

SCIENTIFIC SERIALS

THE *Geological Magazine* for June (No. 96) opens with an interesting article by Mr. Dyer, on some fossil wood from the Lower Eocene of Herne Bay and the Isle of Thanet, in which the author describes and figures the microscopic structure of the wood of a Dicotyledonous tree, showing the peculiar phenomenon known under the name of "tylose."—Mr. G. Poulett Scrope communicates some notes on the late eruption of Vesuvius.—From Mr. T. McKenny Hughes we have a note entitled "Man in the Crag," in which the writer discusses the interpretation to be given to certain crag sharks' teeth with holes bored in their substance, and sometimes through them from side to side, which have been supposed to be the work of human hands. Mr. Hughes is of opinion that there is no evidence to support this opinion, and that the cavities in question have been produced by boring mollusca.—Mr. A. R. C. Selwyn, Director of the Canadian Geological Survey, notices the occurrence of some fine fossil footprints in a stratum of dark shale belonging to the Carboniferous series of Nova Scotia, and these footprints are described and figured by Principal Dawson. The latter writer states that the principal footprints are of two kinds—a large one resembling the form described by him as *Sauropus sydnerensis*, but having a strong claw on the fifth toe of the hind foot, which has left its mark strongly impressed upon the slab containing the prints, and a smaller impression, sometimes trifid, but occasionally showing the marks of four or five toes. The former (which he names *Sauropus unguifer*) he thinks may have been made by *Baphetes planiceps*; the latter perhaps by a species of *Dendropteron*.—Mr. James Geikie concludes his valuable series of papers on changes of climate during the Glacial epoch, and gives an important tabular view of the Quaternary deposits of the British Islands, with their equivalents in some other countries. Mr. G. H. Kinahan notices the supposed middle gravels of the drift of Ireland. The Rev. O. Fisher describes the occurrence of a worked flint in the brick-earth of Crayford. The Rev. T. G. Bonney has a paper on supposed Ice scratches in Derbyshire, which he regards as slickensides; and Prof. Traquair furnishes a supplementary note on *Phaneropleuron* and *Uronemus*.—Among the notices we may mention an account of the human skeleton lately discovered in a cavern at Mentone.

Revue Scientifique, Nos. 43-50.—No. 43 commences with an article by M. Wolf on the Transit of Venus in 1874, illustrated by five diagrams. Mr. Keith Johnston's paper read before the Royal Society of Edinburgh on the Lake-basin of Eastern Africa is translated. In subsequent numbers we find a continuation of M. Claude Bernard's course of lectures on Animal Heat. A paper presented by M. Ch. Grad to the Geographical Society of Paris on the resources of Alsace. Dr. Günther's paper on *Ceratodus Forsteri* is translated from NATURE. M. Dumas contributes an article on the higher instruction in Agriculture at the Central School of Arts and Manufactures in Paris. M. G. de Morillet on Cave-man; epoch of the Madeleine. M. Granddier contributes a most interesting series of papers on his scientific voyage to Madagascar. Translation of the chapter on the evolution of religious ideas among savages, from Sir John Lubbock's "Origin of Civilisation." Translation of Captain Noble's lecture delivered at the Royal Institution on the Explosive Force of Gunpowder. Report of the meeting of the Congress of German Naturalists and Physicians at Rostock in Sept. 1871, department of Geography and Chemistry.—In No. 44 is a history of the Observatory of Paris. Biography of M. Pictet by Soret. We have besides in each number abstracts of the proceedings of the various scientific societies: the Académie des Sciences, Académie de Médecine, Société de Biologie, Société Chimique, Société Géologique, Société Botanique, Société d'Anthropologie, and of the foreign scientific societies at Vienna, Berlin, London, Palermo, &c.

THE *American Naturalist* for June does not contain so many original articles as usual. The longest is by Dr. R. H. Ward, on "Students' Microscopes," with particulars of the relative advantages offered by the instruments furnished by different makers.—Mr. J. A. Allen continues his "Ornithological Notes from the West," discoursing this time on the birds of Colorado.—There are two interesting shorter articles: by Mr. B. Pickman Mann, on the "White Coffee-leaf Miner" (*Ceniosstoma coffeelani*), so destructive to the coffee culture of Brazil, with a plate; and by Prof. Sanborn Tenney, on the Remarkable Simulation of Death presented by the Hibernation of the Jumping Mouse (*Faculus Hudsonius*) of the Western States.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, June 13.—"Further Experiments on the Effect of Alcohol and Exercise on the Elimination of Nitrogen, and on the Pulse and Temperature of the Body." By E. A. Parkes, F.R.S.

