LII. *An Account of a pure native cryſtaliſed Natron, or foſſil alkaline Salt, which is found in the Country of* Tripoli *in* Barbary: *By* Donald Monro, *M. D. Phyſician to the Army, and to* St. George's *Hoſpital, Fellow of the Royal College of Phyſicians, and of the Royal Society.*

Read Dec. 19, 1771.

IT is well known that the nitre, or natron, of the antients, which they uſed for making of glaſs (*a*), and in their baths (*b*), and for other purpoſes, was not the ſalt which now goes by tha name of nitre, or ſaltpetre; but a ſalt of an alkaline nature, which, at preſent, is commonly called the natron of the antients, or the foſſil alkali.

(*a*) See an account of the making of glaſs with nitre and ſand in C. Plinii Secundi Hiſt. natural. Tom. III. lib. xxxvi. cap. 26, —and an account of its medicinal virtues, ibid. lib. xxxi. cap. 10. —And Tacitus, in mentioning the river Belus in India, ſays, "Circa cujus os collectæ arenæ, admixto nitro, in vitrum exco-"quuntur." Lib. v. Hiſt. ſect. 7.

(*b*) Nitre is mentioned as uſed in baths, in ſeveral parts of the Holy Scripture, particularly by the prophet Jeremiah. See chap. ii. ver. 22. The nitre, or natron, is likewiſe taken notice of by many other of the ancient authors.

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The knowlege of it was entirely loſt for ſeveral centuries, but was revived in the laſt, by the Honourable R. Boyle, formerly a diſtinguiſhed member of this Society, who, in his Short Memoirs for the natural experimental Hiſtory of Mineral Waters (*c*), after telling us that it is of an alkaline nature, ſays, "that he had ſome of it brought from Ægypt, and "a neighbouring country, whoſe name he did not "remember."

However, it was afterwards neglected, and its properties as a diſtinct ſpecies of alkaline ſalt not known for many years; for although chemiſts obſerved, that a Glauber ſalt and cubic nitre were formed by diſlodging the marine acid from ſea ſalt, by means of the vitriolic and nitrous acids; and from thence ſuſpected that there was ſomething particular in the baſis of this ſalt; yet its true nature was not diſcovered till Monſ. du Hamel du Monceau gave an account, in the Memoirs of the French Royal Academy of Sciences for the year 1736, of his having obtained it pure, in two different ways. 1ſt, By diſlodging the marine acid by means of the vitriolic, and then ſeparating it by the addition of a phlogiſton, and forming a hepar ſulphuris, from which he precipitated the ſurphur by means of the vegetable acid, and then ſeparated this acid from the baſis of ſea ſalt by the force of fire. 2dly, By diſlodging the marine acid from the ſea ſalt by the addition of the nitrous, and ſo forming a cubic nitre, from which he diſlodged the acid, by deflagrating it with charcoal;

(*c*) See his Notes on Title 26, page 86, of the edition printed at London 1684-5.

and

and then he purifyed the remainder by diſſolving it in water, and by filtrating and evaporating the liquor and cryſtalliſing the ſalt.

After he had obtained the baſis of ſea ſalt quite pure, he tried a number of experiments with it, and with the natron of Egypt; and found that they were entirely of the ſame nature, and that they were of a diſtinct ſpecies of alkaline ſalt, different in their properties from the potaſh, and other alkaline ſalts, commonly obtained by burning wood, and moſt other vegetable ſubſtances; and that they formed different neutral ſalts with the three mineral acids, and with the vegetable.

This ſalt is likewiſe got from burning the Barilla, the Kali, and other marine plants; and all that is at preſent uſed in this country, by our manufacturers, has been prepared in this manner.

Hitherto it has not been found native in the weſtern parts of Europe, except in mineral waters, and in the neighbourhood of volcanoes, or at places where they are alledged to have exiſted formerly; but it has long been found in Egypt, and near to Smyrna, and in other eaſtern countries, commonly mixed with earth, in a floury or concrete form; in ſome places pretty pure, in others more mixed (*d*).

In the year 1764, a reſpectable member of this Society, Dr. Wm. Heberden, gave an account of a ſalt of this kind, which was found on the Pic of Tenerif, where there is a volcano, and added ſeveral very ingenious experiments of the Honourable Henry Ca-

(*d*) See Hoffman. Phyſ. Chem. lib. ii. obſ. 1.—Geoffroy, Mater. Medica, part i. cap. 2.—Dr. Shaw's Travels, Excerpt. pag. 55. and other authors.

vendiſh, to prove that the vegetable alkali has a greater affinity with acids than the foſſil or natron.

It is probable, that this ſalt got at the Pic of Tenerif is the baſis of ſea ſalt, whoſe acid has firſt been diſlodged, either by the force of fire, or by the acid of decompoſed ſulphur, which has afterwards been attracted by a freſh phlogiſton, and both ſeparated by the force of fire; though it is not at all impoſſible but that there may be magazines of this foſſil ſalt lodged native in the bowels of this mountain.

