

## ASTRONOMICAL NOTES

Planets during July 1939.—Mercury will be an evening star and on July 14, will be at its greatest eastern elongation from the Sun ( $-26^{\circ} 31'$ ). Venus continues to draw closer to the Sun and will be visible only for a very short time before sunrise. Mars is best situated for observation, being in opposition to the Sun on July 23; its semi-diameter at the time will be  $24''$  and the stellar magnitude  $-2.6$  (nearly two and a half times brighter than Sirius). The planet is closest to the earth on July 28 when the distance will be about 36 million miles.

Jupiter rises a little before midnight and will be a conspicuous object in the eastern sky during the latter part of the night. On July 30, it will be at a stationary point of its apparent orbit. Saturn will be in quadrature with the Sun on July 24 and will be found near the meridian at sunrise. The ring ellipse is getting gradually wider, the major and minor axes being  $40''$  and  $11''$  respectively on July 15. Uranus is slowly moving eastwards in the constellation Aries and can be seen as a morning

star. There will be a close conjunction of the planet with the Moon on July 12. An occultation of some interest that can be observed in India is that of  $\alpha$  Libræ (magnitude 2.9) by the Moon on the night of July 24.

Comets.—Pons Winnecke Comet is still faint and is moving towards the south in the constellation Böotes. According to the computations of Levin and Porter, the Comet will be nearest the earth on July 2 when the distance will be about ten million miles. At the apparition of 1927, the Comet approached the earth to a distance of four million miles when it was conspicuously visible to the naked eye. Although it may not reach the same brightness next month, it is very likely the Comet will become bright enough to be seen with some moderate optical aid.

The bright Comet (1939 d) which was discovered on April 18, was visible to the naked eye for a considerable time and has been widely observed. It has since moved southwards into the constellation Canis Minor and has become fainter. T. P. B.

## SCIENCE NOTES AND NEWS

**A New Method of Creating Electrification.**—When certain insulating materials, e.g., silica, sulphur, in an adequate degree of fineness are allowed to strike a metal plate perforated with small holes, the metal plate becomes electrified positively and the insulating powder negatively. In order to produce the effect the materials must be dry and the size of the grains of the powder must be such that when they fall on the perforated metal sheet, they fall through and do not accumulate on the metal. This novel phenomenon recently discovered by A. Flemming (*Proc. Phys. Soc.*, 1939, 51, 401) is shown to be inexplicable in terms of frictional or piezoelectric effects, and forms the starting point of a new and fruitful line of investigation.

K. S. G. D.

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**Bud Mutations in the Orange.**—An extraordinarily interesting instance of bud mutation is to be found in the case of the Satsuma Orange (Unshiu), *Citrus unshiu*, Marc. var. *præcox* of the variety called Wase. This variety has the peculiar characteristic that it does not breed true from vegetative propagation. These trees often send out single branches of entirely different character from the main type of branches on the tree. In some trees the variation branch is not limited to a single branch per tree but that two or even three arise from a single tree. These bud mutations show the most diverse variations. Some are suited to hot climates; some are resistant to insufficient care; some produce gigantic fruits; some give fruits which are globose, and others flat-topped fruits; some again are found to suit even very cold

climates; some give exceedingly early-maturing fruits of excellent quality. It is stated that quite fifty different mutants have been so far observed in this variety of orange. The discovery of this phenomenon has been fully exploited by the Japanese in extending their areas of orange cultivation and in raising fruit which can come into the American market long before the local crop. Prof. Tanaka, the famous authority on oranges, who draws attention to this interesting subject (*The Philippine Agriculturist*, 27, No. 6) refers to the great difficulty of explaining scientifically this problem of the instability of the Wase variety of the Satsuma Orange and after discussing various possibilities, inclines to the opinion that the change may be the result of external factors like a strong stimulus, as a wound or a break, or unusual accumulation of nutrients by girdling or twisting. He states his observation that the mutating branches have distinct signs of disturbance close to the point from which the mutation started. If this view is correct, then it should be very easy to induce mutations artificially wherever desired. A. K. Y.

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**The Effect of Scion on Stock.**—Describing the progress of horticultural research in Japan, Prof. Tanaka draws attention to what is well known to Japanese pomologists, though not so well known outside, viz., the marked change undergone by the citrus stock *Poncirus trifoliata*, the trifoliate orange, which is the stock used extensively in Japan for the propagation of the orange (*The Philippine Agriculturist*, 27, No. 6). The trifoliate orange plant

is a shrub in nature but when it is used as a rootstock it swells up greatly in size, becoming thicker than the scion when the latter assumes an enormous size. Prof. Tanaka studied the results of budding citrus varieties of many kinds on to trifoliate rootstock and found that the rootstock undergoes remarkable change, showing a different amount of growth exactly in accordance with the scion species. With scion of sweet orange, for instance, the trifoliate stock becomes deep-rooted; with the lemon as scion, the opposite effect is produced on the trifoliate rootstock, *viz.*, a shallow root system, and even a change in the colour of the roots. The same result of changing the character of the root system of the stock has been found, he says, in the Japanese *Persimmon Diospyros Kaki*, and in other fruits. Some varieties always give the roots a narrow angle or a deep-rooting habit to the rootstock while others give a shallow-rooting habit. In the case of the apple, the *Famuse* apple in California is stated to give a deep-rooting habit and the *Akin* apple a shallow-rooting habit to the rootstock.

