garithm of 0,73. from that of 1.068793,viz. 0,0288937, and take 0.0041393, the 40th part of the difference. Multiply this by 1, 2, 3, &c. and add the logarithm of 0,73 to each of the products. The ſums are the lo­garithms of the ſpecific gravities required. Theſe will be found to proceed ſo equably, that they may be in­terpolated ten times by a ſimple table of proportional parts without the ſmalleſt ſensible error. Therefore the ſtem may be divided into a hundred parts very ſenſible to the eye (each being nearly the 20th of an inch), and 400 degrees of ſpecific gravity obtained within the range, which is as near as we can examine this matter by any hydrometer. Thus the ſpecific gravities correſponding to n⁰ 26, 27, 28, 29, are as follow :

|  |  |  |  |
| --- | --- | --- | --- |
| 26 |  | 1st. Diff. | 2d Diff. |
| 0,93529 | 895 |  |
| 27 | 0,94424 | 904 | 9 |
| 28  29 | 0,95328 0,96241 | 913 | 9 |

Nay, the trouble of inſpecting a table may be avoid­ed, by forming on a ſcale the logarithms of the num­bers between 7300 and 1068,793, and placing along ſide of it a ſcale of the ſame length divided into 400 equal parts, numbered from 0 to 400. Then, looking ſor the mark ſhown by the hydrometer on this ſcale of equal parts, we see oppoſite to it the ſpecific gravity.

We have been thus particular in the illuſtration of this mode of conſtruction, becauſe *it* is really a beauti­ful and commodious inſtrument, which may be of great uſe both to the naturaliſt and to the man of buſineſs. — A table may be compriſed in 20 octavo pages, which will contain the ſpecific gravities of every fluid which can intereſt either, and anſwer every queſtion relative to their admixture with as much preciſion as the ob­ſervations can be made. We therefore recommend it to our readers, and we recommend the very example which we have given as one of the moſt convenient. The inſtrument need not exceed eight inches in length, and may be contained in a pocket caſe of 2 inches broad and as many deep, which will alſo contain the ſcale, a thermometer, and even the table for applying it to all fluids which have been examined.

It is unfortunate that no graduated hydrometer can be made ſo eaſily for the examination of the corrofive mineral acids @@(a). Theſe muſt be made oſ glaſs, and we cannot depend on the accurate cylindric form of any glaſs item. But if any ſuch can be procured, the conſtruc­tion is the ſame. The divided ſcale may either be on thin paper palled on the inside of the ſtem, or it may be printed on the ſtem itſelf from a plate, with ink made of a metallic calx, which will attach itſelf to the glaſs with a very moderate heat. We would recommend common white enamel, or arſenical glaſs, as the fitteſt material for the whole inſtrument; and the ink uſed, in taking the impreſſion of the ſcale, may be the ſame that is uſed for the low priced printing on Delft ware pottery. Firſt form the ſcale on the ſtem. Then, having mea­sured the ſolid contents of the graduated part as exact­ly as poſſible, and determined on the general ſhape of the ball and counterpoiſe below, calculate its ſize, ſo that it may be a little leſs than ten times that of the

ſtem. The glaſs blower can copy this very nearly, and join it to the ſtem. Then make two brines or other li­quors, which ſhall have ſpecific gravities in the ratio of 10 to 11. Load the inſtrument ſo that it may link to 0 in the lighteſt. When put into the heavieſt, it ſhould riſe to 10. If it does not riſe ſo high, the immerſed part is too ſmall. Let the glaſs blower enlarge the ball of the counterpoiſe a little. Repeat this trial till it be ex­act. Nothing now remains but to form the weights : And here we obſerve, that when the inſtrument is to have a very great range, as for examining all ſtates of the vitriolic acid, it has a chance of being very tottering when loaded with the greateſt weight on the top of ſo long a ſcale. To avoid this, Mr Quin and others have added ſome of. their weights below.— But this will not suit the preſent conſtruction, becauſe it will alter the proportion between the bulks of the ſtem and immerſed part. Therefore let theſe weights consiſt of cylinders of metal ſmall enough to go into the ſtem, and let them be ſoldered to the end of long wires, which will let them go to the bottom, and leave a ſmall hook or ring at top. Theſe can lie alongſide of the inſtrument in its caſe. This is indeed the beſt construction for every hydrometer, becauſe it makes it incomparably more ſteady. The inſtrument is poiſed by ſmall ſhot or mercury. But it will be much better to do it with Newton’s fuſible metal (three parts of tin, five parts of lead, and eight parts of biſmuth) in coarſe filings. When the exact quantity has been put in, the inſtrument may be ſet in a veſſel of oil, and this kept on the fire till all is completely melted. It ſoon freezes again, and remains fast. If this metal is not to be had, let a few bits of ſealing-wax be added to the mercury or ſhot, to make up the counterpoiſe. When heated, it will float a-top, and when it freezes again it will keep all faſt. Thus we ſhall make a very complete and cheap inſtrument.

There is yet another method of examining the ſpe­cific gravities of fluids, firſt propoſed by Dr Wilſon, late profeſſor of aſtronomy in the university oſ Glaſgow. This is by a ſeries of ſmall glaſs bubbles, differing equally, or according to ſome rule, from each other in ſpecific gravity, and each marked with its proper number. When theſe are thrown into a fluid which is to be exa­mined, all thoſe which are heavier than the fluid will fall to the bottom. Then holding the veſſel in the hand, or near a fire or candle, the fluid expands, and one of the floating bubbles begins to sink. Its ſpecific gravi­ty, therefore, was either equal to, or a little leſs than, that of the fluid ; and the degree of the thermometer, when it began to sink, will inform us how much it was deficient, if we know the law of expansion of the liquor. Sets of theſe bubbles fitted for the examination of ſpirituous liquors, with a little treatiſe ſhowing the man­ner of uſing them, and calculating by the thermometer, are made by Mr Brown, an ingenious artiſt of Glaſ­gow, and are often used by the dealers in spirits, being found both accurate and expeditious.

Alſo, though a bubble or two ſhould be broken, the ſtrength of ſpirits may easily be had by means of the remainder, unleſs two or three in immediate ſucceſſion

@@@(a) It would be worth while to try copper enamelled.