

News and Views.

RESEARCH work in matters pertaining to forestry science has received a great impetus as a result of the War. In the case of forestry in the British Empire, the reasons are more apparent perhaps than in that of Europe. The countries overseas had, during the great struggle, to be self-supporting in several directions where the raw products of the industries concerned came from the forest. The armies in the East and Middle-East were dependent upon the semi-tropical and tropical forests for the supplies required to carry on their operations. Timbers of many kinds were made use of which had not previously found a place upon the markets; and not timbers alone, for other forest produce became marketable on the grand scale, which had only previously been tapped in a tentative manner. That the importance of research work in forestry in the tropical and semi-tropical forest regions came to receive recognition is not therefore surprising. In Europe the need of research work was not so widely accepted before the War. Although scientific forest management had been practised for a long period in several of the European States, yet it was not before 1891 that some effective recognition of the importance of research work was given by the founding, at a meeting held at Badenweiler, of an international union or association termed the 'International Union of Forest Research Stations.'

As its name implies, the object of the International Union of Forest Research Stations was to have periodical meetings between those engaged in forestry research, with the object of exchanging ideas and, so far as possible, introducing standard methods between the countries for carrying out certain classes of investigation work. The last meeting of the Union so founded, which was the sixth, took place in 1910 in Brussels. The succeeding meeting was fixed for 1914, to take place in Hungary. The War intervened, and no meeting has since been held. As an outcome of the War and the rising demands for timber in Europe, several of the States have realised that, by intensive management, a larger return should be obtainable from the forest areas, and that to obtain such returns demands careful investigation and research work. A revival of the research union came under consideration. During the International Forestry Congress at Rome, held in May 1926, the matter was discussed between a number of the delegates who had the cause of research work at heart. It then transpired that a small meeting of a few Continental experts had been held at Zurich shortly before, with the idea of resuscitating the International Union; and that the Swedish representative had been elected president and commissioned to endeavour to summon a congress in Stockholm in 1928 or 1929. At Rome the project matured, and an invitation to attend a congress, to be held at Stockholm in July 1929, has now been issued by Prof. Henrick Hesselman, chief of the Swedish Institute of Experimental Forestry.

A LARGE *Ichthyosaurus*, at least 30 ft. long, has been discovered at the works of Greaves, Bull, and

Lakin at Harbury, near Leamington, Warwickshire. The specimen is interesting for its large size and good preservation. All the paddles are present, and the skull appears to be complete, though the individual bones are somewhat displaced. Most Lias ichthyosaurs lie crushed on limestone surfaces; but these remains lie in hardened shale, and it should be possible so to develop them that the skeleton can be mounted 'solid,' like the reptiles from the Oxford Clay. The species is almost certainly *I. platyodon* Conybeare. The specimen was found at a higher horizon of the Lias than the plesiosaur which occurred in the same quarry in the *angulatus*-beds and was acquired by the British Museum a year ago. It is hoped that associated ammonites will enable the exact age of the present specimen to be fixed. Messrs. Greaves, Bull, and Lakin have most generously placed the specimen at the disposal of the Trustees of the British Museum, and it should prove a valuable addition to the remarkable series of ichthyosaurs already in the collection.

THE name and personality of Sir Paul Rycaut, F.R.S., traveller, author, and diplomatist, born in the autumn of 1628—three hundred years ago—at the Friary, Aylesford, Kent, is worthy of remembrance. Rycaut's connexion with the Royal Society began on Dec. 5, 1666, when at a meeting he was proposed a candidate by Henry Howard, afterwards sixth duke of Norfolk, who, by the way, had been himself elected in the previous month. "It being intimated (we read) that the said Mr. Rycaut was to go into Turkey, and offered his services to the society in inquiring into philosophical matters, it was ordered that the secretaries should get ready, both a copy of the general inquiries for all countries, and of such particular ones as were proper for Turkey; which last were recommended to the consideration of Mr. Hoskyns and Mr. Oldenburg." Rycaut was elected at the ensuing weekly meeting, and admitted as well.

