Abstract of a Paper accompanying a Suite of Volcanic Rocks from the Lipari Islands, presented to the Royal Society. By
ROBERT ALLAN, Esq. F. R. S. E., M. G. S., &c.

(Read 16th January 1833.)

HAVING frequently had the pleasure of examining the very interesting and highly valuable collection of volcanic specimens brought from Iceland, and presented to the Royal Society by Sir GEORGE MACKENZIE, I was gratified in an opportunity which was afforded me, at the close of 1830, of visiting the Lipari Islands, the only other great repository of obsidian in Europe, and of there collecting the suite of specimens which I have now the honour of presenting to the society. Unfortunately, it is far from complete as a geological series; for the difficulties occasioned by the tempestuous state of the weather, and the impossibility of getting to the more remote islands in a small boat during the month of December, limited my movements extremely, and forced me to confine my observations to the two principal islands of the group, viz. Lipari and Vulcano. I do not therefore pretend to give any geological account of these islands, or even of the two on which I landed. My object in collecting, and consequently also in presenting to the Society, this series of specimens, was to afford the means of comparing with each other the productions of the two great obsidian districts of Europe; those from Lipari, which are now on their table, with the Iceland suite already in their possession.

In so far as I remarked in the island of Lipari, the large and more continuous tracts of obsidian formed the lower strata, while those of a more pumaceous aspect appeared invariably at a higher level. The purest, blackest, and most beautiful specimens, however, are found in nodules in the upper portions of the pumice, where they occur in masses from two inches to as many feet in diameter. The two first specimens are from a locality of this description, occurring perhaps 1000 feet above the level of the sea, among the fine white stratified pumice of that portion of the island called Campo Bianco.

No. 1. is a specimen of the compact, conchoidal, black obsidian, for which, among mineralogists, the Lipari Islands have so long been a celebrated locality. It is translucent on the edges, presents a perfectly vitreous fracture, and is only found in boulders or masses imbedded among the pumice.

Some portions of this obsidian are less compact, and in No. 2. we remark indications of a more slaggy structure, with several white veins intersecting the black surface in a very beautiful manner.

The succeeding specimens of the series were collected in less elevated positions, from the obsidian *in situ*. They are all more or less impure; some of them exhibiting a very vitreous aspect, others a more earthy, and even a pumaceous appearance. None of them are so perfectly black and compact as the obsidian boulders which occur among the pumice, but they have all in some way or other a close analogy to them.

No. 3. deviates the least from the pure black obsidian of the two last. It is as nearly as possible the same substance, but is interspersed throughout with small white opaque globules, which frequently appear stratified, as if formed parallel to the faces of the bed.

Nos. 4. and 5. are specimens of the stratified obsidian, which have more of an ash-grey appearance, and consist of alternate

layers of obsidian, and an earthy substance which appears to be compact pumice. No. 5. is an extremely beautiful example of this.

No. 6. The ash-grey coloured portion of this specimen is so perfectly vitreous, that doubts may be entertained whether it should properly be considered obsidian or pumice. The cross fracture resembles obsidian, while that parallel to the stratified arrangement exhibits a pumaceous structure. It is intimately blended with alternate layers of black obsidian, and has, on the whole, a very close resemblance to many of the slags from our glass-houses.

No. 7. is another specimen composed of alternate layers of black and ash-grey obsidian, so closely united as to afford one uniform mass, with a fine flat conchoidal fracture, and smooth vitreous aspect. This is a rare variety, and certainly the most beautiful I met with.

No. 8. again, is one of the commonest kinds which the island affords; its matrix is a black obsidian like that of No. 3, but so completely interspersed with the white globules, that it sometimes can scarce be recognised as that mineral. These globules are placed so much in parallel lines, as to give the rock the appearance of stratification.

No. 9. is another very beautiful specimen of the same, in which the globules or spheroids are greatly larger, and more irregular. Each of them is coated with a soft white silky substance consisting of silex, which appears to have a fibrous structure radiating towards the centre. A nodule of the same material occupies the middle of the cavity, but is so slightly attached, or rather occurs so often quite loose, that on breaking the rock it disengages itself, and falls out. When a portion of this specimen is held towards the light, the white globules appear quite opaque, while the black matrix is as transparent as bottle-glass.

No. 10. is the same substance in a more compact state, the

globules imbedded in the black matrix being as hard, and almost as vitreous, as the obsidian itself. They present, in fact, a mineral resembling pearlstone, each of the spheroids being composed of a double series of rings, of two distinct hues, enclosing a central point, of a lighter colour ; but equally, as in the last specimen, presenting a radiated structure. This is very similar to the appearances familiar to us in the productions of glass-furnaces.

No. 11. presents a variety of colour not often met with among the obsidians of these islands. It is of a dark liver-brown, streaked with black, and contains imbedded masses, which are of a white colour, and have a pumaceous texture.

