

ASTRONOMICAL NOTES

Planets during February 1939.—Mercury will be visible as a morning star for a few days in the beginning of the month; on February 19, it is in superior conjunction with the Sun and will afterwards become an evening star. Venus is gradually moving towards the Sun, but will still continue to be a bright object in the eastern sky visible for some time before sunrise. Mars also can be seen about the same time near the meridian in the constellation Scorpio; and when it is near the first magnitude star Antares (α Scorpii) which is approximately of the same brightness and reddish colour, the two objects will present an interesting appearance in the morning sky.

Jupiter being too near the Sun, is not favourably situated for observation. Saturn is slowly

moving eastward along the southern border of the constellation Pisces, and will be visible towards the west for about three hours after sunset. The rings continue to widen and the angular dimensions of the axes of the ellipse are $37''\cdot5$ and $6''\cdot4$ respectively. Uranus is in the constellation Aries and will be an hour west of meridian at sunset. The following close conjunctions of the Moon with planets may be noted:—February 12, Mars; February 15, Venus; and February 25, Uranus. Lunar occultations of some interest that can be observed in these latitudes are— α Virginis (Spica), magnitude 1.2 on February 8 and β' Scorpii, magnitude 2.9 on February 11.

T. P. B.

SCIENCE NOTES AND NEWS

New Year Honours.—The New Year Honour list contains the following names of scientists:

Knighthood: MAJOR H. G. HOWARD, Chief Engineer for Electricity, Madras; COL. A. J. H. RUSSELL, I.M.S., Public Health Commissioner, Government of India.

C.I.E.: DR. W. BURNS, I.A.S., Agricultural Expert to the Government of India, Imperial Council of Agricultural Research Department; MR. H. B. DUNNICLIFF, Chief Chemist, Central Revenues Chemical Service and Principal, Government College, Lahore; LIEUT.-COL. G. COVELL, I.M.S., Director, Malaria Survey of India.

Rao Bahadur: MR. V. RAMANATHA IYER, Cotton Specialist, Coimbatore.

Rao Sahib: MR. M. G. PATHALE, Research Assistant in Botany, Agricultural College, Cawnpore; MR. SURJAKANTA MITRA, Assistant Professor of Physics, Science College, Patna.

O.B.E.: MAJOR D. P. BHARGAVA, Professor of Surgery, Prince of Wales Medical College, Patna.

M.B.E.: MR. D. C. CHAKRAVARTI, Professor of Clinical and Operative Surgery, Medical College, Calcutta.

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The Intensity of Solar Radiation.—The hourly and seasonal variations in the solar radiation at Poona, have been recorded in a recent publication of the Indian Meteorological Department (P. K. Raman, *Memoirs of the Indian Meteorological Department*, 1938, 26, Part VIII). The intensity of radiation coming from the sun and from the sunlit sky is a factor of fundamental importance in meteorology and in the study of bioclimatic phenomena. Long records of radiation measurements are confined to a few stations in Europe and North America. In India, work on this subject was started in 1934 at Poona, and the *Memoir* recently issued incorporates the data obtained for all the days for which the data were available in 1935.

The Moll solarigraph was employed for the measurement of the total radiation. The maximum amount of radiation recorded during the year was 855 gm. calories (May 4) and the minimum, 116 gm. calories (July 20). During the summer months, April and May, the mean daily radiation recorded was 784 and 775 gm. calories per day respectively. During the monsoon months, the energy is small, e.g., 388 gm. calories per day in July. The value changes to 600 in November, 478 in December and it steadily increases to the summer maximum.

The maximum radiation epoch occurs at noon during all the months. This epoch is not pronounced during the monsoon months.

It has been observed that a covering of the cirrus clouds does not affect, materially, the total radiation recorded on a horizontal surface. A sheet of cirro-stratus clouds decreases the total radiation by about 10 per cent., while a thick cirro-stratus diminishes the intensity by 20 per cent. Medium clouds cut off more of the incoming radiation.

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Mineral Production in India.—Among the chief sources of production of manganese in the world, India occupies the second place with 1,051,594 tons valued at £3,229,554 in 1937. Russia has the pride of place. The United Kingdom is the chief importer of Indian manganese ore. The industry has shown a gratifying recovery, and its output this year reached the peak point of 1927 (1,129,353 tons valued at £2,703,068). In 1933, the production had diminished to one-fifth of that of the peak year 1927, but its value was only one-twenty-second part of the value of the 1927 production.

