

known as 'revolutionary methods'. He illustrates this progress by what is happening in the coal-mining industry. The hewing of coal by pick and filling it into a tub by shovel, in a more or less confined space, is work of the most arduous nature. The great expansion during recent years of mechanical coal cutters has made this work comparatively easy. In 1900 only 1.5 per cent of the British coal output and 25 per cent of the output of the United States was cut mechanically. In 1932 this had risen to 38 per cent in Britain and 68 per cent in the United States. In the Ruhr coalfield the mechanical pick has found great favour; in 1913 only 2.2 per cent was cut mechanically, now 90 per cent is, 84 per cent being cut by mechanical picks and 6 per cent by mechanical coal cutters. The transport of the cut coal from the coal face to the shaft bottom was almost as laborious as 'getting' the coal. Now, owing to the perfection of electrically actuated plant, not only is the haulage on the main roads carried out electrically, but in the secondary roads also it is replacing horses and ponies. So far as creation of wealth and increase of leisure and comfort of the mass of mankind are concerned, the engineer has taken a leading part. During the last 130 years, wages in coal-mining have risen 3.2 times and the daily time of labour has been decreased 37 per cent, the return on the capital remaining on the average stationary. The chief beneficiary under the system of mechanisation has been the manual worker. There is no doubt that the rationalisation of industry tends to decrease the number of employees, but Sir Richard Redmayne thinks that the lowering of the price of the commodity, its more effective distribution leading to the increase of new industries, together with the increase in wages and leisure creating an increased demand, will result in more than the absorption of the overplus of labour.

#### Unemployment among Young Persons

THE International Labour Office estimates that of about 25 million unemployed throughout the world, about one fourth, or 6-7 million, are young persons less than twenty-five years of age. In Great Britain the percentage between fourteen and twenty-four years old was 30.2 per cent in 1931, a figure which indicates the significance of the National Jubilee Trust inaugurated by the Prince of Wales. The corresponding figure for Switzerland in July 1934 was 15 per cent, but for Hungary in 1930 it reached 42 per cent; in Italy in 1932, 41.5 per cent of the unemployed were between fifteen and twenty-five years of age. These figures indicate the quantitative significance of the discussions on unemployment among young persons at the International Labour Conference opening at Geneva on June 4. They do not, however, reveal the demoralising effects of prolonged unemployment, which are much more serious among young than among older persons. Steps already taken by various countries to deal with this position are indicated in a report prepared by the International Labour Office as a basis for the discussions. The report suggests that most of the measures to be taken

to ameliorate unemployment among young persons call for pooling of experience rather than for the drafting of a convention. Particular stress is laid upon the raising of the school-leaving age to fifteen years; the creation of an increased number of technical schools; the organisation of vocational training centres in connexion with public employment agencies and the establishment of centres for recreation, physical training, etc.

#### Molecular Structure of Dielectrics

SIR WILLIAM BRAGG chose the molecular structure of dielectrics as the subject of the twenty-sixth Kelvin Lecture delivered on May 2 to the Institution of Electrical Engineers. He pointed out that the properties of dielectrics depend on their composition and on the arrangement of their atoms and molecules. During the past twenty-five years, men of science have used X-rays to study the structure of various substances, and engineers by other means have discovered many of the factors which govern the properties of dielectrics. It is now necessary that the two classes of workers should come together and pool their resources in making further advances. It is sometimes thought that X-rays are only of use for examining the structure of crystals, but it has to be remembered that crystallisation is a property of all substances. The crystal is used to obtain electron maps of the image of a single molecule and these maps enable us to find out the electron densities in its various parts. It is possible in many molecules to measure the exact distance from atom to atom, and to determine the way in which they are linked together to form the molecules. This method of attack can be used even when the molecules are not so definite in shape as they are in a crystal. Sir William pointed out the analogies between the properties of proteins and those of dielectrics and laid stress on the recent work done at Leeds by Mr. W. T. Astbury. Once the basic theory of dielectrics is determined, rapid progress will be made in practical applications. It is fortunate that the researches in the pure science of atoms and molecules and the many technical investigations now being carried on are feeling their way towards each other.

#### The New Commonwealth Society

ACCORDING to the annual report of the *New Commonwealth* for 1933-34, a clearer demarcation will in future be drawn between the research and propaganda activities of this organisation. Educational and propaganda work will be undertaken by the New Commonwealth Society, which will continue to be subdivided into an international section and the various national sections. Brief reports of the activities of all these sections are included, which indicate the extent to which the scientific study of international affairs is being encouraged in this way. The scientific investigations hitherto carried out by the Research Bureau of the International Section will now be carried out by the New Commonwealth Institute. These activities are guided by an Advisory Research Committee, which includes among its