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because he generalises his observations. The following are those which he has transmitted from Cumana respecting the famous Peak de Teyde, called commonly the Peak of Teneriff:—"The Peak of Teyde, which rises to the height of 1964 toises, is an enormous basaltic mountain that seems to rest on dense and secondary calcareous stone. The latter is of the same kind as that found with a great deal of flint at Cape Non in Africa, at Cadiz, in the Channel, in Provence, and on which the basaltés of Saint-Loup near Agde, and that of Portugal, rest. It is thus seen with what uniformity the globe is constructed. The Azores, the Canaries, and the Cape Verd isles, appear to be a continuation of the basaltic rocks of Lisbon."

"The waves thus carry with them, and cast on shore in Africa and Teneriff, granites, syenites, and granitic micaceous schist, which I have seen at Saint-Gothard. It is to be supposed that the high ridge of Mount Atlas, which extends from the East towards the coasts of Morocco, consists of such rocks."

"The basaltés of which the Peak is constructed, is not only basaltés containing foliaceous and crystallised olivin and volcanic chrysolite, but particularly towards the top there are strata of the *porphyroschiefer* of Werner, or of another kind of porphyry with an obsidian base. The *porphyroschiefer* is foliated, sonorous, semi-transparent at the edges, has a very hard green base, and contains crystals of vitreous feld-spar.

[To be continued.]

XIII. *Observations on Ants, and on the Poison of these Insects; with some Hints for destroying them. By M. AMOUREUX jun. M.D.**

THE provident ant, which has been so often quoted as an example of foresight and economy, does not, as has been believed, store up provision; it is only laborious, and collects, indiscriminately, things that are eatable and others that are not; the former to supply it with food for the moment, and

* From *Notice des Insectes de la France repares venimeux*.

the

the latter to be employed as materials necessary for supporting subterraneous galleries and for giving occupation to labourers; for their society, like that of the bees, consists of males and females, and a neutral species, or individuals without sex. It is the latter that are charged with the internal labour, and the care of nourishing the young. The labouring ants are distinguished from the rest by being destitute of wings; they enjoy also a longer life than the males or the females, and they often remain alone with the larvæ in the nest. Ants continue in a state of torpor during the winter; and it may thence be presumed that the articles they store up do not consist of food which they wish to provide to afford them a supply during periods of scarcity. Their granaries are not filled with provisions, since they store up, along with grains of corn, bits of straw and all other small articles which they can find. Naturalists, therefore, have been mistaken respecting this pretended foresight, by ascribing to a laborious insect a manœuvre of which man alone is capable.

The ant is not accounted venomous, yet it is more so than most other insects. There arises from its body an acid vapour which is not perceptible but when they are collected in a large number, as in an ant-hill, or when they are heaped up in a box or bottle, &c. For this reason ants leave traces behind them, by a sort of scorched appearance, on the grass and plants over which they pass and repass in going backwards and forwards from their nests. Gardeners, therefore, have great reason to wish for the discovery of some certain means that might free them from these troublesome guests, which some have supposed to be useful by having seen them attack the small insects which injure the leaves of fruit-trees, and particularly those of the peach. Ants, indeed, are attracted by the melleous liquor shed by some of these insects, and which moistens their bodies, but they do not on that account carry on war against them; in concert with them they destroy the plants and trees, on which they assemble in large bodies.

The ant pinches very strongly with its mouth, which is armed with jaws; it punctures also by means of a sting at its extremity, which is wanting in the males: it can do in-

jury, therefore, three different ways. Swammerdam says that the jaws or forceps of the ant have on each side seven points or small teeth; and Leuenhoek pretends that it emits from its sting small drops of a certain liquor which occasions pain, as is the case with that of the scorpion. Probably it is nothing else than its acid liquor which is caustic.

This insect is very extraordinary, not only on account of its form, but on account of its small size; and being so commonly seen, it has not been examined with sufficient attention. Those who wish to see ants of a gigantic appearance, may inspect the figure given of one by Gundelius Ab Ach, who flattered himself that, in 1687, he had invented a microscope that magnified twice as much as any ever before constructed. The same author has given the figure of a winged ant of the dimensions of eleven inches.

We may consider ourselves happy, that among the small number of species of this insect known in France, which Mr. Geoffroy makes to be only six, there are none of those voracious and destructive kinds so troublesome in the burning climates of Africa, in Egypt, and in South America. A swarm of ants which have lodged in a hollow tree, issue from it on its being in the least shaken, and, like a shower of fire, fall on the unhappy person exposed to their fury. One of our most learned naturalists, going along the banks of the Niger, found himself invested by a sort of red ants which lodge in the icaco-tree. The punctures they made were so venomous, says he, that my face and hands were covered with blisters similar to those arising from burning, the pain of which could be allayed by nothing but a heavy rain, which took place in the evening. The same traveller was pestered in the isle of Gorée by another kind of white ants (*termites*) which gnaw and destroy every thing that comes in their way.