HOWARD's interest in Rycaut is further exemplified by the following minute: "There were produced by Mr. Howard's servants several pictures of Turkish habits (to the number of sixteen single and eight double ones) as well as those of the grand signor and the empress, as of those of their officers and servants. He desired that they might be put into the library of Arundel House." Rycaut as an envoy from England was a marked success; also, he became a skilled narrator. His chief work (amongst many) was "The Present State of the Ottoman Empire . . . illustrated with divers pieces of sculpture, representing the variety of habits among the Turks." London, 1668. Rycaut returned to England for good in 1679; six years afterwards he again took office as secretary to the Earl of Clarendon, and was knighted. To the *Philosophical Transactions* he communicated a paper in April 1699, entitled, "A Relation of the small creatures called Sable-Mice." . . . A fine portrait of Rycaut, by Lely, may be seen in the National Portrait Gallery. It was engraved by R. White, and forms a

frontispiece to the "Turkish History." Rycout was buried near his father and mother in the south chancel of Aylesford Church.

THE condition of the Bear River Marshes, Utah, has in recent years caused much concern to sportsmen as well as naturalists. Owing to scanty rainfall and to the diversion of water for irrigation purposes from Bear River and tributary streams, the shallow waters in many parts of the marshes become concentrated solutions of alkali during the summer and autumn of each year. The marshes are a gathering place for millions of wild duck and geese during the spring and autumn migrations, and it has been estimated that in the course of the past few years not fewer than 7,000,000 ducks alone have died owing to alkali poisoning. So serious had the problem become that the Federal Government took the matter in hand, and after sundry delays in Congress during the past two years a Bear River Migratory Bird Refuge Bill has at length been signed by President Coolidge. It grants authorisation for expenditure of 350,000 dollars to be used by the Secretary of Agriculture in the construction of such dykes, ditches, spillways, sluices, etc., as may be necessary for establishing a suitable refuge and feeding- and breeding-ground for migratory wild fowl. This is a most important step in wild-bird conservation, which will result in economic as well as æsthetic advantages, for it is predicted, we learn from *California Fish and Game*, that the food value of the birds that can be saved in a single season will exceed the cost of the proposed improvements.

At a conference of the Superintendents of the National Parks of the United States of America, held on Feb. 17, 1928, Dr. Joseph Grinnell read a paper upon the balance of life in national parks, which bears on the question of the proper maintenance of animal preserves in any country. He discusses the troublesome problem of the artificial regulation of the balance of life so that no dominant animal may attain too great a share of the preserve at the expense of any other, and in particular that of beasts of prey which live upon the other inhabitants of the reserve. In this matter his conclusion is that "animal life in the national parks should simply be let alone. It can be encouraged in amount and variety most practically by desisting from any avoidable interference with the full range of natural conditions of food and shelter. Here is a case where a *do-nothing* policy is the soundest policy." It seems doubtful if such a negative policy, however well suited it may be for the enormous ranges of the parks of the United States, is suited for the limited areas available for preserves in Great Britain. The relatively tiny Nature reserves in Britain are surrounded by cultivated land from which the surplus of dominant species tends to overflow into the reserve to the detriment of the rarer species which require encouragement. We doubt also whether the wardens of the great preserves in Africa would feel justified in adopting the *laissez-faire* policy, in view of the tendency of certain species, particularly of the larger mammals, to multiply unduly in the absence of a sufficient check from natural enemies.

WITH another of Dr. Grinnell's conclusions every naturalist will be in agreement. "First and foremost," he says, "any and all *non-native* animals must rigidly be denied admission. . . . No addition in the way of bird or mammal, reptile or amphibian, should be made to the complement of animal life in a National Park, to that which belongs there. . . . Such introductions should be guarded against like the plague." We commend these wise words to the notice of the authorities and the game warden of Kenya, which is threatened with the setting free, on a deliberate policy, of Scottish red deer and Indian black buck. Dr. Grinnell is opposed to the creation of any sort of zoo in a National Park, for where an animal may be seen in freedom no one would choose to see it in the unnatural conditions of captivity; but he thinks that a museum may serve a useful purpose if it is "conducted subserviently to the function of nature guiding," so that it directs visitors to the living animals out-of-doors, and helps them to understand and appreciate what they see in the wilds.

A COMMITTEE appointed by the Radio Manufacturers' Association of the United States recommends that all radiovision pictures at present being broadcast be standardised, so that one radiovision receiver with one scanning disc will be able to receive any of them. The committee adopts as standard the system used by C. F. Jenkins in Washington. The method recommended uses 48 lines with 15 separate pictures (frames) every second. The pictures therefore will not show much detail, being decidedly inferior in this respect to the pictures which J. L. Baird can broadcast from his laboratory. It is expected that all the television broadcast stations in the United States will adopt this standard, so that one receiver with one scanning disc will be able to receive any of them.

