Under war-time conditions, the demand for searches of scientific literature in planning laboratory research have increased; research workers in all fields of science have made increasing demands on the trained personnel of the Council staff who prepare bibliographies and abstracts or digests of the literature. Although ten of the Council's numerous associate committees have been disbanded and others will remain inactive until after the War, many new committees have been established to give advice or organize and direct research on important problems, in addition to the twenty-eight associate committees of the Council in existence at the end of the year. Special reference is made in the report to the associate committees on medical research and on aviation medical research. Subjects selected for investigation by these sub-committees have included problems in fatigue, vision, hearing and related subjects, wound infection studies, including work in chemotherapy, treatment of shock, development and provision of blood substitutes for transfusion purposes, treatment of burns and other war injuries, dietary studies, problems involved in high-altitude flying and the improvement of oxygen breathing-systems, and protective clothing to counteract effects of cold, fatigue and high accelerations.

The Council has also been particularly active in maintaining the most effective liaison possible in the scientific work going on in Great Britain, Canada and the United States.

SEAWEED PRODUCTS IN AUSTRALIA

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PRIOR to 1940, little had been done in Australia to develop any industries using seaweeds as the raw material. In the last century, a company was formed to make agar from the red alga, *Eucheuma speciosum* (Sond), J.Ag. at Dongarra in Western Australia; potash was produced from Macrocystis and Ecklonia in Tasmania during the War of 1914–18, and several attempts were made at different times to utilize the fibres of *Posidonia australia* Hook. F., which is prolific in South Australian waters and elsewhere. With the death of each of these schemes, seaweed research for industrial purposes languished, and even taxonomy was so neglected that for some years prior to his death, A. H. S. Lucas was the only person in Australia working with the marine algæ of the Continent.

The need for agar in Australia stimulated seaweed research, and the discovery of a quantity of *Gracilaria confervoides* (L.) Grev. at Bateman's Bay and Botany Bay in New South Wales revived interest in the Rhodophyceæ. Studies on the method of production of agar from Gracilaria, carried out at the laboratory of the Fisheries Division of the Council for Scientific and Industrial Research, have culminated in the undertaking of agar production by a Sydney firm. *Gracilaria confervoides* is known to occur in large beds in shallow water in a number of areas in New South Wales and southern Queensland, and is very easily harvested and dried. It is estimated that there will be sufficient raw material in New South Wales to produce at least 100 tons of agar per year, even allowing for fluctuations in the growth of the seaweed. Gracilaria has been found along the coast from Tuross Lake in New South Wales to Urangan in Queensland, a distance of 850 miles. It occurs on shallow flats, in lagoons, estuaries and bays, where conditions are favourable. There is a seasonal rhythm in its abundance, though it appears that this may vary in some seasons. The spores appear to adhere often to shellfish (usually whelks, sometimes cockles and mussels) or to a polychæte worm cast (Eunice), and occasionally to sticks, rocks, etc. Experiments are being made with a view to the cultivation of Gracilaria.

The seaweed is harvested by special grapnels or, in very shallow water, by hand, then loaded into dinghies and taken ashore and dried on wire-netting racks. When dry, it is pressed into bales, and is ready for the manufacturer.

The cardinal features of manufacture are boiling with live steam in open vats, and keeping the *p*H below 7 and preferably below 6·5, but above 5·0. Owing to the difficulty of procuring the necessary materials, the agar has been made in iron or copper equipment, and this results in discoloration and in a high ash residue. Efforts are being made to overcome this. Gracilaria agar tends to be viscous and to have a high setting point, but these are no detriment in the food industries. For bacteriological purposes, Jensen has shown that although these qualities are a disadvantage for poured plates, slopes made from Gracilaria agar will grow most organisms as well as, if not better than, the slopes made from Japanese agar. Two British bacteriologists have also expressed satisfaction with Gracilaria agar in private communications to one of us.

Agar is also manufactured in Western Australia from *Eucheuma speciosum*, which appears to grow in quantity on reefs in the Dongarra district, and to some extent elsewhere. Detailed surveys of these beds are projected. The agar is more easily extracted from Eucheuma than from Gracilaria, but collection of the seaweed from reefs will prove more difficult. This agar also is used for meat canning, and has the same disadvantages for bacteriological purposes as Gracilaria agar.

Hypnea musciformis (Wulf) Lam. is moderately widespread in occurrence, though not occurring in large quantities in any one part of Australia. It makes a very good bacteriological agar with a low viscosity and setting point. It is not used commercially so far.

At the present time, Australian agar production is far below local requirements, but there appears to be no technical reason why these requirements should not be met within the next twelve months, and there is every indication that the raw material will prove adequate.

The production of alginates, potash and iodine have been studied also, and alginates of excellent quality can be prepared from Ecklonia from New South Wales, or from Macrocystis from Tasmania. Abundant growth of Macrocystis occurs in southern Tasmania, which would be the logical centre of the industry. Unless produced as a sideline from an alginate plant, potash and iodine production could be made payable only in war-time. No commercial production of these substances has yet begun.

The commercial development of agar has stimulated systematic and distributional studies of the Rhodophyceæ, and this work is progressing steadily.