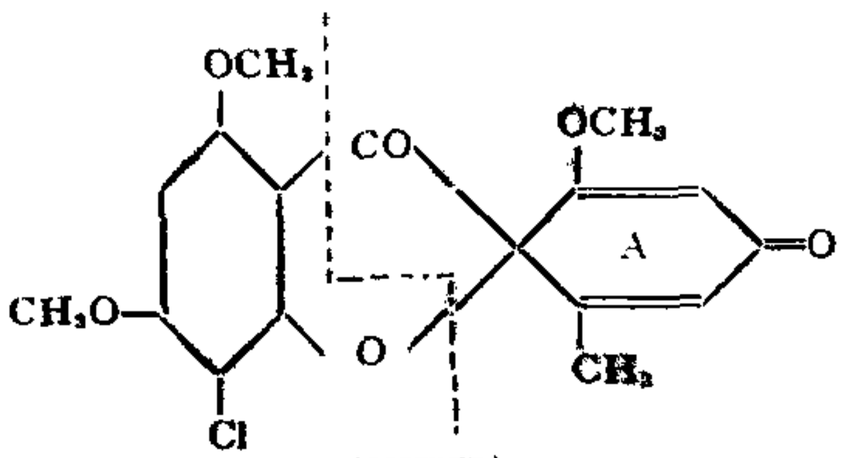
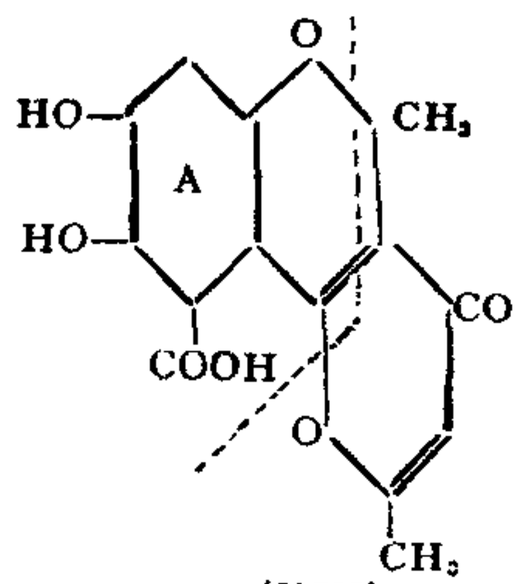
In the formula of these compounds the orsellinic units are indicated as (A).




(XVIII)




(XIX)

The wide occurrence of the orsellinic unit ($C_8$-unit) in lichen and mould products is thus established. It should be considered to be as important as other well known units already fully recognised to be present in natural products.

1. Seshadri, *Proc. Ind. Acad. Sci.*, 1944, **20A**, 1.
2. Yosioka, *J. Pharm. Soc. Japan*, 1941, **61**, 332.
3. Oxford and Raistrick, *Biochem. J.*, 1932, **26**, 1902; 1933, **27**, 634 and 1473.
4. Aghoramurthy and Seshadri, *Proc. Ind. Acad. Sci.*, 1952, **35A**, 327.

## REVIEW OF WORK OF THE NATIONAL LABORATORIES

THE programme of industrial development, which the Planning Commission has laid down for 1951-56, assigns important responsibilities to the work of India's National Laboratories, where research is being carried on in such varied fields as food, housing, roads, metals, glass and ceramics, industrial chemicals and others. Some of the less technical results of research achieved so far there are reviewed below :—

The Central Food and Technological Research Institute, Mysore, has demonstrated that starch can easily be prepared from mango kernels, which are plentifully available in the Indian villages A process has also been evolved by it for the preparation of a palatable and nutritious juice from cashew apples.

The *Indian Pharmaceutical Codex* compiled by the Central Drugs Research Institute, Lucknow, and published by the C.S.I.R recently, constitutes an exhaustive survey of Indian drugs of vegetable and animal origin. Incidentally, the publication also provides India with her *first* national pharmacopœia

Investigations at the Central Building Research Institute, Roorkee, have shown that coal ash, discharged from the boilers, can, after suitable treatment, be used for making cement mixes. About 10-12 per cent. of portland cement can thus be replaced by the ash and the resulting mixture used in making mortars and concrete.

The Central Glass and Ceramic Research Institute, Calcutta, has produced good quality sand-lime bricks from lime sludge obtained as a waste product during the manufacture of acetylene from calcium carbide. These bricks are stronger and more regular in size and shape than clay bricks and by the incorporation of various pigments they can be made in a variety of pleasing colours for use as facing bricks in buildings for decorative effects

The Indian Bureau of Mines, in collaboration with the National Metallurgical Laboratory, Jamshedpur, has designed a plant for the beneficiation of low grade manganese ore for industrial units producing from 10-15 tons per day.