THE progress of electric railway work in Great Britain since the War has been disappointingly slow. On the Continent and in America, progress has been much more rapid. We learn, for example, that the Pennsylvania Railway Company has decided to spend twenty million pounds in electrifying its entire train service between New York and Wilmington, Delaware. The 'wait and see' policy adopted by several railway companies in Britain since the late Sir Alexander Kennedy's Committee issued its report in 1921 has done very little to advance matters. We therefore welcome the report of Sir John Pringle's Committee which has just been published (London: H.M.S.O.) Most of its members have a thorough knowledge of the practical problems which now face the railway companies, and during the past few years many of them have seen how these problems have been attacked overseas. It is now suggested that the direct current system should be standardised, the pressures chosen being 750 and 1500 volts respectively.

It appears that in March 1928 there were in Great Britain 1257 miles of track operated on the direct current (d.c.) low tension system and 77 on the d.c. high tension system. There were only 151 miles operated on the alternating current (a.c.) system and

this number is diminishing. On the higher voltage d.c. system it is suggested that the current be collected from overhead wires with an uninsulated return. On the lower voltage d.c. system the current will be collected by a shoe pressing on the third rail. To permit of interrunning between the various railway systems it can easily be arranged that every train can run on either the high voltage or low voltage network. The recommendations of the earlier commission about standardising the track are endorsed. We hope that rapid progress will now be made. Past experience has shown that the prevention of the railway currents from interfering with the Post Office work either by electromagnetic or electrostatic induction is not a difficult problem.

THE seventh annual report of the British Cast Iron Research Association, covering 1927-28, records developments in the work of the Association, especially in the direction of making its results more readily available to its members. Melting plant has been set up, and experiments on a working scale are also being undertaken in foundries belonging to members. This is a good sign, as indicating willingness to co-operate in research. Cast iron containing nickel and copper has been found to have properties which make it useful in situations exposed to corrosion, but no iron which is resistant under all conditions has yet been discovered. Special attention has been given to the effects of varying composition in the manufacture of malleable castings, and similar studies have been made with reference to iron for light castings. In the main, the work of the Association has dealt with foundry problems, and it is to be hoped that in future increased support from the industry will make it possible to undertake more fundamental research. During the past year the most important work in this direction has been that of Dr. Norbury on the influence of manganese, which reconciles some of the conflicting opinions held on this subject, and constitutes a distinct addition to knowledge.

DURING the past ten years considerable progress has been made in developing the use of X-rays. Not only has their use been extended in medical and surgical practice, but there has been a notable development in their application to the examination of problems which arise in scientific and industrial work. The present range of X-ray equipment extends from the diminutive dental outfit to the apparatus required for the examination of various materials and the inspection of finished articles. The most recent achievement was the penetration of steel to a depth of $4\frac{1}{2}$ inches by radiations from the powerful set in the radiological research department at Woolwich. In a paper read to the Institution of Electrical Engineers by L. G. H. Larsfield, on Nov. 22, the question of the standardisation of the electrical equipment of X-ray apparatus was discussed. The subjects included were induction coils, voltage transformers, filament heating transformers, rectification and switchgear, and control fittings. The Coolidge tube has now largely displaced the gas tube for X-ray work. In the former a hot cathode governs the tube

current by supplying a steady stream of electrons, the impact of which upon the anode causes X-rays to be generated. Induction coils are now seldom used, having been displaced by transformers. In the author's opinion, however, for the highest voltage work there will in the future be a reversion to some improved type of induction coil. Of special interest was the description of a very small set (10 in. \times 7 in. \times 6 in.), weighing only 26 lb., patented by Coolidge. The tube is only 4 in. long, and operates at 56,000 volts and 10 microamperes. As the whole of the high voltage system is enclosed in an earthed metal case, there is no danger of electric shock and no external electric field. Objects under examination also can be brought very near to the tube. Other equipments were also described which are used for army requirements, such as examining the materials used in aeroplane construction, etc.

