curve will be found to be extremely regular, reſembling a hyperbolic arch whoſe aſſymptote makes an angle of 30⁰ with the axis. Ordinates were then interpolated analytically for every 10 ounces of contained ſalt, and thus the table was conſtructed. We did not, however, rest it on one ſeries alone ; but made others, in which 1/4th of the ſalt was repeatedly abſtracted. They agreed, in the caſe of common ſalt, with great exactneſs, and in ſome others there were ſome very inconsiderable irre­gularities.

To ſhow the authority of the tables of ſtrength was by no means our only motive for giving an example of the proceſs. It may be of uſe as a pattern for ſimilar experiments. But, beſides, it is very inſtructive. We see, in the firſt place, that there is a very ſenſible change of density in one or both of the ingredients. For the ſeries is of that nature (as we have formerly explained), that if the ingredients retained their denſities in every proportion of commixture, the ſpecific gravities would have been in arithmetical progreſſion ; whereas we ſee that their differences continually diminiſh as the brines grow more dense. We can form ſome notion of this by comparing the different brines. Thus in the firſt brine, weighing 5027 grains, there are 3770 grains of water in a veſſel holding 4200. If the density of the water remains the ſame, there is left for the ſalt only as much ſpace as would hold 430 grains of water. In this ſpace are lodged 1257 grains of ſalt, and its ſpecific

gravity, in its liquid form, is 1257/430 = 2,8907 very near­ly. But in the 8th brine the quantity of water is 4156, the ſpace left for 157 grains of ſalt is only the bulk oſ 44 grains of water, and the density of the ſalt is

157/44 = 3,568, conſiderably greater than before. This

induced us to continue the dilution of the brine as fol­lows, beginning with the 8th brine.

|  |  |
| --- | --- |
| 157  78,5 | 2)4313 8th brine 2156,5 |
| 78,5 | 2156,5  2105,5  2)4262,0 9th brine |
| 39,7 | 2131 |
| 39,7 | 2131  2102  2)4233 10th brine |
| 19,8 | 2116,5  2116, 5  2102  4218 11th brine. |

This laſt brine contains 4198,2 grains of water, lea­ving only the bulk of 1,8 grains of water to contain 19,8 of ſalt, ſo that the ſalt is ten times denſer than water. This will make the ſtrength 243 inſtead of 210 indicated by the ſpeciſic gravity. But we do not pretend to meaſure the denſities with accuracy in theſe diluted brines. It is evident from the proceſs that a ſingle grain of exceſs or defect in taking out the brine

and replacing it with water has a ſenſible proportion to the whole variation. But we ſee with sufficient evi­dence, that from the ſtrong to the weak brines the ſpace left for the portion oſ ſalt is continually diminiſhing. In the firſt dilution 527l/2 grains of water were added to fill up the veſſel ; but 1/8th of its contents of pure water is only 525 ; ſo that here is a diminution of 21/2 grains in the ſpace occupied by the remaining ſalt. The ſubſequent additions are 604,7 ; 706,5 ; 847 ; 1054,5 ; 1405 ; 2102 ; 2105,5 ; 2102; 2102; inſtead of 600; 700; 840; 1050; 1400 ; 2100; 2100; 2100; 2100. Nothing can more plainly ſhow the condenſation in general, though we do not learn whe­ther it happens in one or both of the ingredients ;nor do the experiments ſhow with sufficient accuracy the progreſſion of this diminution. The exceſſes of the added water being only six or ſeven grains, we cannot expect a nice repartition. When the brine is taken out, the upper part of the veſſel remains lined with a briny film containing a portion of ſalt and water, perhaps equal or ſuperior to the differences. Had our time permitted, we ſhould have examined this matter with ſcrupulous attention, uſing a veſſel with a ſtill nar­rower neck, and in each dilution abſtracting one half of the brine. The curve whoſe abſciſſae and ordinates repreſent the weight of the contained ſalt and the weight of a conſtant bulk of the brine, exhibits the beſt and moſt ſynoptical view of the law of condenſation, becauſe the poſition of the tangent in any point, or the

value of the ſymbol x/y, always ſhows the rate at which

the ſpecific gravity increaſes or diminiſhes. We are inclined to think that the curve in all caſes is of the hy­perbolic kind, and complete ; that is, having the tan­gent perpendicular to the axis at the beginning of the curve. The mathematical reader will eaſily gueſs the phyſical notions which incline us to this opinion ; and will alſo ſee that it is hardly poſſible to diſcover this ex­perimentally, becauſe the miſtake of a ſingle grain in the very ſmall ordinates will change the poſition of the tangent many degrees. It was for this reaſon that we thought it uſeleſs to proſecute the dilution any far­ther. But we think that it may be proſecuted much farther in Dr Watſon's or Mr Achard’s method, viz. by diſſolving equal weights of ſalt in two veſſels, of very different capacities, having tubular necks, in which the change of bulk may be very accurately ob­ſerved. We can only conclude, that the condenſation is greateſt in the ſtrongeſt brines, and probably at­tains its maximum when the quantities of true ſaline matter and water are nearly equal, as in the, caſe of vi­triolic acid, &c.

We conſider theſe experiments as abundantly ſufficient for deciding the queſtion “ Whether the ſalt can be received into the pores of the water, or the water into the pores of the ſalt, ſo as to increaſe its weight without increaſing its bulk?" and we muſt grant that it may. We do not mean that it is simply lodged in the pores as sand is lodged in the interſtices of ſmall ſhot ; but the two together occupy leſs room than when ſeparate. The ex­periments of Mr Achard were insufficient for a decision, becauſe made on ſo ſmall a quantity as 600 grains of water. Dr Watſon’s experiments have, for the moſt part, the ſame defect. Some of them, however, are of great value in this queſtion, and are very fit for aſcer-