

those for a technical man. Sir James epigrammatically stated that the object of patent law is to help industry by encouraging progress, by checking progress at each step; in other words, if there were no patent law and invention continued at its present rate, industry would progress faster; on the other hand, if there were no rewards for invention, the incentive to invent would almost disappear. In his opinion, the cost of patents is too high, and the legal expense entailed in fighting an infringement favours the large company. The appeal system gives rise to anomalies. Thus, the first judge may decide against a patentee, the appeal judges may agree with him, and finally three out of five in the Lords of Appeal might uphold the patentee's claim. We then have the curious position of three judges overruling six.

### History of Iron Founding in England

At the annual general meeting of the Newcomen Society on November 9, Mr. W. A. Young was elected president for the ensuing year. The membership of the Society now stands at 870. After the conclusion of the business, the first part of a paper by Mr. Rhys Jenkins was read entitled "Iron-founding in England, 1490-1890". Though there are objects of cast-iron to be seen in museums, probably made 1,500-2,000 years ago, iron-founding in Europe as a regular trade is of comparatively modern origin. In Great Britain iron-founding followed the substitution of the primitive hearth, the bloomery, by the high furnace, known as the blast furnace. Sussex was the cradle of English iron-founding and there is a reference dated 1490 to a payment on behalf of the Archbishop of Canterbury to "ye Ierne founders of Buxstede". The industry was based mainly on the production of war material, though there was a certain amount of production of chimney backs, fire dogs and grave slabs, and also of gear for the forges. King Henry VIII came to the throne in 1509 and he at once set about the provision of armament. He brought over foreign workmen to cast bronze guns, and a year or two prior to his death the first cast-iron guns were made. The credit for initiating this departure belongs to William Levet, the parson of Buxted. In the early days of Elizabeth, an export trade in cast-iron guns commenced. Guns were sent to the Low Countries, France and Germany, and in 1582 Portugal took no fewer than 132 pieces. In 1601 it was stated the total output was about 800 tons per annum. The earliest account of any real value of the methods of casting guns is given by Sirurey de Saint Remy in his "Memoires d'Artilerie" published in Paris in 1693.

### Structure and Strength

THE seventh Andrew Laing Lecture, delivered by Sir William Bragg before the North-East Coast Institution of Engineers and Shipbuilders at Newcastle on November 8, dealt with the molecular basis of the strength of materials. Taking carbon compounds first, he showed how the regular arrangement of the carbon atoms in the diamond as determined by modern X-ray analysis accounts for its

hardness, how long chains of such atoms with side atoms of hydrogen lead to paraffins, the tendency of which to set themselves parallel to each other like corn stalks in a field leads to their slipperiness, and how chains modified by oxygen atoms at one end lead to oils with lubricating powers. Another arrangement of carbon atoms in a plane leads to graphite sheets, which again can slide over each other and also possess lubricating powers. More complicated chain structures give celluloses of many kinds as found in plants, and a combination of benzene rings with oxygen gives plastics like bakelite. The atoms of metals and alloys are in general packed together like spheres, and the properties of the product depend mainly on the sizes of the atoms constituting it and the number of electrons they can put into the common stock.

### The Science Museum: Recent Acquisitions

THE inventor's working model of the first calculating machine capable of multiplying sums of money in sterling currency (£.s.d. and fractions of a penny) has been presented to the Science Museum. The present machine, invented by Mr. E. C. McClure in 1934, requires only one turn of the handle for each digit in the multiplier, so that to multiply any sum of money by a number less than a thousand it is necessary to make only three turns of the handle. The principles embodied in the machine are being used in a new sterling multiplying punch which is being manufactured by Messrs. Powers-Samas Accounting Machines Ltd., who have given the model to the Science Museum. A collection of trade cards issued by English instrument makers to advertise their products, presented by Mr. Thomas H. Court, has recently been placed on exhibition; they are mostly of the eighteenth century and are of considerable historical interest and importance. The Museum has acquired a large-scale working model of the escapement employed about 1880 in the original Waterbury watches, which were among the first really cheap watches to be made. The group of hearing aids illustrates developments since 1930; of special interest are the widely contrasting valve amplifying sets of 1932 and 1938.

### Radio Valve Data

EACH year the *Wireless World* performs a very useful function in providing comprehensive details of all the thermionic valves available in Great Britain. The issue of November 10 contains a Valve Data Supplement listing more than 1,000 different valves in twenty pages of tables. All types of valves are dealt with, whether these be used as rectifiers, frequency changers or amplifiers; and while some of those described may be becoming obsolete, it is necessary to include them as they are used for replacement purposes in existing radio sets or amplifiers. In general, the valves are listed in order of filament or heater voltage, and the variation in this voltage is one of the reasons for the large number of valves it is necessary to describe. Valves for battery operation have filaments for 2-volt working, while