citizens were as obstinate and severe as in any other city of Germany. The situation of the town opposite the mouths of several roads through the Rhine valley early fostered its trade; in 1294 it rose to be a free imperial city, although it owned no territory beyond its walls and had a population of less than 30,000. It enjoyed great renown as the seat of the imperial supreme court from 1527 till 1689; it was fifth among the free cities of the Rhine, and had a vote in the Upper Rhenish Diet. Numerous imperial diets assembled here. From 1801 till 1814 it was the capital of a department of France; but it was restored to Bavaria in the latter year. By the Peace of Spires in 1544 the Habsburgs renounced their claims to the crown of Sardinia.

SPIRITS.@@1 The original meaning of the word spirit (Lat. *Spiritus*, from *spirare)* was wind in motion, breath, the soul, and hence it came to denote that which gives life or vigour to the human body and other objects, and it is, therefore, synonymous with everything eminently pure, ethereal, refined or distilled. In popular chemical nomenclature the term “ spirit” in its former sense is still occasionally encountered, for instance, “ spirits of salts ” for hydrochloric acid. The spirits of the British Phar­macopoeia *(e.g. sp. aether is nitrosi*; *sp. chlor of or mi*; *sp. camphorae)* are solutions of various substances obtained either by distilling these with, or dissolving them in, the rectified spirit of the Pharmacopoeia, which latter is pure alcohol with 16% by weight of water.

In the modern sense, spirits may be broadly defined as the pro­ducts resulting from the distillation of saccharine liquids which have undergone alcoholic fermentation. Spirits of wine means rectified spirit of a strength of 43 degrees over proof and upwards. By rectified spirit is meant spirit rectified at a licensed rectifier’s premises. Proof spirit, which is the standard spirit of the United Kingdom, is legally defined (58 Geo. III. c. 28) as a spirit which at 51° F. weighs exactly twelve-thirteenths of the weight of an equal volume of distilled water. The strength of proof spirit at 60° F.—the temperature now generally employed for official calculations—is now officially regarded as being equal to a spirit containing 57∙06% by volume, or 49∙24% by weight, of absolute alcohol. Spirit which possesses a greater or smaller alcoholic strength than proof is described as being so many degrees over or under proof, as the case may be. The strength is legally estimated by Sykes’s hydrometer, which was legalized in 1816 by 56 Geo. III. c. 40. The degrees “ over ” or “ under ” proof as ascertained by Sykes’s hydrometer are arbitrary percentages by volume of a standard spirit contained in the spirit under examination. This standard spirit is proof spirit. For example, by a spirit of strength 75∙25 degrees over proof (absolute alcohol) is meant a spirit of such a strength that 100 volumes of the same contain an amount of spirit equal to 175·25 volumes of the standard (proof) spirit. A spirit of 25 degrees under proof is one of which 100 volumes contain only as much alcohol as do 75 *(i.e.* 100—25) volumes of proof spirit. According to Nettleton, “ proof spirit ” would appear to be the outcome of an attempt to pro­duce a mixture of pure alcohol and water, containing equal weights of the constituents. The term “ proof ” probably originated from a rough test for spirituous strength formerly employed, which consisted in moistening gunpowder with the spirit and applying a light. If the gunpowder did not ignite, but the spirit merely burned away, the spirit was regarded as being under proof, *i.e.* it contained so much water that the gunpowder became moist and refused to deflagrate. The basis of the standard of other countries is almost invariably the unit? volume of absolute alcohol, the hydrometers, or rather "alcoholo­meters ”—such as those of Gay-Lussac and of J. G. Tralles— employed indicating the exact quantity of alcohol in a mixture at a standard temperature, in percentages by volume. In the United States the term “ proof ” is also employed, American proof spirit being a spirit which contains 50% of alcohol by volume at 60° F. American “ proof ” spirit is, therefore, considerably weaker than British " proof.” Allowing for this difference and also for the fact that the American standard

gallon (which is really the old English wine-gallon) is equal to 0∙833 of an imperial gallon, the American “ proof ” gallon roughly equals 0∙73 of a British proof gallon.

*Historical.—*The art of distillation, more particularly the preparation of distilled alcoholic fluids for beverage and medi­cinal purposes, is of very ancient origin. It is probable that the art of making spirits was well known many centuries before the advent of the Christian era. According to T. Fairley, the Chinese distilled liquor “ sautchoo ” was known long before the Christian era, and " arrack ” was made in India at a date as remote as 800 b.c. Aristotle in his *Meteorology* (lib. ii. ch. ii.) says " Sea-water can be rendered potable by distillation: wine and other liquids can be sub­mitted to the same process. After they have been converted into humid vapours they return to liquids. ” There is, on the whole, little doubt that spirits were manufactured in Egypt, India, China, and the Far East generally, as far back as 2000 b.c. Figs. 1-4 (from More- wood’s *Inebriating Liquors,* published in 1838) show very ancient forms of stills in use in China, India, Tibet and Tahiti.

As far as can be ascertained the oldest reference to the pre­paration of a distilled spirituous liquor in the British Isles is contained in the “ Mead Song ” written by the Welsh bard, Taliesin, in the 6th cen­tury. He said “ Mead distilled I praise, its eulogy is everywhere,” &c. (Fairley, *The Ana­lyst,* 1905, p.300). The same authority points out that the knowledge of distillation in the British Isles was inde­pendent of the art of distillation from wine, seeing that distilla­tion from grain was known in Ireland before the art of making wine came to Europe. An Irish legend states that St Patrick first taught the Irish the art of distillation; but, however that may be, it is certain that at the time of the first English invasion of Ireland (1170-72) the manufacture of a spirit distilled from grain *(i.e.* whisky) was known to the inhabitants of that country. It is probable that grain spirit was first prepared in the Far East, inasmuch as a spirit distilled from rice and other grains was made in India before the Christian era. The establishment of regular distilleries in England appears to date back to the reign of Henry VIII., and they are said to have been founded by Irish settlers who came over at that time. It is difficult to obtain exact data

@@@1 For the sense of disembodied persons, see Spiritualism.