1. The elimination of nitrogen during exercise was unaffected by brandy; and since the experiments led to the same result in the former series during comparative rest, it seems certain that in healthy men on uniform good diet alcohol does not interfere with the disintegration of nitrogenous tissues.

2. The heat of the body, as judged of by the axilla and rectum temperatures, was unaffected by the amount given.

3. The pulse was increased in frequency by four ounces of brandy, and palpitation and breathlessness were brought on by larger doses, to such an extent as to greatly lessen the amount of work the man could do, and to render quick movements impossible. As the effect of labour alone is to augment the strength and frequency of the heart's action, it would appear obviously improper to act on the heart still more by alcohol. In this effect on the heart, and through it on the lungs, is perhaps to be found the explanation of the trainer's rule, which prohibits alcohol during exertion. Whether in a heart exhausted by exertion alcohol would be good or bad is not shown by these experiments; but it can hardly be supposed that to urge a heart which requires rest, as would then be the case, can be proper.

4. It seems clear, from the suddenness with which marked narcotic symptoms came on after the third dose was taken on each day, that the eight hours from 10 to 6 o'clock were not sufficient to get rid of the brandy taken at 10 and 2, and that in fact the body must have been still saturated at 6 o'clock.

The exact amount of brandy which commenced to lessen the labour the man could perform is not shown by these observations, and would require more careful modes of investigation. It was evidently some quantity more than 4 ounces which produced effects sufficiently marked to attract his attention, but I should not wish to affirm that every 4 ounces produced no effect in this direction. The man himself was of opinion that 4 ounces had no influence either way. He was quite certain it did not aid his work, but he could not see that it injured it. The second 4 ounces decidedly produced a bad effect.

5. That neither exercise on water nor on alcohol produced any effect on the phosphoric acid of the urine. The result is in accordance with that of the experiments recorded in No. 89 of the "Proceedings of the Royal Society."

The effect on the free acidity of the urine was also inappreciable. The free acidity may have been a little increased in the brandy period, but the change is so slight as to fall within the limits of normal variation.

The effect on the chlorine was not certain, as its ingress was not sufficiently constant.

As the action of alcohol in dietetic doses on the elimination of nitrogen and on the bodily temperature is so entirely negative, it seems reasonable to doubt if alcohol can have the depressing effect on the excretion of pulmonary carbon which is commonly attributed to it. It can hardly depress, one would think, the metamorphosis of tissues, or substances furnishing carbon, without affecting either the changes of the nitrogenous structures or bodily heat. It seems most important that fresh experiments should be made with respect to its effect on carbon elimination, as without a perfect knowledge on that point the use of alcohol as an article of diet in health cannot be fairly discussed.

Royal Geographical Society, June 10.—Major-General Sir Henry C. Rawlinson, president, in the chair. "On the New Hebrides and Santa Cruz Islands in the South-west Pacific," by Lieut. A. H. Markham. The paper described the topography, volcanic phenomena, and ethnology of these groups of islands, visited by him during the cruise of H.M.S. *Rosario*, under his command, between October 1871, and February 1872. He gave a history of the progress of discovery in this part of the Pacific, commencing from the voyage of Mendaña in 1568. All the various expeditions for three centuries did little more than sail through the groups and have deadly encounters with the natives. The islands lie in N.N.W. and S.S.E. direction, and contain some of the most continuously active volcanoes on the surface of the globe. The volcanic cones may be traced in a linear direction for 600 miles. The islands are remarkable for the absence of coral reefs around them, which is attributed by Dana to the destruction of the zoophytes by the heat produced by submarine

eruptions. Lieut. Markham ascended the volcano Gasowa, in the island of Tanna, and watched an eruption from the edge of the crater. During the intervals between the explosions (sounding like broadsides from a line-of-battle ship) the sheets of liquid fire seemed to flow back to three distant openings in the bottom of the funnel-shaped crater; masses of scorix were hurled up vertically to a height of 1,000 feet. The Melanesian (black, curly-haired) and Polynesian (straight-haired) races appeared to be curiously dovetailed in their distribution throughout the northern portion of these archipelagos. This was explained, in the discussion which followed, by the Bishop of Lichfield, who gave to the meeting a most interesting account of his own experiences in these islands, and who showed that the wandering Polynesians, who peopled the greater portion of the Pacific area (including New Zealand), had been driven in their canoes by winds on some of the smaller islands of the group.