The fall in the price of the manganese ore from 1924-32, is to be correlated with the fact that during the period 1924-27, the rate of increase in the production of manganese ore was much greater than that in the world's production of pig iron and steel. There was

a disastrous decline in the activity of the iron and steel industry during the years 1931-32. The world's available supplies of manganese ore are much in excess of normal requirements. Russia is able to place large quantities of ore on the market, at a price which many Indian producers are unable to compete.

There is now a steady consumption of manganese ore at the works of the two principal iron and steel companies, not only for use in the steel furnaces of the Tata Iron & Steel Co., and for the manufacture of ferro-manganese, but also for addition to the blast furnace charge in the manufacture of pig iron. The consumption of ore by the Indian Iron and Steel Industry in 1937 was 60,219 tons.

Regarding the production of iron ore, India is the second largest country in the British Empire. The output, 2,896,258 tons valued at £352,487, however, is completely dwarfed by the production of the United States (48,750,000 tons in 1936) and France (32,300,000 in 1936), but her reserves are not much less than $\frac{3}{4}$ of the estimated total of the United States and there is every hope, that India will eventually take a more prominent place among the world's producers of iron ore.

The Tata Iron & Steel Co. produced 885,393 tons of pig iron, 665,309 tons of steel and 8,041 tons of ferro-manganese in 1937. The corresponding figures for the previous year were respectively, 858,272, 660,291 and 3,263. The total production of pig iron in India was 1,621,260 tons in 1937. Japan continued to be the principal importer of Indian pig iron.

The production of petroleum in India reached, in 1937, the highest figure in the history of the industry (350,322,222 gallons). At the end of 1937, there were 2,910 wells producing in the field. India, however, contributed only 0.50 per cent. to the world's production of petroleum during the year, and of this 0.40 per cent. came from Burma, and only 0.10 per cent. from India proper. The contributions from some other important petroleum producing centres were: U.S.A. 62.7 per cent., Russia 9.9 per cent., Venezuela 9.2 per cent., Iran 3.8 per cent., Netherland Indies 2.6 per cent., and Rumania 2.5 per cent. The production methods employed throughout the field are characterised by a realization of the importance of the conservation of oil and gas and the prevention of waste, whether surface or underground. During the year, the Burma Oil Company's deep test well at Monatkan was abandoned at 8,319 feet, as no productive sand had been encountered.

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Report of the Coal Mining Committee.—

The discussion on the Report arranged under the auspices of the Geological, Mining and Metallurgical Society of India, has now been issued in the form of a bulletin (No. 2, June 1938). The criticisms on the report, range in detail over practically every relevant point, investigated by the Coal Mining Committee, the chief among them being stowing and conservation of coal. The critics are unanimous on the following issues:—Stowing should not be insisted upon in every case, but

had better be confined to specific mines, where fires are frequent. The cess proposed in stowing is too large and should, in the first instance, be anna one or so, to be enhanced later, when the actual cost has been studied. The Indian Railways are the worst delinquents in the utilisation of coal and should be directed to use inferior grade. A Research Station to investigate into the possible methods of conserving coal, and of safe and economic methods of mining it, as contemplated by the Committee, is a salutary proposal, but at the first instance, it is preferable to start such researches in the existing institutions as the Indian Universities, the Indian School of Mines and the Geological Survey of India. The dissenting minute by Drs. Nag and Krishnan advocating the nationalization of coal mining, is the only cure for the present ill-management, unsafe mining and unhealthy competition obtaining in the collieries. The appointment of an appellate authority is welcome, but its personnel, salaries of staff and other details should be on more economic and useful basis. The Railways should treat coal freight on exactly the same preferential basis as is current in South Africa.

Other members who took part in the discussion—Messrs. N. N. Chatterji, S. C. Ghosh, M. M. Mukherji and J. S. Bhaduri, Professors S. K. Roy and C. Forrester, and Dr. S. K. Sarkar—have offered suggestions on various technical points such as the desirability of studying the hydrogenation of coal, the utilization of the by-products, the electrification of a part of the railway, the use of brick and dust coal in the railway engines, the method of stowing to be employed, the desirability of grading coal, the method of improving on Dr. Fox's estimate of the coal reserves, and the participation in and allocation of a group of the officers of the Geological Survey of India for exclusively engaging themselves in such economic investigations of national importance.

