success of the Germans in the Franco-German War depended on the German schoolmaster. After the war this opinion found voice also in France, and Sir Henry illustrates this by telling us that at Rouen he saw, to his surprise, in the school museum a Prussian soldier's helmet. On asking why this was there, he was told by the director that when the scholars did not attend to their work it was his custom to bring this helmet down, put it on the desk, and say, "Now, if you do not make progress and learn properly this will happen to you again. The surest way to bring it upon you is to neglect your studies and grow up in ignorance, and become inferior in intellectual training." "The display of this helmet," said the director, "never fails to bring the blush of shame to the cheeks of my students, and to rouse their patriotism and their zeal for their studies." May we recommend this story to the attention of Mr. Haldane, and still more to that of the Minister for Education, and to politicians in general, and suggest that it has for us in England a moral also? Only here, alas! the men need to learn the lesson it conveys as well as, and, indeed, even more than, the boys.

We cannot conclude without expressing our admiration of Lady Roscoe's contribution to this charming volume, viz. the excellent reproduction of her photograph "The Fisherman," which was recently pronounced, by a very competent authority, to be the best photograph by an English amateur that they could suggest for insertion in an American journal, and our hearty wish that Sir Henry and Lady Roscoe may long remain among us to enjoy their retreat in sunny Woodcote, where the great chemist has crowned his scientific career by the almost unique achievement of making both ends meet as an amateur farmer.

W. A. S.

WITH WIRES AND WITHOUT.

Telegraphy. By T. E. Herbert. Pp. xx+912. (London: Whittaker and Co., 1906.) Price 6*s.* 6*d.* net.

The Principles of Electric Wave Telegraphy. By Dr. J. A. Fleming. Pp. xix+671. (London: Longmans, Green and Co., 1906.) Price 24*s.* net.

Wireless Telegraphy. By Dr. Gustav Eichorn. Pp. x+116. (London: Charles Griffin and Co., Ltd., 1906.) Price 8*s.* 6*d.* net.

Wireless Telegraphy. By W. J. White. Pp. x+173. (London: T. C. and E. C. Jack, 1906.) Price 1*s.* net.

OF the numerous achievements of which the electrical engineer can boast, telegraphy is the one of which he has the greatest reason to be proud. If we combine with telegraphy the sister subject of

telephony there can be little doubt but that by the application of these two sciences he has effected a greater revolution in human affairs than by all his successes in the way of heavy engineering. He may "electrify" our railways, especially the suburban lines, to the great advantage of both the travelling public and the shareholder, but he is still only doing for us in another way what the mechanical engineer has already accomplished. He may harness the great waterfalls and transmit their power over hundreds of miles to localities at which it can be more easily utilised, but he is only saving Mahomet the trouble of going to the mountain. He may provide for us in the arc lamp and the glow lamp the most efficient means of producing artificial light, but he is only supplying us with an alternative to the cheaper productions of the gas engineers. But with telegraphy he has given us something entirely new—an art which, whilst actually annihilating distance, virtually annihilates time. So familiar have we become with the operations of the telegraphist that few probably ever realise how closely dependent upon them is every detail of modern civilised life. We speak of the twentieth century as being, or as promising to be, the electrical age, and we think of the railways, the lighting, and the development of power, whereas in reality it is the electrical age because of the telegraph and the telephone. If the vast network of thin wires which stretch over the civilised world like the threads of a spider's web were suddenly wiped out to-morrow, we should as suddenly realise with the non-appearance of the morning paper what it meant to be thrown back into the age before electricity.

In spite of the enormous influence which telegraphy exercises in our daily life, we hear a great deal less about it than we do of a number of unimportant things. Few people write papers upon it. The Journal of the Institution of Electrical Engineers, originally the Society of Telegraph Engineers, will be found almost free from such papers during the past ten years. Fewer people write books. The reason is not far to seek. Every applied science passes through three stages—the stages of incubation, of growth, and of maturity. In the first stage the outsider hears little about it; some few who are specially interested in scientific research may be aware that some observations of the natural philosopher are being developed along lines that promise results of great practical utility. At length a point is reached when the practical value of the work becomes so self-evident that even the halfpenny paper realises it, and the world is provided with a new nine-days' wonder. From now begins the period of growth during which publicity is excessive. Everyone talks about the new discovery. Everyone who can makes experiments in connection with it, and publishes his results in papers, and those who cannot afford the time to experiment write books on the subject. After a period more or less protracted public interest wanes, and is diverted, we will say, to a scandal of tinned meat, and, what is more important, the science, from being experimental and much talked of, becomes practical and much used.

In the art of telegraphy we see a science which reached, long ago, the last stage. If anyone wishes for a general idea of the extent of telegraphy at the present day let him read Mr. Herbert's book. Unless he is an expert, or studying to become one, he will probably realise more from the style in which the book is written than from the study of it in detail. He will see that here he is dealing with something which is firmly established, in which methods and apparatus have become almost stereotyped, and in which progress can only be exceedingly slow because everything is already so highly developed and because the interests which are vested in the methods now in use are so gigantic that only a revolution can warrant their overthrow. Mr. Herbert's book is full and concise, and a vast amount of information is condensed into its pages. At the same time it is simple, as befits a book intended for young students and dealing with a subject in which simplicity has been reached through complexity.

In the three books on wireless telegraphy before us we see good illustrations of what has been said above of the stage of growth of an applied science. Mr. White's book is a somewhat belated arrival, belonging properly to a few years back. It is purely descriptive, almost purely popular, and should have been written when the general public had a keen and living interest in the subject. Inasmuch as it describes the latest systems it has a certain claim to existence. But wireless telegraphy has almost reached the third stage, and before long we shall cease to hear anything more about it, and, taking it for granted, will concern ourselves only with grumbling at its cost. That it has not fully reached the final stages is sufficiently shown by Dr. Fleming's and Dr. Eichorn's books. Of Dr. Eichorn's book we can only say that we should have greatly welcomed its appearance had it not been for the almost simultaneous publication of Dr. Fleming's work. Dr. Eichorn was manager of the large experimental stations for Prof. Braun, and writes specially about the systems which have been developed by Slaby, Arco and Braun into the "Telefunken" system, which shares, we suppose, with the Marconi system the honour of being the most important and most practical systems yet developed. The book is well written, and combines with a good deal of description a careful investigation of the fundamental theoretical phenomena.

But in Dr. Fleming's book we have undoubtedly the one to be recommended to students specially interested in wireless telegraphy, and the practical development already attained warrants the existence of a certain number of such students. If technical education were organised in an ideal manner there would exist a professorial board the duties of which would be to prescribe exactly the literature which a student should and should not read. Such a body would allow anyone to write and publish books, and would not prohibit reading them until the tentative efforts of various authors resulted in the production of one or more books containing all the information on the subject which could be regarded as necessary and sufficient. Then they would say to the student:

You may read this and that book, but on no account are you to waste any time on any others; you may consult such and such original researches, but the remainder are useless. We have no doubt that this body would notify in the present instance that the student of wireless telegraphy must confine his attention to the books by Hertz and Dr. Fleming. We are not speaking of the student of electromagnetic waves. In Dr. Fleming's book is to be found a treatment of the subject which is exhaustive and thorough both on the theoretical and practical sides. It is a book which has been long wanted, and will be warmly welcomed.

One may notice, however, by a careful study of the book that wireless telegraphy practice is still to a certain extent tentative. The *best* methods are not yet decided upon, and methods differ because there is still much ignorance. But there are signs that the approach to more exact results is being made with the advent of apparatus based on wider knowledge and capable of allowing accurate measurements. Just as telegraphy needed the development of very special apparatus before full advantage could be taken of its powers, so wireless telegraphy calls for its own special apparatus. The process of development is necessarily slow, but in our present state of technical attainments it is sure.

It is quite evident from the perusal of the books before us that there is room in our complex civilisation both for ordinary telegraphy and wireless telegraphy. There are very few new discoveries which succeed in displacing old ones. We have room for many technical developments, and are capable of using all to their best advantages in the spheres for which they are particularly suited. For telegraphy over land there is little, if any, fear that wires will be displaced. There is little fear either that for communication between continent and continent the cable will give way to the overgrown "antennæ." Wireless telegraphy has found its special sphere in communication with ships, and soon will succeed in bringing us as close together at sea as we now are on land. When we consider that any man in any civilised country will be able to get into almost instant communication with any other, either on land or sea, we can realise something of the benefits conferred by telegraphy with wires and without.

MAURICE SOLOMON.

THEORETICAL BIOLOGY.

Les Problèmes de la Vie. Part iii. La Fécondation et l'Hérédité. By Prof. Ermanno Giglio-Tos, 1905. Pp. vii+189. Part ii. L'Ontogénèse et ses Problèmes. 1903. Pp. 368; 36 figures. (Chez l'Auteur à l'Université de Cagliari.)

IN the third volume of his treatise on the problems of life, Prof. Giglio-Tos proposes to elucidate all the puzzling problems of maturation, fertilisation, and heredity in the light of a fundamental phenomenon which he calls "biomolecular addition." Biologists, he tells us, have been too much preoccupied with the interpretation of particular chapters in the history of the germ-cells, and have neglected to inquire into the fundamental cause which unifies the whole. They have reached partial interpretations, usually "artificial and teleological," of details, but a connected general theory is lacking. They have been like geologists interpreting the course of a river, and ignoring gravitation. The unifying secret is "biomolecular addition," which seems to mean the power that the living molecule (whatever that may be) has of adding to itself another molecule "so that the biomolecule resulting from the addition has double the number of atoms, and may, in consequence, divide into two biomolecules similar to one or the other of the added biomolecules." Thus a male biomolecule and a female biomolecule (identified with paternal and maternal biomolecules) may add together and then divide into two biomolecules which are either male *or* female. We do not profess to understand this, though the author assures us that biomolecular addition is "nothing but a chemical reaction of the greatest simplicity between the biomolecules constituting the genetic cells," and we regret that we do not understand it, for we are told that "it suffices to explain even in their minor details all the interesting manifestations accompanying the function of sexual reproduction." These are brave words, but the author's "explanation" seems to us far removed from the present-day scope of biology, in Britain at least.

The author cannot accept Weismann's theory of germinal continuity, believing, on the contrary, that the ancestors of the germ-cells become histologically differentiated, like ordinary somatic cells, along special lines of "monodic" development. At a certain epoch—"the genetic moment"—however, they come under the influence of special substances in the internal milieu, and are shunted back on a sort of return journey which brings them, or their descendants rather, to or near their starting point of resemblance to the parental ovum from which they are by cell-lineage derived. If the germ-cells can return perfectly to the state of the original fertilised ovum, with its dual equipment of male and female biomolecules, then parthenogenesis may occur. But this complete return implies very favourable nutritive conditions in the internal milieu, and, as a matter of fact, what usually occurs after the "genetic moment" is a process of internal biomolecular addition as the result of which the male *or* the female biomolecules in the germ-cells disappear, and two kinds of genetic cells are differentiated (with female *or* male biomolecules respectively). Thus fertilisation is necessary to restore the integral constitution of the original parental ovum. "The primitive cause of sexuality and of fertilisation is to be found in the phenomenon of biomolecular addition." In a laboriously ingenious fashion the author uses his key to read the mysterious ciphers of maturation and fertilisation, and he finds that it unifies everything—hermaphroditism and parthenogenesis, secondary sex characters, and the rejuvenescence of infusorians. But we have not been able to use his key, and his distinctions between progenetic and metagenetic parts of the body, neuter and sexual paragenetic cells, external and internal bio-

molecular additions, are not readily borne in mind. We have not been more successful with a previous volume dealing with development, which explains that there is "one fundamental principle" controlling the detailed ontogenetic phenomena, namely, "the principle of monodic development." Though it is "of extraordinary simplicity, like all the principles of natural phenomena," we have failed to detect its luminiferous quality.

But as the author emphasises the fact that if his argument is to be appreciated there must not be "the least omission of any part of the book, even if it seems a superfluous repetition," and as he "has consecrated all his intellectual activity and all his scientific passion" to working out an interpretation which seems to him "to explain the fundamental phenomena of life on absolutely scientific principles," we feel bound, in fairness, to recommend the author's painstaking work to all biologists who may have the leisure and patience which a study of "Les Problèmes de la Vie" requires. Perhaps another requisite which we cannot pretend to possess is a clear apprehension of the biomolecule. J. A. T.

ECONOMIC ZOOLOGY.

Report on the Injurious Insects and Other Animals observed in the Midland Counties during 1905. By Walter E. Collinge, M.Sc. Pp. 58+xxxii figures. (Birmingham: Cornish Brothers, Ltd., 1906.) Price 2*s*.

MR. COLLINGE, in his third report on the injurious insects and other animals of the Midland counties, again deals with many varied subjects. The report is well illustrated, except for the figure of a weird bird and its egg supposed to represent a barn owl. Why a valuable page was wasted on such an unnatural production is impossible to understand.

One of the most interesting parts of the report is that dealing with "big-bud" in black currants, and the treatment of diseased bushes (pp. 6 and 7). In a summary Mr. Collinge tells us that he "feels convinced that the application of lime and sulphur will keep this mite in check, and if the dusting or spraying is continued will entirely eradicate it." Later he tells us that the results have been checked by many large growers, and that they clearly point to the fact that "the application of lime and sulphur offers an effective remedy." He does not tell us how many times we have to dust or spray the bushes. That "we know completely the life-history of the mite" is certainly not the fact; some dozens of points have yet to be found out.

An interesting account is also given of the plum Aphides (*Hyalopterus pruni* and *Aphis pruni*). Something is wrong, however, in the account of *Aphis pruni*, for the young coming from the winter eggs, which are very few in number, and hatch very early in the year, are not green. In early spring we find this Aphis as a large plum-coloured "mother-queen," and she produces green living young. The treatment recommended, namely, early spraying, is nevertheless most imperative.

Among other insects this useful report deals with we find notes on the pea and bean thrips, woolly aphis, currant-shoot moth, raspberry moth, cockchafers, furniture beetles, and book-lice. There are also short accounts of the lilac Gracilaria and the larch Coleophora. The abundance of eel-worms during the past year is also dwelt upon, and a list of woodlice found in the Midlands is given.

Amongst so much of value, such as the account of the snow-fly (*Aleyrodes vaporarium*, p. 22) and the larch and spruce chermes (p. 14), that this report contains, we are sorry to see some wrong statements being carried forward. For instance, on p. 23, caustic alkali wash is *still* recommended for mussel scale in winter. Recent work has shown that it has no effect at all, even when used at treble the normal strength.

A few pages are devoted to the subject of the preservation of wild birds, illustrated by figures from the Board of Agriculture and Fisheries leaflets. There is also a short appendix dealing with the employment of hydrocyanic acid gas and bisulphide of carbon.

This report, like its predecessors, is one of much interest, but some of the remedial measures for such things as wire-worm and "big-bud" must surely not be taken too seriously by agriculturists.

FRED. V. THEOBALD.

THE FEELING FOR NATURE.

The Development of the Feeling for Nature in the Middle Ages and Modern Times. By Alfred Biese. Authorised Translation. Pp. vi+376. (London: Routledge and Sons, Ltd., 1905.) Price 6*s*.

"NATURE in her ever-constant, ever-changing phases is indispensable to man, his whole existence depends upon her, and she influences him in manifold ways in mind as well as body." Such being the relation of nature to man, as set forth in the introduction, it has been the author's endeavour to trace in this volume the development of human thought in regard to the phenomena of nature from the introduction of Christianity downwards, in the same way that was done in a previous volume for the time of the Greeks and Romans. This has been done mainly by the study of writings, both in prose and poetry, in which natural phenomena, whether connected with scenery, weather, birds, or flowers, are spoken of with admiration. That the task of writing the book was a difficult one is freely admitted by Prof. Biese, and it is scarcely to be wondered at if at the end the book strikes the reader as somewhat less attractive than he would naturally expect from the title.