A. K. Y.

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**The Absorption of Ammonium Nitrogen by Plants.**—That pineapple plants can absorb and assimilate ammonium nitrogen and that they can do so more readily than nitrate nitrogen when grown in nutrient solutions, is shown by water culture experiments, reported by C. P. Sideris *et al* (*Plant Physiology*, 1938, 13). The immediate products of the assimilation by the roots were amino-acids and small quantities of glutamine and asparagine. Nitrate was assimilated very slowly if at all in the root tissues and was translocated through the stem and non-chlorophyllous tissues of the leaf bases presumably to the chlorophyllous tissues. Nitrate nitrogen was neither absorbed nor assimilated as readily as ammonium nitrogen, which was apparently assimilated in the roots as readily as absorbed. Plants in the ammonium series contained in the non-chlorophyllous tissues comparatively great amounts of soluble organic nitrogen and small quantities of protein; whereas the plants in the nitrate group had in their roots large quantities of protein as compared with organic soluble organic nitrogen. The nitrate group also showed a lower rate of carbohydrate utilisation as evidenced by the presence in their leaves of somewhat greater amounts of reducing sugars and sucrose.

A. K. Y.

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**The Golgi Apparatus in Amphibian Tissue Cells.**—An important contribution to our knowledge of the structure of the Golgi apparatus of vertebrates is made by A. W. Pollister (*Quart. Journ. Micros. Sci.*, March 1939, 81, Pt. II). He has examined practically every tissue cell of Amphibia and is able to formulate certain general conclusions regarding the structure and arrangement of the Golgi apparatus in this group. Larvæ as well as adults have been examined. Regarding the arrangement of the Golgi apparatus and the associated parts in the cell he notes two types: (1) the epithelial or physiologically polarised type where the Golgi apparatus is in the form of a collar surrounding the nucleus and with the centrioles far dis-

tant from the Golgi apparatus; (2) the leucocyte or physiologically the unpolarised type where the Golgi apparatus is in the form of a horizontal collar in close relationship with the centrioles. Regarding the structure, two facts appear to be emphasised by the author: (1) Everywhere and in every kind of tissue cell of Amphibia the Golgi apparatus is lamellar and presents some variation of a plate-like structure resembling the condition found among the invertebrata; (2) In the Amphibia, at any rate, no differentiation between osmiophilic and osmiophobic regions can be made out in the Golgi apparatus.

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**A Gigantic Monument in India.**—A new chapter has been added to the artistic and cultural history of Bengal in the publication, just made, in the series of *Memoirs of the Archæological Survey of India*, of a monograph on the results of the excavations at Paharpur, Bengal.

The Paharpur mound and its enclosure were protected by the Archæological Department nearly twenty years ago, and the first sod was turned sixteen years ago. The systematic excavation by the Archæological Department begun in 1925 was only recently concluded, and the place has now revealed a great four-storeyed temple with a unique plan and a gigantic monastery containing nearly 190 cells enclosing it.

The plan of the main temple at Paharpur consisting, as it does, of a square shrine in the centre with cross-shaped adjuncts on each side and projections between each side, the whole being constructed in four terraces, is so far unique in India and supplies the missing clue to the type of architecture so prevalent in Burma, Java and the Malayan Archipelago. After the discovery of Paharpur an earlier prototype has been found farther inland at Nandangarh in the extreme north of Bihar.

The most important discoveries at Paharpur are the stone images in the lower basement of the main temple, which revealed a new school of art in the sixth-seventh century A.D. It is astonishing that in a monument which, there is no doubt, must be identified as the Buddhist *vihara* built by the well-known Pala Emperor, Dharmapala, at the end of the eighth century A.D., such a remarkable series of sculptures consisting mainly of Brahmanical figures should have been found embedded in the walls in such good preservation.

The most numerous specimens of artistic work found at Paharpur are the terracotta plaques, of which nearly 2,800 were found, over two-thirds being still *in situ*. These plaques in which are depicted a bewildering variety of subjects play a prominent part in the scheme of decoration of the walls in each terrace of the temple, there being two or even three rows of plaques in some walls.

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**The Bihar Earthquake of 1934.**—Extensive investigations have recently been made on the nature of the numerous earth fissures which came into existence all over the affected area, as a result of the great Bihar earthquake of 1934. The fissures were widespread over certain zones north of the Ganges, and generally

followed pronounced surface features such as river-banks, lakes, tanks, road and railway embankments, etc. Sometimes they were arranged in a series of step faults, others resembled trough faults where the ground sank between two parallel fissures. The maximum width of a fissure was about 27 ft. and the greatest length, 700 yards. Towards the end of the main shock, and immediately after it, enormous quantities of sand and water were thrown out from vents and fissures. The fact that the erupted water was frequently reported to have been hot shows that it may have come from a fair depth.