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The Friction of Shoe Brakes applied to a vehicle in motion, is a very important factor in finding out the stopping distance of the Vehicle. This problem with respect to Railway shoes brakes was investigated from 1880 to 1930, and a large amount of experimental work was done to determine the coefficient of friction of Railway brake shoes under varying conditions of speed and brake shoe pressures. The experiments were limited to maximum speed of 65 miles per hour and pressures of 15,000 lbs. With the general increase in speed of all trains at the present day, the existing data had to be supplemented by further data to bring them up to date. The Engineering Experimental Station of the University of Illinois, in the Department of Railway Engineering, undertook this as part of their work, and the results have been published in their Bulletin 301, entitled "The Friction of Railway Brake Shoes at High Speed and High Pressure" by Herman J. Schrader, 1938. "The main purpose of the tests was to determine the coefficient of friction of brake shoes, the stopping distance, and the brake shoe wear under conditions which

simulate those that prevail on the road in stopping trains that travel at high speeds."

The investigations were conducted on brake shoe pressures, varying from 4,500 lbs. to 20,000 lbs. and under each of these pressures, stops were made from initial speeds of 60, 80 and 100 miles per hour. Two different patterns of shoes, one light and the other heavy, were tested, and in each pattern there were chilled-end shoes and also those with plain ends, ground to shape. The wheel tested was the "multiple wear" rolled steel wheel of the American Railway Association standard design, 33 inches diameter, for use on 6-inch and 11-inch axles, chosen by a representative of the University from the wheel stock of a Western Railroad Company. The wheel weighed 773 pounds and was 8.66 feet in circumference. All the tests were made on the brake shoe testing machine of the University, consisting essentially of a car wheel keyed to a main shaft which carries also a heavy flywheel, the system being rotated at any desired speed by means of a steam engine, which drives the shaft through a pulley and clutch. The shoe to be tested is held in a brake shoe head and is suspended above the wheel from one of a system of levers, by means of which the shoe may be applied to the wheel at any desired pressure up to 20,000 lbs.

The tests conclusively proved that, with the particular types of shoes and kind of wheel tested, no cast iron brake shoe should be subjected to braking condition which will require it to perform and dissipate more than 90,000 ft. lbs. of work per sec. Also, if the building up of the brake shoe material on the wheel tread is to be avoided, the workrate performance of the shoe should be kept below 70,000 ft. pounds per sec. Another important conclusion was that pressures of 20,000 lbs. combined with high speeds, cracked the wheel tread at a very rapid rate, and in order to avoid this type of failure, the rate of performing work on the wheel should be kept below 125,000 ft. pounds per sec. The heavy pattern shoes are more economical than the lighter pattern; but the chilled-end shoes were not superior to plain-end shoes when tested at high speeds and high pressures.

K. B. K. R.

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Molecular Distillation.—In a series of four important papers read before a joint meeting of the Chemical Engineering Group and the London Section of the Society of Chemical Industry, various aspects of the subject of Molecular Distillation and its technical applications were discussed. The first practical application of molecular distillation began nine years ago, but on account of the necessity for employing extremely low pressures of the order of 10^{-6} atmospheres, the technique could not be developed till improvements and developments were made on Langmuir's original condensation pump, which enabled high vacua of this order being obtained on a technical scale.

On account of the extremely low pressures employed in molecular distillation, the rate of distillation depends on the saturation pressures of the distillant. An apparatus consisting of

a shallow pool of heated liquid with a condensing surface of a few centimetres above it is used, the whole being enclosed in a chamber which can be evacuated to a pressure of 10^{-6} atmospheres or less. It is very important to remove traces of uncondensable gases dissolved in the liquid or produced by slight decomposition and various special methods have been developed to effect this.

The most recent and perhaps the most important application of Molecular Distillation is the isolation of Vitamin A directly from the fish-liver oils. Before this, Vitamin A concentrates were prepared from the unsaponifiable portion of the oil. Messrs. British Drug Houses, Metropolitan Vickers and Imperial Chemical Industries in England and the Eastman Kodak Co. in America, have been associated with these developments. The work done on the Molecular Distillation of fish-liver oils has shown that Vitamin A occurs in these oils in the form of esters and Tischer isolated it in the form of a palmitate. Crystalline Vitamin A, melting at a temperature of 7° to 8° has also been prepared, by Molecular Distillation and is expected to have a potency of about three million international units per gram. Further work on this subject is being pursued actively and more interesting developments are awaited.