The book is largely made up of quotations, and many of these quotations do not, after all, prove very much. Then, again, as we approach recent times the quantity of literature at a writer's disposal tends to become for practical purposes infinite, and in such circumstances anything might be proved by choosing suitable quotations. Again, in quoting poetry as an indication of popular feeling at various times it must not be forgotten that poetry is, from the very nature of things, essentially conservative, so

that the poetry of one age necessarily reproduces the thoughts and modes of expression of previous ages.

It thus appears that the method of treatment which undoubtedly was admirably adapted to the study of the Greek and Roman period becomes less and less satisfactory as the present day is approached. The early chapters are, therefore, by far the most interesting. They deal with the effects of Christianity in turning man's thoughts from the things of this world to spiritual matters, and with the revival of the feeling for nature among the German races, who, living in a northern climate, were naturally led to appreciate and value the beauties associated with the coming of summer. But it may be reasonably urged that evidence of later-day developments of the feeling for nature should be sought in science rather than in art, in the interest taken in the study of natural phenomena rather than in the recantation of praises of sunshine, sea, and the nightingale's song.

It is fairly certain that if some readers do not find this book as interesting as they expect, there will be others who will enjoy its perusal more than this review suggests, and we may safely apply to Prof. Biese the Yorkshire quotation, "He did his best and he couldn't do owt else."

OUR BOOK SHELF.

A Handbook of York and District. Prepared for the Seventy-fifth Meeting of the British Association for the Advancement of Science, 1906. Edited by Dr. G. A. Auden. Pp. xvi+365. (York: J. Sampson, 1906.)

THE handbook which has been prepared for the benefit of those attending the forthcoming meeting of the British Association at York will be found to be exceedingly useful. The volume is neatly bound and printed on suitable paper, is of the size now usually adopted by the local committees, and has a most appropriate design on the cover. Undoubtedly most of the members attending the York meeting will take an interest in the relics of the past with which this ancient city abounds. It is natural, therefore, that by far the greater portion of the book should be devoted to a description of the various antiquities from prehistoric to mediæval times. The editor, Dr. Auden, describes the prehistoric remains, Mr. H. M. Platnauer refers to the relics of the Roman and Danish occupations, and other writers continue the story.

The second part of the volume, which is restricted to 100 pages, contains an account of the geology, botany, zoology, and meteorology of York and district, and, as might be expected from the space allotted, this part of the work is much more condensed, and is not so readable as the earlier portion. The Rev. W. Johnson describes the geology of the district in a chapter exceedingly brief, possibly due to the fact that "the geology of York is, in one sense, of the simplest kind." Dr. W. G. Smith, of the Leeds University, gives an interesting general survey of the botanical features of the district. This chapter is particularly appropriate in view of the leading part being played by Dr. Smith and his colleagues in Yorkshire in reference to botanical survey. Lists of flowering plants, algæ, fungi, Hepaticæ, Sphagnaceæ, Musci Veri; mammals, birds, reptiles, amphibians, fishes, beetles, butterflies, moths, and land and fresh-water shells are given by various York workers. In most cases, unfortunately, the exigences of space prevent much more than lists of species, but it can be safely said that this portion of the handbook forms an epitome of the natural history of the district. Mr. J. E. Clark brings the volume to a close by some meteorological notes.

There are three maps sent with the volume, all of which are excellent. It was a happy thought to reproduce Skaife's archæological map of York, and with the help of the Ordnance Survey department a really charming map of the greater part of Yorkshire is produced. The third is obviously principally for the use of the geological section, and is coloured so as to show the glacial lakes, moraines, &c.

T. S.

Bacteria in Relation to Plant Diseases. By Erwin F. Smith. Vol. i. (Washington, D.C.: Carnegie Institute, 1905.) Pp. xii+285.

AN authoritative account of bacterial plant diseases has long been a desideratum, and no investigator more competent than Mr. Erwin Smith, of the U.S. Department of Agriculture, who has himself made important original contributions to the subject, could be found to undertake such a task. The bacterial diseases of plants are, however, only incidentally mentioned in this, the first volume of the work, which is mainly devoted to methods of investigation and to a bibliography of the general literature of bacteriology, exclusive of plant diseases. As a guide to general bacteriological methods we know no better, though, as it is a preliminary to plant bacteriology, methods specially applicable to pathogenic organisms attacking men and animals are necessarily not to be found. Sterilisation, the preparation of culture media, methods of infection, the investigation of chemical products, keeping of records, and equipment of the laboratory are all dealt with very fully, explanatory figures being used liberally. A considerable section is also devoted to an account of photomicrography. The difficult question of the nomenclature and classification of bacteria is critically discussed at considerable length, and forms an excellent summary of the whole subject. At the end of the volume a number of useful formulæ for stains, etc., is collected, and the bibliography, which extends over sixty-four pages, and index complete the work. The volume is excellently illustrated with thirty-one plates and 146 figures in the text. We congratulate Mr. Smith on this, the first, though perhaps the easier, portion of his task, and shall await the appearance of the next volume with considerable interest.

R. T. HEWLETT.

Outlines of Zoology. By Prof. J. A. Thomson. Fourth edition, revised and enlarged. Pp. xix+856. (Edinburgh and London: Young J. Pentland, 1906.) Price 15*s*.

THIS book has very great positive merits and very slight defects. Though it is packed with facts, and can be recommended to students preparing for examinations, yet it is never dull. Prof. Thomson describes animals, not as corpses, but as living creatures with interesting habits that depend largely on their structure. The method leads to expansion, and yet this excellent zoological text-book is a single royal octavo of hardly more than eight hundred pages. Though our author, to use an American term, "enthuses" his readers, he does not waste words over it.

In his general survey in the first chapter he begins with monkeys, as being the animals most like man, and works down to the Protozoa. In the body of the book, reversing the order, he proceeds from the lowest

to the highest. This is an ingenious compromise between two methods each of which has something to recommend it. The early chapters, that deal with the functions of animals, the modern conception of protoplasm, the elements of structure, reproduction, the evolution of sex, and heredity are particularly good. The chapter on palæontology is, owing to the necessary limitations, far too short for the subject, but a table makes clear the order in which the different classes of animals appeared upon the earth. When we come to the body of the book we notice, as in the opening chapters, the remarkable clearness of the style; and though morphology is in no way neglected, yet some room is always found for the description of the habits of the animals in question. For instance, there are some eight pages devoted to the habits and functions of birds, their modes of flight, their courtship, their nests, moulting, diet, migrations.

One or two minor points may now be mentioned that seem to be open to criticism. Plants and animals, Prof. Thomson says, "represent the divergent branches of a V-shaped tree of life." But plants originated before animals; the nature of their food proves this beyond a doubt. Animals we must look upon as a branch from the primitive vegetable stem. The account of the Hydromedusæ would be much better for an illustration—a figure of a hydroid with the Medusa of the alternating generation or of Tubularia with its Actinula. Such additions would, of course, increase the bulk of the book, but the figure of a frog (p. 560) is superfluous, since everyone knows what a frog is like. Again, the process of natural selection is easily intelligible without Fig. 378.

F. W. H.

Animal Heroes; being the Histories of a Cat, a Dog, a Pigeon, a Lynx, two Wolves, and a Reindeer. By E. T. Seton. Pp. 362; illustrated. (London: Archibald Constable and Co., Ltd., 1906.) Price 6*s.* net.

MR. SETON has always something fresh and interesting to tell his readers, and in the present beautifully illustrated volume breaks new ground in attempting to reveal some aspects of the strenuous side of the lives of animals, both wild and domesticated. Every one of the stories, we are told—although of course amplified and set out with the picturesque surroundings the author knows so well how to portray—is founded on the actual life of some individual bird or quadruped; the biography of the lynx being based on the author's own backwood experiences. Where all is so good, fresh, and entertaining, it seems almost invidious to select one portion of the book for special commendation. To our thinking, however, the almost pathetic story of "Arnaux," the homing-pigeon, is far ahead of the rest in sustained interest; but some may prefer the history of the tame wolf, while to others, again, the narrative of the wild reindeer may appeal more strongly. Alike to young and old the book may be heartily commended as an excellent example of the best style of animal biography.

R. L.

Some Facts about the Weather. By William Marriott. Pp. 32. (London: Edward Stanford, 1906.) Price 6*d.*

THIS pamphlet supplies just the information about meteorological phenomena likely to be useful to the general public. The instruments in use in climatological stations are enumerated, and the determining factors of climate are explained in order. The booklet should be the means of stimulating interest in the scientific study of weather.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Osmotic Pressure.

PROF. KAHLENBERG'S letter published in NATURE on July 5 shows that, as so often happens, the controversy about osmotic pressure is based on a difference in meaning assigned to that term.

We may adopt what now appears to be Prof. Kahlenberg's conception, and regard the osmotic pressure of a solution as a real experimental pressure reached with some actual membrane in certain practical conditions. Such a definition gives us a conception of great interest and importance, especially from a physiological point of view. But unfortunately it has no bearing on the thermodynamic theory of solution—or the allied theories of fusion and evaporation—which apparently Prof. Kahlenberg still wishes to attack by its means, after he has insisted that "the formation of crystals from a solution, or the concentration of a solution by evaporation are not osmotic processes." Of course they are not osmotic processes in Prof. Kahlenberg's sense of the term. But the theory of fusion and evaporation, which, as I pointed out in my letter published on May 31, has been verified experimentally in the case of the depression of the freezing point to an accuracy of nearly one in a thousand, depends on the hypothetical separation of solvent by some ideal and perfect semi-permeable process.

It is such considerations as these that demand the other conception of osmotic pressure, which, suggested no doubt by Pfeffer's experiments on osmosis, has now, in accordance with the usual course of development of the concepts of physical science, come to possess an ideal significance, towards which the actual experimentally measured quantity can but tend as the experimental conditions approach the ideal state postulated in the theoretical definition.

Defining osmotic pressure as the hydrostatic pressure needed to keep a solution in equilibrium with its solvent across an ideally perfect semi-permeable membrane, we obtain a conception, possibly of less chemical and physiological importance, which nevertheless enables us to develop a thermodynamic theory of solution; and this theory has been verified experimentally in cases where we have reason to suppose that the actual conditions approach the ideal.

I have found that this confusion of ideas as to the conception of osmotic pressure has occasioned trouble in other cases. It would be well if a new name could be applied to osmotic pressure when used in one or other of its meanings; but I suppose that each side in the controversy would insist on the rights of possession and customary usage. Hence I would suggest that, at the cost of some complexity of nomenclature, one of the two meanings should be emphasised as "experimental osmotic pressure" and the other as "thermodynamic osmotic pressure."

Prof. Kahlenberg remarks that "in creating the theory of electrolytic dissociation, the actual phenomena of electrolysis have played a minor part," and wishes thus to invalidate my statement that "the theory rests on electrical evidence, and by such evidence it must be tried." I can hardly believe that Prof. Kahlenberg would wish seriously to commit himself to the opinion that the historical train of ideas by which a given hypothesis may have been reached necessarily supplies the only (or even the best) logical basis for its support. We do not always doubt the stability of our houses because it has been necessary or convenient to remove some of the scaffolding used in their construction.

It is true that the abnormally great osmotic pressures and freezing-point depressions of electrolytic solutions originally suggested that the molecules of their solutes were dissociated; but such observations clearly can give no information on the electrical state of the dissociated structures. A valid test for an electric ion must depend on some electrical property, such as motion in an electric field.

At the request of Prof. Armstrong, I have summarised already what seems to me the electrical evidence for the dissociation theory, and I will not repeat what appeared in your columns of May 31; but I wish again to express a hope that someone who rejects the theory will put forward an alternative scheme to explain the mechanism of electrolytic conduction. W. C. D. WHETHAM.

Trinity College, Cambridge, July 13.

The Fertilisation of Pieris.

ON May 20, near Chindi, in the State of Sukét, North-Western Himalaya, I was able to make notes on the pollination of *Pieris ovalifolia* by *Pieris brassicae*, *Pieris soracta*, and other insects. *Pieris ovalifolia*, D. Don, at Chindi, grows to be a small tree in forests of *Pinus longifolia* and *Pinus excelsa* on hill-sides about 6000 feet, where in May thousands of *Pieris soracta*, and hundreds of *Pieris brassicae*, flit through the trees.

My first observations were made about 6 a.m., before the sun was fully on the hill-side; and then the Pieris flowers were visited by *Bombus haemorrhoidalis*, Smith, in a very diligent way. Later, after the sun was well up, came *Pieris brassicae*, Schrank, to the flowers, and then many individuals of *Pieris soracta*, F. Moore, which is in May a most abundant butterfly. With the butterflies a large steel-blue and orange wasp came to the Pieris bushes, and bit holes in the corollas, which later little Aphids also used for stealing the honey.

Pieris branches stand horizontal, with the leaves on a plane above the racemes of flowers. There are twenty to thirty flowers on a raceme, and the topmost open as the lowest die. Each flower is a bell, like that of one of our common English Ericas, 10 mm. long, and very slightly constricted at the middle; the mouth is only 2 mm. in diameter. Pierids and Bombus suck honey hanging under the bells, except where some fortuitous circumstance brings the flowers of one branch close to the leaves of another; and then the butterflies are very ready to try to get the honey without having to hang back downwards to reach into the bells. When once back downwards they walk as on a causeway along the long, regular racemes, generally from younger to older flowers, *i.e.* towards the base.

Pieris anthers are two-horned, as are so many of the anthers in the Ericaceæ, and with the help of their filaments make an entanglement at the constriction of the bell. The filaments are much more bent into an S than is usual in the Ericaceæ, and form a spring which, by pressing with the lower curve of the letter against the corolla, holds the anther pores against the style, in such a firm manner that they can only free the powdery pollen when the pressure of the spring is interfered with. This the visiting insects do, and receive a shower of pollen on their heads or probosces. As it is impossible to slit the corolla without causing pollen to fall, the part it plays in keeping closed the anther pores is evident; and it is also impossible to push a needle past the ring of anthers without liberating pollen. The stigma is close to the mouth of the flower, and is bound to be touched by an insect's tongue before it touches the anthers. When mature it is 4·5 mm. beyond the anther-ring. The stigma matures after the opening of the flower, and the style grows 1·5 mm. between the opening of the bud and its maturity, but the anther-pores appear in the bud. Honey is secreted very abundantly behind the slightly broadened bases of the filaments. The duration of the flowers is several days. After the fall of the corolla, the sepals close over the ovary, and the pedicel ultimately turns upwards.

I have communicated the above actual observations to NATURE in the hope that both zoologists and botanists may read them, and be reminded of the possible inconveniences resulting from using the same generic name for two even very distinct organisms. I admit that we are not at present at all likely to rule that a previous use of a name in zoology or botany precludes its use in botany or zoology; but it is desirable to do what one can to avoid using used names, and to forward that end indexes like Durand's "Index Generum Phanerogamarum" become the more and more wanted, especially from the zoologists.

I give here just a few instances of the double use of a generic name. Liparis is the nun moth of Europe and an orchid of Europe; Iris is an insect and the well-known plant; Lælia is a moth and an orchid; Adesmia is a beetle and a shrub; Castalia is a beetle of India and the water-lily, while Castalius is an Indian butterfly; Graeffea is a Phasmid of Fiji and a plant of Fiji; Empusa is an insect and an insect-killing fungus; Prosopis is a bee and a plant; Stilbum is a Chrysid and a fungus; Acrocephalus is a bird and a herb; Taphria is an insect and the legitimised form of Taphrina, a fungus. To emphasise my point it will be my endeavour to ascertain if a fungus of the genus Empusa can destroy the insect Empusa, if Castalius visits Castalia, and if Acrocephalus eats the seed of Acrocephalus.

I. HENRY BURKILL.

Indian Museum, Calcutta.

AUSTRALIAN ORIGINS.[1]

IF the enthusiasm which leads a man of science to travel at midsummer to one of the hottest regions of the world may be taken as evidence, geology will soon have much to say on Australian anthropological problems. Prof. Gregory, at the instigation of Dr. Howitt, visited the Lake Eyre region, with a prospect of encountering a temperature of some 120° F., in order to throw light on the legends of the aborigines and the problem of their original home. All over Australia are found stories of monsters like the Bunyip; but in the Lake Eyre region they present peculiar features; the animals, called Kadimakara, are said to be extinct, and are represented as arboreal in their habits according to one form of the legend, aquatic in another. The latter is of no special interest, but it is difficult to see how the idea of sky people and animals could have originated in Australia, the vegetation of which is not apt to suggest the idea. Prof. Gregory sees in it evidence of migration, either of legends or of their narrators, from tropical parts.