The fearful rumblings which accompanied the earthquake have also been investigated and these have been variously described as comparable with the noise of "several aeroplanes", "a heavy motor lorry", "an approaching goods train", "a passing motor car", or "a train passing through a tunnel". So far as can be judged, these sounds were heard more or less simultaneously over the whole area, and could not accordingly have originated from a point. During the transmission of seismic waves, rock particles are moving rapidly against each other, and the secondary vibrations so set up may give rise to sound waves. The sounds emitted are independent of the speed of the seismic waves, but are indirectly dependent upon their frequency.

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**Earthquake Shocks in 1938.**—According to the General Report of the Geological Survey of India for 1938, Htawgaw, not far from the China frontier in the northern corner of Burma, maintained its notoriety as one of the most seismic places in this country, by recording several scores of shocks.

A series of tremors and shocks of varying intensity, accompanied by loud rumbling sounds, were felt in Western India at Paliyad. The shocks are ascribed to changes taking place beneath the Deccan trap formation of the locality, probably connected with the uplift of Kathiawar in recent geological times, which in places amounts to about 1,200 feet.

Occasional shocks of small intensity continued at Mettur in the Salem District where the Cauvery River has been impounded by a large dam having a maximum depth of storage of 165 feet and a net capacity of 93,500 million cubic feet of water.

Many shocks of light to moderate intensity were reported from north-western India, the Punjab, Kashmir, North-West Frontier Province and Baluchistan. One of these, of moderate intensity sufficient to affect persons at rest and make hanging objects swing was felt between 15.00 hours and 15.05 hours I.S.T. on January 18, 1938, over a large area north and west of Lahore. No damage to property was reported. Two other shocks of a similar nature, one at about 16.15 hours on January 26 and the other at about 1.00 hour on February 15, were also felt in several places in the North-West Frontier Province.

A number of tremors and light shocks were felt in Assam, in and around the plateau.

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**Andamans' Shell Fishery.**—Indications of a new industry, the possibilities of which yet remain to be exploited by India, are given by the Zoological Survey of India, as a result of investigations lately concluded on the shell fishery of the Andamans and Nicobar Islands.

Round these reef-bound islands of the Bay of Bengal, there occur beds of two large species of marine snails, the Top-Shell and the Turban-Shell of commerce known to zoologists as *Trochus niloticus* and *Turbo marmoratus*. The shells of the snails, as well as those of the pearl-oysters and similar animals, are largely used in China, Japan, the Philippines and other parts of the world for inlaying and other forms of ornamental work and in the manufacture of buttons, studs, tooth powder, etc. The best grades of shells are sold at Rs. 600 to Rs. 800 per ton in the Singapore shell market. Between 1930 and 1937, the shells fished under licence in the Andamans and Nicobar areas exceeded 1,200 tons, valued at Rs. 8,50,000.

Little was known of the occurrence, life-history, growth and bionomics of the shell fish, and as rules and regulations to control the fishery had to be based on facts relating to the life of the animal, the Zoological Survey of India was called upon to undertake a preliminary study of the fishery in 1930, when the fishing by enterprising Japanese Fishery Companies had been in progress for three months.

With the help of a small research staff at Port Blair, Andamans, drafted from the Zoological Survey of India and under the control and direction of the Director of the Survey, some important facts concerning the life-history of the shell fish and the fishery were gathered during the six years 1930-35. These facts are now published in the form of a "Consolidated Report on the Shell-fisheries in the Andamans".

As a commercial proposition, the shell-fishery has suffered a setback mainly as a result of excessive fishing in the earlier period, both by the licensed and the unlicensed Japanese fishermen of Singapore, which has considerably thinned out the shell population of the sea. The indiscriminate removal of all shells, whether young or in the breeding stage, has likewise been the cause of the decline of the shell population.

The enforcement of the observance of the rules and regulations framed for the protection of the fishery was by no means easy. The result has been that shell-fishery in the Andamans has been at a low ebb for the last five years and it seems that nothing can rehabilitate it except prolonged rest from fishing for a period from three to five years.

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**Dipterocarpus (Gurjan) Forests in India and their Regeneration.**—A recent publication issued by the Forest Research Institute, Dehra Dun (*Indian Forest Records*, 3, No. 4) summarises all available information concerning the *Dipterocarpus*, which are extensively employed for railway sleepers, plywood and for general constructional purposes. Nine species of *Dipterocarpus* are known, all of which are considered to be good, general utility timbers. The trees are usually of large size and give a high output of sound, clean timber of uniform quality.

The publication, besides containing information on the distribution and silvicultural characters, gives details regarding the natural and artificial methods of regenerating these species.

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The Hornet's Nest placed on show in the Insect Gallery of the Indian Museum, Calcutta, is probably one of the largest specimens that have yet come to notice, it is a never-ending source of interest to the visiting public, who are able to examine at close quarters and in perfect safety its complicated internal structure.

The nest was acquired by the Zoological Survey of India from a small *bael* tree growing in the compound of a house in Calcutta in 1925. On enquiry it was found that the hornets commenced building this beautiful nest in the spring of 1924. In the month of March the size of the nest was about the size of the *bael* fruit and by May it had attained the size of a man's head; towards the end of October the growth of the nest reached its maximum and was over 3½ feet in height, its maximum breadth near the base being over 2 feet.

The nest is covered over by an envelope of a papery material which is probably a mixture of chewed wood and some glandular secretion of the hornets; usually the covering is thin and delicate but in the present case it is very strong and tough. The envelope completely encloses the nest, except for two small circular openings on the two sides near the base, which served as the ingress and exit passages to the nest.