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Salmon of the River Shannon, Ireland.—Arthur E. J. Went of the Department of Agriculture, Fisheries Branch, Dublin, has in his paper on "Salmon of the River Shannon" (*Proc. Roy. Irish Acad.*, Vol. XLIV, Section B, No. 11, pp. 261 to 322) given a very instructive account of the analysis of the salmon stock of the year 1927 and the growth of salmon smolts in the River Shannon from an examination of vast material collected from the net fisheries at Lax Weir and Glin Co., Limerick and from the rod fisheries between O'Briens Bridge and Killaloe. In the body of the paper the author gives the results of examination of scales and extensive data and graphs indicating the periodical growth of smolts. The factors governing the smolt migration has also been discussed. In the 1927 stock 98 per cent. of the total catch formed one and two year smolts. April, May and June are stated to be the most important months from the point of view of the commercial catches. It has also been observed that there is a decrease in the percentage of females with the increase in the age of the fish. The spring fish appear to improve in condition with age better than the summer fish. The fastest growing smolts were the first to migrate. This paper by Arthur Went is indicative of the high class work that is being done in the Fisheries Department in Ireland.

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Breeding Habits and Early Development in Hill-stream Fishes.—Mr. S. Jones of the Department of Agriculture and Fisheries, Travancore, has made an interesting contribution to our knowledge of the breeding habits and early development of two of the hill-stream Cyprinoid fishes—*Danio (Danio) malabaricus*

(Jerdon) and *Garra ceylonensis ceylonensis* (Bleeker) (*Ceylon Journ. Sci., Sec. C, Fisheries, 1938, 61*). The author after an extensive search for the eggs of these fishes in the mountain torrents of Ceylon was able to locate their breeding places. The eggs of *Danio* have been observed to be deposited among the algal growth in the shallow regions of the stream, whereas the eggs of *Garra* were found loose on the bottom of the fairly calm water in larger pools close to the bank beneath the algae. A good account of the early development of both the forms has been given. The most interesting feature in the early development of *Danio* is the presence of a large cement organ in the mid-dorsal region of the head. The secretion of this gland helps the larvae to attach themselves to the algal filaments until the yolk is absorbed and the pectoral fins are developed. This is a very interesting case of adaptation to life in hill-streams. The presence of a cement organ during the development of a cyprinoid has been recorded for the first time.

Cytoplasmic Inclusions in *Spirostomum*.

While our knowledge of the structure, distribution and function of the Golgi apparatus and other cytoplasmic inclusions in the Metazoa is fairly extensive, the findings in the Protozoa are very meagre and conflicting. Since the time Naessanow's theory that the contractile vacuole of the protozoan was homologous with the metazoan Golgi apparatus was refuted, many attempts have been made to determine its structure and position and K. M. R. Browne (*Journ. Roy. Microsc. Soc., 1938, 48, Pl. 3*) has studied it in *Spirostomum ambiguum*. Using almost all the classic methods, he has demonstrated the presence of the Golgi bodies as spherical structures, blackened by osmic acid but not revealed by silver techniques and scattered all over the cytoplasm. They appear to have an osmophile membrane surrounding an osmophobic medulla. They apparently have no connection with the contractile vacuole whose wall in *Spirostomum* is not osmiophilic. The mitochondria are more numerous and are also scattered in the cytoplasm. They are in the form of deeply staining discoidal rods.

A New Teak Planting Technique.—In the past, teak plantations were formed either by direct sowing of the seeds or by transplanting small seedlings at the beginning of the rains, but with either of these methods, results were frequently irregular, and partial failure of the plantations was a common experience. The rate of growth of the young teak plants raised by these methods was moreover slow and the cost of keeping them from being swamped by the vigorous weed growth experienced in moist west-coast localities was correspondingly high.

More recently, experiments conducted in Madras by A. L. Griffith (*Indian Forest Records, Sylviculture, 3, No. 2*) have proved that far more regular results can be obtained by planting out stumps, prepared by digging up

one-year-old nursery seedlings and cutting off the shoot at about one inch above and the root at about 8 or 9 inches below the original ground level and trimming off all side roots. These stumps are much more resistant to adverse weather conditions after planting, give higher survival percentage and grow faster than either direct sowings of seed or planted nursery seedlings.

