electrical power for firing, and the necessary apparatus for testing the system of mines, which is usually done daily. To let the operator in the firing station know when the C.C. of a mine has been struck and the mine is ready to fire, a small electrical apparatus is provided in the firing station for each group of mines. This arrangement strikes a bell when thc C.C. is worked and also closes a break in the firing circuit. The operator can then close the main switch and fire the mine, or if acting on the order to “fire all mines that signal” he has already closed his main switch, the signalling apparatus, in the act of striking the bell, completes the firing circuit. A similar piece of apparatus is connected to each observing instrument, thc completion of the circuit of any line at the observing station then gives a signal in the firing station and the firing circuit is completed.

The firing station can be on a vessel moored near the mine field, but is more usually on shore, where it can be made abso­lutely secure against any form of attack. But the observing stations must be on shore to give stability to the observing instruments, they cannot be entirely protected as they must have a small opening facing the mine fieid, but can be made very inconspicuous.

Any explosive can be used in submarine mines, provided adequate means are taken to explode the charge, but the explo­sive which is easiest to handle and is in most general use is wet gun-cotton with a small dry primer and detonator to start ignition. The detonators for electrical mines are on the “ low tension ” system, that is, firing is effected by the heating of a small length of wire called a “ bridge,” round which is placed a priming which ignites and detonates a small charge of fulminate of mercury.

The charge is contained in a steel mine-case, which has an “ apparatus ” inside to contain the electrical arrangements and the C.C. when used. Cases for observation mines are usually cylindrical in shape for mines to rest on the bottom and spherical for buoyant mines. The weight of charge is about 500 lb and the size of a buoyant case for this charge would be four feet in diameter. Cases for contact mines are spherical, about 39 in. in diameter, and can hold 100 lb of gun­cotton. They are always buoyant. Buoyancy is provided for by an air-space inside the case. Buoyant cases are moored to a heavy weight or “ sinker,” the connexion being by a steel wire rope, or in electrical mines, the cable itself. The cable is care­fully insulated and protected with a layer of steel wires. An earth return is used for the electrical circuit.

The employment of mines in any defence must depend entirely on the general character of the. defence adopted, which will itself depend on the size and importance of the harbour to be defended and other details (see Coast Defence). The rôle of mines in a defence is to act as an obstacle to detain ships under fire and compel them to engage the artillery of the defence. Thus mines find their greatest usefulness in the defence of har­bours with long channels of approach. Mine fields can be de­stroyed by “ creeping ” for and cutting the electric cables, by “ sweeping ” for the mines themselves with long loops of chain or rope or by destroying the mines with “countermines.” To guard against any of these, the mine field should be protected by gun fire and lit at night by electric lights. As vessels sunk by mines may obstruct the channel, mines should not be used in very narrow channels.

Although the scientific development of submarine mining is the work of the last fifty years, attempts to use drifting charges against ships and bridges are recorded as early as the 16th century. Mines were used by the Americans in 1777, and in 1780 Robert Fulton produced an explosive machine which he called a “ torpedo,” and which was experimented with, not very successfully, up to 1815. In 1854 the Russians used mechanical mines in the Baltic, but without any marked success.

The first application of electricity to the explosion of sub­merged charges was made by Sir Charles Pasley in the destruc­tion of wrecks in the Thames and of the wreck of the “ Royal George ” at Spithead in r839 and subsequent years. The first

military use of electrically-fired mines was made in the American Civil War of 1861-65 when several vessels were sunk or damaged by mines or torpedoes. From this date onwards most European nations experimented with mines, and they were actually used during the Franco-German War of 1870, the Russo-Turkish War of 1878 and the Spanish-American War of 1898. But the most interesting example of mine warfare was in the attack and defence of Port Arthur during the Russo-Japanese War *(q.v.)* of 1904-05. Both sides used mechanical mines only, and both suffered heavy losses from the mine warfare. Mines and tor­pedoes were first introduced into the English service about 1863, defence mines being placed in the charge of the Royal Engineers, while torpedoes were developed by the Royal Navy. Up to 1904 there were mine defences at most of the British ports, but in that year the responsibility of mines was placed on the navy, and since then the mine defences have been much reduced. (W. B. B.)

SUBSIDY (through Fr. from Lat. *subsidium,* reserve troops, aid, assistance, from *subsidere,* literally “ to sit or remain behind or in reserve ”), an aid, subvention, assistance granted especially in money. The word has a particular use in economic history and practice. In English history it is the general term for a tax granted to the king by parliament, and so distinguished from those dues, such as the customs dues, which were raised by the royal prerogative; of these subsidies there were many varieties; such was the subsidy in excess of the customs on wool, leather, wine or cloth exported or imported by aliens, later extended to other articles and to native exporters and importers (see Tonnage and Poundage); there was also the subsidy which in the 14th century took the place of the old feudal levies. Apart from this application the term, in modem times, is particularly applied to the pecuniary assistance by means of bounties, &c., given by the state to industrial undertakings (see Bounty). Subsidies granted by the state to literary, dramatic or other artistic institutions, societies, &c., are generally styled “ subventions ” (Lat. *subvenire,* to come to the aid of).

**SUCCESSION** (Lat. *successio,* from *succedere,* to follow after) the act of succeeding or following, as of events, objects, places in a series, &c., but particularly, in law, the transmission or passing of rights from one to another.

In every system of law provision has to be made for a readjust­ment of *things* or goods on the death of the human beings who owned and enjoyed them. Succession to *rights* may be considered from two points of view: in some ways they depend on the personality of those who are concerned with them: if you hire a servant, you acquire a claim against a certain person and your claim will disappear on his death. But personal relations are commonly implicated in the arrangement of pro­perty: if a person borrows money, the creditor expects to be paid even should the debtor die, and the actual payment will depend to a great extent on the rules as to inheritance. Succes­sion, in the sense of the partition or redistribution of the pro­perty of a former owner is, in modem systems of law, the subject of many mles. Such rules may be based on the will of a de­ceased person. They will be found in such articles as Adminis­tration; Assets; Executors and Administrators; Inheri­tance; Intestacy; Legacy; Will; &c. There are cases, however, in which a will cannot be expressed; this eventuality is discussed in the present article, and there can he no doubt that it is the most characteristic one from the point of view of social conditions. It represents the view of society at large as to what *ought to be* the *normal* course of succession in the readjustment of property after the death of a citizen. We shall dwell chiefly on the customs of succession among the nations of Aryan stock. Other customs are noticed in the articles on Village Communities; Mahommedan Law; &c.

We have to start from a distinction between personal goods and the property forming the economic basis of existence for the family which is strongly expressed in early law. War booty, pro­ceeds of hunting, clothes and ornaments, implements fashioned by personal skill, are taken to belong to a man in a more personal way than the land on which he dwells or the cattle of a herd.