*Vespa cincta*, which is the name by which this insect is known to the scientific world, is a fairly common species of hornet found all over the plains of India. It builds its nests in the holes of large fig and other forest trees. It is largely predacious and its larvæ are known to feed on other insects. Although at times it causes injury to fruits, it is useful as scavenger and in reducing the number of other insects, more especially Dipterous and Lepidopterous larvæ which are responsible for the destruction of several economically important plants.

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A new giant telescope has recently been installed at the McDonald Observatory in Davis Mountains of Western Texas. The instrument has a 82-inch mirror and is capable of photographing stars only a millionth as bright as any that can be seen by the unaided human eye. This brings the total number of telescopes of 2 feet in diameter or more now in use in the world to 40. According to a Bulletin recently issued by the *National Geographic Society*, "The McDonald Observatory telescope is the second largest in the world in actual use at present, being exceeded only by the 100-inch telescope at Mount Wilson Observatory, Pasadena, California. Both, however, will be surpassed soon by the 200-inch telescope to be set up on Mount Palomar, California, under the joint auspices of California Institute of Technology and Mount Wilson Observatory. The McDonald Observatory will be operated jointly by the Universities of Texas and Chicago. The mirror of the McDonald Observatory telescope weighs nearly three tons, yet its curved surface has been ground and polished to an accuracy of one-millionth of an inch. The telescope and

its mounting weighs 75 tons, yet it is so perfectly balanced that it is moved by a motor of 1/3 H.P. and can be adjusted to a hair's breadth."

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**Demographic Problems.**—The League of Nations' Committee of Experts, whose terms of reference were "to study demographic problems and especially their connection with the economic, financial and social situation and to submit a report on the subject which may be of practical value to Governments in the determination of their policies", held its first session recently, with Prof. T. Smolenski as Chairman. According to a communique issued by the Information Section of the League of Nations, the Committee held a general discussion with the object of defining the points to which its studies should, in the first place, relate. The following three questions will receive attention at the beginning: (1) the problems which present themselves in countries with rapidly increasing populations; (2) the problems which present themselves in countries with or threatened with diminishing population and (3) the problems which present themselves in countries with a population which is small relatively to the productive area or to the natural resources. The Committee also considered the advisability of organising a demographic centre attached to the Secretariat.

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**Anti-Malarial Drugs.**—The enormous disproportion between the world output of quinine and the quantity required to treat known cases of malaria is widely recognised. The latest issue of the *Chronicle of the Health Organisation* of the League of Nations (Vol. I, No. 6) refers to this question and points out that "this matter is the more deserving of attention as malaria-ridden countries are usually countries of limited economic resources and are unable for that reason to meet the expense of collective treatment and prophylaxis by anti-malarial drugs".

The Malaria Commission has carried out extensive comparative experimental work on the so-called synthetic drugs. The research work conducted by the Commission has enabled it to recommend the use of *totaquina*, a mixture of cinchona bark alkaloids, that can be produced at a price well below that of quinine.

With a view to consider the present state of production of anti-malarial drugs in various countries, the requirements of malarious countries and future possibilities and to consider how the consumption of these drugs can be promoted, the Health Organisation of the League of Nations, on the recommendation of the Malarial Commission, proposes to call for a conference of representatives of producing and consuming countries; the conference will probably be held in 1940.

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**Microbiology in the Preservation of the Hen's Egg.**—When eggs are stored all possible steps must be taken to prevent their spoilage by moulds and bacteria. A recent report issued by the Food Investigation Board (*Special Report*, No. 47. H. M. Stationery Office. Price 2sh. 8d.) deals *inter alia*, with the various kinds

of micro-organisms that attack the egg, the sources from which they come, the types of spoilage they cause, the egg's defences against invasion, and the means that can be adopted in storing eggs to reduce infection and consequent spoilage.

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The *Simphak* or Bark cloth of the Garos of Assam, was one of the exhibits shown by Dr. B. S. Guha at the ordinary monthly meeting of the *Royal Asiatic Society of Bengal* held on the 5th June. "The making and use of bark cloth is confined to the Matchi and Chisak Garos inhabiting the eastern half of the district. They call it *Simphak* and prepare it from the bark of one of the following trees: (1) Pakram (*Grewia liliæ folia*), (2) Prap (*ficus Rumphii*), (3) Chram (*Artocarpus Chaplosha*), (4) Dumbri (*ficus glomorata*), (5) Anisep (*Kydia calycina*). Of these the first yields the best and the last, the worst kind of *Simphak*. The bark is taken from the main stem of the trees by cutting two rings on the stem about 8' apart. These are joined by one vertical cut and the bark is split open and pulled off. The outer green layer is carefully removed and the bark is well pounded from the one end to the other running along the fibre with serrated mallet on a smooth log of wood. It is then doubled over lengthwise and the process of folding and pounding is continued until it is reduced to a thick mass of fibre. The moisture is wrung out and it is dried in the sun unfolded. The requisite length and width are obtained by stitching together two or three pieces, the usual size being 8' x 2'. The *Simphak* is used for blanket or bedding purposes and is never used for wearing by the Garos."