Geological Society, June 5.—J. Gwyn Jeffreys, F.R.S., in the chair.—1. "Notes on Sand-pits, Mud-volcanoes, and Brine-pits, met with during the Yarkand Expedition of 1870." By Dr. George Henderson. The author described some very remarkable circular pits which occurred chiefly in the valley of the Karakash river. These pits varied in diameter from six to eight feet, and were between two and three feet deep, the distances between the pits being about the same as the diameters. He accounted for the formation of the pits by supposing that the water, which sinks into the gravel at the head of the valley, flows under a stratum of clay, which prevents it from rising; the water in course of time, however, flowing in very varying quantities at different periods, gradually washes away small portions of the clayey band, when the sand above runs through into the cavity thus formed, leaving the pits described by the author. The mud-volcanoes at Tarl Dab he accounted for by supposing that after a fall of rain or snow the air contained in the water-bearing stratum would get churned up with water and mud, and be ejected as a frothy mud, sometimes to a height of 3 ft.; while the brine-pits in the Karakash valley he believed to be formed by the excessive rise and fall in the level of that river at various times, which alternately fills and empties the bottoms of the pits, and the water left in the pits gets gradually concentrated by evaporation until a strong brine remains. Mr. Prestwich pointed out that the pits seemed due to quite another cause than the pipes in the chalk and other calcareous rocks, as they did not appear to arise from erosion by carbonic acid. Mr. Thorp suggested an analogy between the phenomena in Yarkand and those at Nantwich, and thought that the pits might be due to solution of rock-salt below the surface.—2. "On the Cervidæ of the Forest-bed of Norfolk and Suffolk," by W. Boyd Dawkins, F.R.S. The author described a new form of *Cervus* from the Forest-bed of Norfolk, which he based on a series of antlers, and named *C. verticornis*. The base of the antler is set on the head very obliquely; immediately above it springs the cylindrical brow-tyne, which suddenly curves downwards and inwards; immediately above the brow-tyne the beam is more or less cylindrical, becoming gradually flattened. A third flattened tyne springs on the anterior side of the beam, and immediately above it the broad crown terminated in two or more points. No tyne is thrown off on the posterior side of the antler, and the sweep is uninterrupted from the antler base to the first point of the crown. The antlers differ in curvature and otherwise from those of *Cervus megaceros*, but there is a general resemblance between the two animals; and the *verticornis* must have rivalled the Irish elk in size. A second species of deer, the *Cervus carnutorum*, which had been furnished by the strata of St. Prest near Chartres, must be added to the fauna of the forest-bed. The Cervidæ of the forest-bed present a remarkable mixture of forms such as the *Cervus polignacus*, *C. Sedgwickii*, *C. megaceros*, *C. carnutorum*, *C. elaphus*, and *C. capreolus*, seeming to indicate that in classification the forest-bed belongs rather to an early stage of the Pleistocene than to the Pliocene age. This inference is strongly corroborated by the presence of the mammoth, which is so characteristic of the Pleistocene age.—3. "The Classification of the Pleistocene Strata of Britain and the Continent by means of the Mammalia." By W. Boyd Dawkins, F.R.S. The Pleistocene deposits may be divided into three groups—1st, that in which the Pleistocene immigrants lived, with some of the southern and Pliocene animals in Britain, France, and Germany, and in which no arctic mammalia had arrived; 2nd, that in which the characteristic Pliocene Cervidæ had disappeared, and the *Elephas meridionalis* and *Rhinoceros etruscus* had been driven south; 3rd, that in which the true arctic mammalia were