The National Chemical Laboratory, Poona, has evolved a method of preparing phosphatic fertiliser by the action of hydrochloric acid on phosphate rocks from Egypt and phosphatic nodules from Tiruchirapalli The hydrochloric acid needed can be obtained from chlorine, large amounts of which are produced as a by-product by the Indian alkali plants.

The problem of sulphur has also engaged the attention of the Fuel Research Institute, Jealgora, which has located a valuable source. Research by the Institute shows that Nowrozabad coal contains pyrites which can be recovered without any extra expense in the normal washery treatment of the coal, and sulphur can be obtained from the pyrites. On the basis of 150 tons of coal washed per hour for 20 hours a day, about 50 tons of pyrites will be available which can yield about 25 tons of sulphur every day.

The Central Electro-Chemical Research Institute, Karaikudi, is now engaged in the work of developing processes for recovering aluminium

from scrap arising from aluminium ware and utensils' manufacture and from used and discarded aluminium vessels. The Institute has also made progress in preliminary experiments on the fabrication of special primary batteries characterised by many useful features such as high current and power output, prolonged cell life, lightness and wide operation range.

The most important tanning material used by the Indian leather industry is wattle bark and for this, the country is dependent on outside supplies. Intensive research by the Central Leather Research Institute, Madras, has located an efficient substitute in Karada bark

In addition to advanced fundamental research, the National Physical Laboratory, New Delhi, has also been engaged in industrial research. It has evolved an improved gas carburettor of the automatic type capable of operating in conjunction with petrol carburettor but having independent control. A digester suitable for production of bone meal for use as fertilisers has also been designed in the Laboratory. The Central Road Research Institute, New Delhi, is engaged in studies on road materials and construction techniques which will yield better roads at lower cost. The Institute is directing attention to the improvement of locally-made bricks for metalling rural roads by increasing their compressive strength and decreasing the formation of dust, which occurs through wearing of the brick metal.

To fill the gap between research and its industrial application, the Government has established a National Research Development Corporation. The main function of the Corporation is to exploit in the public interest inventions of the Council of Scientific and Industrial Research and its National Laboratories, inventions of other State-owned Research Institutes and of other research organisations like Commodity Committees. It will also afford facilities to universities and other research institutions, and where public interest so demands, to individuals also, to exploit their inventions.

## ANTIBIOTICS

IN the course of a lecture delivered at the Indian Institute of Science, Bangalore, Professor E. B. Chain of Oxford traced the growth of antibiotics from the time that he and his group of workers demonstrated in 1940 that a mould product containing the active principle designated penicillin from *P. notatum* possessed remarkable curative properties. The strain was by no means new, having been isolated by Alexander Fleming earlier.

Professor Chain recalled how after preparing a somewhat purified product from the culture fluid he injected some 30 mg. into a mouse and expected it to die. The greatest surprise was that it did not, and the experience was unforgettable. After the animal experiments, there were some dramatic cases of cure in hospital patients. These initial successes with penicillin inaugurated a new era in chemotherapy.

The chemical formula of penicillin proposed by Chain and Abraham was not initially accepted by any one. But elaborate studies with the aid of the X-ray diffraction patterns, Fourier analysis and interatomic distance measurements made later have only confirmed the original formula. The substance contains two amino acids, but wherefrom their wonderful properties are derived is not clear.

Attempts have been made recently to prepare biosynthetic penicillins by using different acids and constituents in the culture media. The products behave in the same manner. Lately, a new type of penicillin, 'Cephelosporin', has been reported. It is different from penicillin, in that it gives α-amino-adipic acid on hydrolysis, is also very active against gram negative bacteria, and is non-toxic. Further work on this is being watched with great interest.

Reviewing the work on other antibiotics, Professor Chain observed that Waksman had studied the properties of streptomycin isolated from cultures of *S. griseus* in great detail. In some cases of typhoid, it was found to be highly useful *in vitro*, but not *in vivo*. Pellmann of Mayo Clinic showed in a classical work that the antibiotic is effective against acute forms of tuberculosis. In most of the pulmonary cases, however, it produces resistant strains after two or three administrations. Prof. Chain also dealt at length with the phenomena of synergism in the action of antibiotics. A combination of penicillin and streptomycin has proved efficacious, while aureomycin with penicillin did not prove advantageous. Aureomycin and terramycin were instances of agents which had proved active against some viruses. It would appear that more antibiotics are needed urgently for the treatment of pulmonary tuberculosis and the virus diseases. Further advances will no doubt depend on fundamental progress in the field of chemical microbiology.

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