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The *Annual Report* of the Indian Association for the Cultivation of Science for the year 1938 refers, briefly, to the more important activities during the past year. Sir Arthur Hill delivered the Ripon Professorship lectures for 1938, Prof. J. E. Lennard Jones, the Cooch-behar Professorship lectures, and Sir L. L. Fermor, the Ripon Professorship lectures for 1937. The Joy Kissen Mookherjee Gold Medals for the years 1937 and 1938 were awarded to Sir James Jeans and Dr. F. W. Aston. Seven scholarships were awarded during the year. Thirty-nine papers covering 462 pages were published in the *Indian Journal of Physics*, the contributions being drawn from various parts of the country. Important research work was carried out under the direction of Professor K. S. Krishnan, Mahendralal Sircar Professor of Physics; these researches are classified under the following heads: (1) Paramagnetic studies on single crystals at low temperatures, (2) Magnetic behaviour of manganous salts, (3) Magnetic anisotropy of hydrated gadolinium sulphate, (4) Magne-crystalline studies in relation to valency problems, (5) Crystalline fields in rare earth salts, (6) Magnetic studies in relation to crystal structure, (7) Some theoretical implications of the magne-crystalline work and (8) Magnetic studies on organic crystals. Dr. S. C. Deb, Research Fellow, carried out investigations on the absorption spectra of sulphides and sulphur molecule.

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The Mining, Geological and Metallurgical Institute of India.—The latest number of the *Transactions of the Mining, Geological and Metallurgical Institute of India* (May 1939, 35, Pt. 1) gives the Proceedings of the Annual General Meeting of the Institute held on 13th January 1939, at which Mr. A. Farquhar was elected President of the Institute for the ensuing year. Mr. Farquhar's Presidential Address deals with the factors governing the conservation of the natural mineral resources of the country—especially of the coking coals of India. He deals with the various aspects of this problem, such as stowing of coal by packing, co-ordinated sequence of working the coal seams, blending of coals, washing of coals, rationalisation of coal production and coal consumption, research, etc., and in this connection, discusses the several recommendations of the Coal Mining Committee. In Mr. Farquhar's opinion, "the most pressing need to-day, therefore, is the formation of a National Industrial Research Board to make an immediate investigation into these questions, and definitely and finally establish a condition of affairs which will meet, with safety, the needs of the country, both for the present and the future."

The issue also contains a very elaborate and valuable paper by Mr. J. Thomas on "Methods of Stowing for Indian Mines" which, together with the views expressed by the leading workers on this subject in the course of the discussion following the paper, will form an outstanding contribution to the study of this problem of great importance in the Coal Mining Industry in India at the present day.

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A recent Press Note issued by the Indian Central Cotton Committee gives a resume of the work on cotton carried out at the *Institute of Plant Industry*, Indore, since its inception in 1924. In 1932, the Committee reviewed its policy with regard to the work of the Institute and approved of a revised programme which included, besides different field experiments dealing with agronomic problems, (a) botanical classification and survey, (b) cotton breeding and selection, (c) cotton genetics, (d) physiology of the cotton plant, (e) influence of environmental factors on lint characters, and (f) field experimental technique. Considerable progress has been achieved in all these directions. A satisfactory classification of Asiatic cottons, complete and acceptable to taxonomists, has been published. A census study of the cotton crops in Central India and Rajputana has shown that the best yielding cotton is a balanced mixture of types and not a pure type. The mode of inheritance of quantitative characters in cotton is being intensively studied at the Institute, and a new technique has been developed to overcome the difficulty of environmental variation and for distinguishing it from genetic variation. Varietal trials have given results of great practical value and through seed-distributing organisations, the purity of new strains has been effectively maintained, thus ensuring the best monetary return to the cultivator. The Institute also provides training in various branches of cotton research to students selected by the Indian Central Cotton Committee.

A report on the staple length of cotton produced in India for the 1938-39 season has just been published.

The total production of cotton for the season is estimated at 5,120,000 bales of 400 lbs. each, the trade estimate being higher, i.e., 5,979,000 bales (including a figure of 450,000 bales representing extra-factory consumption); of this it is estimated that 5 per cent. was of staple length 1" and over 32 per cent. of staple length 7/8" to 31/32". The corresponding percentages for the previous years were 4 and 27 respectively, showing thereby an increase in long and medium staple cotton production in India.

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**Birthday Honours.**—The Honours List issued on the 8th June, contains the following names of scientists:—

**C.I.E.:** Mr. H. R. Stewart, Director of Agriculture, Punjab; Mr. W. J. Jenkins, Officiating Director of Agriculture, Bombay; Lieut.-Col. F. T. Anderson, Professor of Surgery, Medical College, Calcutta. **O.B.E.:** Mr. E. J. Bruen, Live-Stock Expert to the Government of Bombay. **M.B.E.:** Mr. A. F. MacCullough, Advisory Chemist, Medical Stores Department, Madras. **Rao Bahadur:** Rao Sahib D. V. Bal, Agricultural Chemist to the Government of the C.P. and Berar; Rao Sahib S. L. Tambe, Special Officer for the Improvement of Cotton and Member of the Legislative Council, Indore State. **Rai Sahib:** Dr. Piare Lal Srivastava, Reader in Mathematics, Allahabad University, U.P., Babu Sajani Kumar Chatterji, Officer-in-Charge, Bacteriological Laboratory, Patna, Bihar.