the chief inhabitants. This third, or late Pleistocene division, must be far older than any prehistoric deposits, as the latter often rest on the former, and are composed of different materials; but the difference offered by the fauna is the most striking. In the Pleistocene river-deposits twenty-eight species have been found, the remains of man being associated with the lion, hippopotamus, mammoth, wolf, and reindeer. On examining the fauna from the ossiferous caves, we find the same group of animals, with the exception of the musk-sheep; and it is therefore evident that the cave-fauna is identical with that or the river strata, and must be referred to the same period. Some few animals, however, which would naturally haunt caves, are peculiar to them, as the cave-bear, wild cat, leopard, &c. The magnitude of the break in time between the prehistoric and late Pleistocene period may be gathered also from the disappearance in the interval of no less than nineteen species. The middle division of the Pleistocene mammalia, or that from which the Pliocene Cervidæ had disappeared, and been replaced by invading temperate forms, is represented in Great Britain by the deposits of the Lower Brick-earths of the Thames Valley, and the older deposits in Kent's Hole and Oreston. The discovery, by the Rev. O. Fisher, of a flint-flake in the undisturbed Lower Brick-earth at Crayford, proves that man must have been living at this time. The mammalia from these deposits are linked to the Pliocene by the *Rh. megarhinus*, and to the late Pleistocene by the *Ovibos moschatus*. The presence of *Machærodus latidens* in Kent's Hole, and of the *Rh. megarhinus* in the cave at Oreston, tends to the conclusion that some of the caves in the south of England contain a fauna that was living before the late Pleistocene age. The whole assemblage of Pleistocene animals evinces a less severe climate than in the late Pleistocene times. The fossil bones from the forest-bed of Norfolk and Suffolk show that in the early Pleistocene mammalia there was a great mixture of Pleistocene and Pliocene species. It is probable also that the period was one of long duration, for in it we find two animals which are unknown on the Continent, implying that the lapse of time was sufficiently great to allow of the evolution of forms of animal life hitherto unknown, and which disappeared before the middle and late Pleistocene stages. The author criticised M. Lartet's classification of the late Pleistocene or Quaternary period by means of the cave-bear, mammoth, reindeer, and aurochs, and urged that, since the remains of all these animals were intimately associated in the caves of France, Germany, and Britain, and, so far as we know, the first two appeared and disappeared together, and the last two lived on into the Prehistoric age, they did not afford a basis for a chronology. The latest of the three divisions of the British Pleistocene fauna is widely spread through France, Germany, and Russia, from the English Channel to the shores of the Mediterranean. The Middle Pleistocene is represented by a river-deposit in Auvergne, and by a cave in the Jura, in which the presence of the *Machærodus latidens*, and a non-tichorine rhinoceros, and the absence of the characteristic arctic group of the late Pleistocene and of all the peculiar animals of the early Forest-bed stage, prove that that era must be Middle Pleistocene. The early Pleistocene division is represented in France by the river-deposit at Chartres, being characterised by the presence of two non-Pliocene animals, *Trogontherium* and *Cervus carnutorum*. The Pleistocene mammalia of the regions south of the Alps and Pyrenees present no trace of arctic species, the mammoth being viewed as an animal fitted for the climatal conditions both of Northern Siberia and of the Southern States of America. It contains *Elephas africanus* and *Hyæna striata*. The fauna of Sicily, Malta, and Crete differ considerably from that described above, possessing some peculiar forms, such as *Hippopotamus pentlandi*, *Myoxus melitensis*, and *Elephas melitensis*. The Pleistocene mammalia may be divided into five groups, each marking a difference in the climate, the first embracing those which now live in hot countries; the second those which inhabit northern regions, or high mountains, where the cold is severe; the third those which inhabit temperate regions; a fourth those which are found alike in hot and cold; and a fifth which are extinct. There were three climatal zones, marked by the varying range of animals. The northern, into which the southern forms never penetrated, the latitude of Yorkshire being the boundary of the advance of the southern animals; the southern, into which the northern species never passed, a line passing through the Alps and Pyrenees being the limit of the range of the northern animals, and an intermediate area in which the two are found mingled together. Two out of the three zones are proved by the physical evidence of the Pleistocene strata,