Carefully planned experiments have shown that the best date for planting was mid-April or early May. The survivals may be as high as 99 per cent. The results were unexpected and surprising. The stumps very often experienced an almost complete drought for anything from ten days to three weeks after planting, while the soil was baked hard and dry. At first it seemed inconceivable that they could survive such early planting and much less, give improved results, and it took five years to prove definitely that early planting was not only feasible but reliable and very beneficial. It is emphasised, however, that these results have been obtained for localities with a west-coast climate and that, while some degree of early planting is probably beneficial in most teak planting areas, local experiments must be carried out to determine the earliest safe date in each case, otherwise expensive failure may be experienced. The experiments are now being extended to drier localities.

Pasteur Institute of South India, Coonoor.—The Annual Report of the Director for the year ending 31st December 1937, records an extension of the activities of the Institute over those of the previous years. The Paris fixed virus was used exclusively in the preparation of the vaccine. It was in its 994th passage at the close of the year. Semple's 5 per cent. carbolised sheep brain suspension was the vaccine in use. 426 patients underwent treatment at Coonoor, and 15,371 courses of antirabic vaccine were issued to the subsidiary centres. The mortality rate for all treated cases (complete and incomplete) was 0.15 per cent. 31 new subsidiary treatment centres were opened during the year in the Madras Presidency.

Antirabic vaccine is also available for the prophylactic treatment of animals. During the year, 34,720 c.c. of 5 per cent. carbolised sheep-brain vaccine was issued for the treatment of animals, chiefly to veterinary officers in the Madras Presidency and neighbouring Indian States.

The Institute continued to receive clinical specimens from hospitals and medical practitioners in the Nilgiris District for bacteriological examination. 4,382 such specimens were examined during the year.

A special meeting of the members of the Association of the Pasteur Institute of South India was held at Coonoor, on 10th June 1937, when a resolution recommending that certain definite lines of research connected with rabies should be undertaken at the Institute under the direction of the Director of the Pasteur Institute, was adopted. The lines suggested were: Extension of the work which was already being done with the object of obtaining concentrated rabies

virus by cataphoresis method; investigation by culture methods, of the nature and identity of rabies virus; and any allied research bearing on the subject of rabies, such as the effect of administration of vitamin to infected animals.

Dr. Veeraraghavan, M.B.B.S., has been appointed Special Research Officer for a period of five years, with effect from 21st March 1938.

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Educational Broadcasts.—The Madras Station of the All-India Radio has issued a pamphlet giving the programme of educational broadcasts for the first quarter of 1939. The programmes are transmitted on the medium wave and are of half-hour duration: (1) 2 p.m. to 2-30 p.m., for the benefit of the pupils of the High School, and (2) 4 p.m. to 4-30 p.m. for children. The programme for the High School pupils includes "Things of Interest", (5 minutes) from the news of the world, and talks lasting for 15 minutes on topics of scientific and general interest. The programmes for children also include talks on subjects of general interest, physical and natural sciences, biography, history, geography, etc., the treatment being adapted to the psychology of the child, which is able to intelligently understand a subject, if it is presented in suitable form such as a story. The talks will be in two languages, Telugu and Tamil.

It is indeed very thoughtful on the part of the Station Director to have printed the programme in the form of a booklet and made it available to the different schools and members of the public. The Madras Station has been doing commendable work in harnessing the radio for educational work.

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Mining, Geological and Metallurgical Institute of India.—The following prize and medals for papers on mining and metallurgical subjects were announced at the meeting of the Institute held on January 13:—

(1) The Government of India Prize of Rs. 500 and the Institute Gold Medal were awarded to Mr. J. Thomas for his paper entitled "Methods of Stowing for Indian Mines"; (2) The Institute Silver Medal to Dr. Cyril S. Fox, for his paper entitled "Mineral Developments in Soviet Russia"; and (3) The Institute Bronze Medal to Mr. P. N. Mathur for his paper entitled "Small-scale Manufacture of Iron and Steel in India by the Direct Method".

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Benares Hindu University.—His Exalted Highness the Nizam of Hyderabad has donated one lakh of rupees to the Benares Hindu University, towards the endowment of a Chair of Indian Culture, with a view to promoting Hindu-Muslim unity.