DR. E. D. ADRIAN delivered two lectures on "The Mechanism of the Nerves" at the Royal Institution on Nov. 22 and 29. The messages which are sent from the sense organs to the brain and from the brain to the muscles, are composed of a series of brief impulses—waves of chemical change which spread rapidly down the nerve fibre, leaving in their wake a refractory state from which the fibre must recover before a second impulse can pass. Impulses of the same general type may be produced in non-living systems, and the iron wire model of R. S. Lillie copies the behaviour of a nerve fibre with surprising accuracy. The impulse is accompanied by a change of electric potential, and the recent development of the valve amplifier has made it possible to record these changes with much greater certainty. Whenever a sense organ is stimulated, *e.g.* by touching the skin, it is found that a series of impulses pass up the sensory nerve fibres at a frequency which varies from 5 to 150 a second, and depends upon the strength of the stimulus. This message is somehow translated into consciousness, giving a sensation which rises or falls in intensity according to the frequency of the incoming impulses. In the same way, when a movement is to be carried out, the motor nerve fibres transmit a series of impulses to the muscles, and here, too, the frequency is varied over the same range to produce contractions of different intensity. A further means of gradation is provided by changes in the number of fibres in action. Communication between the different groups of nerve cells within the brain is probably carried out by impulse messages of the same kind, though disturbances which arise and subside more slowly must occur in certain regions. The complex reactions of the nervous system depend in the main on these more lasting changes.

In his recent presidential address to the Surveyors' Institution, Mr. C. B. Fisher dealt with a number of points of agricultural interest. Since 1920, upwards of fifty Acts have been passed in the House of Commons which affect the land in some way or other: in consequence, the agriculturist is often uncertain as to his actual position. Changes are proceeding so rapidly that there is a danger of old records being lost; many of them cease to have present application

but their historical value is considerable. Mr. Fisher appealed particularly for the preservation of documents describing the enclosure of open fields, the growth and break up of large estates, fluctuations in size of farms and rents; these should be handed over to the custody of public libraries or local historical societies. He discussed also the disparity in price paid by the consumer to the middleman, and by the middleman to the farmer, and pointed out that the United Dairies' last balance sheet showed profits of more than £500,000, while "any addition to price to assist in meeting the cost of production is grudgingly given and passed on to the consumer." It is notorious that the payment to the farmer is so low that he can barely make both ends meet, even with the minimum agricultural wage of 30s. to 31s. per week.

RECENT acquisitions in the Department of Zoology of the British Museum (Natural History) include a mounted specimen of a baby sloth-bear, or Aswal (*Melursus ursinus*), from Oudh, India, presented by the Rowland Ward Trustees. This specimen measures little more than 18 inches in total length, whereas the adult bear will measure from 5 to 6 feet in length; the animal is restricted in its distribution to India and Ceylon. Rear-Admiral H. Lynes has presented a collection of birds and eggs from Africa, including 964 examples of different kinds of small fan-tailed warblers of the genus *Cisticola*. These small birds have a very intricate summer and winter plumage, which it was impossible to work out without this additional material. A specimen of the king cheetah (*Acinonyx rex*) has been acquired. Unlike the common cheetah, the markings on the skin are not in the form of spots so much as longitudinal stripes and blotches, giving the animal a very handsome and gaudy appearance. The king cheetah is found in Southern Rhodesia, and it is surprising that such men as Selous, who hunted this district for many years, never obtained a specimen or made any record of its existence. Interesting acquisitions reported by the Department of Geology include a specimen, 3½ feet long, of a fossil angel- or monk-fish (*Squatina*) from the Upper Jurassic lithographic stone of Bavaria. This fossil scarcely differs from the recent form found living in temperate and tropical coastal waters, and is intermediate between the sharks and the skates. Additions to the Mineral Collection include further examples of fluorescent minerals from the zinc mines at Franklin Furnace, New Jersey, and the Trustees have agreed to the purchase for the Department of Botany of a valuable series of 870 plants collected in Mexico by Ynes Mexia of the University of California, and a further instalment of 1237 specimens from Frère Sennen's collections of Spanish plants.