We see by the discoveries of Dr. Bryce, Mr. Jameson, and others that the Pleistocene mammalia must have invaded Europe during the first Glacial period before the submergence, for the reindeer and the mammoth have been found in Scotland under the deposits of Boulder-clay. Dr. Falconer and others have also discovered the latter animal in the pre-glacial forest-bed. The Glacial period can therefore no longer be looked on as a hard and fast barrier separating one fauna from another. If man be treated as a Pleistocene animal, there is reason to believe that he formed one of the North Asiatic group, which was certainly in possession of Northern and Central Europe in Pre-glacial times. The Pleistocene mammalia may again be divided into three groups, those which came from Northern and Central Asia, those from Africa, and those which were living in the same area in the Pliocene age. Had not the animals which lived in Europe during the Pliocene age been insulated from those which invaded Europe from Asia by some impassable barrier, the latter would occur in our Pliocene strata as well as the former. Such a barrier is offered by the northern extension of the Caspian up the valley of the Obi to the Arctic Sea. The animals of Northern and Central Asia could not pass westwards until the barrier was removed by the elevation of the sea-bottom between the Caspian and the Urals. The same argument holds good as to the African mammalia, which could not have passed into Sicily, Spain, or Britain, without a northward extension of the African mainland. The relation of the Pleistocene to the Pliocene fauna is a question of great difficulty. If the Pliocene fauna be compared with that of the Forest-bed, it will be seen that the difference between them is very great. The Pliocene mastodon and tapir, and most of the Cervidae, are replaced by forms such as the roe and red-deer, unknown until then; but many of the Pliocene animals were able to hold their ground against the Pleistocene invaders, although they were ultimately beaten in the struggle for existence by the new comers. The fauna which the author adopted as typically Pliocene is that furnished by the lacustrine strata of Auvergne, the marine sands of Montpellier, and the older fluviatile strata of the Val d'Arno. Mr. Prestwich was hardly prepared to accept the proposed division of the Pleistocene mammalia into three groups; at all events so far as Britain is concerned. Neither could he draw that distinction between the beds at Erith and Grays and those higher up the Thames, which found favour with the author. The barrier offered by the river itself might to some extent account for the absence of reindeer; and though there was a difference in the fauna in the two cases, it seemed hardly enough to mark any great distinction in time. As to the hippopotamus, which occurred over the whole of Northern Europe, associated with the musk-ox and large boulders, he could not see how the conclusion was to be escaped of its having been able to withstand greater cold than its present representative. Though the winters might have been colder, there was evidence in favour of the summers having been warmer; and the flora seems to have been much like that of the present day. The probable migrations of the different animal groups had already been pointed out by M. Lartet, though Mr. Dawkins had carried his investigation of the subject further. He called attention to the fact of the mammoth having been found in Italy. Mr. Boyd Dawkins, in reply, stated that in forming his conclusions, he had not left out of view the evidence afforded by the classes of remains other than those of mammalia, but they threw no light on the classification. With regard to the middle of his divisions of the Pleistocene mammalia, he relied to a great extent on the presence of *Rhinoceros megarhinus*, and of a large number of stags, to say nothing of the absence of reindeer. He did not attach so much importance to the question of the level, as such discrepancies as those pointed out appeared to him by no means impossible. He gave his reasons for not regarding the mammoth as an exclusively arctic animal. His remarks with regard to M. Lartet's classification referred rather to the expanded views of his followers than to those of M. Lartet himself. He acknowledged his obligations to Profs. Gaudry, Fraas, Rüttimeyer, and Nilsson for various facts of which he had made use.

PARIS

Academy of Sciences, June 10.—M. Marie presented a memoir on the determination of the critical point at which the region of convergence of Taylor's series is situated; and M. A. Ribaucour a note on the theory of lines of curvature.—M. Yvon Villarceau exhibited and described to the meeting an isochronous regulator with vanes, constructed by M. Breguet.—A note was

read by M. E. Vial on a new mode of printing on stuffs by means of metallic precipitations, in which the author described a method of printing either by means of clichés or of copper or steel plates upon any textile fabric by the agency of nitrate of silver.—M. A. Clermont presented a note on the metallic trichloracetates, in which he described the preparation and characters of trichloracetate of ammonium, and of acid and neutral trichloracetate of thallium, and noticed the action of permanganate of potash upon hydrate of chloral in producing trichloroacetic acid.—M. Wurtz communicated a note by M. Oré on M. O. Liebreich's experiments, from which the latter inferred that strychnine is an antidote to chloral. M. Oré shows grounds for the belief that M. Liebreich's experiments were inconclusive.—M. de Vibraye presented some further remarks on the spontaneous appearance in France of exotic plants in the track of the belligerent armies in the late war, in which he stated that the number of these plants introduced into the department of the Loir et Cher alone is 163.—In consequence of M. de Vibraye's statements, the sections of Botany and Rural Economy were instructed to prepare a scheme for the systematic introduction of Algerian forage plants suitable for the climate of France.—M. Decaisne presented a note by M. J. E. Planchon on the geographical distribution of the Ulmideæ.