It is certain that at the present day transmission of the dramatic performances known as corroborees is very common. The expedition saw on the Peak Station, west of Lake Eyre, a corroboree known to have travelled from North-west Central Queensland since the year 1893. From a photograph in the possession of the present writer it is certain that the dance called Molongo in Queensland and Tji-tji-ngalla near Lake Eyre was known to the Arunta at Alice Springs in 1903 or 1904; but whether it came *viâ* the Peak or from the north-east cannot be determined. From Dr. Howitt and others we learn that new songs are passed from tribe to tribe, their meanings being forgotten; and the tendency seems to have existed in the 'thirties of the last century, so that it cannot be put down to European influence and easier communication. There is, however, no similar evidence of transmission of myths; *prima facie*, therefore, there is no ground for supposing that the Kadimakara story is of foreign origin; to raise the presumption it would be necessary to find its analogue elsewhere.

The argument for the foreign origin of this myth rests in part on the assumption that the geographical conditions of the region have been unchanged since its present, or rather, in only too many cases, late occupiers reached it. In proof of this Prof. Gregory quotes legends explaining the origin of natural features and representing them as the same when they were first known as they are at the present day. But it is clear that we are not entitled to assume the

[1] "The Dead Heart of Australia; a Journey round Lake Eyre in the Summer of 1901–2, with some Account of the Lake Eyre Basin and the Flowing Wells of Central Australia." By Prof. J. W. Gregory, F.R.S. Pp. xvi+384. (London: John Murray, 1906.) Price 16*s*. net.

same age for all items in a stock of folk-tales; and in any case the evidence of myths is untrustworthy in matters of history. It seems possible that man was in the area before the great climatic changes described in the work before us; the failure to find worked stones associated with the extinct marsupials cannot be regarded as decisive until a wider search has been made.

Unfortunately, Prof. Gregory was unable to see more than a portion of the Tji-tji-ngalla corroboree. Its transmission raises interesting problems; in Queensland the Molongo is a kind of evil spirit, and it would be interesting to know whether it is in this light that the principal performer is regarded in Central Australia. Some of the words are recorded, and the author is disposed to see in the fact that they are untranslatable by the performers evidence of rapid changes in language. But it is the unintelligibility which causes the changes, and not *vice versa*. The song passes from tribe to tribe, and is unintelligible a few miles from its centre of origin. The change in corroboree words is therefore comparable to the variations introduced by children into counting-out rhymes, &c., which they have learnt, parrot fashion, from a foreigner; these changes would not be evidence of modifications in European languages.

By discovering dingo bones in association with those of the Thylacinus, now found alive only in Tasmania, Dr. Gregory has added force to the argument that the dingo was not introduced by man. He also argues that the Tasmanians must have been in Australia before the dingo if, as Dr. Howitt argues, they passed into Tasmania by land. On the relation of the Tasmanians and Australians Prof. Gregory has seen reason to change his view. He now holds that there is no evidence of intermixture, and points to the singular uniformity of type in Australia as evidence of racial purity. Against this it may be said that there is considerable variation in hair, as may be seen by comparing Taplin's South Australian types with Spencer and Gillen's Central tribesmen. As Prof. Gregory points out, the skull is more variable than hair; similarity of physical conditions may have more to do with similarity of skull-type than any original uniformity of physical type.

The latter half of the book is devoted to a discussion of how the dead heart of Australia can be revived, and of the origin of the water supply of the so-called artesian well in Australia. It appears that the scheme for an inland sea, to be formed by supplying Lake Eyre with water from the Southern Ocean, is impracticable. It would cost little less than the amount of our national debt. Prof. Gregory protests against the waste of water from the wells, justifiable only on the supposition that they will never cease to flow. Experience shows that they are already diminishing their supplies, not from any choking of the bores, but from more radical causes, and it is suggested in the work before us that the real source of the supply is not meteoric, but plutonic; in other words, Australia is recklessly drawing on a banking account which has been steadily piled up for tens or hundreds of thousands of years. Unless measures are taken to check youthful extravagance, future generations of colonists will have cause to regret that no heed is paid to the warnings of geologists.

The work is excellently illustrated by numerous maps, plans, and plates. Anthropologists will look forward to the other work on the aborigines which Prof. Gregory promises in the preface. N. W. T.

FIG. 1.—The Tji-tji-ngalla Corroboree, as performed at Kilalpaninna. From "The Dead Heart of Australia.

SOME RESULTS OF THE "BELGICA" EXPEDITION.[1]

THE voyage of the *Belgica* is an important landmark in Antarctic exploration, for, in addition to its adventurous journey and its valuable geographical discoveries, it was the first expedition to make deep-sea collections within the Antarctic circle. The scientific results of the expedition are in process of publication in a fine series of volumes which will long be an indispensable work of reference on Antarctic geography and biology. The three memoirs the titles of which are given below contain further instalments of the geographical, botanical, and zoological contributions.

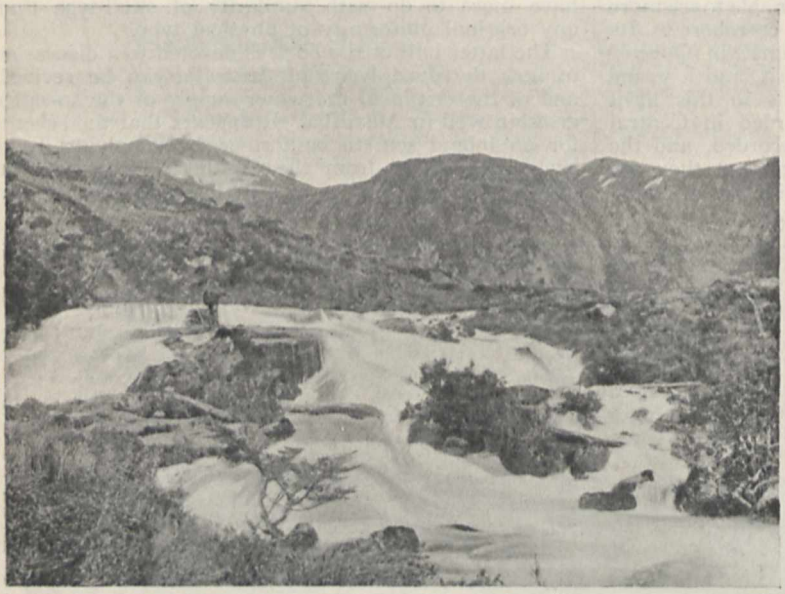


FIG. 1.—The stream falling into Torrent Bay, Beagle Channel,—Magellan Strait.

The second part of the first volume of the "Rapports scientifiques" of the expedition gives the technical geographical observations, and some account of the methods. Every effort has been made to remove uncertainty as to the geographical positions attained, as the calculations for some of them are repeated at length. The text is mainly devoted to detailed descriptions of the harbours and coasts visited in the Magellan Archipelago, and in the subsequent journey past Graham's Land and through Gerlache Strait, and there is a full account of the long drift of the *Belgica* in the ice, from February 19, 1898, to March 15, 1899. The volume is accompanied by an atlas of seven charts, of which those of Gerlache Strait and of the drift in the ice contain most new information. The text is illustrated by twenty-nine photographs and plates, many of which are of unusual merit. Most of the photographs were taken by Dr. Cook, others by M. Lecointe, and some by M. Arctowski.

M. É. de Wildeman's report on the phanerogams of the Magellan Archipelago is based upon the material collected by M. Racovitza, during a short stay there, before the departure of the expedition to the south. The report begins with a description of M. Racovitza's collection, and, as many of the species were imperfectly known, the author has taken this opportunity of giving a detailed account of them, illustrated by a series of fine plates. Then follows a systematic enumeration of the phanerogamic flora of the southern part of Patagonia and of the adjacent archipelago, and a detailed table of distribution. The author concludes that the new collections show that the flora of Tierra del Fuego is less primitive and distinct from that of the mainland of South America than had been thought. All the species are found on the American continent, and some of them have a wide distribution. Amongst other British species there are *Rumex maritimus*, on Tierra del Fuego, while *Urtica dioica* and *Veronica arvensis* occur on the mainland.

The memoir by M. Dollo on the fish collected by the *Belgica* discusses problems of more general interest than those of the two other reports. It includes a systematic description of the fish collected by the expedition, including three new genera—Cryodraco, Gerlachia, and Racovitzaia. The Cryodraco is of some historic interest, as a specimen no doubt belonging to this genus was caught frozen against the bow of the *Erebus* during Ross's expedition. The fish was sketched at the time by Robertson, but it was devoured by the ship's cat before it could

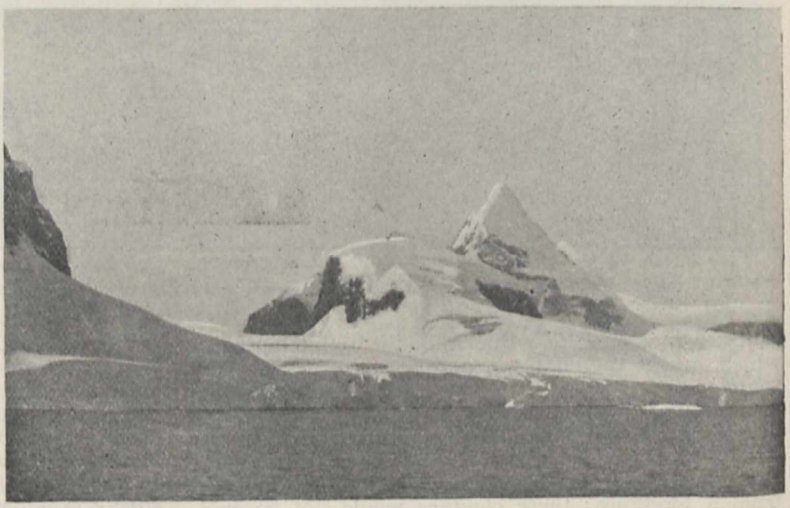


FIG. 2.—Sierra Du Fief (Wiencke Island).

[1] "Expédition Antarctique Belge. Résultats du Voyage du S.Y. *Belgica* en 1897-99 sous le Commandement de A. de Gerlache de Gomery." Rapports scientifiques. Travaux hydrographiques et Instructions nautiques. Vol. i., part i. By G. Lecointe. Pp. 110, xxix plates, with a portfolio of 7 charts. (Antwerp, 1905.)

"Botanique—Les Phanérogames des Terres Magellaniques." By É. de Wildeman. Pp. 222, xxiii plates. (Antwerp, 1905.)

"Zoologie—Poissons." By L. Dollo. Pp. 239, xii plates. (Antwerp, 1905.)

be preserved. The fishes collected by the *Belgica* in the Weddell Sea were all pelagic. One species, a Nematonurus, came from a depth of 2800 metres. In addition to the account of the first deep-sea fish collected within the Antarctic circle, there is an account of a larger collection made in the Magellan Archipelago, accompanied by a bibliography and full account of the fish fauna of that area. The fish are not only described and illustrated with M. Dollo's usual skill and care, but their significance is discussed in the very interesting chapters devoted to their zoo-

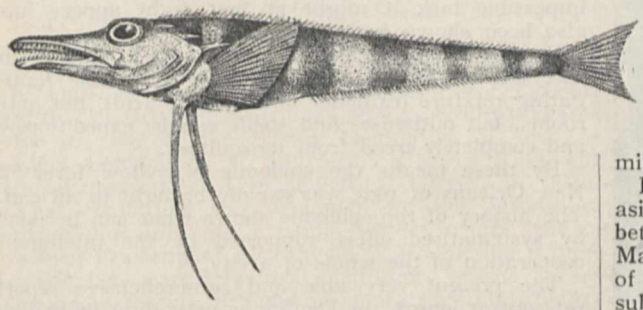


FIG. 3.—Cryodraco, according to Robertson's sketch made on the *Erebus*.

logical and geographical relations. M. Dollo maintains that the Antarctic fish are of modern development and highly specialised, and are not, as has been thought, a primitive fauna. He discusses the problem of bipolarity, which has commanded wide attention owing to its advocacy by Sir John Murray. M. Dollo maintains that the evidence of the fish gives no support to this theory. Thus he points out that in the Antarctic area the predominant family of fish is that of the Nototheniidæ, whereas in the Arctic Ocean the dominant group is the Cottidæ. In the wide distribution of the Nototheniidæ in the Southern Ocean and the South Pacific M. Dollo sees further support of the existence of the assumed Miocene Antarctic continent, connected with New Zealand, Australia,

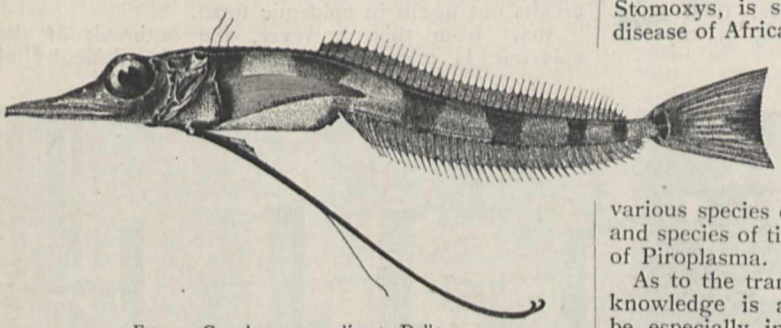


FIG. 4.—Cryodraco, according to Dollo.

and South America, but separated from South Africa; for eleven-twelfths of the Nototheniidæ are littoral species, and, according to Dollo, they can only have spread along the former shores of this sunken land.

J. W. G.

YELLOW JACK.[1]

THE main facts established regarding yellow fever and mosquitoes can be summed up in a few propositions.

(1) The cause of yellow fever is unknown.

(2) Yellow fever is transmitted by one particular mosquito, known to science as *Stegomyia fasciata*, and by no other mosquito or in any other way.

(3) In order to transmit the infection, the Stegomyia must have sucked the blood of a patient during the first three days of the fever, not earlier (during the incubation period), and not later.

(4) The infection is transmitted after an incubation period in the mosquito of not less than twelve days, and the mosquito may still be infectious fifty-seven days after its first infection.

It is a peculiar fact that although there are many species of Stegomyia, so far as is known it is only *S. fasciata* that is capable of transmitting the disease. If we may accept this as established, it points to a peculiar relationship between the mosquito and yellow fever which is not exactly paralleled by the case of any other disease-transmitting agent, be it mosquito, fly, or tick.

In the case of malaria, filariasis, and trypanosomiasis there is not this absolutely limited correlation between the disease and the agent that transmits. Malaria we know is transmitted only by mosquitoes of the subfamily Anophelina of the Culicidæ. This subfamily is divided into a number of genera, and not only do different species of the same genus, *e.g. Myzomyia culicifacies* and *Myzomyia funesta*, transmit malaria, but also species pertaining to different genera, *e.g. Pyretophorus costalis* and *Anopheles maculipennis*, or, if we do not accept these as different genera, and classify them all as belonging to a single genus, Anopheles, still we have the fact of transmission by different species. In filariasis the correlation between Filaria and the mosquito is still less definite; thus not only various species of Culex, but various species of Anopheles all permit of the development of the microfilariæ (filarial embryos) in their tissues. (It may be well to say in passing that the proof that mosquitoes actually do transmit Filaria is still wanting.)

Our knowledge of the correlation of trypanosomes and flies, especially species of Glossina, Tabanus, and Stomoxys, is still incomplete. Ngana, the tsetse-fly disease of Africa, is transmitted by species of Glossina, but not by Stomoxys or Tabanus. The trypanosome of sleeping sickness is transmitted by *Gl. palpalis* mainly, but also by other species; but it is not yet known which exactly these are.

Again, in the transmission of various species of Piroplasma by ticks, various genera and species of ticks suffice to transmit the same species of Piroplasma.

