

Britain in both Forestry Commission areas and on private estates. Advantage can be taken of courses in every branch of forestry, including saw mills and utilization generally, soil science and other research.

The staff of the Institute, excluding the office and library members, now numbers fifteen, including Prof. H. G. Champion, the head of the Institute, with five others from university departments who assist in instructional work. An excellent reproduction of a drawing of the Institute building, by Alan Course of the *Oxford Mail*, is given as a frontispiece.

E. P. STEBBING

## PRECAUTIONS IN THE USE OF IONIZING RADIATIONS IN INDUSTRY

THE Factory Department of the Ministry of Labour and National Service has produced an important and interesting booklet which gives a clear warning to the industrial worker using X-rays or the radiations from radioactive substances of the potential hazards and dangers to which he is exposed and of the precautions he needs to take to protect himself\*. At the same time it illustrates the wide and rapid spread of the use of these radiations in industry for the examination, testing and improvement of products and processes. In the introduction to the booklet the numerous applications are outlined. These cover X-ray radiography of metals; X-ray fluoroscopic examination of manufactured articles; X-ray diffraction analysis of crystalline compounds; gamma radiography; elimination of static electricity; thickness control and measurement; and radioactive tracer methods to elucidate the mechanism of chemical, physical, engineering and biological processes. It is stated that no industrial processes coming under the Factories Act have as yet been reported in which neutrons, protons and deuterons, which are biologically very dangerous radiations, have been used; but the possibility that these particles may soon find suitable applications, particularly neutrons for radiography and diffraction, cannot be excluded.

It is emphasized in the section dealing with health hazards that experience so far shows that, with proper forethought and care, risks of impairment of the health of work-people in factories where ionizing radiations are used can be countered; but that complete immunity from harmful effects depends on an intelligent appreciation of the properties of the various radiations and of their potential damaging effects on the human body, and on vigilant attention being paid to the necessary precautions. This seemingly calls for specially and technically trained staff; in fact, to appreciate fully the detailed and valuable information given in the booklet the reader must have more than a nodding acquaintance with the terminology of radiation physics and chemistry.

In another section recommended maximum permissible dosage-rates, based mainly on the internationally agreed values adopted at the Sixth International Congress of Radiology 1950, are quoted and explained, and the latter half of the booklet is devoted to recommended precautions, both of a general nature and when using particular apparatus

\* Ministry of Labour and National Service: Factory Department. Factory Form 324: Precautions in the Use of Ionising Radiations in Industry. Pp. 11+18. (London: H.M.S.O., 1953.) 2s. net.

or methods. Under the heading of general precautions, the following categories are dealt with: planning and equipment; inhalation and ingestion precautions; supervision, training and monitoring; flow or dosimeter tests of workers' radiation exposures; and medical supervision. Special precautions are discussed separately for X-radiography, X-ray fluoroscopy, X-ray crystallography, gamma radiography, radioactive static eliminators, thickness gauges, radioactive tracer work and the handling of unsealed radioactive materials. The booklet ends with a valuable comprehensive bibliography of published memoranda on radiological hazards and protection.

The Factory Department of the Ministry of Labour and National Service is to be congratulated on the production of such an informative and timely booklet; it is a work which boldly presents the dangers of the new and powerful methods but yet, by indicating to industrialists how adequate precautions can be taken to safeguard their workers, wisely advocates the introduction and expansion of the use of ionizing radiations in industry.

## ISOLATION AND PROPERTIES OF ALPHA-CORTICOTROPIN\* FROM SHEEP PITUITARY GLANDS

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IN an earlier communication<sup>1</sup> we described the preparation of a highly purified ACTH fraction (*E*) from an acid acetone extract of sheep pituitaries. We wish to report herewith the isolation from fraction *E*, without pepsin digestion, of a peptide ( $\alpha$ -corticotropin) which behaves as a pure substance. This hormone is clinically active, and possesses adrenal-stimulating activity according to the results of standard bioassay procedures for adrenocortical function. While this work was in progress, the isolation and properties of corticotropins *B* and *A* from pig glands was reported by investigators from the Merck<sup>2</sup> and the Armour<sup>3</sup> laboratories, respectively.

The first step in a typical isolation of  $\alpha$ -corticotropin is the precipitation at pH 9.3-9.4 of inactive material from a solution of fraction *E* in 50 per cent dioxane. The supernatant obtained from this step is further purified by zone electrophoresis on starch<sup>4</sup>. An electrophoretic pattern obtained in this manner is illustrated in Fig. 1. The active fraction is eluted from segments 5-7 and then chromatographed on 'Amberlite XE-97' resin under the conditions shown in Fig. 2. The contents of tubes 34-49 are combined, desalted, and submitted to 100 transfers in the all-glass counter-current distribution apparatus of Craig and Post<sup>5</sup> using a 2-butanol/0.5 per cent trichloro-

\* In accordance with the suggestion of the Merck<sup>2a</sup> and Armour<sup>3a</sup> groups in designating pepsin-hydrolysed pig ACTH as corticotropin *B*, and the unhydrolysed hormone as corticotropin *A*, we have chosen to designate unhydrolysed ACTH obtained from sheep pituitaries as  $\alpha$ -corticotropin, since many of its chemical and physicochemical characteristics differ from those described for corticotropin *A*.