No. 12. may be denominated pitchstone-lava. It has somewhat of the pearlstone structure, and presents a stratified aspect parallel to the faces of the bed. Its colour is dark ash-grey, mixed with some brownish tinges. It is devoid of the brilliant vitreous aspect of the obsidian, and is more nearly allied to pitchstone, than to any other volcanic product.

No. 13. This specimen was taken from a rock at some distance from the rest. It broke in slaty fragments, like some portions of the pitchstone from Arran. Its texture is vitreous throughout, its colour brown and mottled, bearing traces of the globular structure described in some of the preceding specimens ; while on its surface there is an iridescent tarnish, peculiar, in so far as I remarked, to this variety.

The specimens from Nos. 14. to 23, form a suite of the pumice rocks, all occurring within the space of a few yards, at a quarry situated high up on the hill of Campo Bianco, the great deposit of this mineral at the northern extremity of the island. No. 14. is so light and spongy it floats on water like froth. Nos. 18. and 19. present the most delicate glassy texture, while No. 20. is the variety usually exported as an article of commerce. Its structure is somewhat fibrous, and its filaments have a peculiarly silky aspect. In No. 22. the pumice reassumes a charac-

ter more nearly allied to pitchstone-lava ; and in No. 23. it only occupies a small portion of the mass, presenting a compact vitreous texture, and a light ash-grey colour, exceedingly like a glass-house slag.

The next four are varieties of the compact pumice, which is used on the island as a building-stone,—a purpose for which, on account of its lightness and freedom from humidity, it is peculiarly well adapted.

Nos. 24. and 25. are from the eastern side of the island ; the latter being a portion of what some masons were excavating from the foundation of a house for the construction of its walls. No. 26. is much stratified, and was taken from Monte Gallina, at the southern extremity of the island, as was also No. 27, though greatly dissimilar in structure and appearance.

Nos. 28. and 29. form embedded masses in the Pumice of Campo Bianco, and were picked up along with the greater part of the foregoing. They are evidently of volcanic origin, but that they properly come under the denomination of “Pumice,” admits of some doubt.

No. 30. is termed the *lava* of Monte Gallina. It has a somewhat pumaceous feel and appearance ; is much lighter and more friable than most lavas ; is stratified in a singular manner ; and contains numerous imbedded crystals of felspar.

No. 31. is another very peculiar rock, having little apparent relation to any of the preceding ; evidently of volcanic origin, however, and mottled with small cavities, which are coated with silex.

No. 32. On a small hill immediately above the town of Lipari, there occur, imbedded in clay or decomposed tuff, considerable masses of selenite, confusedly crystallized, stellated and fibrous, of which this is a specimen.

No. 33. Specular iron-ore, occurring in cavities upon Monte Rosse, in which it has been sublimated by the action of heat.

Some of these crystals are extremely beautiful, branching out to the extent of several inches, and frequently presenting the most fantastical shapes.

The remainder of the suite are the productions of the island of Vulcano; most of them having been collected within and around the margin of its crater.

No. 34. is either the obsidian of the year 1775, which DOLOMIEU tells us flowed over the side of the crater in a stream; or that produced during the last eruption in 1786. I found it about half way up the mountain, generally in large broken masses, but in several places also distinctly forming very extensive surfaces. It is the blackest and most vitreous variety on the island, and, judging from the lengthened shape of the cavities interspersed throughout it, must have flowed quickly, and cooled rapidly.

No. 35. is the common variety of obsidian from this locality. It is neither so compact, so translucent, nor so vitreous as the Lipari species, and has much more the aspect of pitchstone, than of obsidian.

No. 36. This is an interesting piece, as exhibiting clearly the gradation between obsidian, pitchstone, and pumice. One portion of it is closely allied to the last specimen, while another has equally near relation to the next.

No. 37. The common pumice of the island of Vulcano, where, however, it is by no means of so fine a quality as in Lipari; and where it is never worked for any commercial or useful purpose.

No. 38. is a variety of the coarse pumice containing an imbedded mass of obsidian. The remaining specimens were all collected within the crater. With one of the men employed in gathering the sulphur, I descended by a rugged and circuitous path, but with comparative ease, about 400 feet into the smoking abyss; and examined its surface with perfect facility.

No. 39. is the kind of porcelain jasper peculiar to this locality, and occurring in great abundance inside the crater.

Nos. 40. to 45. are specimens of the different rocks found in the same situation. Some of them evidently decomposed, and much changed, by the action of heat and acidulous fumes.

Nos. 46. and 47. are specimens of the native sulphur, as it is collected and conveyed to the manufactory. The former is somewhat crystallized ; while the latter presents a fibrous structure, and was taken in a hot state from the mouth of a fumarole. The minute white silky crystals occupying the interstices in the slaggy mass of No. 48. seem to be selenite.

No. 49. is the native alum from this island, disposed in veins of a fibrous structure, and having a shining silky appearance ; and No. 50, is the beautiful white boracic acid, which forms in sublimation on the surface of the sulphur, to the depth of from half an inch to two inches ; and of which variety the crater of Vulcano is the principal locality.