

pursued should be supplemented by a systematic survey of blood groups. Among other contributors Mr. Sasanka Sarkar puts forward a proposal for a classification of the nasal elevation index, and Dr. Biren Bonnerjea, profiting by his sojourn in the United States, discusses "Fish-Hooks in North America and their Distribution". We offer the new periodical a cordial welcome, and wish it a long and prosperous career.

Extension of Electric Power Supplies in U.S.S.R.

ACCORDING to "Russia Today" Press Service, the Commissariat of Power Stations of the U.S.S.R. is expending a sum of 1,056 million roubles on this purpose in the present year, when 882,000 kw. will be added to the capacity of the generating plants of the Union. The capacity of the power stations in the Ukraine has been augmented considerably, a notable addition being a 100,000 kw. turbine to the Zuyev Station, which is one of the largest in the U.S.S.R. Two large turbines have been added to the Moscow power system and three new heat and power stations are in course of construction in that city. The power system of the Urals has been augmented by a 50,000 kw. generator at the Central Urals Station near Sverdlovsk, which brings the capacity of this station up to 150,000 kw. A heat and power plant was recently put into operation at the Kamensk Aluminium Works in the Urals. Work on a large scale is also proceeding on hydro-electric power plants. This includes work on the world's largest power project, the Kuibyshev Hydro-Electric Centre (on the Samara Bend of the Volga), the power plant of which when completed will have a generating capacity of 3.4 million kw., and the hydro-electric power stations at Uglich and Rybinsk, two further links in the chain of the Greater Volga Project. The Uglich and Rybinsk stations will have a combined capacity of 440,000 kw. Construction is in progress on the first underground hydro-electric power station beyond the Arctic Circle, in the district of Kandalaksha, in the Murmansk Province. This station, which will have a capacity of 150,000 kw., will be the third power plant in the Soviet Far North. To provide power for the growing non-ferrous metal industry in the Altai Mountains, building has commenced for a generating station of 240,000 kw. capacity on the River Irtysh in Kazakhstan.

Precautions against Flooding in the London Tubes

IN order to protect railway and road transport services from the risks arising from air raids, London Transport, in conjunction with the Ministry of Transport, has undertaken a great programme of emergency work. The *Electrical Times* of October 19 states that the total cost of the programme, including that already completed at the outbreak of the War, will be about a million pounds. The most difficult part of the problem was how to protect the underground railways from flooding either from the Thames itself or from sewers or water mains where these are in close proximity to stations. There has been already a preliminary inspection of two examples

of such protective works, namely, floodgates installed at Waterloo, where the tunnels of the Northern line go under the river, and work which has been done at King's Cross Underground, to guard against flooding from water mains and sewers. When the works are finished, all the stations and sections of line at present closed will be reopened and journeys on the Underground will be as safe as in peace time.

BOTH the floodgates installed at Waterloo and Charing Cross stations on the Bakerloo line are electrically operated. They enable the sub-fluvial sections of the lines between these stations to be isolated during an air raid and so the risk of damaging the under-river tunnels is avoided. Similar floodgates are being installed at Waterloo and Strand stations on the Northern line, which also runs under the Thames. Each gate is made of built-up steel of an overall thickness of thirteen inches and weighs very nearly six tons. In normal open position it is against the headwall of the station platform tunnel, against the tunnel mouth. It is made to slide horizontally into position across the tunnel mouth within a framework of cast iron and can be operated either electrically or by hand. For electrical operation control is by push-button. The gates would resist a force of more than 800 tons, which is several times greater than any possible pressure of water that might have to be borne. The gates on the Bakerloo line were actually closed during each of the three air raid warnings which marked the outbreak of war, the time taken to close them being less than three minutes. The gates were designed by W. T. Halcrow, consulting engineer, in conjunction with London Transport's engineers.

Commercial Irradiation of Food

IT is now sixty years ago since it was first discovered that bacteria are killed by exposure to sunlight, and that the bactericidal effect is due to rays of short wave-length. For medical purposes the use of such ultra-violet rays is now well known, but it is not generally known to what extent irradiation is used commercially in the preparation of foodstuffs, and the engineering devices that are employed for obtaining the ultra-violet rays. Until recently, sterilization of water by ultra-violet radiation has been hampered by the complexity of the equipment available (*Elect. Rev.*, Sept. 23). Recently, Messrs. Hanovia, Ltd., have brought out the new 'Uster' type of sterilizer, which uses a simple straight generating quartz mercury arc tube with a 700-watt loading. This starts automatically by an electronic discharge from activated metal electrodes. One of these units can deal with 600 gallons of fluid per hour. Mr. Harding, a director of E. Harding and Sons, Birmingham, states that in a bakery he finds that dough which has been subjected to ultra-violet rays during the seven to ten minutes it is mixing not only gives a loaf a better colour, owing to the slight bleaching action of the rays, but also causes a definite improvement in fermentation. Another application of ultra-violet radiation is to determine

quality or age by fluorescent effects. Many substances absorb ultra-violet rays and re-emit them as visible light of certain colours. The colours are specific and characteristic for each substance, but minute differences in chemical composition often cause large differences in the colours of the emitted light. An egg, for example, changes its colour from mauve-red when it is newly laid to pale blue as it grows older, and a mixture of margarine and butter appears an unmistakably different colour from pure butter.