RECENT appointments to scientific and technical departments made by the Secretary of State for the Colonies include five assistant conservators of forests: Mr. R. G. McK. Willan and Mr. R. D. Catterall to Nigeria, Mr. E. W. March to Ceylon, Mr. C. Swabey to Trinidad, and Mr. C. Cairns to the Federated Malay

States. There have been three appointments of veterinary officers, Mr. F. W. Aston and Mr. D. F. Macpherson to Kenya, and Mr. H. M. Salusbury to Tanganyika Territory. Mr. G. F. Clay, who has for some time been geneticist at the Amani Institute, has been appointed senior agricultural officer, Uganda. Messrs. D. Thornton, F. E. Buckley, and K. D. R. Davis have been appointed superintendents to the Agricultural Department, Nigeria. Mr. T. H. Nicol has been appointed agricultural instructor at Sultan Idris College, Federated Malay States; Mr. H. A. Pieris, divisional agricultural officer, Ceylon; Mr. J. L. Greig, assistant agriculturist, Federated Malay States; and Mr. E. J. H. Corner, assistant director of Gardens, Straits Settlements. Messrs. Buckley, Nicol, Greig, and Pieris were holders of Colonial agricultural scholarships.

At the annual meeting of the American Optical Society, held on Nov. 1-3, the first award was made of the Frederic Ives Medal, to Mr. Frederic Eugene Ives, a pioneer in the invention of the half-tone process used for the reproduction of photographs, etc., for book and newspaper illustrations. The medal, which was founded recently by Dr. H. E. Ives, son of Mr. F. E. Ives, will be awarded biennially "for distinguished work in optics."

THE International Society of Experimental Photonics has acquired *Vox* (Prof. Calzia, Hamburg) as its monthly organ of publication. Copies are sent free of charge to the members. The Society will also publish a yearly volume entitled *Psychologische Beiträge* (herausgegeben von Prof. Dr. E. W. Scripture, Wien).

"THE Royal Natural History," which was edited by Richard Lydekker, is probably the most comprehensive of popular systematic works on the animals of the world in the English language. A re-issue of this standard work, which contains 63 coloured plates, more than 2000 engravings, and nearly 3500 pages, is being published by Messrs. Warne in 18 fortnightly parts, at a price of 2s. 6d. each. Since it was first completed in 1896 this has been a standard work of reference, and its accuracy, its detailed descriptions, and the particular attention which it pays to the habits of animals, must assure it a place on the shelves of every well-equipped naturalist.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—An assistant lecturer and demonstrator in mechanical engineering in the department of mechanical engineering of the University of Sheffield.—The Registrar, The University, Sheffield (Dec. 7). A demonstrator in physics in the University of Leeds.—The Registrar, The University, Leeds (Dec. 10). Two assistant lecturers in chemistry at the Battersea Polytechnic, one to conduct classes in analysis of foods and drugs and the microscopic examination of food and drugs.—The Principal, Battersea Polytechnic, S.W.11 (Dec. 10). A senior demonstrator in anatomy in the University of Sheffield.—The Registrar, The University, Sheffield (Dec. 11). A chemist at the Royal Naval Cordite Factory,

Holton Heath—The Secretary to the Admiralty (C.E. Branch), Whitehall, S.W.1 (Dec. 15). A technical assistant at a naval establishment at Portsmouth, with a sound knowledge of high frequency electrical testing methods—The Secretary to the Admiralty (C.E. Branch), Whitehall, S.W.1 (Dec. 15). A pathologist in the General Infirmary, Salisbury—The House Governor and Secretary, General Infirmary, Salisbury (Dec. 17). A professor of mathematics in the University of Western Australia—The Agent-General for Western Australia, 115 Strand, W.C.2 (Dec. 18). A public analyst for the County of Cornwall—The Clerk of the County Council, County Hall, Truro (Dec. 22). A professor of mechanical engineering at the College of Engineering, Guindy, Madras—The Secretary to the High Commissioner for India, 42 Grosvenor Gardens, S.W.1 (Dec. 31). A lecturer in geography in the Huguenot University College, University of South Africa—The Registrar, Huguenot University College, Wellington, Cape Province (Jan. 1). An officer-in-charge of the Wood Preservation Section of the Forest Research Station, Dehra Dun, India—The Secretary to the High Commissioner for India, General Department, 42 Grosvenor Gardens, S.W.1 (Jan. 19). A director of the Tea Research Institute of Ceylon—The Director, Royal Botanic Gardens, Kew (Jan. 30). A principal of the Technological Institute, Cawnpore—

