**ledge** already diffused is judſicously compiled. But a due reſpect for the public, and gratitude for the very honourable reception hitherto given to our labours, induce us to exert ourſelves with honeſt zeal to merit the continuance of public favour. We aſſure our readers that the experiments were made with care, and on quantities sufficiently large to make the unavoidable ir­regularities in ſuch caſes quite inſignificant. The law of denſity was aſcertained in each ſubſtance in two ways. We diſſolved different portions of ſalt in the ſame quantity of water, and examined the ſpecific gra­vity of the brine by weighing it in a vessel with a nar­row neck. The portions of ſalt were each of them one- eighth of what would make a nearly ſaturated solution of the temperature 55. We did not make the brine ſtronger, that there might be no riſk of a precipitation in form of cryſtals. We conſidered the ſpecific gravi­ties as the ordinates of a curve, of which the abscissæ were the numbers of ounces of dry ſalt contained in a cubic foot of the brine. Having thus obtained eight ordinates correſponding to 1, 2, 3, 4, 5, 6, 7, and 8 portions of ſalt, the ordinates or ſpecific gravities for every other proportion of ſalt were had by the uſual methods of interpoſition.

The other method was, by firſt making a brine near­ly ſaturated, in which the proportion of salt and water was exactly determined. We then took out one-eighth of the brine, and filled up the veſſel with water, taking care that the mixture ſhould be complete ; for which purpoſe, beſides agitation, the diluted brine was allow­ed to remain 24 hours before weighing. Taking out one-eighth of the brine alſo takes out one eighth of the ſalt ; ſo that the proportion of ſalt and water in the diluted brine was known. It was now weighed, and thus we determined the ſpecific gravity for a new pro­portion **of** ſalt and water.

We then took out one-ſeventh of the brine. It is evident that this takes out one-eighth of the original quantity of ſalt ; an abſtraction equal to the former. We filled the veſſel with water with the ſame precau­tions ; and in the ſame manner we proceeded till there remained only one-eighth of the original quantity of ſalt.

The ſpecific gravities by theſe two methods agreed extremely well. In the very deliqueſcent ſalts the firſt method exhibited ſome ſmall irregularities, ariſing from the unequal quantities of water which they had im­bibed from the atmoſphere. We therefore confided moſt in the experiments made with diluted brines.

That the reader may judge of the authority of the tables which we ſhall insert, we ſubmit to his inſpection one ſeries of experiments.

Two thouſand one hundred and eighty-eight grains of very pure and dry (but not decrepitated) common ſalt, prepared in large cryſtals, were diſſolved in 6562 grains of diſtilled water of the temperature 55⁰. A ſmall matraſs with a narrow neck, which held 4200 grains of diſtilled water, was filled with this brine. Its contents weighed 5027 grains. Now 6562 + 2188 : 2188 = 5027 : 1256,75. Therefore the bottle of brine contained 1256,75 grains of ſalt diſſolved in 3770,25 grains of water. Its ſpecific gravity is -= 5027

or 1,196905 ; and a cubic foot of brine weighs 1196,9 ounces avoirdupois. Alſo 5027 : 1256,75 =

1196,9 : 299,28. Therefore a cubic foot of this brine contains 299,28 ounces of perfectly dry ſalt.

The ſubſequent ſteps of the proceſs are repreſented as follows.

Thus, by repeated abſtraction of brine, ſo as always to take out 1/8th of the ſalt contained in one conſtant bulk, we have obtained a brine conſiſting of 157 grains of ſalt united with 4313— 157, or 4156 grains of water. 4313

Its ſpecific gravity is 1,0279, and a cubic foot

of it weighs 1028 ounces, and contains 374/10 ounces of dry ſalt. In like manner may the ſpecific gravity, the weight of a cubic foot, and the ſalt it contains, be eſtimated for the intermediate brines.

When theſe eight quantities of ſalt contained in **a** cubic foot are made the abſciſſae, and the weights of the **cubic foot of brine are the correſponding ordinates,** the

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Salt. | Brine. | Water. | Wt. *of* Salt in Cub. Ft Cub. Ft | |
| 8)1256,75  157,1 | 8)5027  628,4 | 3770,25 = 1/8 of brine. | 1196,5 | 299,28  37,41 1/8 |
|  | 4398,6  527,4 | Remains. Water to fill it  again.  2d Brine.  1/7 taken out. |  |  |
| 7) 1099,6  157,1 | 7)4926,0  703,7 | 1172,7 | 261,87  37,41 |
|  | 4222,3  604,7 | Water added. |  |  |
| 942,5  157,1 | 6)4827,0  804,5 | 3d Brine. Taken out. | 1149,3 | 224,46 |
|  | 4022,5  706,5 | Remains. Water added. |  |  |
| 785,4 157,1 | 5)4729,0  946 | 4th Brine. Taken out. | 1125,9 | 187,05 |
|  | 3783  847 | Remains.  Water added. |  |  |
| 628,3  157,1 | 4) 4630  1157,5 | 5th Brine. Taken out. | 1102,3 | 149,64 |
|  | 3472,5  1054,5 | Remains.  Water added. |  |  |
| 471,2 | 3)4527  1509 | 6th Brine. Taken out. | 1077,9 | 112,23 |
|  | 3018  1405 | Remains.  Water added. |  |  |
| 314,1 | 2)4423  2212 | 7th Brine. Taken out. | 10533 | 74,82 |
|  | 2211  2102 | Remains.  Water added. |  |  |
| 157,0 | 4313 | 8th Brine. | 1027,9 | *37,41* |