As to the transmission of Spirochætes by ticks, our knowledge is at present incomplete, and it would be especially interesting to discover if the relationship were as strict as it appears to be in yellow fever, for Spirochætes (invisible) have been suggested by Schaudinn as the possible cause of yellow fever.

The fact, then, that yellow fever appears to be transmitted by only one genus of mosquitoes, and only one species in that genus, points to some very peculiar relationship, and would suggest an organism as the cause, of a different kind from any of those we have mentioned, and, indeed, this is no doubt the case, as, if it had not been so, the cause would have been already discovered.

Yellow fever, then, is transmitted by a particular and practically world-wide mosquito, *Stegomyia fasciata*. The fact still requires emphasis that mosquitoes only *transmit* disease from the sick person to the healthy after certain changes have proceeded in the tissues of the mosquitoes, and that mosquitoes

[1] Report to the Government of British Honduras upon the Outbreak of Yellow Fever in that Colony in 1905, together with an Account of the Distribution of the *Stegomyia fasciata* in Belize, and the Measures necessary to stamp out or prevent the Recurrence of Yellow Fever. By Rubert Boyce, M.B., F.R.S. Pp. ix+104+13 Plates. (London: Waterlow and Sons Ltd., 1906.)

do not get malaria, yellow fever, &c., from the water of pools or marshes.

The author in this report emphasises the necessity for the knowledge of these facts, for, as he points out, it is useless to expect an intelligent carrying-out of prophylactic measures by those ignorant of the present state of our knowledge, or by those who have

FIG. 1.—Operations in yellow fever prophylaxis at New Orleans. An outhouse completely closed with paper.

a "conscientious belief" that malaria is due to marshes and yellow fever to digging the soil.

The *Stegomyia fasciata* is essentially a domestic mosquito, *i.e.* it frequents houses, it breeds in domestic utensils, pots, cisterns, tubs, tins, calabashes, boats, flower-pots, &c., in fact, in any collection of water about a house.

The destruction of larvæ is, therefore, a comparatively simple matter, and if the water were emptied out, thousands of potential mosquitoes would be at once destroyed. Where it is impossible to empty any collection of water, then the simple device of covering the receptacle with suitable gauze has the same effect. So that the destruction of larvæ of Stegomyia can readily be effected if only people will or can be compelled to do it!

We may express some doubt, however, as to what would happen supposing Stegomyia suddenly by some governor's edict found all their breeding tubs emptied of water or covered over. Would they be content to die, or would they now breed in ditches, canals, slowly-flowing streams, &c., as Anophelinæ do? We think they would choose the latter course, and this point is not solely of academical interest, for the most vigorous campaign against tubs and cisterns might have been carried out, and yet the Stegomyia might now be enforced to breed in drains, canals, &c., and if these existed in the midst of the town it is conceivable that the condition of things might be no better than before. For the doing away with canals, &c., implies drainage and re-levelling, and is a far more expensive matter than mosquito-destroying in back-yards. But no considerations of this kind should restrain us from doing our utmost absolutely to free a town of its tub-bred larvæ, and that this is possible is shown by experience at Havana and New Orleans.

Not only must the larvæ be proceeded against, but also all adult mosquitoes, and that this is not the impossible task it might at first sight appear has also been shown by the Americans.

By very simple means, by pasting up a house with sheets of paper, and by the use of a suitable fumigating mixture (camphor and carbolic acid), not only rooms, but outhouses and sheds can be expeditiously and completely freed from mosquitoes.

By these means the epidemic of yellow fever in New Orleans of 1905 was rapidly brought to an end. The history of the epidemic shows what can be done by systematised effort supported by the intelligent cooperation of the whole of a city.

The present very able and comprehensive report sets out at length the conditions prevailing in British Honduras, showing how in Belize, the capital, and other towns all those conditions exist which in the light of our present knowledge should not exist. *Stegomyia fasciata* exists in profusion, and breeds freely, and so far without hindrance, in water vats, tanks, wells, barrels, tins, and a multitude of other receptacles.

In considering the origin of the outbreak of the disease in British Honduras, the author adopts the view that the disease was imported, and does not discuss another possibility. It is well known, however, that among the native population in yellow-fever areas the children suffer from extremely mild attacks of fever, and, indeed, many of these cases are not recognised as such. By this means an endemic supply of yellow fever may always exist, and it may be only at some years' interval that the disease breaks out again in epidemic form.

Apart from this, however, the outbreak of the epidemic is minutely traced, and the difficulty of

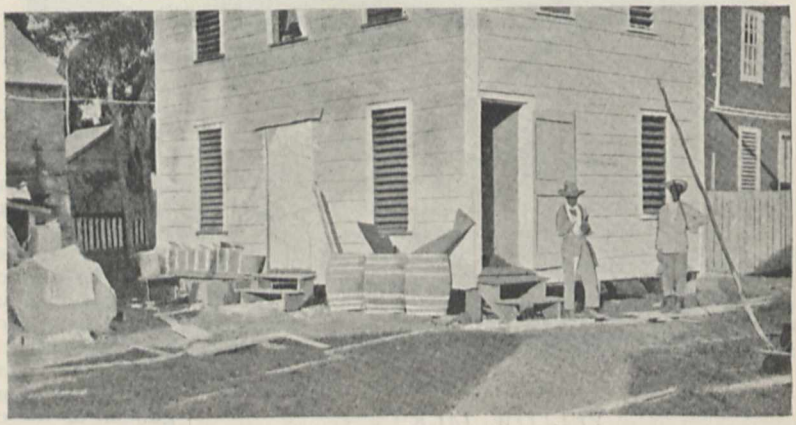


FIG. 2.—House in Belize with waterlogged yard. Numerous water receptacles consisting of barrels and kerosene tins.

detection of early cases, and the resulting fatality under such conditions, emphasised.

The necessity for efficient sanitary survey, especially in the matter of breeding-places, is pointed out.

Finally, we have a complete account of the influence on shipping and disturbance of trade of such an out-

break, and a full discussion of quarantine regulations of various authorities.

For the administrator and sanitarian in yellow-fever zones the report is indispensable. For permission to reproduce the above two plates we are indebted to the courtesy of the Colonial Office.

J. W. W. STEPHENS.

SCIENTIFIC WORK OF THE SURVEY OF INDIA.[1]

IF any apology were needed for the maintenance of the scientific work of the Indian survey it will be found in No. 9 of the series of professional papers of that department, which has been especially prepared for the use of the Survey Committee of 1905 by Lieut.-Colonel S. G. Burrard, R.E., F.R.S., the Superintendent of Trigonometrical Surveys in India. That committee was appointed for the purpose of examining into the existing system of the Indian Survey Department with the view of rendering it more efficient as a topographical institution, having regard to the increasing demand for more accurate military mapping in India, and the necessity for more perfect revision of those maps which are gradually falling out of date with the advance of public works developments. India is an unscientific country. The scientific members of the Anglo-Indian community would hardly fill a first-class carriage on any railway line, and they exist only as paid servants of the Government, living in constant fear of "reduction" when any financial crisis occurs. They have to justify their existence from time to time, and Colonel Burrard is to be congratulated on the very effective justification which he has given to the public for the maintenance of the scientific branches of his own department. It is all the more valuable for the reasons that the booklet which contains his opinions is written in clear and simple language, intelligible even to the most unscientific reader, and that it appeals directly to a far wider circle of men of science than can be found in any one department. The various sections of the scientific work which Colonel Burrard superintends are principal triangulation, levelling, astronomical, pendulum, magnetic and tidal observations, and solar photography. He deals with them all in turn concisely, showing their relative interdependence and their practical utility.

No distinction is drawn by Colonel Burrard between scientific and practical work. He maintains rightly that their relations are constant. "The primary object of a national survey is the making of maps, and all operations are subordinated to that end. It is for topographical purposes that a national survey measures its allotted portion of the earth's surface. If, however, these measurements be combined with astronomical determinations, the size and shape of the earth can be deduced, and a knowledge of this size and shape is essential to astronomers, geographers, geologists and meteorologists, all of whom look to surveys for information." Here, then, is the principle of geodetic triangulation enunciated, and the wholesome doctrine recalled to mind that it is the measurement of "areas," and not "arcs," which will be found most useful for the geodesist as for the practical topographer. The connection between the principal triangulation and secondary methods is well illustrated, and incidentally we are shown the relative degrees of accuracy of the triangulations of different countries. Taking the ratio between precision and length of the triangulation of Great Britain as a unit, we find that ratio to be 0.6 in Russia and 0.7 in India, the only two countries which can claim a superior degree of accuracy; while in France and Prussia it rises to 2.5 and 2.6 respectively, and we are told that South Africa and the United States are equal in precision to France and Prussia. This is something of a surprise, for we were always under the impression that the triangulations of these two last countries was of a very high degree of accuracy as compared with that of older systems.

Colonel Burrard proceeds to show that we have by no means arrived at an ideally accurate framework for the basis of our mapping even yet. Accurate as the process of measurement may be, inaccuracies in the data for reducing observations introduce very considerable and very practical errors. The deflection of the plumb line, the deformation of the earth's figure (which has upset the original calculations of the earth's size, giving it a diameter which is two miles too short), and other physical causes of initial error have this effect, amongst others, viz., that we are 1000 feet too far north with our position of Peshawar in northern India, and two and three-quarter miles too far east with our position of the Salween River in Burma. This is of little consequence until we come to an international junction with other surveys. It has already had a certain effect in the junction of the geographical surveys of Afghanistan and Russia, which (after making due allowance for these errors) was fairly satisfactory. When, however, a connection between the principal triangulations of these two countries is effected, it may become necessary to revise our Indian data; but, as Colonel Burrard wisely points out, unless we are to continue systematically to combine with other countries (notably South Africa and America) in the elucidation of those scientific problems which form the basis of the world's mapping, we shall never reach the possibility of a final revision which will place our international boundary pillars in the same terms as regards their position on the earth's surface.

No practical surveyor will quarrel with Colonel Burrard's conclusions, or be disposed to criticise his plea for extending the principal triangulation of India far enough to cover the Indian borderlands, where it is of almost paramount importance that we should possess a substantially accurate basis for topography. After all, this preliminary work of the most scientific class only adds 10 per cent. to the final cost of the survey.

The interdependence of astronomical, pendulum (for investigating the eccentricities of the force of gravity), and levelling operations is duly emphasised, and in connection with the latter some interesting details are given regarding the probable heights of the highest peaks in the Himalayas. These details have already been referred to in the pages of NATURE. Investigations into magnetic phenomena and solar physics speak for themselves. They cost little, and add greatly to the sum of our scientific knowledge of the data surrounding certain most obscure and elusive natural forces.

As a unit in the series of professional papers of the Indian survey, this is perhaps the most important that has yet appeared, and it is one which appeals to a world-wide community of practical surveyors.

[1] Survey of India, Professional Papers, Serial No. 9, 1905:—An Account of the Scientific Work of the Survey of India, and a Comparison of its Progress with that of Foreign Surveys prepared for use of the Survey Committee, 1905. A pamphlet by Lieut.-Col. S. G. Burrard, R.E., F.R.S. (Calcutta: Office of the Superintendent of Government Printing, 1906.) Price 1s. 6d.

NOTES.

THE knighthood just conferred upon Dr. W. H. Perkin, F.R.S., has given much satisfaction in scientific circles. The great interest being shown in his services to science and industry, on account of the celebration of the coal-tar colour jubilee to-day and to-morrow, makes this official mark of recognition of his work particularly welcome. It was fifty years ago when Sir William Perkin discovered the first anilin dye—mauve—and so founded the coal-tar colour industry, which has been so profitably developed in Germany. His knighthood, with the other honours and addresses which will be presented to him at the Royal Institution to-day, thus form an appropriate crown to his successful career.

THE University of Oxford has recently taken a new departure in scientific teaching. Under the energetic conduct of Prof. Sollas, a contingent from the geological class started to spend a week among the Alps for the purpose of studying on the ground the structures which have in recent years been so keenly studied and discussed, especially the recumbent folds that are claimed to play a large part in the architecture of the mountains. At Lausanne on June 30 they were met by the enthusiastic explorer of Alpine geology Prof. Lugeon, who took charge of the excursion, and enabled the members of the party to see with their own eyes some of the gigantic disturbances to which the region has been subjected. They followed one after the other the folds and internal structure of the Préalpes médianes, and finished up with a glimpse of the successive vast folds of the central crystalline region. Starting sometimes as early as 5 a.m., they spent long days in climbing and viewing the disposition of the rocks from favourable points of view, and, thanks to the clear expositions of the eminent Swiss professor, learnt more in a few days on the ground than they could have acquired by months of sedulous reading.

THE Matteucci medal for 1906 of the Società Italiana della Scienze, the president of which is Prof. Cannizzaro, has been conferred upon Sir James Dewar.

THE Paris correspondent of the *Times* announces the death, at the age of sixty-nine, of Dr. Brouardel, for many years professor of legal medicine at the University of Paris and president of the consultative committee of hygiene.

WE regret to announce that Sir Walter L. Buller, K.C.M.G., F.R.S., distinguished by his work on "The Birds of New Zealand" and other contributions to science, died on July 19 at sixty-eight years of age.

THE death is announced of Mr. J. A. Wanklyn, at the laboratory, New Malden, Surrey, in his seventy-third year. Mr. Wanklyn was a member of the Bavarian Academy, and was well known as an analytical chemist.

A MESSAGE from Danes Island reports that Mr. Wellman has now established wireless communication from within 600 miles of the Pole *viâ* Hammerfest. Everything is progressing favourably at the camp. The construction of the balloon-house is being continued. It is hoped that the expedition will start on its aërial voyage toward the Pole in the middle of August.

ON the east coast patches of burnt earth occur scattered along the margin of many creeks and saltmarshes, especially in Essex. A committee has been formed under the auspices of the Essex Archæological Society and the Essex Field Club for the systematic study of these interesting relics of antiquity, generally known as "red hills," and the settlement, if possible, of the many questions relating to them. Among the members of the committee are Mr. Miller Christy, Mr. William Cole, Mr. T. V. Holmes, Prof. R. Meldola, F.R.S., Mr. F. W. Rudler, and Mr. H. Wilmer, hon. sec. and treasurer. The chairman of the committee is Mr. I. Chalkley Gould.

THE well-known balloon journey made by Comte de Lavaux, the French aëronaut, at the time of the Paris Exhibition in 1900, when the distance from Paris to Moscow was traversed in forty-one hours, was recently surpassed by the brothers Wegener, of the German aëronautical observatory at Lindenberg. The details of their ascent have now been published in the Strassburg *Aeronautische Mittheilungen*. The balloon, of 36,000 cubic feet capacity, and inflated with hydrogen, started from Berlin at 9 a.m. on April 5 last, and descended at 9 p.m. on April 7 six and a half miles east of Aschaffenburg. During their journey of at least 900 miles, the Wegeners crossed the Baltic Sea and Jutland twice, once travelling north and again on the return journey. The route was determined by astronomical observations at night and by visual and photographic observations during the day. The altitudes at which the journey was performed were as follows:—during the day of April 5, 1200 metres; on the night of April 5–6, from 200 metres to 800 metres; from sunrise to midday on April 6, up to 2900 metres; from midday to sunset of the same day, 300 metres to 1000 metres; during the next night, from 100 metres to 800 metres, except when in the vicinity of Hamburg, where the balloon was taken to a height of 2900 metres. The greatest altitude, of 3700 metres, was reached on April 7. The lowest temperature recorded was $-16°$ C.

THE seventh International Zoological Congress will be held in America in August or September, 1907, under the presidency of Mr. Alexander Agassiz. The arrangements for the congress are in charge of a committee of the American Society of Zoologists. The meetings will open in Boston, where the scientific sessions will be held, and from which excursions will be made to Harvard University and to other points of interest. At the close of the Boston meeting the members will proceed to Woods Hole, Massachusetts, visiting the station of the United States Bureau of Fisheries, the Marine Biological Laboratory, and the collecting grounds of the adjacent seacoast. The journey to New York will be by sea through Long Island Sound. In New York the congress will be entertained by Columbia University, the American Museum of Natural History, and the New York Zoological Society, and excursions will be made to Yale University, to Princeton University, and to the Carnegie Station for Experimental Evolution. From New York the members will proceed to Philadelphia and Washington. The first formal circular announcing the preliminary programme of the congress will be issued in October next. All inquiries should be addressed to Mr. G. H. Parker, Seventh International Zoological Congress, Cambridge, Massachusetts, U.S.A.

