HAFFKINE INSTITUTE*

THE Haffkine Institute, first started as a plague research laboratory, has, under the able and enlightened Directorship of Lieut.-Col. S. S. Sokhey, extended its wings and achieved spectacular progress with nearly fifty members on the rolls of the scientific staff, there are now nine departments functioning—the departments of Vaccines, Antitoxins and Sera, Pharmacology, Biochemistry, Chemotherapy, Entomology, Nutrition and Experimental Pathology, Clinical Pathology and Virus Diseases including Rabies; in addition, there is a Blood Bank. In short, all the arteries of the Medical Sciences are running here. In recent years, the sharp dividing lines between the various branches of science are gradually shading out and, the specialist must now cease to work in "splendid isolation"; he needs the help from other sciences. This is especially true of the research worker in the field of medicine. For example, Immunology is slowly getting into the folds of Chemistry; the production of vaccines and sera, instead of remaining immutable as a bacteriological art, is becoming a technology; for a theory of formation of nerve fibres, ideas from astrophysics (!) are invoked; statistics is, of course, the handmaid of medical sciences. So, with the various interrelated departments organised at the Haffkine Institute, the researchers here can easily understand each others' language. Another gratifying feature consists in the provision of facilities for the large-scale production of drugs, a circumstance which rarely obtains at other research centres in this country. The Annual Report of the Haffkine Institute for the years 1942 and 1943 which has just reached us, gives an account of the various activities.

In the budgetary turnover of the Institute, we find that in the financial years 1941-42 and 1942-1943, the total expenditure incurred is respectively Rs. 456,430 and Rs. 7,09,701 against which it has realised Rs. 5,85,705 and Rs. 6,75,496 respectively by the sales of vaccines, sera, etc. The prices of the products from the Institute have remained competitive.

The Institute has as one of its primary duties the manufacture and supply of the medical requirements of the Governments. In the two years 1942 and 1943, the Institute has supplied 6,561,441 c.c. of plague vaccine, 6,724,243 c.c. of cholera vaccine, 336,799 c.c. of T.A.B. vaccine and 2,505 c.c. of meningococcal vaccine. The recently started Serum Department, though it has not yet reached its peak activity, has already made good progress. It maintains about 150 horses under immunisation and produces tetanus, gas-gangrene and diphtheria antitoxins, and anti-dysentery, anti-plague, and antisnake venom sera, totalling 3,39.355 ampoules in the two years. The tetanus welchii, septique, œdematiens, diphtheria, dysentery (Shiga) toxins have been produced. 220 Litres of tetanus toxoid were prepared, conforming to the accepted international standards. The Anti-rabic Department has treated 7,818 cases in two years and has prepared and supplied a total of 15,947 doses of anti-rabic vaccine. The Pharmacology Department has assayed 2,600 samples in the two years; it has supplied 15,000 sulphonamide paste tubes and 8,000 occlusive dressings to the army and 3,500 litres of glucose saline to the various organisations. The Chemotherapy Department has prepared the sulphathiazole required for clinical trials in plague and has supplied an antiseptic solution to the various hospitals.

The Pathology and Biochemical sections have rendered very valuable diagnostic aid to the various hospitals and to private practitioners; nearly 30,000 specimens were examined in the two years. As a caretaker of the health of the City and Province, the Institute does diagnostic work at a very moderate cost and free diagnosis is given to all practitioners in cases of infectious diseases as diphtheria, dysentery, cerebrospinal fever, enteric fever, typhus fever, cholera and malaria.

Haffkine Institute claims the distinction of being the first in India to obtain dried blood plasma with a locally fabricated plant. The Blood Bank has processed and dried 325·59 litres of human blood plasma in the two years.

In addition to this overburdened work due to production and routine, the research activity has been maintained at a high level. There are listed in the report 23 research publications and there is also given a brief account of the research covering 22 pages. The preventive and curative aspects of bubonic plague remain the special field of research activity of this Institute. A new plague vaccine, better than the old one, has been developed. The work of the Institute on the treatment of plague with the sulfa drugs is now widely recognised. New processes for the manufacture of some important sulfa drugs, which are covered by six patents, have been evolved and new compounds of this group have been synthesised. The pharmacology of these drugs and their effects in plague, war wounds and malaria, have been investigated. The production and preservation of anti-toxins and sera have been studied as also the changes in the protein fractions of plasma of horses undergoing hyperimmunisation against tetanus. Improvements in the methods of diagnosis have been made.

This Institute also serves as training centre for the health personnel and bacteriologists. During these two years 24 Chinese doctors and 6 local public health workers received training.

