intelligence ; in which ſenſe God is ſaid to be a ſpirit, as are angels and the human ſoul. See Metaphysics, Part III.

Spirit, in chemiſtry and pharmacy, a name applied to every volatile liquid which is not inſipid like phlegm or water ; and hence the diſtinction into acid, alkaline, and vinous ſpirits. See Pharmacy-Index.

*Spirit of Wine.* See Chemistry-Index, Distillation, and Pharmacy-Index.

SPIRITS, or Animal Spirits. See Anatomy, Part V. n⁰ 136, and Physiology, n⁰ 185.

SPIRITUAL, in general, something belonging to or partaking of the nature of ſpirit. See Spirit.

SPIRITUOUS liquors have in all nations been conſidered as a proper ſubject of heavy taxation for the ſupport of the ſtate. This has naturally occaſioned a pice examination of their ſtrength. It having been at laſt found that this was intimately connected with the ſpeciſic gravity, this has been examined with the most ſcrupulous attention to every circumſtance which could affect it, ſo that the duties might be exactly proportion­ed to the quantity of ſpirit in any ſtrong liquor, inde­pendent on every other circumſtance of flavour or taſte, or other valued quality. The chemiſt at laſt found that the basis of all ſtrong liquors is the ſame, produced by the vinous fermentation of pure ſaccharine matter diſſolved in water. He alſo found, that whether this vegetable ſalt be taken as it is ſpontaneouſly formed in the juices of plants and fruits, or as it may be formed or extricated from farinaceous fruits and roots by a cer­tain part of the proceſs of vegetation, ſt produces the ſame ardent ſpirit, which has always the ſame denſity in every mixture with water. The minute portions of aromatic oils, which are in ſome degree inſeparable from it, and give it a different flavour according to the ſub­ſtance from which it was obtained, are not found to have any ſenſible effect on its denſity or ſpecific gravity. This ſeems very completely eſtabliſhed in conſequence of the unwearied attempts of the manufacturers to leſſen the duties payable on their goods by mixtures of other ſubſtances, which would increaſe their denſity without making them leſs palatable. The vigilance of the re­venue officers was no leſs employed to detect every ſuch contrivance. In ſhort, it is now an acknowledged point, that the ſpeciſic gravity is an accurate teſt of the ſtrength.

But though this is true in general, we cannot derive much benefit from it, unleſs we know the preciſe rela­tion between the ſtrength and the denſity of a ſpiritu­ous liquor. Do they increaſe *pari passu,* or by what law are they connected ? It was natural to expect that equal additions of ardent ſpirits or alcohol to a given quantity of water would produce equal diminutions of denſity. Areometers were accordingly made on this principle above 200 years ago, as may be ſeen in the works of Gaſpar Schottus, Sturmius, Agricola, and other old authors. But when mathematical phyſics be­came more generally known, this was eaſily diſcovered to be erroneous ; and it was ſhown (we think firſt by Mr Boyle) that equal additions to the ſpecific gravity would be produced by ſucceſſively taking out of any veſſel a certain meaſure of alcohol and replacing it with an equal meaſure of water. This was the moſt conve­nient diſcovery for all parties, becauſe then the duties payable on a cask of ſpirits would be in the exact pro­portion of the diminution of its denſity. But it was ſoon found by thoſe who were appointed guardians of the revenue that this conclusion was erroneous, and that a mixture which appeared by this rule to contain 35 gallons of alcohol, did really contain 351/2. This they found by actually making ſuch a mixture: 18 gallons of alcohol mixed with 18 of water produced only 35 gallons of ſpirits. The revenue officers, finding that this condenſation was moſt remarkable in mixtures of equal parts of water and the ſtrongeſt ſpirits which could then be procured, determined to levy the duties by this mixture ; becauſe, whether the ſpirituous liquor was ſtronger or weaker than this, it would appear, by its specific gravity, rather ſtronger than it really was. This ſagacious obſervation, and the ſimplicity of the composition, which could at all times be made for companion, ſeem to be the reaſons for our exciſe offices selecting this mode of eſtimating the ſtrength and levying the duties. A mixture of nearly equal meaſures of water and alcohol is called proof spirit, and pays a certain duty *per* gallon; and the ſtrength of a ſpirituous liquor is eſtimated by the gallons, not of alcohol, but of proof ſpirit which the calk contains. But becauſe it might be difficult to procure at all times this proof ſpirit for compariſon, ſuch a mixture was made by order of the board of exciſe : and it was found, that when six gallons of it was mixed with one gallon of water, a wine gal­lon of the mixture weighed 7 pounds 13 ounces avoir­dupois. The board therefore declared, that the ſpirituous liquor of which the gallon weighed 7 pounds 13 ounces ſhould be reckoned 1 to 6 or 1 in 7 under proof. This is but an awkward and complex formula ; it was in order to suit matters to a mode of examination which had by time obtained the sanction of the board. Mr Clarke, an ingenious artiſt of that time, had made a hydrometer incomparably more exact than any other, and conſtructed on mathematical principles, fit for com­putation. This had a ſet of weights correſponding to the additions of water or proof ſpirit, and the mixture 1 to 6 or 1 in 7 was the only one which weighed an exact number of ounces *per* gallon without a fraction.

Thus ſtands the exciſe law; and Clarke’s hydrometer is ſtill the instrument of authority, although others have been since conſtructed by Dicas, Quin, and others, which are much more ingenious and convenient. The mathematician who examines Dicas’s hydrometer, with its sliding ſcale, by which it is adjuſted to the different temperatures, and points out the condensations, will perceive a beautiful and ſagacious combination of quan­tities, which he will find it difficult to bring under any analytical formula. Perhaps Quin’s may have ſome preference in reſpect of conveniency ; but *facile inventis addere.* Mr Dicas’s was original.

As naturaliſts became more accuſtomed to exact observation in every topic of inquiry, the condensation which obtains in the mixture of different ſubstances be­came more familiarly known. This evidently affects the preſent queſtion; and both the exciſe and the distillers are interested in its accurate deciſion. This occaſioned an application to the Royal Society ; and a moſt ſcrupulous examination of the ſtrength of ſpirituous liquors was made by Sir Charles Blagden and Mr Gilpin, of which they have given a very particular account in the Philosophical Transactions for 1790 and 1792.

We have taken notice of this in the article Specific