The Secretary to the High Commissioner for India, General Department, 42 Grosvenor Gardens, S.W.1 (Jan. 31). The John Lucas Walker Studentship in the pathological laboratory of the University of Cambridge—Prof. H. R. Dean, Cambridge (Feb. 19). An assistant science master with good qualifications in physics, at King Edward's School, Birmingham—The Headmaster, King Edward's School, Birmingham. An assistant in physiology in the Medical School of Dalhousie University, Halifax, Nova Scotia—Prof. A. V. Hill, University College, Gower Street, W.C.1. Junior technical officers at the Royal Aircraft Establishment for, respectively, tests and experimental work on strength of materials and aircraft components, and work in the engine experimental department—The Chief Superintendent, Royal Aircraft Establishment, South Farnborough, Hants. A temporary science mistress at the Central Foundation Girls' School, Spital Square—The Head Mistress, Central Foundation Girls' School, Spital Square, E.1. An assistant master in the physics department of the Leeds Central High School—The Director of Education, Education Department, Calverley Street, Leeds. Teachers of woodwork and metalwork under the West Riding Education Committee—The Education Department (Elementary Branch), County Hall, Wakefield.

Our Astronomical Column.

NEW COMET.—The third cometary discovery of the year was made on Nov. 19 by Mr. Forbes, an amateur astronomer of Cape Town. It was a fairly easy telescopic object, being then estimated as of the sixth magnitude, but no tail was seen. The following observations, of which the first was noted as being only approximate, have been distributed by the I.A.U. Bureau at Copenhagen :

U.T.	R.A. 1928-0.	S.Decl. 1928-0.	Observatory.
Nov. 21-08333	12 ^h 8 ^m 30 ^s	21° 42' 0"	Johannesburg.
„ 24-21465	12 17 2.6	23 58 53	Algiers.
„ 24-57167	12 17 59.7	24 13 32	Lick.

The estimated magnitudes at Algiers and Lick were 10 and 7. The discordance illustrates the large personality that exists in these determinations. The Lick observer was Mr. Berman.

These observations are not well spaced for orbit determination, the second and third being only 8 hours apart. An attempt (not yet completed) indicates that the motion is direct and that the distance from the earth at the middle observation was about one unit ; perihelion appears to be already past, the distances from both earth and sun increasing. When this note appears, the comet will be inconveniently low in England, but may possibly be seen just before dawn in the south-east.

THE LEONID METEORS OF 1928.—The display this year, writes Mr. W. F. Denning, appears to have given evidence of increased activity and to have furnished some brilliant objects, if the shower was not strikingly abundant. On the morning of Nov. 16, from 2 to 3 A.M., Mr. A. King, of Ashby, Lincolnshire, found the horary rate of appearance for Leonids was 30, and he noticed several as brilliant as Jupiter. On the following morning there was a decline in activity, but at 2^h 47^m A.M. he observed a brilliant Leonid fireball falling from Ursa Major through Hercules. There

was an explosion at the end of its flight, and the sky was illuminated in the region where it occurred, for the object was several times brighter than Venus.

From Blackheath, London, S.E., on the night following Nov. 15, several brilliant meteors with long paths and luminous trails were casually observed. One appeared at about 11^h 30^m P.M., ascending some 50° in the eastern sky from the 'Sickle of Leo,' and other large and conspicuous meteors were remarked near midnight. It is evident from the descriptions of their flights that they were Leonids. It is probable that this system of meteors will exhibit more abundance in the next few years, as the ensuing maximum and the return of its parent comet (Tempel, 1866 I) are due in 1933.

DETERMINATIONS OF RADIAL VELOCITIES AT THE CAPE.—*Annals of the Cape Observatory*, vol. 10, part 8, contains radial velocity determinations not previously given in the Cape publications. The first section contains a new determination of the constant of aberration and the solar parallax from the radial velocities of stars. Using Hayford's value, 6378.388 km., for the earth's equatorial radius, and Michelson's 1926 value of the velocity of light, 299800 km./sec., then the solar parallax is given as 8.803" and the constant of aberration 20.475". The probable errors are 0.004" and 0.010" respectively. It is satisfactory to note how narrow the range of different determinations of the solar parallax has become ; it scarcely exceeds one-hundredth of a second.

The orbits of 13 spectroscopic binaries are determined, and the radial velocities of 434 stars. There are several different values found for the solar motion. When the *K*-term is taken as zero, the apex is found to be R.A. 263.6°, N. Decl. 28.8°, velocity 20.5 km./sec. An erratum on p. 11 may be noted ; the period of Sirius should be 50, not 40 years.