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**Lady Tata Memorial Trust.**—The Trustees have announced the awards of the following scholarships and grants for the year 1939-40:—

(1) *International Awards:* Dr. Jorgen Bichel (Aarhus, Denmark), Dr. Julius Engelbreth Holm (Copenhagen), Dr. Maurice Paul Jean Guerin (Paris), Professor Dr. Karl Jarmai (Budapest), Professor J. McIntosh (London), Professor Eugene L. Opie and Dr. Jacob Furth (New York), Dr. Joachim Wienbeck (Breslau), Dr. Werner Jacobson (Cambridge), and Dr. Edoardo Storti (Pavia, Italy).

(2) *Indian Scholarships:* Mr. K. Ganapathi (Bangalore), Mr. M. Sadashiva Rao (Bombay), Mr. T. J. Job (Calcutta), Mr. M. K. Halder (Dacca) and Mr. P. L. Narasinha Rao (Bangalore).

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**Dr. K. N. Kaul**, Lucknow University, has been appointed as a member of the staff of the Royal Botanic Gardens, Kew.

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**Dr. W. L. Davies**, Research Dairy Chemist and Analyst, National Institute for Research in Dairying, Shinfield, near Reading, has been appointed Director of the Imperial Dairy Research Institute.

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**Dairy Science Abstracts.**—The Imperial Bureau of Dairy Science will shortly publish a quarterly journal called *Dairy Science Abstracts*, the purpose of which will be to provide a survey in English of the current literature of dairy science from all parts of the world. The Table of Contents will include (1) Hus-

bandry, (2) Technology, (3) Control and Standards, (4) Economics, (5) Physiology, (6) Bacteriology and Mycology and (7) Chemistry and Physics. At present this literature is published in a variety of languages and scattered in a large number of journals, many of which are not generally available to workers in dairy science. Particular attention, therefore, will be paid to information published in less familiar languages or in journals with a limited distribution.

The first number will deal with literature received or examined by the Bureau during January, February and March 1939. A number will appear every three months; four numbers will constitute a volume. To facilitate reference each number will contain an author index, and each volume, author and subject indexes.

The annual subscription, inclusive of postage, will be:—For residents of the countries of the British Commonwealth and the Anglo-Egyptian Sudan who send their subscriptions direct to the Bureau, 20/-. For all other subscribers, 25/-. Single parts, each, 7/6.

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**Spectrographic Analysis in Great Britain.**—Edited by A. C. Candler (Adam Hilger Ltd., London), 1939. 80 Pp., limp cloth covers: 7s. 6d. net; 7s. 9d. post free.

Although specialised spectrographs for use in industry originated in Great Britain and are widely used here, the fact has received relatively little notice in scientific or other publications.

This record of the uses to which the spectrograph is being put in 28 British factories and research laboratories may therefore come as a surprise to many who still regard chemical analysis as the only method of determining the elements present.

The applications are extremely diverse. About half the contributions deal with the analysis of metals and alloys and these show that analysis by the spectrograph is accurate enough to replace chemical analysis for the routine control of many alloys, while where a factory is producing metal for 99% pure or has to keep definite impurities down to less than a fraction of 1%, the spectrograph is likely to be as accurate. In every case it is much quicker.

Other contributions deal with subjects as widely separated as brewing, the refining of sugar, the manufacture of silica ware, the analysis of soil and diseases of sheep. To take the last only, a disease common in Somerset has been shown to be associated with a small trace of molybdenum in the herbage; traces as small as are here important would hardly have been revealed by chemical analysis.

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The Spectroscope is being used in an increasing measure for standardising vitamins. The spectroscopic requirements for riboflavin have recently been investigated by Dr. H. R. Kreider of the American Medical Association's Chemical Laboratory. Dr. A. E. Ruehle of the Bell Telephone Laboratory has made extensive use of ultraviolet absorption spectroscopy for studying the chemical reactions of vitamin B<sub>1</sub>. For the assay of vitamin A the spectroscope offers, perhaps, the best method. Evidence

has accumulated to show that more than one vitamin A occur, all very similar in physiological effects. The existence of these have been revealed by the spectroscope.

A routine list of spectrographic apparatus required for vitamin A assay work in the pharmaceutical or food industries is given in the *Bausch & Lomb Instrument Bulletin*, No. 43 (January 9, 1939). Special problems involved in the spectroscopic analysis of the several vitamins should be referred to Messrs. Bausch & Lomb, Rochester.

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### Announcements

**J. N. Tata Endowment for Advanced Studies.**—Applications for studentships available for advanced study out of India, will be received *not later than the 31st July 1939*, by the Secretary, J. N. Tata Endowment for Higher Education of Indians, Bombay House, Fort, Bombay. Applications should be in the prescribed form which can be had on application from the Secretary, and must be accompanied by copies of testimonials as to character, special aptitude and physical fitness (including eyesight) and a photograph of passport size. Applications of students who have graduated with conspicuous distinction will be considered.

Three studentships shall be given to Parsi candidates for every studentship awarded to a non-Parsi candidate but if eligible Parsi candidates are not available, further studentships will be available to non-Parsi candidates.