WITH the recent motor-bus accident on Handcross Hill fresh in our memories, and the discussion that has arisen in the Press in consequence, it is satisfactory to find that at least one note of improvement has been struck, according to the description of an electrically controlled petrol motor-bus given in the *Standard* of July 21. The demonstration referred to was given on the scene of the recent disaster, and the descent was made in perfect safety with-

out the use of any brakes whatever, the driver keeping his feet above the splash board to prove that no pedal brake was in use, and the side hand-brake was tied and sealed before starting the descent. The omnibus in question was driven by an ordinary four-cylinder petrol engine, but was practically under electrical control. The engine is started by an electrical device, and the variations of speed are under electrical control, the clutch and foot-brake being electromagnetic and controlled by one pedal. The speed control is obtained by shunt regulation of the dynamo in combination with the ignition and carburation, and gives the driver—it is claimed—perfect control without the use of brakes. Various tests for pulling up and starting were made and proved satisfactory, and the steepest portion of the hill was taken at a snail's pace without the use of brakes. We can only hope that, should this new method of control continue to prove so satisfactory, it will be adopted by the motor omnibus companies, and thus help to re-establish public confidence in one of the most useful innovations of recent years.

THE provisional programme of Section B (Chemistry) of the British Association meeting at York has just reached us; it is as follows:—*August* 2.—Presidential address, Prof. W. R. Dunstan; chemical research in the Dutch East Indies, Dr. Greshoff; utilisation of nitrogen in air by plants, T. Jamieson; the electrical discharge in air and its commercial application, Sidney Leetham and William Cramp; the action of ammonium salts upon clay and kindred substances, A. D. Hall; oxidation in soils and its relation to productiveness, Dr. F. V. Darbishire and Dr. E. J. Russel. *August* 3.—Report, present position of the chemistry of gum, H. H. Robinson; on a gum (*Cochlospernum gosipium*) which produces acetic acid on exposure to air, H. H. Robinson; report, hydrolysis of sugars, R. J. Caldwell; papers by the president and Dr. T. A. Henry and by Dr. Greshoff. Joint discussion with Section K, the production of hydrocyanic acid by plants. *August* 6.—Report, present position of the chemistry of rubber, S. S. Pickles; the constitution of caoutchouc, Prof. Carl Harries (Kiel); paper by Prof. W. A. Tilden; report, the study of hydroaromatic compounds, Prof. A. W. Crossley. *August* 7.—Joint discussion with Section I, the factors which determine minimal diet values, opened by Dr. F. Gowland Hopkins.

A SPELL of the hottest weather this summer has been experienced since the middle of the month over the Midland and south-eastern districts of England. At Greenwich the thermometer in the shade has exceeded 80° on four days since July 17, while there was only one day previously this summer, June 20, with a temperature above 80°. On July 18 the thermometer in the screen registered 86°·2, and on July 23 it registered 84°·7. On three days this month the thermometer in the sun's rays at Greenwich has exceeded 145°. In the northern and western portions of the kingdom the temperature has been generally below the average. At Greenwich the total rainfall this month, to July 24, only measured 0·22 inch, which is about one-tenth of the average. The weekly weather report issued by the Meteorological Office shows that on July 17 and 18 an exceedingly heavy fall of rain occurred in the north-west of Scotland, the aggregate amount for the two days measuring 4·9 inches at Fort William and 4·4 inches at Glencarron. An exceptionally important storm area for the time of year had its centre near the Shetlands on July 19, and strong westerly gales were experienced on the northern coasts of Ireland and Scotland and in the North Sea.

MR. G. A. HIGHT, writing from Audisques, Pas de Calais, states that among the peasantry of that district there is a universal belief that the magpie is a dangerous enemy to poultry, and it is shot by the farmers as vermin. His own observation seems to show that the stories of the magpie's depredations are unfounded, or at least greatly exaggerated, and he would be glad to know whether there is any authority for the belief.

IN the Proceedings of the United States National Museum, vol. xxx., Mr. T. W. Vaughan describes three new species of corals belonging to the genus Fungia, the one a fossil species from Japan, the others being recent forms.

NEW or rare scombriform fishes form the subject of a paper by Mr. H. W. Fowler in the March issue of the Proceedings of the Philadelphia Academy, in the course of which several forms are described as new, while the genus Lepodus of Rafinesque is made the type of a new family. The same issue contains the second portion of a paper by Messrs. Pilsbry and Ferriss on the land-molluscs of the south-western United States.

THE Natural History Museum has just received an important collection of bird and mammal skins from Mount Ruwenzori, East Central Africa, obtained with the aid of subscriptions from a number of persons interested in natural history. The collection, we believe, includes a number of new forms, or of forms previously known only by a single specimen or so of each.

WE are indebted to Prof. K. Heider for a copy of an obituary notice of the late Dr. Fritz Schaudinn, published at Innsbruck, and reprinted from the *Innsbrucker Nachrichten* for June 26. Dr. Schaudinn's career, although brief (1871–1906), was a memorable and active one. Among the subjects to which Schaudinn specially devoted his attention was the study of blood-parasites, his last achievement in this line being the discovery of *Spirochaeta pallida*, which he believed to be the bacterium of syphilis.

A COPY of an illustrated guide to the German section of the International Exhibition at Marseilles devoted to the illustration of subjects connected with the study of the ocean and sea-fisheries has reached us. In the German section, a prominent place is occupied by exhibits connected with the recent deep-sea and South Polar expeditions, and also by others displayed by the German Sea-fisheries Union of Hanover. The frontispiece to the guide represents a reproduction of an Antarctic scene, with seals and penguins on the ice.

IN the summer number (vol. ii., No. 2) of *Bird Notes and News* attention is directed to the wholesale collecting of eggs of the great skua in Iceland, as demonstrated by a photograph in a German ornithological serial, in which a collector is represented with no less than 240 eggs of that species. If egg-hunting is permitted on such a scale, it seems scarcely probable that the skua will long survive in the island. In another article gratification is expressed at the support accorded by Her Majesty the Queen to the crusade against the wearing of "osprey" plumes.

AT the date of publication (1880) of Dr. Günther's "Study of Fishes," but three representatives of the genus Chimæra were known to science. By the description in the Journal of the College of Science of Tokyo University (vol. xx., art. 2) of two new Japanese forms, Mr. S. Tanaka has brought up the number to no less than ten. The author seems to have had abundant material—no less

than twenty-one specimens—for the description of his first species, although in the case of the second he had to be content with a couple of examples. Mr. Tanaka has found that the form and direction of the lateral line afford excellent characters for the discrimination of species.

ACCORDING to the June number of the *Museums Journal*, Salford has acquired a new natural history museum. Photography enters largely into the scheme of arrangement of the galleries, this being employed to illustrate the nesting of birds, and likewise to display the contrast presented by deciduous trees in summer and in winter. Attention is directed in another paragraph to the charge made by the trustees of the British Museum for permission to photograph plates and books in the print-room. It is urged that since publishers—who are compelled to supply the museum with a copy of the most expensive edition of each of their books—are the chief applicants for such permission, the new charge is inadvisable.

THE rose-breasted grosbeak, of which a coloured plate is given, forms the subject of the latest educational leaflet (No. 2) issued by the U.S. National Association of Audubon Societies. The following statement in favour of this bird is given :—"The spread of the potato-beetle pest caused an enormous loss to the farmers of the country, not only by the failure of the potato crops, but also by the cost of insecticides, principally Paris green, used to destroy this voracious beetle. It is doubtful whether the farmers of the country would have been able successfully to contend with the potato-beetle had not Nature interposed one of her powerful checks. As the beetle extended its range and became more numerous, the Rose-breasted Grosbeak developed a newly acquired taste for this pest."

A BEAUTIFUL coloured plate (by Mr. H. Grönvold) of hitherto undescribed or unfigured eggs of South African perching-birds forms an attractive feature in the first number of vol. ii. of the Journal of the South African Ornithologists' Union. The accompanying notes are by Messrs. J. A. Bucknill and G. H. Grönvold. In a paper on bird-migration in South Africa (originally read at last year's British Association meeting), Mr. W. L. Sclater directs attention to the occasional breeding of the bee-eater during its (northern) winter sojourn at the Cape. The evidence is indisputable, but the question as to whether the same individual birds breed in May in the northern, and again in October in the southern, hemisphere has yet to be definitely answered. Possibly there are two phases of the bird—the one a northern and the other a southern breeder. Those interested in parasitism among birds should read an article by Messrs. Haagner and Ivy on the breeding-habits of certain South African cuckoos of the genus Chrysococcyx.

THERE is an interesting note by Dr. Raymond Pearl in No. 3 (1906) of the *Journal of Comparative Neurology and Psychology* on the correlation between intelligence and the size of the head. The note is based on the measurements, published last year by Drs. Eyerich and Loewenfeld, of the head-circumferences of 935 Bavarian soldiers, who were also classified according to intelligence. These observers came to the conclusion that there was no relation between the head-circumference and the grade of intelligence, but Dr. Pearl, using more efficient statistical methods, finds a correlation which, though small, is quite sensible. It is pointed out that the result is in accordance with those obtained by Prof. Pearson (Proc. Roy. Soc., vol. lxix.), and it is suggested that the interpretation is probably "physiologic rather than psychologic," the larger size of head and the greater vigour in mental operations being both the consequences of good conditions of nurture.

A REVISED list of the group of red algæ known as Corallinæ is contributed by Mr. K. Yendo to the Journal of the College of Science, Tokio (vol. xx., article 12). The writer, after making a careful study of the generic distinctions laid down by previous authorities, enumerates seven genera, of which Cheilosporum is divided into three, and Amphiroa into four sections.

WRITING in the *Monthly Review* (July) upon the subject of instinct in the lower animals, Mr. C. B. Newland mentions a number of cases illustrating the actions and ways of instinct as manifested in animals, birds, and insects. When the faculty of intelligence is developed the instinctive faculty is diminished. Instinct is perhaps most pronounced in insects, and as an instance of remarkable development Mr. Newland describes the systematic method in which a small ichneumon fly bores into oak-apples with the purpose of depositing its eggs in the grubs of the gall-fly that lie concealed within.

THE second edition of the volume on north Yorkshire, by Mr. J. G. Baker, dealing with the botany, geology, climate, and physical geography, that has been appearing in instalments in the Transactions of the Yorkshire Naturalists' Union since November, 1888, is completed with the part published last April. This part is chiefly devoted to the mosses and hepatics, that have been revised and brought up to date by Mr. M. B. Slater. The name of Dr. Spence is closely associated with the early investigations of these plants, and in Yorkshire he laid the foundations of that knowledge that was put to advantage during his explorations in tropical America. The nomenclature and arrangement of the mosses are based on Braithwaite's "British Moss Flora," and for the hepatics Mr. Slater adopts the arrangement given in Pearson's "Hepaticæ of the British Isles."

THE scientific aspect of what has been designated in the United States as "dry-farming" consists in utilising to the best advantage all the water that falls in semi-arid regions. An article by Mr. J. L. Cowan in the July number of the *Century Magazine* presents the main features of the system, and explains how it is possible to produce fine crops in regions where the rainfall averages only about 12 inches in the year. The first essential is thoroughly to break up the subsoil and collect in it all the rain-water; then, in order to prevent evaporation, the upper layers of the soil are kept in a finely pulverised condition, so that the water cannot rise to the surface by capillary action. Apart from these physical considerations, dry-farming requires continuous and intelligent husbandry. Another hope of the farmer in dry regions lies in finding or producing drought-resistant varieties, and this field of inquiry is yielding a bountiful harvest. In the case of wheat, a hard wheat, recognised in America as a distinct species, *Iviticum durum*, has been introduced from Russia; this gives a better yield in a dry than in a humid climate. Among other suitable "dry-farming" crops are Kafir corn, emmer (a variety of wheat), dwarf milo maize, and varieties of oats and barley.

THE valedictory address delivered by Prof. J. G. M'Kendrick, at the close of the summer session of the University of Glasgow, on the occasion of his resignation of the professorship of physiology, provides a striking

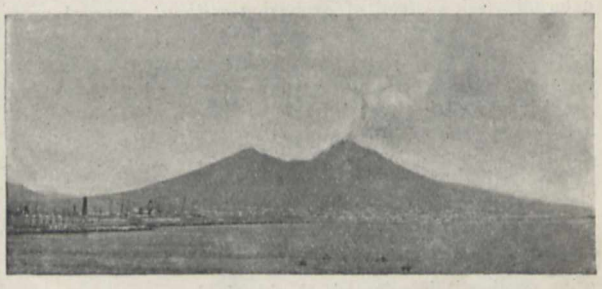
account of the progress of physiological science during the past thirty years. In 1861, when Prof. M'Kendrick attended a course of lectures at Aberdeen, there was no attempt at demonstration except by diagrams and a few microscopes on a side-table. There were no experiments, and the only instrument displayed was a sphygmograph. But a little later Goodsir, of Edinburgh, brought from Continental schools of physiology to the University of Edinburgh such instruments as myographs, kymographs, electrical appliances and other apparatus, and the teaching of practical physiology was soon firmly established under Argyll Robertson. Prof. M'Kendrick himself installed similar teaching in the University of Glasgow in 1876, the date of his appointment to the chair of physiology. The requirements of modern physiological teaching are shown by a statement in the address that while Prof. M'Kendrick has worked and taught for thirty years in five roo twenty-five are apportioned to physiological work in the new buildings. Reviewing the progress of physiology, Prof. M'Kendrick detailed the advances made in histol and expressed the doubt whether much more progress can be expected. Graphic methods have been elaborated during the same period, and the action of electrical stimuli on muscle and nerve elaborately worked out. The study of the functions of living isolated organs, modern vivisectional methods, our knowledge of the nerve paths in the central nervous system, and the subject of internal secretions, are all among the triumphs of physiological science during the past thirty years, and were each passed in review. In conclusion, Prof. M'Kendrick indicated physiological chemistry as the direction in which progress will be made during t next few decades.

THE Engineering Standards Committee has issued a specification for structural steel for bridges and general building construction (report No. 15). The draft of the specification, drawn up by a sectional committee of which Sir Benjamin Baker is president, was submitted to the science standing committee of the Royal Institute of British Architects, and certain modifications have been introduced into the specification as a result of the cooperation of that committee. In view of the authoritative positions held by members of the committee, the specification cannot fail to meet with general adoption.

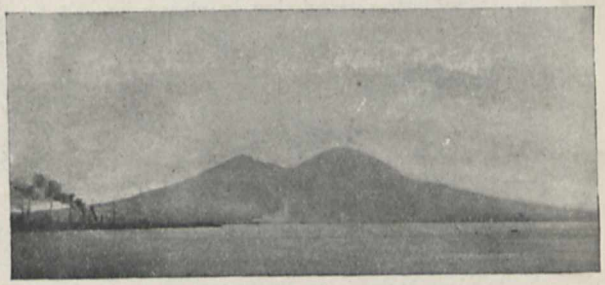
THE *Engineering Review* (July) contains a series of special original articles dealing with the engineering development of several British colonies. The contributions have been limited to Canada, Western Australia, Queensland, New Zealand, New South Wales, and Natal. Farming and mining no longer constitute the only pursuits worthy of notice in these colonies. Railways, roads, and bridges are being constructed, harbour, river, canal, and irrigation schemes are being undertaken, and municipal and sanitary engineering projects are everywhere in evidence. All these developments furnish occupation for professional men and skilled labour.

WE have received from the publishers, MM. Gauthier-Villars, Paris, a set of tables and formulæ compiled by M. J. de Rey-Pailhade for the practical use of instruments graduated in *grades* instead of degrees. The compiler urges the employment of the decimal system in astronomical and navigation tables, and points out that errors constantly occurring in ephemerides, &c., would probably be eliminated if the simpler method were employed. Formulæ for obtaining interpolated values and for calculating star positions, tables for the conversion of sexagesimal into decimal values, and the decimal values of numerous astronomical constants are included in the brochure.

