for which all the corrections given under the head Baro**METER** would be necessary, in order to render it equally perfect with observations by that instrument. In short, this method may be considered as a telltale on the baro meter, showing where the barometer would stand if placed in its position. Thus, if water boil at 200° on the top of a mountain, that is merely to be considered as indicating that the barometer, if placed there, would stand at 22.8 ; after which, the process of deducing the height remains the same. To illustrate the mode of deducing heights from the boiling point, as we have given it, we take the following example.

Water boils on the top of Ben Nevis at 203·8β, while at the side of the Caledonian Canal it boils at 212°, the temperature being 30° on the summit of the mountain, and 35° below. In order to determine the height,

From 212°

Take 203∙8° To 30°

Add 35°

There remains 8∙2°

Multiply by 530 Sum 65°

Subt. 64°

246∙0

410 Remain 1° mult, by 4346

4346 first approx. Latitude 56° nearly 4 first correct. Mult. 4∙350

by 2∙

4350 second approx. —

9∙7 second correct. 9∙700

Calc, height, 4359,7 third approximation.

4358· true measured height—the difference being less than 2 feet.

This method, however, is seldom susceptible of so high a degree of accuracy, even with the most carefully con ducted experiments.

17. This method of determining heights by the ebullition of water is not a recent invention. It was suggested originally by Mr Fahrenheit, in the 33d volume of the *Philosophical Transactions,* in a paper entitled *"Barοmetri Novi Descriptio."* The subject was further matured by Cavallo, who has written concerning it in the 71st volume of the same Transactions ; and the method has finally received from the Rev F. J. H. Wollaston the highest degree of perfection of which it seems to bo capable. His paper, read before the Royal Society on the 6th of March, 1817, and afterwards published in the Philosophical Transactions of that year, gives an account of the very beautiful and ingenious apparatus which he has contrived for facilitating the procedure of taking the observations with the requisite precision. Fig. 4, is a view of the whole apparatus, consisting principally of a tripod stand, surrounded by a sort of tent cover, which is quite essential for the protection of the lamp from the strong winds generally encountered at considerable altitudes. The lamp acts on a small tin vessel, which is a cylinder 5½ inches deep and 1½ in diameter, the sides of which are double, leaving an interstitial space of confined air to prevent cooling. Above this vessel is a circular plate of metal G H K, to which the thermometer is to be fixed ; and the scale and neck of the thermometer are seen projecting above the stand. A (fig. 3) represents the thermometer made use of, which it is desirable to have of as strong and as compact a construction as possible, while, at the same time, its degrees should range as ex­tensively as possible. These desiderata are attained in Ills construction. The bulb A, one inch in diameter, is blown thick and strong, on the end of a tube about of an inch in diameter : close above the bulb, is a cavity B, swelled out to such a size as to contain whatever mercury will

expand out of the bulb, between 32o and the lowest temperature at which the mercury is likely to boil at such altitudes as it will be used to measure. It is this which renders the instrument compact ; because, if it be not taken out of the British islands, it will never, in all probability, boil at less than 200\*; and thus the whole length of the stalk is left for a range of 12° or 15” of the thermometer. In the instrument figured, the scale R is 5 inches long, 9/10 of an inch wide, and a length 4∙15 inches is divided into 100 parts, which, by a vernier reads off to 1000 parts, being 241 parts to an inch ; so that 1’ Fahr, corresponds to 233 parts on the scale, or to 530 feet. Each part of the scale, as read by the vernier, will there fore correspond to 2∙275 feet, being about half the degree of minuteness of the mountain barometer divided into thousandths, each of which is nearly equivalent to one foot of height. The accuracy, however, of this scale is probably greater than the degree of accuracy of which the method of observation is itself capable.

Whethcr an observer have or have not the means of obtaining such an instrument as this, it will be, in many cases, useful to travellers to be provided with means, more or less accurate, of making observations of this nature, on the summit of such mountains as they may have the opportunity of visiting. For this purpose, the most convenient is a small cooking apparatus, such as will supply the wants of a traveller ; consisting of a round tin stand, protecting a lamp, in which a small quantity of the traveller’s supply of spirituous liquid may be burnt, so as to boil some of the water of a small bottle, which he has also carried with him, or perhaps a little melted snow. An umbrella or waterproof cloak will screen the whole from the wind ; and a thermometer should have been procured, with a stem as minutely divided as possible, and should be insert ed, by means of a small cork, in an aperture of the lid left on purpose. The quantity of the water may be small, and it will serve a culinary purpose immediately after the operation is completed. The thermometer should be inserted only among the steam. The traveller must take great precautions for striking a light, as he will find this much more troublesome in the cold rarified air of a mountain summit than below.

18. Distillation is a method of separating a liquid from extraneous matter, by first of all converting it into steam,