BOOKS RECEIVED

- ENGLISH.—Contributions to Molecular Physics in the domain of Radiation Heat: J. Tyndall (Longmans).—Patterns for Turning: H. W. Elphinstone (J. Murray).—Symon's British Rainfall for 1871 (E. Stanford).—Erewhon, or Over the Range (Trübner).—The Principles of Geology, 11th edition, Vol. ii: Sir C. Lyell (Murray).
 AMERICAN.—Astronomical and Meteorological Observation made at the U. S. Naval Observatory, Washington, 1869.—The Science of Æsthetics in the Nature, kinds, laws, and uses of Beauty: H. N. Day.
 FOREIGN.—Medizinische Jahrbücher, Heft i., 1872: S. Stricker.—Bulletin de la Société Impériale des Naturalistes de Moscou, iii. and iv., 1871.—Die Darwinische Theorie: J. W. Spengel.

DIARY

THURSDAY, JUNE 20.

- ROYAL SOCIETY, at 8.30.—Volcanic Energy—an attempt to Develop its True Origin and Cosmical Relations: R. Mallet, F.R.S.—Preliminary Note on the Reproduction of Diffraction Gratings by means of Photography: Hon. J. W. Strutt.—On Voltaic Standard of Electromotive Force: Latimer Clark.—Pyrology, or Fire Chemistry: Capt. Ross, R.A.
 SOCIETY OF ANTIQUARIES, at 8.30.—Hungarian Origin of the word Coach: A. Goldsmid.—On the Origin of the Christian Æra: G. Oppert.
 LINNEAN SOCIETY, at 8.—On the structural peculiarities of the Bell Bird (*Chasmorhynchus*): by Dr. Murie, F.L.S.
 CHEMICAL SOCIETY, at 8.—On Deacon's Method of obtaining Chlorine, as illustrating some principles of Chemical Dynamics: H. Deacon.

MONDAY, JUNE 24.

- ROYAL GEOGRAPHICAL SOCIETY, at 8.30.

WEDNESDAY, JUNE 26.

- SOCIETY OF ARTS, at 4.—Anniversary Meeting.
 ROYAL SOCIETY OF LITERATURE, at 8.30.—On the Extent of Ancient Libraries: W. E. A. Axon.—On a Service Book of Strassburg use, containing Dramatic representations: Walter de Grey Birch.

THURSDAY, JUNE 27.

- SOCIETY OF ANTIQUARIES, at 8.30.

CONTENTS

	PAGE
LIVINGSTONE	137
CONVERSATIONS ON NATURAL PHILOSOPHY	138
THE GEOLOGICAL SURVEY OF OHIO	139
OUR BOOK SHELF	140
LETTERS TO THE EDITOR:—	
The Method of Least Squares—J. W. L. GLAISHER	140
Solar Halos. (<i>With Diagram</i>)	141
The Volcanoes of Central France.—REV. T. G. BONNIY, F.G.S.	141
Force and Energy.—J. J. MURPHY, F.G.S.	142
Pelagic Fish-Nest.—G. J. HINDE	142
Why are Red Sandstones Red?	142
Mounting of Thermometers.—R. BUSHELL, F.R.A.S.	142
A Few Millions.—A. COWPER RANVARD, F.R.A.S.	142
PROF. CANNIZZARO'S FARADAY LECTURE	143
THE OBSERVATORY ON MOUNT SEVUVIUS. By G. FORBES, F.R.S. (<i>With Illustrations</i>)	145
ON THE DISINTEGRATION OF COMETS. By Prof. D. KIRKWOOD.	148
NEWTON'S MANUSCRIPTS AND BIRTHPLACE. By Dr. C. M. INGLEBY	149
NOTES	149
ON THE SOUND MADE BY THE DEATH'S HEAD MOTH, "ACHERONTIA ATROPOS." (<i>With Illustration</i>) H. N. MOSELEY	151
SCIENTIFIC SERIALS	154
SOCIETIES AND ACADEMIES	154
BOOKS RECEIVED	156
DIARY	156