The Cochin Durbar have endowed a Chair to be called "Rama Varma Chair" and have been pleased to donate a sum of Rs. 9,000 as yearly recurring grant, to the University.

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University of Calcutta.—Dr. Girindrasekhar Bose, D.Sc., who acted as the Head of the Department of Psychology, University of Calcutta,

has been appointed University Professor of Psychology for a period of five years.

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University of Mysore.—Dec. 1938. *University Extension Lectures:* The following lectures were delivered under the scheme of Extension Lectures during the month:—(i) Mr. S. G. Vaze, "The Treatment of Minorities in Czechoslovakia", in English at Bangalore and on "Czech-German Settlement of Munich". (ii) Mr. V. N. Rangaswami, M.A., B.Sc. (tech.), A.M.C.T., A.M.I.E. (India), "Bituminous Materials and Their Uses", in English at Bangalore. (iii) The University Teachers' Association held its Lecture camp during the Christmas holidays in Shimoga from the 23rd to the 27th December 1938.

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Announcements

The annual meeting of the British Association for the Advancement of Science will be held this year at Dundee, from August 30 to September 6, under the Presidency of Sir Albert Seward, F.R.S.

Indian Science Congress.—The Twenty-seventh Session of the Congress will be held at Madras, from 2-8 January, 1940. Prof. Birbal Sahni, F.R.S., has been elected General President. The Sectional Presidents will be: Prof. K. S. Krishnan (*Mathematics and Physics*), Dr. S. Krishna (*Chemistry*), Prof. L. Rama Rao (*Geology*), Dr. S. P. Chatterji (*Geography and Geodesy*), Prof. Y. Bharadwaja (*Botany*), Prof. B. K. Das (*Zoology*), Rao Bahadur K. N. Dikshit (*Anthropology*), Mr. J. R. Haddow (*Medical and Veterinary Research*), Mr. E. McKenzie Taylor (*Agriculture*).

The Eighteenth International Congress of Agriculture, organised by the International Confederation of Agriculture (former International Commission of Agriculture), will be held in Dresden from June 6-12, 1939.

An Executive Committee has been formed under the presidency of Herr M. Behrens with Dr. F. Sohn as Secretary-General. This Committee has arranged for the circulation of bulletins, giving information in regard to the preparatory work of the Congress. Communications regarding the Congress should be addressed to the General Secretariat of the Congress, Berlin, S.W. 11, Hafensplatz 4.

Messrs. Edward Arnold & Co., have drawn our attention to an omission in the bibliographical details given in the review notice of the book, entitled "The Behaviour of Animals" (November 1938, 7, 249). The publishers have pointed out that the book is the *Second Edition*. We regret the omission.

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We acknowledge with thanks, receipt of the following:—

"Agricultural Gazette of New South Wales," Vol. 39, No. 12.

"Monthly Bulletin of Agricultural Science and Practice," Vol. 29, No. 11.

- "Agriculture and Live-Stock in India," Vol. 8, No. 6.
 "The Philippine Agriculturist," Vol. 28, No. 7.
 "Journal of the Royal Society of Arts," Vol. 86, Nos. 4488-91.
 "L'Agricultura Coloniale," Vol. 21, No. 10.
 "Biochemical Journal," Vol. 32, Nos. 11 and 12.
 "Journal of the Indian Botanical Society," Vol. 17, No. 5.
 "Journal de Chimie Physique," Vol. 35, No. 10.
 "Chemical Age," Vol. 39, Nos. 1013-16.
 "Transactions of the Faraday Society," Vol. 34, No. 212.
 "Indian Forester," Vol. 55, No. 1.
 "Forschungen und Fortschritte," Vol. 14, Nos. 34-36.
 "Bulletin of the American Meteorological Society," Vol. 19, No. 7.
 "Calcutta Medical Journal," Vol. 34, No. 6; and Vol. 35, No. 1.

- "Review of Applied Mycology," Vol. 17, No. 12.
 "American Museum of Natural History," Vol. 32, No. 5.
 "Bombay Natural History," Vol. 40, No. 3.
 "Nature," Vol. 142, Nos. 3604-07.
 "Indian Journal of Physics," Vol. 12, No. 5.
 "Journal of Research (National Bureau of Standards)," Vol. 20, Nos. 1-5.
 "Ceylon Journal of Science," Vol. 6, Sec. C.
 "Science Forum," Vol. 3, No. 2.