Hitherto we have no account, that I know of, of its being found any-where native in a cryſtalline form, and in large quantity; and therefore I imagined that the following hiſtory would be agreeable to the Society.

In the year 1765, Mrs White, widow to the late Conſul White of Tripoli, on her return to this country, ſhewed me a ſubſtance which, ſhe ſaid, had a very particular property of bubbling up, or fermenting, when mixed with lemon juice. Immediately, on ſeeing and taſting it, I ſuſpected it to be a pure native natron, or foſſil alkali; and was confirmed in this opinion, by mixing it with different acids; and I have ſince had a few pounds of it ſent home to me, and ſome gentlemen in the city have imported ſome hundred weight of it.

On enquiring into the hiſtory of this ſalt, I was told that it was brought yearly to Tripoli, in large quantities, from the mountains in the inland part of the country, and that it went by the name of Trona; that the inhabitants ſometimes took an ounce, or more of it, by way of phyſic, and that it commonly operated both as an emetic and purgative medicine; that

that the principal uſe they made of it, was to mix it with their ſnuff, to give it, what they think, an agreeable ſharpneſs; and that it was yearly ſent to Conſtantinople, in large quantity, to be employed for the ſame purpoſe. But, ſo far as I can learn, the Turks are entirely ignorant of its nature, and employ it for no other uſes.

It is well known that this ſalt does not run *per deliquium*, but falls down into a white floury powder, when expoſed to the air; and that it makes a harder and firmer ſoap than the common vegetable alkali, and is alledged to make a purer and a finer glaſs.

This ſalt, which I have the honour now to preſent to the Society, is extremely pure, diſſolves entirely in water, leaving only a ſmall quantity of a reddiſh earth behind. I tried what quantity of acid an ounce of this ſalt would ſaturate, and found that it ſaturated as much as near two ounces and a half of the common groſs barilla, in the form it is commonly imported. I had it likewiſe tried by callico printers, and it was found to anſwer all their purpoſes, and nearly in the ſame proportion with reſpect to the groſs barilla, as above-mentioned, and I was told that it was thought to anſwer better than any other ſalt they had ever tried.

Moſt of the neutral ſalts made with this alkali and acids (except the cubic nitre) keep long without running *per deliquium*, even thoſe made with vegetable acids; for moſt of the neutral ſalts made with vegetable acids, and with ſome of the ſalt now before you, which I had the honour to preſent to this Society in the year 1767, ſtill remain entire, though

kept only in a cloſe drawer, in the ſame tea-cups and ſmall baſons, without any cover, as they were ſhewn to the Society.

I have not hitherto been able to learn in what particular place of the inland part of Tripoli in Barbary this ſalt is found, nor how it is diſpoſed of in the bowels of the earth: but it ſhould ſeem to run in thin veins, of about half an inch, or a little more thick, in a bed of ſea ſalt; for all of it that has hitherto been imported into this country is covered with ſea ſalt on each ſide. The one ſide is always ſmoother than the other, and appears as if it had been the baſis on which it reſted; the other, which ſhould ſeem to be the upper ſide, is rougher, by the ſhooting of the cryſtals. The pieces of the thin veins appear almoſt as if the ſalt had been diſſolved in water, and afterwards boiled up into thin cryſtalliſed cakes, only that the cryſtals are much ſmaller, and diſpoſed in a manner that cannot eaſily be imitated by art; for when this ſalt is diſſolved, and evaporated to a pellicle, and left to cryſtalliſe, it always ſhoots into cryſtals reſembling thoſe of Glauber ſalt.

Brown paper dipt into a ſolution of this ſalt, after it is dry burns almoſt as if it had been dipped in a ſolution of true nitre, as Dr. Heberden had obſerved of the ſalt got at the Pic of Tenerif; which ſhews, that it contains more of an inflammable principle than the common vegetable alkali.

There are great mines of ſea ſalt in the country of Tripoli, the ſalt of which ſhould ſeem to contain a large proportion of this natron; for, I am told, that all the meat ſalted with it acquired a red colour.

This native alkaline ſalt having never been ſubjected to the force of fire, is perfectly mild, and contains

tains no cauſtic parts, as the barilla, and the common potaſhes prepared by burning wood and plants, or the ſalts thrown out by volcanoes commonly do; and therefore, it will be found to be much more uſeful for bleaching and waſhing linens, and for cleaning and ſcowering cotton or woollen ſtuffs, and for many other purpoſes, than any other alkaline ſalt hitherto known, at the ſame time that it will anſwer every purpoſe for which the other kinds of the foſſil alkali are employed

When this ſalt is to be uſed for making rochelle or other neutral ſalts, or for waſhing or bleaching linen, it ought firſt to be diſſolved in pure water, and the ſolution be allowed to ſtand for ſome time, till the reddiſh or brown earth has all precipitated to the bottom, and then the pure liquor ought to be poured off, and what remains at the bottom be thrown into a filter; for, if this precaution is not taken, the reddiſh earth is in danger of giving a ſlight brown or reddiſh colour to the neutral ſalts, or to affect the colour of the linen.