

The Soviet Polar Enterprise

Some Preliminary Results

SOME preliminary results of the observations made on the drifting Soviet polar station are contained in articles supplied by the Soviet Union Year Book Press Service. Prof. V. Shuleikin, writing on currents and winds of the Arctic, says that the rate of drift of the ice is about three per cent of the velocity of the wind and that the drift deviated from the wind direction by so much as 45°. Further, he maintains that the pack-ice moves only by the action of the wind and that apart from the winds there were no surface currents observable in the Arctic Ocean. Thus there must obviously be a general prevalence of winds across the polar basin, for the observers are insistent that no sign of a circulatory movement of the floes within the basin was apparent. The East Greenland current is attributed to the persistence of north-west winds from the plateau of Greenland giving a southward movement, presumably in conjunction with the northward push of the ice due to the earth's rotation. It is said to be entirely a wind current.

Prof. N. Zubov points out that the conception of the Arctic as a region of continuous high pressure must be modified since cyclones penetrate to the region of the North Pole and bring relatively warm weather. If, however, the drift of the ice, which was principally to the south, is due solely to wind action it would appear that the wind must prevail from one direction and this may prove to be from the region of cold in north-eastern Siberia. There the radiation from a land surface results in lower winter tem-

peratures than occur over the Arctic Ocean, where higher temperatures are maintained by the unfrozen water below the ice. The low pressure of the Greenland sea in conjunction with this high pressure over north-eastern Siberia would no doubt account for a pressure gradient leading to these transpolar winds. Previous observations on the winter drift of pack-ice north of Asia show some correlation with the air current from the Siberian high pressure area. In summer, northerly winds on the Asiatic coast, due to a change in pressure condition, fray out the edges of the pack towards the south. Comparable northerly winds seemed to have driven the Soviet floe southward on the other side of the Pole in summer.

Prof. L. Zenkevich, writing on the biological results, has little to say so far, except to record that fauna has been collected at depths of more than 1,000 metres. This is more than four hundred metres below the ridge between Greenland and Spitsbergen. Thus it would appear that the deep Arctic fauna is completely cut off from the faunas of the Atlantic and Pacific basins, and may well contain faunas of great interest. Lastly, Prof. O. Schmidt foresees further exploration of the inner Arctic basin by this novel form of transport on drifting ice, the only suitable means that has so far been adopted. The new magnetic observations will be a great help to future aviators, both in placing and removing such parties of floating observers. Aerial transport between Europe and the Far East will also be facilitated.

R. N. R. B.

Veterinary Science in India

IN his presidential address before the Section of Veterinary Research of the Indian Science Congress Association at its recent jubilee meeting in Calcutta, Sir Arthur Olver discussed "The Development of Veterinary Work in India". Sir Arthur gave a detailed history of the early pioneers of veterinary science in India and the great efforts they made to lay down the foundation upon which the present structure had been built. So long ago as 1788, Joseph Earl published in Calcutta an English translation of a Sanskrit work on the diseases of horses entitled "Saluter and Farrier", and in 1799 a number of qualified veterinary surgeons, graduates of the London Veterinary College, were drafted to India for the organization of cattle and camel breeding and the establishment of studs for the breeding of cavalry horses. The most prominent among these was William Moorcroft, who was appointed in 1808 by the East India Company as superintendent of their Bengal stud at Pusa, in North Bihar; and it is recorded that by improved management he reduced losses by 90 per cent, and amongst other things introduced the cultivation of oats into India. Unfortunately, whilst on an expedition to Central Asia on behalf of his scheme to improve the breed of remounts for India he was

murdered, but his writings were of exceeding value, not only on veterinary subjects but also in connexion with agriculture; and he is credited with having placed the Kashmir shawl industry on a sound footing, and to have described a breed of mountain sheep with wonderful wool and to have given an account of a new species of the genus *Equus* which was neither horse, ass, nor mule, and which he thought might have been the 'Onagar' of Pliny.

In 1821, in consequence of the terrible losses from disease amongst the animals, the East India Company insisted upon veterinary surgeons forming part of the staff of the various depots, and arranged a system by which Indians could be trained as assistant apothecaries to the troops of the Bengal Army. In 1823 a scheme was promulgated for an organized veterinary service, but the Veterinary Department of India remained without an official head or a single administrative officer for forty years; spasmodic efforts to fight the many tropical diseases from which the animals suffered being undertaken only in districts where there happened to be stationed veterinary officers of the British and Indian cavalry regiments. It was one of these, Dr. Griffith Evans, of the Army Veterinary Department, who, in 1881,

for the first time, demonstrated a large flagellated organism, now known as *Trypanosoma evansi*—in the blood of horses and camels affected with surra, and this discovery was the pioneer work in the knowledge of protozoan diseases, and has since been of immense benefit to the human race as well as to livestock.