Deutsche Arbeit (vol. v., p. 352) contains an account of a visit to Vesuvius after the late eruption, by Dr. E. Trojan, illustrated by reproductions of photographs, two of which are of some interest as representing the mountain from about the same point of view before and after the eruption. By the courtesy of Prof. R. von Lendenfeld and the editor of *Deutsche Arbeit* these illustrations are given here; they show the changes by which the graceful



(1) Photograph taken on Apri 4.



(2) Photograph taken on April 18.

Vesuvius before and after the recent eruption. From photographs taken by Dr. E. Trojan from Santa Lucia.

outline of the cone has been destroyed and the mountain converted into a hump-backed mound of distinctly lower elevation.

THE volumes which have now appeared of the Proceedings of the Royal Society of London, as divided about a year ago into two series, are vols. lxxvi.–lxxvii. of series "A," containing papers of a mathematical and physical character, and vols. lxxvi.–lxxvii. of series "B," containing papers of a biological character; each volume runs into about 600 pages royal octavo, with illustrations. A main object of this new arrangement was to render the Proceedings more accessible to workers by placing the two groups of subjects on sale separately, at a stated price attached to each separate part of a volume when it first appears. Moreover, with the view of promoting the circulation of the complete series, it has been directed that a subscription paid in advance to the publishers at the reduced price of 15*s.* per volume, for either series, shall entitle subscribers to receive the parts as soon as published, or else the volumes when completed, in boards or in paper covers, as they may prefer. With a view to increase further the accessibility of the various publications of the Royal Society, each number of Proceedings now contains an announcement on the cover of the more recent memoirs of the Philosophical Transactions as published separately in wrappers, and the prices at which they can

be obtained. It is hoped that by this arrangement the difficulties which have been found to impede the prompt circulation of the journals of the society, which are of necessity published in a somewhat different manner from a regular periodical, may be finally removed.

AN important contribution to our knowledge of the liquefaction of gases is contained in a paper on the liquefaction of air and its application to the manufacture of oxygen and nitrogen, by M. Georges Claude in part i. of the Bulletin of the French Physical Society for session 1906. M. Claude adopts the principle of expansion *with* external work instead of expansion *without* external work as utilised in the plant devised by Linde, Hampson, and others. The result, it is contended, is to effect a surprising economy, while it becomes possible to employ very much smaller pressures than those hitherto considered necessary and to dispense with auxiliary cooling. The liquid air, obtained in this way at very small cost, can be used as a commercial source of oxygen and nitrogen. The two elements are separated by a process of fractional distillation; in the apparatus devised for this object, M. Claude displays remarkable ingenuity. The principle of "recuperative cooling" is adopted, liquid air in one vessel being caused to evaporate by means of gaseous air compressed at 2 to 3 atmospheres circulating in pipes surrounded by the cold liquid. The nitrogen distils off more readily than the oxygen from the liquid air in the one vessel, whilst in the other oxygen is liquefied before nitrogen during the condensation of the air. Finally, nearly pure oxygen and nearly pure nitrogen are obtained. A machine has been constructed capable of supplying 1000 cubic metres of oxygen, containing 96 per cent. to 98 per cent. of the pure element, per day, with the expenditure of an amount of energy equal to only 1/20th or 1/30th that required in the processes based on the electrolysis of water. It is contended that the results obtained invalidate the assumption made by Dewar and confirmed by Linde that in the liquefaction of air the two component gases condense simultaneously; in reality, the more volatile nitrogen is condensed after the oxygen, and the process of liquefaction is strictly the inverse of vaporisation.

THE fourteenth volume of the Bulletin of the Philosophical Society of Washington has now been completed by the publication of the brochure entitled "Organisation and Proceedings." This volume contains abstracts of papers and other communications brought before the society during the sessions 1900–1904.

A SECOND edition of the Class List and Index of the periodical publications in the Patent Office library has been published, price 6*d*., at the Patent Office, 25 Southampton Buildings, Chancery Lane.

MR. EDWIN ANTHONY has issued through Messrs. George Routledge and Sons, Ltd., a pamphlet, price sixpence, on decimal coinage, weights, and measures, in which he discusses the question as to whether this country should adopt them, and passes in review the various arguments for and against the use of decimal coinage and weights and measures.

MESSRS. CHARLES GRIFFIN AND CO., LTD., have published a fifth, revised edition of Prof. G. A. J. Cole's "Aids to Practical Geology." The work has been brought up to date without increasing its size, so that it will maintain the leading position it has gained among manuals of determinative geology.

OUR ASTRONOMICAL COLUMN.

REFLECTING TELESCOPES OF SHORT FOCUS.—In No. 5, vol. xxiii., of the *Astrophysical Journal*, Prof. Vogel discusses the relative efficiency of short-focus reflectors for astrographic work.

Prompted by the discovery of the Nova Persei nebula, Prof. Vogel turned his attention to the subject of reflectors, and finally obtained an excellent parabolic mirror, of 40 cm. effective aperture and 93 cm. focal length, from Mr. B. Schmidt, of Mittweida, Saxony.

With this instrument numerous problems of practical interest in reflector work have been investigated, and the results are tabulated in the present paper. Prof. Vogel also compares the efficiency of an instrument of this type with that obtained from other types of photographic telescope. For instance, he found that with an exposure of thirty minutes on the Pleiades nebula he obtained a photograph showing all the detail seen on Keeler's plates with four hours' exposure using the Crossley reflector. The nebulæ around γ Cassiopeiæ appear quite as distinctly in forty minutes as on the plates taken by Dr. Roberts with ninety minutes' exposure on October 25, 1895.

THE ASTRONOMICAL SOCIETY OF CANADA.—The Transactions, for 1905, of the Royal Astronomical Society of Canada contain a number of papers of astronomical interest, a few of which are mentioned below. In the presidential address Mr. C. A. Chant made a summary review of the progress of astronomy during 1905, referring, among other things, to the spectroheliograph work which is being systematically prosecuted at the Yerkes, Meudon, South Kensington, and Potsdam observatories, and to the important results which these researches in solar physics may lead us in the study of terrestrial meteorology. Other papers selected for publication deal with sun-spots and magnetic storms, colour photography of the corona, stellar classification, and the new problem in solar physics recently enunciated by Dr. C. L. Poor.

MAGNITUDES AND PLACES OF 251 PLEIADES STARS.—At the desire of Prof. Wolf, Herr K. Schiller has continued the researches of Dr. Dugan on the photographic magnitudes and mean places of the fainter stars of the Pleiades group, and now publishes his results for 251 stars in No. 4102 of the *Astronomische Nachrichten*. The places for 1900, and a formula connecting the magnitude scale of the present series with that employed by Dr. Dugan, are given in the paper.

ELEMENTS AND EPHEMERIS OF JUPITER'S SEVENTH SATELLITE.—In No. 4101 of the *Astronomische Nachrichten*, Dr. F. E. Ross publishes the following elements of the orbit of Jupiter's seventh satellite, derived from observations made during the two most recent oppositions, and corrected for the principal perturbations:—

1906 January 0·0 G.M.T. Elements referred to Earth's Equator.

$g = 18°\cdot9$	$e = 0\cdot208$
$\pi = 118°$	$n = 1° 386$
$\Omega = 291°$	$\log a = 8\cdot8946$
$i = 25° 28'$	Period = 259·7 days

This satellite is only about 2 per cent., or 170,000 miles, more distant from Jupiter than the sixth, but, on account of their large eccentricities, they do not approach within two million miles of each other. The inclination of their orbits to each other is 28° 1′.

In addition to the foregoing elements, Dr. Ross also publishes an ephemeris, corrected for perturbations and giving the position angle and distance of the seventh satellite, for every fifth day between August 15, 1906, and April 27, 1907.

OBSERVATIONS OF MINOR PLANETS AND COMETS.—The results of a large number of observations of minor planets, comets, and comparison stars, made by Dr. J. Palisa with a wire micrometer attached to the 27-inch refractor of the Vienna Observatory, are given in Nos. 4099 and 4100 of the *Astronomische Nachrichten*, by Prof. E. Weiss. The list of objects includes comets 1904 i and ii, and 1905 ii, iii, v and *c*, and 296 comparison stars.

OPENING OF A NEW LABORATORY AT THE ROTHAMSTED EXPERIMENTAL STATION.

ON July 20 Earl Carrington opened the "James Mason" laboratory for agricultural bacteriology at the Rothamsted Experimental Station. Sir John Evans, chairman of the Lawes Agricultural Trust Committee, presided, and among those also present were Mr. J. F. Mason, M.P., the donor of the laboratory, Sir T. H. Elliott, Sir Michael Foster, Sir R. P. Cooper, Mr. Laurence Hardy, M.P., Mr. F. A. Channing, M.P., Mr. Abel Smith, M.P., Mr. Phipson Beale, M.P., Prof. R. Meldola, president of the Chemical Society, Sir Charles Lawes Wittewronge, Dr. Hugo Müller, Dr. H. E. Armstrong, Dr. J. A. Voelcker, and Mr. J. Bowen Jones.

Sir John Evans, in his introductory remarks, explained that the building they were asking Lord Carrington to declare open was the gift of Mr. J. F. Mason, and was to be devoted to a class of work that had grown up since the original Rothamsted experiments were started, but which had become of cardinal importance in the study of the growth of crops. The difficulty of the Lawes Agricultural Trust Committee, carrying out as it was by private benefactions the work which in every other country was regarded as the duty of the State, was to find funds for such new developments, and he trusted that the President of the Board of Agriculture might soon be able to obtain a grant for the proposed council of agricultural research, and so furnish some assistance to themselves and other bodies concerned in similar investigations.

Lord Carrington expressed the pleasure it gave him to find himself at Rothamsted, which had been the pioneer of agricultural research, not only in England, but in the world. Agriculture was rapidly ceasing to be a rule-of-thumb business, and as a highly skilled industry was more and more requiring the assistance of such scientific investigations as were being carried out at Rothamsted. He sincerely hoped that some money might be found for the proposed council of agricultural research, but he felt bound to remind them that the income tax still stood at a shilling in the pound; but both he and the Government of which he was a member had every sympathy with the work represented by Rothamsted.

Sir Michael Foster then expressed the thanks of the Lawes Trust Committee to Mr. Mason for his munificent gift of the laboratory, and explained how the bacteria, the existence of which almost was unsuspected when the Rothamsted laboratory was built, were year by year being found to be of fundamental importance, not only to ourselves directly, but to the crops and to the soil. Sir Thomas Elliott, the Secretary of the Board of Agriculture, seconded the expression of thanks, and declared that gifts like Mr. Mason's were the best argument he could have in approaching the Treasury for assistance for the work of Rothamsted.

Mr. Mason then replied, and explained how he was led to establish this laboratory as the best means of securing the continuance of the work to which his father had devoted so many years and had so much at heart. He also trusted that it might be a means of stirring public opinion, both generally and in the House of Commons, to recognise the necessity of research if agriculture was to maintain its position in this country.

After the meeting the company was shown round the laboratories, and afterwards visited the experimental plots, where the wheat and barley in particular were showing very interesting results.

The new laboratory takes the form of a wing added on to the Lawes Testimonial Laboratory, which was built in 1855; it is built of brick from the designs of Mr. V. T. Hodgson. It owes its origin to Mr. James Mason, of Eynsham Hall, Oxon, who for many years carried out on his own estate extensive experiments on such questions as the utilisation of leguminous plants in increasing the fertility of the soil, and the unlocking of fertility stored up in the subsoil, a summary of which may be read in the Journal of the Royal Agricultural Society for 1904. Mr. Mason died in 1902, and in his memory Mr. J. F. Mason, M.P., presented the trust with 1000*l.* for the building and equipment of a bacteriological laboratory, together with a further sum of 50*l.* a year toward its working expenses. The building contains a main laboratory looking north, 25 feet by 15 feet, fitted with teak-topped working tables and slate slabs to carry the incubators; a preparation room, where the working tables are covered with lead; a dark-room for photography, polariscope work, &c.; and a room for the director. The whole is floored with pitch-pine blocks, and heated by steam from the old laboratory adjoining.

RECENT RESEARCHES IN REGIONAL GEOLOGY.

THE Geological Survey of Great Britain has issued a memoir (price 1*s.*) by Mr. A. J. Jukes-Browne, to accompany the colour-printed geological map, Sheet 282. The country dealt with lies south and east of Devizes, and contains exposures of almost horizontal strata, from the Middle Jurassic to the Lower Eocene. The author refers the superficial "clay with flints" to the weathering of Eocene material, and urges that its presence at any particular point shows that we are "not far below the ancient plane of erosion on which the lowest Eocene deposits were laid down." He has sustained this position more recently in an important paper (Quart. Journ. Geol. Soc., 1906, p. 159). Notes are given on economic geology, including the general character of the soils.

Another memoir of the survey, also issued in 1905, is by Mr. Fox-Strangways and Prof. Watts (price 2*s.*), on the country between Derby, Ashby-de-la-Zouch, and Loughborough, included in Sheet 141. The description of Charnwood Forest will probably attract most attention, and it is to be supplemented in a forthcoming memoir. Prof. Watts, from mapping the ground, finds that the famous "porphyroids" of the region are not lava-flows, but are intrusive (p. 9); they have, however, shared in the general cleavage and shearing, and thus were in place before the Charnwood mass became a mountainous knot in the Carboniferous sea. We find the term "fjord" hardly a happy one when applied to the inlet of a Triassic lake (p. 11), which has become revealed by latter-day denudation. But Prof. Watts's reconstruction of the Charnwood landscapes of Triassic times has already afforded us pictures for which we should be warmly grateful (see *Geographical Journal*, 1903). On p. 33, Mr. Fox-Strangways refers to an interesting puzzle as to the origin of certain Foraminifera once stated to be from the Keuper Marl. The suggestion is made that similar forms occur, as derived Liassic material, in the drift, and thence became erroneously recorded from the Keuper. With so many good geologists in the neighbourhood, this question ought not to be left long in uncertainty. The point suggests itself, moreover, that the local Boulder-clay, like that of the low ground of Lancashire, may possibly contain Foraminifera of its own, imported from some neighbouring sea. On this matter, by the by, a paper has reached us from Mr. Mellard Reade (Proc. Liverpool Geological Society, vol. x., part i., 1905), who believes that the abundance of Foraminifera in the Lancashire Boulder-clay points strongly to the probability of the whole of the low-level deposit having been laid down in marine waters under fairly quiet conditions. Mr. W. Edwards, on the other hand (*ibid.*), in a paper on the glacial geology of Anglesey, urges that the island was not submerged beneath the sea at the epoch of the formation of the well-known shell-bearing beds at Moel-y-Tryfan in Caernarvonshire.

A pleasant addition to the publications of the Geological Survey of Great Britain is the "Guide to the Geological Model of the Isle of Purbeck," by Mr. A. Strahan, F.R.S. (1906, price 6*d.*). The model, on the horizontal scale of six inches to one mile, was made by Mr. J. B. Jordan, and is accessible in the museum of the survey in Jermyn Street, London. Copies have also been acquired by the Government museums in Edinburgh and Dublin. The purpose of the model is educational, and the guide, by marginal notes, points out how it illustrates an "escarpment," an "anticline," a "trough-fault," and so forth, so that it serves as a companion to the ordinary text-book. For those unable to consult one of the copies of the model,

the photograph and coloured geological map included in the guide will give a clear impression of its features.

Signor Luigi de Marchi has published, through the Reale Istituto Veneto (1905), a folio memoir on "L'Idrografia dei Colli Euganei," in which much attention is paid to the question of the change of slope in the bed of a stream according to the grouping of the rocks successively encountered by it. An interesting result (p. 46), borne out by other evidence, is that the trachytic masses round the central tuff-cone of the Venda are found, not to lie, as Suess and Reyer have supposed, upon fragmental deposits as relics of great viscid lava-flows, but represent independent volcanic necks rising through a mantle of softer rocks. Observations are added on the limitation of human activity on the mountain-sides by the progress of denudation.

