

co-ordinate measuring apparatus, a spectrograph, several objective prisms, a Blink comparator and an astro-wedge-photometer, as well as a new refractor-mounting for an existing telescope objective. The domes will each be equipped with an observation platform of the latest type, the so-called tilting platform, which is moved by electric motors controlled by switches within easy reach of the observer. On these sliding platforms the observer can easily follow any movement of the telescopes. The instruments and apparatus are to be supplied within two years.

#### Crystals of the Living Body

THE first Friday evening discourse of the new session was delivered at the Royal Institution on January 20 by Sir William Bragg, who chose as his subject "The Crystals of the Living Body". Growth and purpose require directed arrangement of the protein or other molecules of which the body is made. The protein of a silk fibre is a long chain-like molecule consisting of a sort of backbone in which two carbon atoms and one nitrogen make the regularly recurring links, and this structure is common to the various forms of protein. Of every pair of carbon atoms one has, so to speak, a spare hook to which other atoms or strings of atoms may be attached, like pendants to the links of a mayor's chain. In the case of silk these pendants are very simple, consisting alternately of a hydrogen atom and a group containing one carbon and three hydrogens. The new methods of X-ray analysis enable us to prove the arrangement of these chains, and to measure the dimensions of the links. They show that the chains tend to group themselves into bundles, and they find the forms which the bundles take. This arrangement is obviously appropriate to the functions of the silk fibre, to its flexibility and its tenacity. The fibre is spun, in fact, just as we spin a rope on a far grosser scale, laying the vegetable fibres side by side. Such a parallelism is no surprise, for in all our examinations of organic substances in the laboratory, physical, chemical, or biological we have always found that our best practice is foreshadowed. A particularly interesting comparison can be made with the structure common to hair, wool, horn, feathers and the like. These are built on the same principle as the other proteins, from which they differ only in the nature of the pendants. The latter in this case attract each other strongly, and in drawing together give the chain a wavy or crumpled form: the process has lately been explained by Astbury. The in-curved proteins, with their internal attractions satisfied, are not susceptible to many reagents which bring about the dissolution of proteins of the extended form. Thus hair long outlasts other parts of the body in their decay.

#### Synthetic Sound Films

ACCORDING to a report in the *Times* of January 11, an interesting curiosity has been on exhibition in Germany in the form of a sound film "Die Tonënde Handschrift" in which the sound part was originally prepared without the use of sound. Details are not

available but from the illustrations it appears that the film uses the contour method of sound recording in which a constant density of blackening is produced over varying widths of the film. Normally this is produced by light reflected on to the moving photographic film from an oscillograph operated by electric vibrations transformed from the original sound vibrations. Herr R. Pfenninger in the new process makes templates each containing several sound waves and photographs a reduced image of these in turn on to the stationary film. Both the preparation of the templates and their photographing naturally take much longer and the object is not to reproduce graphically the tones of well-known musical instruments but to construct music of new timbre. The report states that the laboriousness of preparing the templates is to be reduced by the use of a typewriter which uses wave-outlines instead of letters, a separate sound-wave typewriter being used for each timbre. It would be interesting to know if the characteristic wave-forms of singing or string playing of exceptionally good quality could be successfully copied so as to give reproductions of melodies which had not been actually performed. This might make possible the performance of a new musical work by the voice, or playing, of an artist no longer living.

#### Migration from and to Great Britain

A PAPER by Mr. H. Leak and Mr. T. Priday on the subject of migration from and to Great Britain was read at a meeting of the Royal Statistical Society on January 17. Factors affecting post-War migration, of which the chief are social insurance, national assistance to emigrants, and the United States quota system, were fully considered and also the main features of post-War migration, particularly in regard to the inter-censal period 1921-31. A comparison of pre-War and post-War migration shows that the annual average of the net outward movement of British subjects from the British Isles to places out of Europe was about 193,000 in the ten years 1904-13 and 112,000 in the years 1921-30. In 1931, however, there was a change from net emigration to net immigration, the excess inward in that year amounting to 37,000, while for 1932 the figure is estimated to be about 50,000. Although, in the future, emigration may be on a considerably smaller scale than in pre-War days, it may still, within the next one or two decades, be on a scale commensurate with the ability of Great Britain to release population of the ages which the Dominions require, regard being had to the diminishing numbers of new entrants into the labour market.

#### Anomalous Eskimo Vertebrae

SOME suggestive results, which may possibly turn out to have a bearing on the question of the existence of evolutionary tendencies in modern man, emerge from an examination by Dr. T. D. Stewart, of the Smithsonian Institution, Washington, D.C., of skeletal material brought back by one of the Institution's recent expeditions to Alaska. The material consists