In nurturing a scientific institution one item requiring great foresight and careful consideration is the continuous replenishment and modernisation of the equipment. The problems that are presented to the researchers today demand for their speedy and satisfactory solution, special instruments and apparatus, the precision and accuracy of which are being improved almost daily. This has been well appreciated by Col. Sokhey whose constant

* "Report of the Haffkine Institute for the years 1942 and 1943," by Lt.-Col. S. S. Sokhey, I.M.S., Director, 1945.

endeavour has been to furnish the Haffkine Institute with the most modern and up-to-date equipment.

The chief problems of India are poverty and pestilence. If we have to have our public health problems tackled in an effective way, each Province should organise at least one Institution; it is revealed that Russia, which has tackled her public health problems in an admirable way, has 200 Medical Research Institutions. How many India shall need can easily gauged.

SOME ABNORMAL POLLEN GRAINS OF *PINUS EXCELSA* WALL.

By G. S. PURI, Ph.D.

(*Department of Botany and Geology, University of Lucknow*)

Introduction

POLLEN grains of *Pinus excelsa* Wall., as also those of other members of the Abietineæ, are normally two-winged. However, abnormal pollen grains—with one wing (encircling the body like a frill), three wings or four wings—have been infrequently observed among normal pollen of both modern and fossil material of *Pinus* and in some modern species of *Cedrus* and *Abies*. Such abnormalities are by no means confined to the Abietineæ but they are recorded in other tribes also, *e.g.*, in the Podocarpineæ the number of wings is very variable and abnormal grains have been observed in more than one species of *Podocarpus*.

One-winged pollen grains with a single bladdery exine encircling the body like a frill are recorded by Wodehouse (10, p. 266, pl. 3, fig. 8) in *Abies nobilis* and similar grains have been observed in *Cedrus Deodara*, *Podocarpus neriifolia* (1, pl. 5, fig. 11; and pl. 13, fig. 19) and in at least one other species of *Podocarpus* (10, pp. 219, 274). Florin (2, p. 639, text-figs. 4*c*, *d* and *e*) has figured two one-winged pollen grains of *P. silvestris* from postglacial deposits of Sweden and according to him "Eneroth has found that among 38,887 subfossil pollen grains of *P. silvestris* collected in the Swedish province of Norrbotten 0·04 per cent. exhibited an abnormal number (1, 3 or 4) or extension of the air sacs".

Three-winged pollen grains are recorded in more than one species of *Pinus*. Florin (2, p. 639) has recorded from the post-glacial deposits of Sweden a number of three-winged pollen grains of *P. silvestris*, and similar abnormal grains of *P. Banksiana*, *P. Strobus* or *P. resinosa* have been figured by Wilson and Webster (9, pl. 2, figs. 21, 22) from Vilas County bogs in the U.S.A., which are of Pleistocene age.

In modern material of *P. Khasya*, *P. longifolia*, and *P. Merkusii* Miss *Chatterjee* (1, pl. 14, figs. 20–22) has observed three-winged pollen grains. Four-winged pollen grains have been found in *P. silvestris* (2, *loc. cit.*), *P. Banksiana* (?), *P. strobus* or *P. resinosa* (9, figs. 25, 26).

Although abnormal pollen grains with one or four wings are already reported in other species of *Pinus*, so far as the author is aware they have not been previously observed in *Pinus excelsa*.

Description

Fig. 1 is a photomicrograph of a one-winged pollen grain, which measures 76·5 μ in diameter. The bladdery exine, which encircles the body in the form of a frill, shows a strong tendency to get transformed into two wings. Another abnormal pollen grain, illustrated in Fig. 2, shows two notches and in this specimen a tendency to get transformed into three wings is clearly seen.

Fig. 4 is a photomicrograph of another abnormal pollen in which the two bladders are of unequal size (*cf.* fig. 3, a normal pollen grain) and similar pollen grains seem to be fairly common in this species.

A four-winged pollen grain is illustrated in Fig. 5. In this specimen the four bladders are symmetrically arranged round a body, which measures 54 μ in diameter.

Discussion

It is interesting to note that a single bladdery exine, which is evidently an abnormality in modern and Pleistocene conifers, is a normal feature in ancient member of this group.

Some Palæozoic members of the Coniferales, *e.g.*, *Walchia*, *Lebachia* and *Ernestiodendron* (3) possessed one-winged pollen grains which do not seem to be very different from what we have described above. Pollen grains of Cordaitales were also one-winged and in