In the *Verhandlungen der k.k geologischen Reichsanstalt* for 1905 Dr. Kerner (p. 127) gives the results of five weeks' study of the Neogene deposits of Sinj, in central Dalmatia, and (p. 593) describes the fossil plants collected. Dr. Franz Baron Nopcsa (*Jahrbuch, ibid.*, 1905, p. 85) leads us farther south, having been able, with the aid of the Turkish authorities, to study the geology of Albania. He gives a pleasant account of the country that should attract other travellers. Not every geologist can be an artist, and we feel that some of the drawings, made by the author from his photographs, might have been well entrusted to other hands. The author believes that the so-called Flysch of Albania and Bosnia is at latest of Middle Mesozoic age, and has nothing to do with the Flysch of the Dalmatian coast-ranges and of the Wiener Wald. Baron Nopcsa writes very modestly of his results; but he has clearly felt the fascination of working, within the bounds of Europe, in a virgin field. The bibliography provided should help explorers of various tastes.

In the same *Jahrbuch* (p. 349) Mr. W. A. Humphrey, "aus York, England," reports on the ore-deposits of the Stangalp. His remarks on the so-called Urgebirge of Styria and Carinthia are of general interest, since he finds that the gneiss and the mica-schist vary inversely in importance on the margin of a mass of alpine granite. This granite has affected even the interstitial material of the Carboniferous conglomerate, while tourmaline has been formed among the sediments far beyond the zone where they are injected with actual granite-veins. Mr. Humphrey therefore (pp. 363–5) regards the whole sedimentary and schistose mass as a continuous series, which became highly metamorphosed in its lower portions. Here we once more recognise the change of opinion, forced upon field-observers in very diverse areas, with regard to the alleged antiquity of schists in mountain-cores.

Dr. Ampferer's extensive paper (*ibid.*, pp. 451–562) on the Wettersteingebirge, among his favourite limestone Alps, introduces questions of torsional movement combined with thrust-planes. In *Spelunca*, Nos. 42 and 43 (1905), M. Martel deals with the subterranean aspects of limestones, in continuing his immensely valuable abstracts of recent papers upon caves. These two numbers, which are issued as one, cover the whole area outside France, and even contain references to Kerguelen Island and the Fijis.

G. A. J. C.

METEOROLOGICAL REPORTS.

IN the Journal of the Meteorological Society of Japan for February, Mr. H. Mukasa gives a summary of the temperature conditions at Chemulpo (Korea) for the years 1893–1903, from four observations daily. The mean of the daily maxima in summer is 80°·6, in winter 37°·9, and the mean of the minima 67°·3 and 22°·8 respectively. The absolute maximum was 99°·5, in August, 1901, and the minimum −1°·3, in February, 1895; the greatest daily range, 40°·3, also occurred in the latter month. The Journal for April contains an interesting contribution on the management of the wet-bulb thermometer, by Mr. T. Okada. It was pointed out by Dr. Edelmann in the *Meteorologische Zeitschrift* for 1896, p. 334, that the kind of covering used for conveying moisture to the bulb had considerable influence on the readings of the thermometer. Prof. Tanakadate has recently found that a Japanese paper called "Yoshinogami," made from fibres of a species of mulberry tree, was most suited for a cover for the wet-bulb both for temperatures above and below freezing point, and, being quite easy in manipulation, can be changed even daily without the slightest trouble. Mr. Okada's experiments show that the bulb covered with paper is more sensitive than one with the usual muslin covering, and that in frosty weather its indications give the humidity more in accordance with that shown by the hair-hygrometer. The paper is said to be suitable for all climates.

The Proceedings of the Rhodesia Scientific Association (vol. v., part ii.) contains monthly and annual means of meteorological observations made at Bulawayo (altitude about 4469 feet) from 1897 to 1904 by the Jesuit Fathers Barthélemy and Nicot. As the observations mostly refer to 9h. a.m., the results can only be taken as approximate, but the discussion by the Rev. E. Goetz, S.J., is nevertheless very useful. The absolute highest reading of the barometer was 26·171 inches (in July), and the lowest 25·397 inches (in January); the daily range rarely exceeds 0·1 inch. The temperature shows one minimum, in June, and two maxima, in October and January; the means of maximum and minimum readings for these months are 57°·5, 73°·7, and 72°·6 respectively. The absolute extremes were 105° in November and 33° in June (in June, 1905, not included in the tables, the temperature in the screen fell to 30°). The rainfall has two maxima, one in the beginning of December, followed by a serious break, and a second in the middle of January. Mr. Goetz states that this break in the rainfall is a very disastrous feature of the climate, as the crops are either destroyed or stunted by the burning sun. The annual rainfall averages 22·2 inches, and the rainy days seventy-four. Very little rain falls between May and September; it is very heavy during thunderstorms, and for some minutes falls at the rate of from 2 inches to 6 inches an hour.

Sir Charles Todd has recently published the meteorological observations made at the Adelaide Observatory and other places in South Australia during 1902 and 1903. He states that the year 1902 must be classed as one of the driest on record, particularly during the winter season (April to October). The returns for 1903 show a general improvement; on the average, the agricultural areas had about 3 inches above the normal rainfall. A marked feature of this year was that during every month, except September to November, the mean temperature at Adelaide was below the average; the lowest air temperature on record at that place, 32°·2, was observed on July 11. The highest shade-temperature was 105°·6, in February.

The report of the Government astronomer of Natal for the year 1905 has been condensed; in the case of the subsidiary stations, meteorological summaries only are given, and the daily results are only published for the observatory at Durban. The rainfall for the year at that place was 44·95 inches, which is 5·6 inches above the average of the previous twenty-one years. This result was owing to one of the most remarkable hurricanes that have occurred in Natal during the last thirty years, which swept over the entire colony with extraordinary severity on May 31 and June 1. The rainfall on these two days amounted to nearly 11 inches at Durban and to 17 inches at Umzinto. The mean temperature of the year was exceptionally low; the mean of the maxima was 78°·1 and of the minima 61°·4, and the extremes were 90°·7 and 45°·4 respectively. The only year of lower mean temperature was 1887.

Captain H. G. Lyons, director-general of the Survey Department, Egypt, has published his report on the rain of the Nile basin in 1905. The Egyptian and Soudan stations at which rainfall is measured only number thirty-one, but a good many other returns showing the days on which rain fell are received, and are to some extent useful in supplementing the information supplied by the recording stations; observations are also given for neighbouring territories. On the whole, the rainfall is said to have been everywhere deficient; the volume of the Nile flood considered as the volume passing Aswan between July 1 and October 31, was only 0·65 of the average for thirty

four years (1869–1903), making the ninth successive year of low floods. The mean rainfall, and the oscillation of the rain-belt with the apparent motion of the sun, are very clearly shown by coloured maps, drawn for each month.

The report of the Falmouth Observatory committee of the Royal Cornwall Polytechnic Society for the year 1905 (one of the principal observatories subsidised by the Meteorological Office) shows that a record reading of the barometer for that part of the British Islands occurred on January 28, viz. 31·097 inches (corrected and reduced to sea-level). The next highest reading at Falmouth during the last thirty years was 30·981 inches, on January 18, 1882. Another interesting point is the mean temperature of the sea-surface, taken one mile outside the harbour, viz. 53°·3, being 2°·3 above the mean temperature of the air. The mean monthly sea-temperature was only below that of the air in June, July, and August. Much attention is given to magnetic observations, and the instruments are not affected by electric tramways. During a display of aurora borealis on the night of November 15, an easterly movement in the declination took place at 8h. 53m. p.m. which in twelve minutes reduced it about 33′, while in the subsequent twenty minutes the declination increased about 41′, which was 8′ west of its position before the movement occurred.

The *Jahrbuch* of the Norwegian Meteorological Institute for 1905 contains hourly observations for Christiania, with tri-daily readings and summaries for other stations. The results are given according to the international scheme, as before, the only change being that mid-European time has been introduced (one hour earlier than Greenwich), so that the observations at telegraphic reporting stations, which were previously taken by Christiania time, are now made seventeen minutes earlier than in previous years, while at the ordinary stations the time of taking observations has not been altered. Accompanying the *Jahrbuch* is part xiv. of the valuable series of climatological tables for Norway, containing the average monthly amount of cloud for the various directions of wind ("cloud wind-roses"); at most of the stations the averages are for a period of twenty years (1876–95).

The trigonometrical branch office at Dehra Dun has published a valuable series of daily rainfall observations for each of the thirty-six years 1868–1903. The mean annual fall is 84·72 inches, of which 65 per cent. falls in July and August. The maximum yearly amount was 122·47 inches, in 1894, and the minimum 41·69 inches, in 1877. The greatest fall in one day was 12·47 inches, on August 10, 1896. From a summary of the highest and lowest temperatures in the shade, for the same years, we observe that the mean of the annual extremes was 104°·3, the absolute maximum being 108°·4, on May 19, 1892 (108°·3 on June 5, 1890), and the minimum 31°·8, on January 13, 1874, the next lowest being 33°·9, on February 5, 1876.

COLOURING OF GUEREZA MONKEYS.

IN vol. ii. of the Proceedings of the Zoological Society of the current year, Mr. Lydekker contributes a paper on colour-evolution in the black or black and white tropical African monkeys of the genus Colobus commonly known as guerezas. Starting with a wholly black monkey, like the West African *C. satanas*, in which, although there is a fringe of long hair round the face, the body is comparatively short-haired and the tail not tufted, the author shows how a gradation can be traced through species like *C. palliatus* and *C. sharpei* of East Central Africa, in which tufts of long white hair (larger in the second than in the first of the two species named) make their appearance on the sides of the face and shoulders, as well as on the terminal third of the tail, to the Abyssinian *C. guereza*, in which the white shoulder-tufts extend backwards to form a mantle on each side of the body, and unite on the lower part of the back. The culmination of this type is formed by the white-tailed guereza (*C. caudatus*) of the Kilimanjaro district, in which the pendent white mantle is still longer, and the tail, which is wholly white except for a small length at the root, is clothed with long pendent hair; the cheek- and throat-tufts, however, have been lost, so that the head is short-haired, with the face and throat white.

The West African white-thighed guereza (*C. vellerosus*) appears to exhibit a kind of retrograde development in these respects, the body having lost the mantle of long white hair and the tail its white "flag," while the white of the perineal patch has spread on to the hinder and outer sides of the thighs. In this case we find practical reversion to the type of the black guereza, with the exception that the band on the forehead, the sides of the face and throat, the thighs, and almost the whole tail have become white, while the long hair has disappeared from the face. In the opinion of the author the colouring and special development of the long hair in the white-tailed guereza form a protective modification, but the purport of the colouring of the intermediate forms between this and the black guereza is left undecided.

FIG. 1.—White-tailed Guereza (*Colobus caudatus*). From the Proceedings of th Zoological Society.

ELECTRICITY IN MINES.

A VERY great development has taken place during the past two years in electrical machinery and apparatus for working colliery plant. Manufacturers seem at last to have realised that machines and accessories must be adapted and made to suit the conditions existing in collieries, and that the collieries cannot be adapted to suit their standard machines. Consequently, in the colliery exhibition which has just taken place, the result of experience in colliery work was clearly put before us in entirely new designs of motors and switchgear specially adapted for this work.

The details of colliery requirements have been most carefully studied and gone into, and the designs prove the tremendous development that has taken place. Whereas a few years ago contractors simply attached their standard machine to a haulage-gear or coal-cutter, and supplied the ordinary switch-gear as for everyday use, to-day we find that it is the general rule for motors to be designed and built for the particular work for which they are intended, and to be made part and parcel of the machine they have to drive. The same applies to the switch-gear, and a large supply of different forms of specially enclosed switches for

use in very fiery mines proves how thoroughly the manufacturers have interested themselves in the matter.

The automatic and electrical devices for regulating and signalling in connection with electrically driven winding engines were quite the most interesting and valuable introduction in this year's exhibition, and the fact that by far the greater number of coal-cutters and drills which were exhibited were fitted with electric motors should go far to prove that electricity is fighting its way successfully against the older established methods of colliery procedure.

Other arrangements of colliery machinery showing the adaptability of electric motors were well represented by motor-driven pumps, fans, hoists, heading machines, and elevators, and among interesting signs of the times were the electrically driven air compressors.

This development in colliery work is quite in keeping with the expansion of the use of electricity for power purposes which is taking place at the present time. The many power schemes now in hand or being brought before Parliament also show that, although it has been a long time coming, electricity as a motive power for general use may now be said to have "arrived."

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

THE annual meeting of the Midland Agricultural and Dairy College will be held on Monday next, July 30, when the certificates gained during last session will be distributed, and the report on the year's work presented.

MR. P. FRASER has been appointed lecturer in mathematics at University College, Bristol, in succession to Mr. S. B. McLaren, who has resigned to take up an appointment in the University of Birmingham. The University of Liverpool has conferred the degree of Doctor of Engineering on Mr. J. Morrow, lecturer in engineering in University College, Bristol.

DR. JAMES STEWART, of Rickmansworth, who died on June 2 last, left more than 25,000*l.* to the University of Melbourne, Victoria, to found and endow in perpetuity three scholarships, each of an annual value of not more than 50*l.*, and tenable for two or three years, to be called the "Stewart Scholarships," one to be awarded for anatomy, one for medicine, and one for surgery. In addition to this, more than 3000*l.* is left to the Ballarat School of Mines for a "Stewart Fund" to be applied to the augmentation for ever of the salary of a teacher of mineralogy, and about 1500*l.* to the Ballarat Mechanics' Institute for replenishing the library.

THE new regulations of the Board of Education for the training of teachers and for the examination of students in training colleges have been published. No very substantial alterations have been made in the present issue. It is satisfactory to find that no single detailed syllabus of elementary science is included in the schemes of work regulating the instruction in the compulsory subjects of the examination to be conducted by the Board in 1908. After a consideration of the needs of the students and of the facilities which the training college offers for science teaching, the authorities are to draw up a scheme of instruction in science and to submit it to the approval of the Board. This instruction will in the main be tested by inspection, and the students will be expected to be able to carry out experiments selected from that portion of the approved syllabus which has been worked through up to the date of the inspector's visit, or to perform such experiments of similar character as the inspector may consider suitable. Encouragement is to be given to students proposing to teach in country schools to take up what is called "rural science," which includes nature-study and the broad principles of agriculture. The whole tendency of these regulations is to discountenance a mere text-book acquaintance with the facts of science; the Board is to be congratulated upon its recognition of the value to teachers of a practical training in the methods of science.

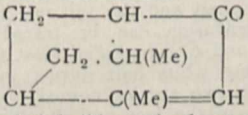
ON Wednesday, July 18, the new buildings of the South-Eastern Agricultural College, Wye, were opened by Lady Carrington in the unavoidable absence of the Minister of Agriculture. At the same time the diplomas, certificates, and prizes were presented by her to the students before a large assembly of persons interested in agriculture, including Lord Ashcombe, Mr. Laurence Hardy, M.P., and Mrs. Laurence Hardy, Mr. Henniker-Heaton, M.P., Mr. Marsham (chairman Kent County Council), Major Craigie, C.B. (Board of Agriculture), the Poet Laureate, Lady Theobald Butler, Dr. Clowes, and others. The new buildings have increased the size of the college by about one-third its present extent. The additions include a veterinary and bacteriological laboratory, a large new drawing school, a new zoological research laboratory, a chemical research room connected with a greenhouse, new offices and students' common room, and a large detached gymnasium, the latter and the drawing school both anonymous gifts. The additions have permitted the enlargement of the biological laboratory and one of the lecture rooms to nearly double their former size, and the formation of a mycological research room. Electric light has been installed throughout. The college may now be said to be the most completely equipped agricultural institution in the country. The principal, in addressing the meeting, and also Mr. Laurence Hardy, in seconding the vote of thanks to Lady Carrington, both spoke of the importance of research work and urged strongly that national financial aid should be given to the college, which has opportunities for such work as cannot be found elsewhere.

