snow just beginning to thaw, and mark the place where the mercury ſtands with a 32 ; then immerge it in boiling water, and again mark the place where the mercury ſtands in the tube, which mark with the num. 212, exceeding the former by 180 ; dividing therefore the intermediate ſpace into 180 equal parts, will give the ſcale of the thermometer, and which may afterwards be continued upwards and down­wards at pleaſure.

Other thermometers of a ſimilar conſtruction have been accommodated to common uſe, having but a portion of the above ſcale. They have been made of a ſmall ſize and portable form, and adapted with appendages to particular purpoſes ; and the tube with its annexed ſcale has often been encloſed in another thicker glaſs tube, alſo hermeti­cally ſealed, to preſerve the thermometer from injury. And all theſe are called *Fahrenheit's thermometers.*

In 1733, M. De l’Iſle of Peterſburgh constructed a mer­curial thermometer on the principles of Reaumur’s ſpirit thermometer. In his thermometer, the whole bulk of quickſilver, when immerged in boiling water, is conceived to be divided into 100,000 parts ; and from this one fixed point the various degrees of heat, either above or below it, are marked in theſe parts on the tube or ſcale, by the va­rious expanſion or contraction of the quickſilver, in all ima­ginable varieties of heat. —Dr Martine apprehends it would have been better if De l'Iſle had made the integer 100,000 parts, or fixed point, at freezing water, and from thence computed the dilatations or condenſations of the quickſilver in thoſe parts; as all the common obſervations of the weather, &c. would have been expressed by numbers increaſing as the heat increaſed, inſtead of decreaſing, or counting the contrary way. However, in practice it will not be very easy to determine exactly all the diviſions from the altera­tion of the bulk of the contained fluid. And besides, as glaſs itſelf is dilated by heat, though in a less proportion than quickſilver, it is only the exceſs of the dilatation of the contained fluid above that of the glaſs that is obſerved ; and therefore if different kinds of glaſs be differently affected by a given degree of heat, this will make a ſeeming difference in the dilatations of the quickſilver in the thermometers conſtructed in the Newtonian method, either by Reaumur’s rules or De l’Iſle’s. Accordingly it has been found, that the quickſilver in De l’Iſle’s thermometers has stood at dif­ferent degrees of the ſcale when immerged in thawing ſnow : having stood in some at 154⁰, while in others it has been at 156⁰ or even 158⁰.

The thermometer preſently uſed in France is called *Reau­mur's;* but it is very different from the one originally invent­ed by Reaumur in 1730, and deſcribed in the Memoirs of the Academy of Sciences. The one invented by Reaumur was filled with ſpirit of wine ; and tho’ its ſcale was divided by the author into 80 parts, of which o was the freezing point and 80 the boiling water point, yet in fact 80 was only the boiling point of the ſpirit of wine that he employ­ed, which, as Dr Martine computes, correſponded with 180 of Fahrenheit. But the thermometer now in uſe in France is filled with mercury ; and the boiling water point, which is at 80, corresponds with the 212th degree of Fahrenheit. The ſcale indeed commences at the freezing point, as the old one did. The new thermometer ought more properly to be called *De Luc's thermometer,* for it was first made by De Luc; and is in fact as different from Reaumur’s as it is from Sir Iſaac Newton’s. When De Luc had fixed the ſcale, and finiſhed an account of it, he ſhowed the manuſcript to Μ. De la Condamine. Condamine adviſed him to change the number 80 ; remarking, that ſuch was the inattention of phyſicians, that they would probably confound it with Reaumur’s. De Luc’s modesty, as well as a predilection for the number 80, founded, as he thought, on philoſophical reaſons, made him decline following this advice. But he found by experience that the prediction of Condamine was too well founded.

The thermometer of Celſius, which is uſed in Sweden, has a ſcale of 100 degrees from the freezing to the boiling water point.

Theſe are the principal thermometers now uſed in Europe ; and the temperatures indicated by any of them may be redu­ced into the correſponding degrees on any of the others by means of the following simple canons ; in which R signi­fies the degrees on the ſcale of Reaumur, F thoſe of Fah­renheit, and S thoſe of the Swediſh thermometer.

1. To convert the degrees of Reaumur into thoſe of Fahrenheit ; (R × 9)/4 + 32 = F.

2. To convert the degrees of Fahrenheit into thoſe of Reaumur ; (F — 32 × 4)/9 = R.

3. To convert the Swediſh degrees into thoſe of Fahrenheit ; (S × 9)/5 + 32 = F.

4. To convert Fahrenheit’s into Swediſh ; (F — 32 × 4)/9 = R.

5. To convert Swediſh degrees into thoſe of Reaumur; (S × 4)/5 = R.

6. To convert Reaumur’s degrees into Swediſh; (R × 5)/4 = S.

To ſuch readers as are unacquainted with the algebraic expreſſion of arithmetical formulae, it will be ſufficient to expreſs one or two of theſe in words to explain their uſe.— 1. Multiply the degree of Reaumur by 9, divide the pro­duct by 4, and to the quotient add 32, the ſum expresses the degree on the ſcale of Fahrenheit.—2. From the degree of Fahrenheit ſubtract 32, multiply the remainder by 4, and divide the product by 9, the quotient is the degree ac­cording to the ſcale of Reaumur, &c.

As many other thermometers have been uſed beſides theſe, and conſequently obſervations taken by them, it is of importance to have them placed in ſuch a point of view that they may be eaſily compared with any of theſe four now in general uſe. We therefore give them in Plate DVII. in the ſame order as they were arranged by Dr Martine in his valuable Essay on the Conſtruction and Graduation of Ther­mometers, and at the ſame time adding thoſe of Celſius and De Luc. We call it by the name of De Luc for the ſake of diſtmquiſhing it from Reaumur’s ſpirit of wine thermo­meter, which may be ſeen in the ſame Plate.

It is unnecessary to deſcribe any of theſe more minutely, as they are no longer uſed. Thoſe who wiſh to read a more particular account of them may conſult Dr Martine’s Essays.

As in meteorological obſervations it is neceſſary to attend to the greatest rise and fall of the thermometer, attempts have been made to conſtruct a thermometer which might register the greatest degree of heat, or greatest degree ofcold, which took place during the abſence of the obſerver. In 1757 Lord Charles Cavendiſh preſented to the Royal So­ciety of London a thermometer in two different forms ; the one contrived to mark the greatest degree of heat, and the other the greatest degree of cold.

The firſt consists of a glaſs tube AB, with a cylindrical bulb B at the lower end, and capillary at the top, over which there is fixed a glaſs ball C. The bulb and part of the tube are filled with mercury, the top of which ſhows the