VITAMIN SOURCES IN ARCTIC REGIONS. By Kare RODAHL. Skrifter No. 91. $10\frac{1}{2} \times 7$ in. Pp. 64, with 15 figures and 36 tables. 1949. Oslo: Norsk Polarinstitutt. Price N. kr. 6,00.

THE TOXIC EFFECT OF POLAR BEAR LIVER. By Kare RODAHL. Skrifter No. 92. $10\frac{1}{2} \times 7$ in. Pp. 90, with 36 figures and 15 tables. 1949. Oslo: Norsk Polarinstitutt. Price N. kr. 12,50.

HYPERVITAMINOSIS A. By Kare RODAHL. Skrifter No. 95. $10\frac{1}{2} \times 7$ in. Pp. 206, with 55 figures, 78 tables and 27 graphs. 1950. Oslo: Norsk Polarinstitutt. Price N. kr. 22,50.

The first two Skrifter (Nos. 91 and 92) deal with the historically interesting facts that led to the main investigation. These were: that the liver of seals contained much vitamin A; that the livers of polar bears, largely dependent on seals for their diet, produced severe sickness in man; and finally that this toxicity of polar bear liver was due to its vitamin A content. The third Skrifter (No. 95) then deals with the signs of hypervitaminosis A in experimental animals. These are described in very great detail. Rats were used in most of the experiments, but some were also carried out on guinea-pigs, mice, rabbits and cockerels. The author gives a masterly summary of the facts, and points out how closely in his animals the haemorrhagic signs of hypervitaminosis A mimicked scurvy while the bone changes, as revealed by radiographs, could resemble those in hyperparathyroidism. A great part of this book deals with details of limited interest, such as, for instance, the evidence that polar bear liver is toxic only on account of its vitamin A content and not because of associated compounds. It does not deal adequately with the growing literature on hypervitaminosis A in man. However, as a work of reference it is a valuable contribution to knowledge, especially in these days of widespread vitamin administration.—C. E. DENT.

PHANTOM LIMBS IN AMPUTEES. By Börje CRONHOLM. 10×7 in. Pp. 310, with 40 figures. 1951. Copenhagen: Ejnar Munksgaard. Price D. kr. 35.

In this volume the author has attempted to explain and analyse the common sensations experienced by amputees, whether in the stump or in the phantom limb. Only 122 patients were examined, and the conclusions reached, although adding a little to our knowledge of this highly complex subject, do not point a way to any more certain method of treatment of pain in stump or phantom limb.

It is interesting that only twenty-seven of the patients exhibited painful neuromas, but in many cases there was evidence not only of somato-motor hyperactivity in the stump but also of vegetative hyperactivity in the stump and adjacent parts of the trunk. There seems little doubt that painful sensations in the stump or phantom limb are commoner after high amputations, whether of the arm or leg, and are commoner in those losing the limb late in life when adaptation is more difficult. The investigation also proved that pain in the phantom limb is commoner immediately after amputation, and usually tends gradually to subside. Patients who have lost a limb that has been painful for some time before amputation are also more liable to a painful phantom.

The loss of a limb causes a state of hyperexcitability of the central nervous system, not only at spinal level but also at central level, and some of the phantom sensations can be due only to this excitability. The tendency of a phantom sensation to disappear or diminish proves that there is an attempted central adaptation. This is easier and more complete in young patients—the very young may experience no phantom. It is thought that there is a central " shift " in functional organisation, which conditions the integration and interpretation of the afferent or centripetal impulses from the cut nerves. The sensation of pain appears to be determined chiefly by the intensity of the centripetal volley of impulses, especially from the stump, and by the state of central hyperexcitability; but the localisation of the pain to phantom or stump is determined by the central state of functional organisation, in which the make-up of the patient would seem to be important.

A basic phantom sensation is not present in every case, but some patients can summon a phantom by concentrating on it, by trying to perform movements with it or by contracting the stump muscles or the muscles of the opposite limb. A referred sensation assigned to the phantom can also be caused, and sometimes altered, by various types of stimuli applied to the stump or to " trigger areas " of the stump or adjacent parts of the trunk. Stimulation may inhibit the phantom or may intensify the sensations assigned to it. Sensations in the phantom leg are usually referred to the foot or distal part, those in the phantom arm to the hand or wrist; but in arm cases it is commoner for the phantom to be foreshortened to within the area of the perception of the stump.