HIGHER education will benefit greatly by the handsome bequests detailed in the will of the late Mr. Alfred Beit. The college of technology (including mining and metallurgy) in connection with the University of London receives 50,000*l.* and 5000 preferred shares of 2*l.* 10*s.* each in De Beers Consolidated Mines (Limited). The sum of 200,000*l.* is left to the University of Johannesburg to be applied in or towards building and equipping university buildings on the site of the property recently given by Mr. Beit to Johannesburg (including the construction of a tramway connecting the property with Johannesburg), the income of such 200,000*l.* to be applied meanwhile for educational projects as the Board of Education at Johannesburg may determine; but if at the expiration of ten years the 200,000*l.* shall not have been applied in such building and equipment, then the legacy is to lapse. 200,000*l.* is to be distributed within two years after Mr. Beit's death by a board of trustees, of whom the present Bishop of Mashonaland is to be one, for educational, public, and other charitable purposes in Rhodesia. Mr. Beit also bequeathed 25,000*l.* to the Institute of Medical Sciences Fund, University of London, and 25,000*l.* to the Rhodes University, Grahamstown, Cape Colony; 20,000*l.* to his firm of Eckstein and Co., of Johannesburg, to be applied for educational, public, and other charitable purposes in the Transvaal Colony; 15,000*l.* to his firm at Kimberley, to be applied for educational, public, and other charitable purposes in or near Kimberley; and 15,000*l.* to Dr. Jameson, Prime Minister of Cape Colony, and Sir Lewis L. Michell, to be applied for educational, public, and other charitable purposes in Cape Colony (excluding Kimberley).

SOCIETIES AND ACADEMIES.

LONDON.

Chemical Society, July 5.—Prof. R. Meldola, F.R.S., president, in the chair.—Saponarin, a new glucoside coloured blue with iodine: G. **Barger.** This substance has been isolated from *Saponaria officinalis*. It crystallises in microscopic needles and is hydrolysed by acids yielding glucose, vitexin, and a colouring matter, apparently isomeric with vitexin, for which the name saponaretin is suggested.—The constitution of umbellulone: F. **Tutin.** Umbellulone occurs in the essential oil of *Umbellularia Californica*, and has the formula $C_{10}H_{14}O$. Its reactions indicate that it has the constitution



—The action of ethyl iodide and of propyl iodide on the disodium derivative of diacetylacetone: A. W. **Bain.**—A

possible source of error in Stas's nitrogen ratios: R. W. **Gray.** The researches of Rayleigh, Leduc, D. Berthelot, Guye, and the author confirm Stas's lower value for the atomic weight of nitrogen, and an indirect comparison of the atomic weights of nitrogen and silver from the results of Marignac, Scott, and Richards leads to the same result. —Electrolytic oxidation: H. D. **Law.** On oxidising benzoin by the electrolytic method, benzil, benzaldehyde, and benzoic acid are formed. In addition, a certain amount of tarry matter is always obtained, the formation of which is a property of high potential discharge at the anode, and always takes place in the case of unsaturated compounds. —The ethyl esters of acetonyloxalic and acetophenyloxalic acids and the action of ethyl oxalate on acetanilide and its homologues: S. **Ruhemann.**—An oxidation product of indigotin: A. G. **Perkin.** On sublimation with limited access of air, pure indigotin gives a small quantity of a yellow sublimate, which crystallises in needles and has the formula $C_{15}H_8O_2N_2$.—Indigo-yellow: A. G. **Perkin.** In 1904 it was shown that the yellow colouring matter present in Java indigo is kampherol. Examination has now shown that it is derived from a glucoside (kampheritrin) present in the leaves of *Indigofera arrecta*. It is hydrolysed by acids into kampherol (1 mol.) and rhamnose (2 mols.).—1 : 3-Diphenylbarbituric acid and some coloured derivatives. Synthesis of 1 : 3-diphenyluric acid: Miss M. A. **Whiteley.**—The alkylation of rhamnose: T. **Purdie** and C. R. **Young.** Dimethyl acetone-rhamnoside, trimethyl methylrhamnoside, di- and tri-methylrhamnose, and a number of their derivatives are described.—The alkylation of *l*-arabinose: T. **Purdie** and R. E. **Rose.** By methylating Fischer's α-methylarabinoside with silver oxide and methyl iodide, trimethyl α-methylarabinoside is obtained in large, well-formed crystals, and by hydrolysing this with dilute hydrochloric acid, trimethyl arabinose is produced. Descriptions of these substances are given.—The esters of triacetic lactone and triacetic acid: F. **Sproxton.** The methyl and ethyl esters are described.—Optically active reduced naphthoic acids, part ii., the resolution of the tetrahydronaphthoic acids: R. H. **Pickard** and J. **Yates.** —The velocity of chemical change in the pentamethylene series: N. **Menschutkin,** sen. A *résumé* of the results obtained in the study of the velocity of chemical change in polymethylene derivatives is given.—Hydrolysis of ammonium salts by water: E. G. **Hill.** The constants obtained in the case of the salts of monobasic acids are inversely proportional to the molecular conductivities of the acids, and agree well with the values obtained for the strength of the acids by the various dynamical methods. In the case of dibasic acids, the constants are irregular.— The addition of alkyl halides to alkylated sugars and glucosides: J. C. **Irvine** and Miss A. M. **Moodie.** The results point to the formation, during cooling, of oxonium compounds of the sugar with alkyl halides, and the α-form of the aldose appears to be more reactive than the β-isomeride.—The following notes have been received since the meeting:—Note on the preparation of ethyl acetonedicarboxylate: E. **Ormerod.**—The interaction of nitroformazyl, carbon disulphide, and potassium hydroxide. A contribution to the chemistry of the thiobiazalones and the xanthates: E. **Ormerod.**—Aldehydrol and the hydrates of compounds containing a carbonyl group: W. M. **Colles.** Concentrated aqueous solutions of aldehyde acetone, formic, acetic, monochloroacetic, and trichloroacetic acids were cooled to low temperatures in a special apparatus. The following compounds of special interest were obtained:— aldehydrol, $CH_3CH(OH)_2$; a hydrol of formic acid, possibly *o*-formic acid, $HC(OH)_3$; *o*-acetic acid, $CH_3C(OH)_3$; and *o*-monochloroacetic acid, $CH_2ClC(OH)_3$.

Challenger Society, June 27.—Capt. Wilson-Barker in the chair.—A series of deep-water fish from the N.E. Atlantic slope: Messrs. **Holt** and **Byrne.** The series included *Chimaera mirabilis*, Collett, *Macrurus labiatus*, Koehler, and *Scorpaena echinata*, Koehler. Several of the rarer species filled gaps in the known area of distribution.—A photograph of so-called oily patches at sea, supposed to be rich in plankton: Captain **Wilson-Barker.** —New charts published by the society. Six of these, prepared by Dr. **Schott,** showed the mean annual isotherms of the ocean, and the seventh was a small blank chart of the world for plotting distributions, &c.—A destructive test of Hensen's theory of the uniformity of plankton over large areas: Dr. **Fowler.** It was shown that great variations in the plankton occurred on successive days at stations close together in a district apparently unappreciably affected by currents.—The scientific cruise of his yacht, *Silver Belle*, in 1906: Dr. **Wolfenden.** The vessel was chiefly occupied with trawling and hydrographic work, from Dublin to Funchal, and from Gibraltar to the Josephine Bank and N. coast of Morocco. Mr. Byrne exhibited and commented on some of the fish obtained during the cruise, of which the most interesting was a fine specimen of the little-known *Himantolophus reinhardi*, Lütken, said to have been taken in shallow water near Gibraltar.

Faraday Society, July 2.—Prof. S. P. Thompson, F.R.S., in the chair.—The oxidation of atmospheric nitrogen in electric arcs: Prof. Kr. **Birkeland.** This will be dealt with in a later number.—Preliminary report on the experiments made at Sault Ste. Marie, under Government auspices, on the smelting of Canadian iron ores by the electrothermic process: Dr. E. **Haanel.** The results obtained are summarised as follows:—(1) Magnetite (which is the chief Canadian ore) can be as economically smelted by the electrothermic process as hematite. (2) Ores of high sulphur content not containing manganese can be made into pig-iron containing only a few thousandths of 1 per cent. of sulphur. (3) The silicon content can be varied as required for the class of pig to be produced. (4) Charcoal, which can be cheaply produced from mill refuse or wood which could not otherwise be utilised, can be substituted for coke as a reducing agent, without being briquetted with the ore. (5) A ferronickel pig can be produced practically free from sulphur and of fine quality from roasted nickeliferous pyrrhotite. (6) The experiment made with a titaniferous iron ore containing 17·82 per cent. of titanic acid permits the conclusion that titaniferous iron ores up to perhaps 5 per cent. titanic acid can be successfully treated by the electric process.—Electrolysis of dilute solutions of acids and alkalis at low potentials: dissolving of platinum at the anode by a direct current: Dr. G. **Senter.** When dilute solutions of sulphuric acid and of sodium hydroxide are submitted to electrolysis at a potential below that at which oxygen is evolved in the gaseous form, an oxidising agent is formed in a very small amount at the anode. The substance is very stable, and is not destroyed by boiling; it is not hydrogen peroxide. In the course of the experiments with dilute sulphuric acid, it was observed that traces of platinum went into solution from the anode, although the average current density was only about $1{\cdot}5\times10^{-7}$ amperes per sq. cm.

DUBLIN.

Royal Dublin Society, June 19.—Prof. J. A. McClelland in the chair.—The absorption of β radiation by matter: Prof. J. A. **McClelland** and F. E. **Hackett.** As pointed out in a previous paper, the coefficient of absorption of β radium rays as usually measured gives little information as to the stopping power of different types of atoms. This arises from the fact that the secondary radiation of β particles is important, and must be allowed for before a true coefficient is obtained. The measurements in the present paper are made in such a way that this necessary correction can be applied. The results show that the quotient of this true coefficient of absorption by the density is not constant, but depends on the atomic weight of the absorbing substance. The main feature is that the quotient increases as the atomic weight increases; the rate of increase is not, however, uniform, and there is evidence that the elements fall into divisions with respect to this quotient corresponding to the chemical periods. This may be compared with the previous work by one of the present authors, showing that the emission of secondary β radiation is determined by the atomic weight of the substance acted upon.

PARIS.

Academy of Sciences. July 9.—M. H. Poincaré in the chair.—Remarks by M. Berthelot on his work "Archéologie et Histoire des Sciences."—Trypanosomiasis of the

Upper Niger: a new pathogenic trypanosome: A. **Laveran.** The new species was obtained from a ram, inoculated from the blood of a horse infected in the Bari region, and is named *Trypan. cazalboui.* This trypanosome is clearly distinguished from neighbouring species by its pathogenic action upon animals.—The chlorides and sulphates of rubidium and cæsium: M. **de Forcrand.** A thermochemical paper.—The secondary alcohols of the octane $(CH_3)_2.CH.(CH_2)_4.CH_3$: Louis **Henry.** A discussion on the relations existing between the boiling points of the secondary alcohols and the position of the hydroxyl group in the chain.—The effect of breathing air containing from 5 per cent. to 10 per cent. of carbon: N. **Gréhant.** The effect of increasing the carbonic acid content of the air from the normal amount to 5 per cent. is to set up more rapid breathing, but the composition of the gases of the blood remains nearly constant. When the proportion of carbonic acid was increased to 10 per cent., the respiratory movements were three times as fast as with pure air; the oxygen in the blood gases was still constant, but the carbonic acid was increased from 38·4 per cent. to 42·8 per cent.—A reflection heliometer: Milan **Štefánik.**—A preliminary measurement of the lines of the solar spectrum in the infra-red: G. **Millochau.** The results of the application of a method indicated in a previous note. Measurements of 106 lines are given for wave-lengths λ 8025·5 to λ 9325·2.—The theory of ensembles: Jules **König.**—The measurement of the capacity and self-induction of telegraph lines: M. **Devaux-Charbonnel.** Details are given of the methods used to prevent the interference of parasitic currents. It was found that the capacity of air lines is higher than their theoretical value, and varies with the hygrometric state of the atmosphere.—The determination, in wave-lengths, of the photographed absorption bands of the colouring matters of the blood: Louis **Lewin,** A. **Miethe,** and E. **Stenger.**—The action of the silent discharge on cyanogen: H. **Gaudechon.** Nitrogen is set free and a solid body deposited, the latter not being merely a polymeride of cyanogen, since the values of *n* in the formula C_nN_4 varied from 4·4 to 5·0 in different experiments.—Amido-acids derived from the albumens: Albert **Morel.** An account of the preparation of some substituted ureas of glycocoll, including glycocoll-urea, a mixed urea of glycocoll and leucine, and of glycocoll and tyrosin. None of these compounds was capable of hydrolysis with digestive ferments.—Condensations with anthranol: R. **Padova.**—The reduction of the primary unsaturated alcohols of the fatty series by the metal-ammoniums: E. **Chablay.** With allyl alcohol, one molecule is converted into sodium allylate and a second into propylene. The reaction is quantitative, and forms a good method for the preparation of pure propylene.—The transformation of some secondary-tertiary α-glycols into ketones, and the transposition of hydrobenzoin: MM. **Tiffeneau** and **Dorlencourt.**—The isomorphism of potassium chlorate and nitrate: Jean **Herbette.** It is shown in the case of these two salts that the properties of mixed crystals in a series of isomorphous mixtures are not necessarily intermediate between those of the extreme terms of the series, the pure salts.—The influence of the absorption of sugar on the phenomena of germination of young plants: W. **Lubimenko.** When fermentable sugars are absorbed by the plant, the latter behaves physiologically like a yeast placed under aërobic conditions.—Variations in the nutritive exchanges under the influence of muscular work developed during mountain climbing: H. **Guillemard** and R. **Moog.**—The temporary disappearance of the trypanosomes of nagana in infected dogs: Gabriel **Roux** and Léon **Lacomme.**—The geology of the Djebel Ouenza district, on the borders of Tunis and Algeria: Pierre **Termier.**—The terrestrial magnetic inclination in prehistoric times: Paul L. **Mercanton.**—The trajectories of electric corpuscles in space under the influence of terrestrial magnetism, with applications to the aurora borealis and magnetic disturbances: Carl **Störmer.**—The aurora borealis: P. **Villard.**—The supposed law of monthly distribution of earthquakes: F. de Montessus **de Ballore.** The author concludes that earthquakes occur at any time of the year, and that there is no ground for supposing a maximum earthquake frequency in any special month.

NEW SOUTH WALES.

Linnean Society, May 30.—Mr. Thos. Steel, president, in the chair.—The genus Cardiothorax, with descriptions of new species of Australian Coleoptera, part ii.: H. J. **Carter.** All workers in Australian entomology who are precluded from an examination of types in European museums find their difficulties increased by the want of information on many of the commoner species. The present paper is an attempt to clear up much of the confusion that has existed as to the nomenclature, identification, and geographical distribution in one of the larger genera of the family Tenebrionidæ, subfamily Helopides, viz. the genus Cardiothorax.—Preliminary note on the geological history of the Warrumbungle Mountains district: H. I. **Jensen.** It is shown in this note that the Warrumbungle Mountains are the remnants of a dome-shaped mass of volcanic rocks dissected by arid agencies. The erosion has produced a land form similar to that described by Ida H. Ogilvie under the new name of "conoplain" (*American Geologist*, July, 1905). It is also shown that this conoplain is surrounded by a peneplain dissected by arid agencies and base-levelled to the level of the Western Plains.—Descriptions of new species of Australian Coleoptera, part viii.: A. M. **Lea.** The paper contains descriptions of twenty-two new species and one new genera (a blind one) of Staphylinidæ, a new genus of Paussidæ, a remarkable new genus of Ptinidæ, the only known species of which occurs in ants' nests, an Inopeplus, a Pelonium (a genus of Cleridæ not hitherto recorded from Australia), four species of Lathridius, and a beautiful Lemodes.—New Australian species of the family Agrionidæ (Neuroptera: Odonata): R. J. **Tillyard.** Eleven new species are added to the Australian list, bringing the total for this family up from twenty-eight to thirty-nine. Seven genera are represented, of which two have not before been recorded for Australia. Of the species described, ten are new to science, and the eleventh has only been recorded before from Central Africa, where it is common.

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