The years between 1860 and 1892 saw considerable advance in the organization of veterinary services in various provinces, and the formation not only of an army veterinary school but also several teaching schools and veterinary colleges. With these must ever be associated as pioneers the names of Hallen, Steel, Pease and Fred Smith; and in most provinces superior veterinary services were formed, officered by members of the Royal College of Veterinary Surgeons with subordinate services officered by graduates of the Indian Veterinary Colleges. The year 1891 marked one of the most important steps ever taken for the development of veterinary work in India, in the appointment of an Imperial bacteriologist; the sequel to which has been the establishment of the well-equipped and well-staffed Veterinary Research Laboratory at Muktesar. It was here that Dr. Lingard, who was the first Imperial bacteriologist, discovered the special affinity of arsenic for the parasite of surra; a discovery which has led to results of greatest importance to the human race. The more recent work of Dr. J. T. Edwards in the production of a goat virus of fixed and reduced virulence for the ox laid the foundation to what has proved a highly successful and economical method of controlling outbreaks of rinderpest amongst plains cattle, without the use of anti-rinderpest serum; the results being to confer a lasting immunity at a fractional cost of the serum methods which had been in vogue previously.

Sir Arthur Oliver directed attention to the enormous field for scientific veterinary work which exists in India and deplores the paucity of trained scientific workers, and the heavy loss which could be avoided if more and more scientifically trained staff could be brought into action for combined veterinary and animal husbandry activities. He suggests that in addition to the five veterinary colleges which at present exist, at three of which the course is only three years, whilst at the other two the course is four, there should be added a Central India University Veterinary College. This would work in conjunction with the Veterinary Research Institutes of Izatnagar and Muktesar to train specially selected students who would be required to undergo a minimum of five and perhaps even six years of scientific veterinary research with special facilities for training in animal husbandry and a university matriculation to enable them to train up to modern standards and to carry out the higher diagnostic and research work which is so essentially necessary to control the epidemics of animals—especially in a tropical country like India, where the wealth and also the health of the people so largely depends on the health of its farm animals. As Sir Arthur said: "the field for such work is unlimited, and up to the present almost untouched."

The meeting of the Veterinary Section at the Indian Science Congress was well attended, and the papers on veterinary scientific subjects were of a very high order. One notable result ensued in that a proposal to add to future science congresses a Section of Comparative Medicine—in which medical men, veterinarians, physiologists, and those interested in animal husbandry could take equal part, was enthusiastically received and adopted.

The New Super-Novæ

A NUMBER of interesting notes on the discovery and the investigation of the two 'super-novæ', found within the course of a month, by F. Zwicky at the Mount Palomar Observatory, California, have been recently published in the *Astronomische Nachrichten*.

On an earlier occasion Zwicky (*Proc. Nat. Acad.*, 22, 459; 1936) had emphasized the great importance of extensive observation of these unique objects. Super-novæ radiate during several weeks as much energy as a whole galaxy of stars, and thus these data may furnish most valuable information on fundamental problems, such as the generation of energy in stars, the evolution of stars and stellar systems, the origin and the characteristics of cosmic rays travelling in space.

The latest discoveries, as well as earlier ones, for example, that in the nebula *NGC 4157* in February 1937, are the result of a careful and regular search organized by Hubble, Baade and Zwicky, in the course of which the most important clusters of nebulae were photographed as often as possible and tens of thousands of nebular images carefully searched for new stars (see *Publ. Astro. Soc., Pacific*, 49, 290; 1937).

Zwicky's recent super-novæ are of special interest because of their enormous absolute brightness, namely, -16, which makes them the most luminous stars known.

The first of these new stars, "Nova 144.1937 Canum Venaticorum", was found with the 18-in. Schmidt telescope in the faint nebula *I.C. 4182* on August 31, when it had already reached the magnitude 8.5. It then faded rather rapidly; M. Beyer-Hamburg (*Astro. Nach.* No. 6307) recorded it on September 2 as 8.85 m., and by September 6 it had decreased to 9.8 m. In this period several spectra have been obtained by K. Walter and W. Strohmeier, of the Astrophysical Observatory at Potsdam (*Astro. Nach.*, No. 6308). The plates show on a rather strong continuous background some very wide emission bands, the whole spectrum having an appearance similar to that of a Wolf Rayet star of early O-type, characterized by bands at λ 4680 and λ 5411, He II, λ 5007, [O III], and the Balmer lines. Discussing spectra obtained at the Lick Observatory, D. M. Popper (*Publ. Astro. Soc. Pacific*, 49, 282; 1937) expresses the half-widths of the most distinct bands in km./sec. and finds a velocity of expansion of the star of about 4500 km./sec.

The other super-nova was discovered on September 10 in the east end of the nebula *NGC 1003*. Plates taken at the Hamburg-Bergedorf Observatory on September 6 and September 8 by A. Wachmann showed the star increasing from 13.6 m. to 13.3 m. (*Astro. Nach.*, No. 6310). On September 19, W. Strohmeier succeeded in obtaining an objective prism