The Executive Committee of the International Union against Tuberculosis has announced the award of a biennial prize of 2,500 French Francs in memory of the late Prof. Leon Bernard, who was the Founder and for fourteen years the Secretary-General of the Union. The prize will be awarded for the second time in 1940 to the author of an original essay on "Conjugal Tuberculosis" in French or in English. The essays must be typewritten or printed and must not exceed 10,000 words. They must be forwarded to the Secretary, Tuberculosis Association of India, 20, Talkatom Road, New Delhi, not later than March 1, 1940.

The Adult Education Committee of the Central Advisory Board of Education in India meets in Simla on July 17, 18 and 19. The Committee which was appointed at the fourth annual meeting of the Central Advisory Board of Education held in New Delhi on December 3, 1938, to examine the problem of adult education in India and to report to the Board, consists of the following members:—

(1) The Hon'ble Dr. Syed Mahmud, Minister of Education, Government of Bihar (*Chairman*); (2) The Hon'ble Mr. Sampurnanand, Minister of Education, Government of the United Provinces; (3) Rajkumari Amrit Kaur; (4) Mr. W. H. F. Armstrong, I.E.S., Director of Public Instruction, Punjab; (5) The Educational Commissioner with the Government of India.

The following have been co-opted members of the Committee:—

(1) The Hon'ble Mr. Varkey, Minister of Education, Madras; (2) Mr. Bhagwat, Chair-

man, Adult Education Committee, Bombay; (3) Mr. J. J. Ghandy, General Manager, Tata Steel and Iron Works, Ltd.; (4) Dr. W. A. Jenkins, Director of Public Instruction, Bengal.

**Agricultural Training at the Imperial Institute of Agricultural Research.**—The date for admission to the post-graduate courses of the Imperial Agricultural Research Institute, New Delhi, has been changed from November 1 to October 1 from the next session, according to a press note issued by the Principal Information Officer, Government of India.

Though a research organization at which studies are made of fundamental agricultural problems of general or all-India importance, or of such problems as cannot be properly or conveniently investigated by the Provincial Departments of Agriculture, the Imperial Agricultural Research Institute is also a higher teaching institution, providing post-graduate courses as well as facilities for special research, for selected graduates of Provincial Agricultural Colleges and distinguished science graduates of Indian Universities.

**The Third All-India Obstetric and Gynaecological Congress.**—With a view to facilitate collection of data relating to the three principal subjects of discussion at the ensuing Congress, *viz.*, (1) Anæmia of pregnancy; (2) Functional uterine hæmorrhage; and (3) Maternity and child-welfare, the provisional scientific committee have formulated a scheme, copies of which can be had on application from Dr. S. Mitra, M.B., Secretary, Provisional Scientific Committee, 3, Chowringhee Terrace, Calcutta.

We acknowledge with thanks, receipt of the following:—

"Journal of Agricultural Research," Vol. 58, Nos. 6 and 7.

"Agricultural Gazette of New South Wales," Vol. 50, Part 5.

"Monthly Bulletin of Agricultural Science and Practice," Vol. 30, No. 4.

"The Nagpur Agricultural College Magazine," Vol. 13, No. 4.

"The Indian Journal of Agricultural Science," Vol. 9, Pt. 2.

"L'Agricoltura Coloniale," Vol. 33, No. 4.

"Biochemical Journal," Vol. 33, No. 4.

"Berichte der deutschen chemischen Gesellschaft," Vol. 72, No. 5.

"Journal of the Institute of Brewing," Vol. 45, No. 5.

"Journal of Chemical Physics," Vol. 7, No. 5.

"Journal of the Indian Chemical Society," Vol. 16, No. 3.

"Chemical Age," Vol. 40, Nos. 1034-1038.

"Journal de Chemie Physique," Vol. 36, No. 2.

"Chemical Products," Vol. 2, No. 1.

"Experiment Station Record," Vol. 80, No. 4.

"Indian Forester," Vol. 65, No. 6.

"Forschungen und Fortschritte," Vol. 15, Nos. 13-15.

"Transactions of the Faraday Society," Vol. 35, No. 217.

"Transactions of the Geological, Mining and Metallurgical Society of India," Vol. 10, Nos. 3-4,