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Catalogues

- "Monthly List of Books on Natural History and Science," December 1938. Messrs. Wheldon & Wesley, Ltd., London.
 "Diffusion Pumps for the Production of High Vacua," W. Edward & Company, London.
 List of Publications issued by the International Institute of Agriculture (October 1938).

ACADEMIES AND SOCIETIES

National Academy of Sciences, India:

December 17, 1938. A. C. BANNERJI AND MOHID, NIZAMUDDIN: Jupiter Atmosphere. B. P. PANDA: On the trematode genus *Lypersomum* Loos, 1939, (Dicrocoelidae) with a description of two new species from India. B. P. PANDE: Two new species of trematodes from *Anhinga melanogaster*, the Indian Darter or Snake-bird. S. N. BANERJI AND S. GHOSH: Changes in the viscosity of agar sol with concentration. JAGRAJ BHABH LAI: Constitution of Santalin. R. R. RAIPAI AND B. D. PANT: Further studies of the F region at Allahabad. A. B. SEN: Migration of para-halogen atom in a derivative of meta-cresol.

Indian Chemical Society:

October 1938. JAMNAT V. LAKHANI AND RUDOLPH P. DAROGA: The Determination of the Parachors of Inorganic Salts in Solutions and their Structure. Part II. Some Lithium, Sodium, Rubidium Salts and Atomic Parachors of the above Elements including Cesium. K. GANAPATI: The Chemotherapy of Bacterial Infections. Part I. Synthesis of Some Derivatives of Sulphanilamide. MAHADEO PRASAD GUPTA AND SIKHINDRIAN DUTT: Chemical Examination of the Seeds of *Cleome viscosa*, Linn. Part I. The Constituents. DINESH CHANDRA SEN: Studies in the Camphor Series. Part V. Some Derivatives of *iso*-Nitrosacamphor. N. R. DHAR AND S. K. MUKERJI: New Aspects of Nitrogen Fixation and Conservation in the Soil. N. C. SEN GUPTA: On the Physico-Chemical Properties of Indian Bentonites. Part I. B. N. GHOSH AND D. K. CHOWDHURY: Enzymes in Snake Venom.

Meteorological Office Colloquium, Poona:

December 1938.—C. W. B. NORMAND: On Soaring and Gliding Flight. S. K. BANERJI: Relationship between upper wind velocity and temperature. A. K. ROY: On forecasting of weather in South Bengal during the Nor'wester season mid-March to mid-May. M. W.

CHITLONKAR: On brightness of the Zenith sky at twilight and its relation to upper air temperatures.

The Indian Botanical Society:

December 1938.—L. M. GHOSH, S. GHOSH, N. R. CHATTERJEE AND A. T. DUTT: Actinomyces: Their Biochemical reactions as aids in their classification—Part I. Reduction of Nitrates. A. B. SARAN: A short note on the rate of respiration and respiratory quotient of starved leaves of *Aralia* sp. before and after a course in nitrogen. M. J. THIRUMALACHAR: On the morphology, cytology and parasitism of *Uromyces* *Hobsoni* Vize (U. Cunninghamianus Barc), A preliminary note. M. S. MURDIA: Cytological studies of certain members of the family Saprolegniaceae—Part I. L. P. KHANNA: On two species of *Anthoceros* from China. K. R. RAMANATHAN: On a form of Anabænosis from Madras. C. BHASHYAKARLA RAO: The Zygomoidæ of the Central Provinces, India—I. V. B. SHUKLA: On a new species of *Dadoxylon*, *D. Deccani*, sp. nov., from the Deccan Intertrappean Series. R. N. SINGH: The Zygomoidæ of the United Provinces, India—II.

The Entomological Society of India:

November 9, 1938.—H. R. BHALLA: On *Sylepta derogata* Fab., the Cotton Leaf Roller.—The author describes in detail its bionomics and control. For successful control the following measures were recommended: (1) eradication of ratoon cotton and other alternative host plants such as *Hibiscus esculentus*; *Althea rosea*; *Abutilon indicum*; *Malvestrum tricuspidatum*; *Urina lobata* and *Malva parviflora*, (2) Hand picking, (3) dusting the infested crop with sodium fluosilicate or Paris green, in the ratio of 1 : 8, (4) destruction of the shed material, and (5) ploughing the infested fields with furrow turning plough during January and February in order to bury the hibernating caterpillars,