A Geothermic Generating Plant

ITALY has not confined its attention to developing hydro-electric power. At Bastardo in Umbria, Italian lignite is used to supply a large electric power station. In addition, there has recently been exploitation of the natural steam resources of the borax mines geysers in Tuscany. The Larderello geothermic electric station is the best known. Antonio Giordano, in an article published in the *Electrical Times* of October 19, gives an account of its growth from 1905 to the present time. Its capacity initially was 16,000 kilowatts. In the past twelve months, in association with the electrification of the Viareggio-Rome section of the Turin-Naples railway, running along the western Italian coasts, a new geothermic generating plant of 50,000 kw. capacity has been built. Its operation in the first few months has been so successful that the Borax Company of Larderello has placed orders for two new 12,000 kw. machines, for the necessary heat transformers, etc., and for the construction of a completely new power station at Castelnuovo, which will house five generating sets each of 12,000 kw. When the new developments are completed, the aggregate capacity of geothermic generating plants in Italy will amount to 135,000 kw., and the possibilities of further extensions are not exhausted. A problem connected with the exploitation of natural steam for power generation purposes is its purification. The difficulty was solved successfully by Prince Ginori Conti, chairman of the Larderello Company, by means of specially designed evaporator units. These consist of primary pipes through which the natural steam is circulated at a pressure of 3 kgm. per sq. cm., the pipes being immersed in water in a cylindrical tank. The energy is generated in the turbo-alternators at 25,000 volts and transmitted to the substations along the Viareggio-Rome railway, where it is converted to 3,000 volts direct current. The new station at Castelnuovo will also serve this railway.

Report of the Cambridge Observatory, 1938-39

THE work carried out at the Cambridge Observatory under the directorship of Sir Arthur Eddington includes photo-electric observations for the purpose of testing the constancy of the light of stars similar in physical constitution to the sun (dwarf *G* stars). With the Northumberland equatorial, 165 measures of double stars were made, 51 being less than 1" in separation. Dr. Woolley began laboratory experiments in preparation for a determination of the sun's apparent magnitude, planned, in conjunction with

Mr. C. R. Davidson, to be carried out in South Africa in 1940. The apparatus had been brought to a stage at which it is possible to measure with a probable error of 0.01 mag. the transmission in sensibly monochromatic light of a dark glass cutting down three magnitudes. The polarization of a spectrograph was carefully determined in several wave-lengths, and a preliminary determination of the coefficient of reflection from an unsilvered glass surface was made. Both theoretical and observational work have been carried out by research students: Dr. M. Krook (Isaac Newton student) investigating certain problems involving non-coherent absorption; D. S. Evans concluding his work on the influence of Stark effect on the centre-to-limb variation of the contours of the Balmer lines; J. Jeffreys (Isaac Newton student) on photometric work in conjunction with Dr. Woolley's research on the sun's apparent magnitude, and H. Corben working on relativistic quantum theory. The Director has investigated the problem of how far the properties of a star of variable polytropic index are intermediate between those of polytropes corresponding to the two extreme indexes. This research is given in *Monthly Notices*, 99, 4. By Grace of the Regent House on June 10, 1938, the Observatory was constituted a Department in the Faculty of Mathematics, and the Observatory Syndicate was discharged. The Syndicate had been in continuous existence for 109 years, an earlier Syndicate, appointed "for considering the propriety of building an Observatory", having met from 1818 until 1824.

Plant Hormones in Horticulture

THE chemical recognition of plant hormones was quickly followed by the synthesis of substances capable of initiating the formation of roots in the stems of many plants. These substances have been used in plant propagation, causing almost in a 'catalytic' manner an acceleration of the rooting process accompanied by a more profuse root system. H. L. Pearse has now reviewed the work of thirty or more investigators who have endeavoured with considerable success to apply recent scientific discoveries to horticulture in this way ("Imperial Bureau of Horticulture and Plantation Crops. Technical Communication No. 12: Plant Hormones and their Practical Importance in Horticulture". By Dr. H. L. Pearse. Pp. 88. Bibl. 248. 3s. 6d.). There follows a valuable index showing approximately one thousand examples of propagation and the treatments used. This is not a complete list, and some difficulties in presenting the results of many workers in one table have been neatly overcome; but comparative reference would have been made easier by a standardized method of stating the concentrations employed. Results obtained by the additional use of vitamin B₁ (aneurin), known to influence the growth of excised roots *in vitro*, and other substances are also brought under review. The widespread use of aneurin is not recommended as yet, although at East Malling, as elsewhere, Pearse observed some stimulation in the subsequent growth of rooted cuttings which had received small quantities of