## ACADEMIES AND SOCIETIES

## Indian Academy of Sciences:

May 1939. SECTION A.—SIR C. V. RAMAN AND V. S. RAJAGOPALAN: *The Structure and Optical Characters of Iridescent Glass*. A study of numerous specimens and of 30 photomicrographs of the same shows that the structures in decomposed glass may be divided into six categories exhibiting distinct optical phenomena. The colours of decomposed glass actually become more striking when the material is covered by liquid. K. G. KRISHNAN: *Dispersion of Ultrasonic Velocity in Liquids*. There is no definite evidence of acoustic dispersion over the frequency range 1.5 to 7 mc. in the cases of xylol, benzene, carbon tetrachloride, carbon disulphide and water. L. A. RAMDAS, B. N. SREENIVASIAH AND P. K. RAMAN: *Variation in the Nocturnal Radiation from the Sky with Zenith Distance and with Time during the Night*. The equivalent black body temperature of night sky as a whole as calculated from thermopile measurements agrees within 2° with that measured with a Pyrogeometer. C. R. MEHTA: *Chemical Investigation of the Seed-Oil of Oroxylum indicum Vent.* An yellow crystalline substance (m.p. 274°) and a fatty oil have been isolated and examined. H. GUPTA: *Analogues of Bauer's Theorems*. H. GUPTA: *On a Problem of Arrangements*. K. BAPAYYA: *Effect of Temperature on the Characters of the Wings accompanying the Rayleigh Lines in Liquids*. In the cases of chloroform and benzene, different portions of the continuous wings are found to be depolarised to the same extent, viz., 0.86, both at room temperatures and high temperatures. Depolarisation of the total scattering, however, in benzene diminishes from 0.44 at room temperature to 0.11 at 260°C. S. MINAKSHI SUNDARAM: *On an Infinite System of Non-Linear Integro-Differential Equations*. S. CHOWLA: *On a Problem of Arrangements*. K. NAGABHUSHANA RAO: *Diffraction of Light by Supersonic Waves—Part I*. The amplitude expressions for the diffracted orders are worked out in extenso. B. R. SETH: *Potential Problems Concerning Curved Boundaries*.

May 1939. SECTION B.—P. R. PARUKUTTY: *On a collection of Algæ from Assam*—Twenty-six forms out of which ten belong to the Chlorophyceæ and sixteen to the Myxophyceæ have been described. One variety and five forms are new. G. W. CHIPLONKER: *Echinoids from the Bagh Beds—Part II*. The examination of fossils from the various exposures, leads to the conclusion that the different constituents of the Bagh Beds must be assigned to a single geological age, the observed differences being due to only lithological facies. The echinoids from the Beds must be regarded to mark the Cenomanian and very probably the lower Cenomanian age. ALI MOHAMMAD AND ABDUR RASHID KHAN: *Root Development of Certain Oilseed Crops of the Punjab*. A Study of the Root Habits of Representative Types of Toria, Sarson, raya or rai and taramira. S. JONES: *On the external gills of Acentrogobius viridipunctatus (Day)*. External gills are unknown in Teleo-

stei and those in *A. viridipunctatus*, the origin, structure and degeneration of which are described in this paper, are the first of their kind. B. P. PAL AND B. B. MUNDKUR: *Studies in Indian Cereal Smuts—I. Cereal Smuts and their Control by the Development of Resistant Varieties*.—An introductory paper to a series dealing with the results of investigations on the relative resistance of strains of wheat, oats and barley to their respective smuts. M. K. SUBRAMANIAM: *Studies on the Structure of the Golgi Apparatus—V. The Idiosome in the Pancreas of the Toad and its Possible Relation to the Ergastoplasm*. The Golgi apparatus and mitochondria were studied in acinar, duct and islet cells of the pancreas, and the suggestion of Subramaniam and Gopala Aiyar that the idiosome may form a core to the Golgi apparatus is substantiated. P. N. MEHRA AND H. L. MEHRA: *Life-history of Stephensoniella brevipedunculata Kash.* MAHESHWAR SINGH SOOD: *A peculiar case of Caudal Abnormality in Hemidactylus flaviviridis Rüppel*.

## National Academy of Sciences:

March 1939.—V. L. VARMA AND S. DUTT: *Indigoid dyestuffs derived from Chrysoquinone*. K. B. MATHUR AND G. R. TOSHNIWAL: *F-Region Ionization in June 1938 at Allahabad*. R. BEHARI: *Osculating quadrics of a ruled surface*. B. P. PANDE: *On the Trematode Genus Lyperosomum Looss, 1899 (Dicrocoeliidae) 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*.

## Indian Association for the Cultivation of Science:

February 1939.—M. N. SAHA AND K. B. MATHUR: *The propagation and the total reflection of electromagnetic waves in the ionosphere*. BHOLANATH ROY: *Raman spectra of co-ordination compounds*. JAGATTARAN DHAR: *Crystal structure of diphenylamine, Part I*. M. F. SOONAWALA: *The internal pressure in liquids*. D. SUBRAHMANYAM: *A new theory of Lapse Rate*. R. R. BAJPAI AND B. D. PANT: *Further Studies of F-region at Allahabad*.

## Indian Chemical Society:

March 1939.—MATA PRASAD AND D. M. DESAI: *The effect of the addition of non-electrolytes and of temperature on the times of setting of some transparent inorganic gels*. SISIR KUMAR GUHA: *Dyes derived from acenaphthenequinone—Part VII. 2-(5-Chloro)-thionaphthene-acenaphthyleneindigos*. M. N. RUDRA: *Manganese content of Indian foodstuffs and other materials*. N. L. VIDYARTHI AND M. NARASINGA RAO: *Chemical examination of the wax from sugarcane*. DUHKHAHARAN CHAKRAVARTY AND NIRANJAN CHAKRAVARTY: *Constitution of halogenated resaceto- and propiophenones*. DUHKHAHARAN CHAKRAVARTY AND BROJESWAR MAJUMDAR: *Limit-ed applicability of Kostanecki's reaction. The influence of Halogen atom on the reaction*. S. RANGASWAMI: *A note on methyl-β-resorcylate*. M. NARASIMHAM AND S. N. PAL: *A note on the analysis of certain algæ*.