Botanists long ago observed, that when the flowers of fucory were thrown into an ant's nest, their blue colour was changed into red, which is, no doubt, common to the greater part of blue flowers. This phenomenon must at first have excited some surprise, and it was explained, no doubt, according to the physical knowledge of the period; but it was afterwards discovered that this change of colour was owing

to the acid liquor which the ants had shed upon it. This acid spirit was carefully examined by several experiments, an account of which was published in the Philosophical Transactions for the year 1670. M. Tischer appears to have been the first who ascertained the nature of this acid, and this discovery must have appeared the more astonishing, as it was known that animals in general furnished alkali and an urinous spirit.

After this, chemists hastened to analyse ants and the vapours exhaled from them. Homberg extracted from them, by distillation, abundance of acid, and showed it to the Academy of Sciences in 1712. Margraf soon obtained the same acid; but the learned Prussian chemist considered this acid only in regard to its relation and combinations with other chemical substances, and the solutions it is capable of effecting. This acid has a great resemblance to that of radical vinegar, though it does not resemble it in every thing: Neuman first perceived an odorous essential oil, of a peculiar smell, which, however, occasions no burning sensation on the tongue. Margraf obtained the same subtil oil, and another fat oil similar to that of vegetables. M. Thouvenel drew from ants both these oils, and a particular extract; a result of the most complete analysis that ever had been made of these insects.

The late M. Roux, the editor of the *Journal de Medecine*, paid attention also to this object, and by his curious experiments brought to light some facts very little known. For example, if an ant-hill be opened, and a living frog be exposed in it, the animal will die in less than four or five minutes, though it has not been bit by the ants. M. Roux, being employed in collecting ants to fill a bottle, perceived in the evening that his fingers were somewhat hot, that they swelled and became red; next day the epidermis separated from the skin as if he had applied a vesicatory, and his fingers became entirely peeled. It appears also, by M. Roux's experiments, that the acid vapour of ants is capable of suffocating them when they are shut up in a bottle. This may supply some hints for stifling their destructive colonies by carefully closing up the apertures of ant-hills and heaping earth above them. M. Roux mentions also an observation similar to his own, which was

communicated by Baron D'Holbach; he made at the same time some reflections on the nature of the poison of ants, respecting which he would not venture to give a decisive opinion. This prudent modesty in an able chemist may serve us as a lesson.

Messrs. Ardouillon and Oerhne have also made a number of curious experiments on this acid, which they consider as a peculiar kind. It has been admitted into the new chemistry under the name of the *formicine*: it is stronger than the vitriolic acid*, serves for different combinations, and an ether may be obtained from it. M. Thouvenel, who prepared from it the formiate of potash, experienced the same effects from the volatile acid of ants as M. Roux; for, after having collected some of these insects, large vesicles full of serous liquor were formed at the ends of his fingers. This learned chemist made many experiments to ascertain the nature of the acid of ants, and they all convinced him that it differs from the mineral acids as well as from fermented vegetable acid, and that it has every chemical relation to the microcosmic acid†, &c.

M. Cadet junior, and other chemists, found that the volatile alkali destroys ants and neutralises their acid. This, therefore, may afford the means of being preserved from it, or of checking its action on the skin. Olive oil produces the same effect.

Medicine might perhaps derive more advantage than it has hitherto done from the volatile spirit and oil of ants. A bath of ants has been prescribed in cases of the palsy. The water or spirit of magnanimity, and other pharmaceutic compositions, are prepared from ants and their products. They might certainly be employed in vesicatories.

To the above observations I shall add the following fact, recorded in the *Ephemerides* of the curious of Nature for the year 1688†, which will prove the efficacy of ants as a revulsive remedy:—A fuller, who had been long tormented with a pain in his head, and tired of taking medicines with-

* The author, no doubt, means that it will decompose some of the vitriolic salts: in this sense many vegetable acids are stronger than the vitriolic.—EDIT.

† Phosphoric acid.

‡ Dec. 2, obj. 80.

out receiving any benefit from them, resolved to discontinue them, and to bear his sufferings with patience. One day, however, while collecting ants, his hands were excoriated by the acrid liquor of these insects, and he was immediately freed from the pain in his head, which never afterwards returned.

XIV. *Experiments respecting the Influence which Oxygen has on the Germination of Seeds.* By MR. SAUSSURE junior*.

MOST philosophers who have examined the nature of atmospheric air have found, that seeds exposed to water and pure azotic gas do not germinate; that, on the other hand, carbonic acid gas is formed, which mixes with the azotic gas, and increases the atmosphere of the plant. They observed also; that when oxygen gas was employed instead of azot, carbonic acid gas was in the like manner produced, but that the atmosphere was then lessened and the oxygen gas absorbed.

Dr. Rollo†, in the course of his researches respecting the germination of barley, remarked, that the formation of sugar in the grains of barley during the process of germination was the immediate consequence of the action of oxygen gas on the grains, and that, in every case where this action was suppressed, no sugar was formed. From this observation, as well as from the formation of carbonic acid gas in azotic and oxygen gas, he concludes, that oxygen gas is in part absorbed by the barley, but that it in part forms with the carbon of the seeds carbonic acid gas. The sugar which is formed immediately after the germination is, according to him, produced by the union of oxygen gas with the slimy vegetable fermentable matter.

If the quantity of the carbonic acid gas formed in this manner be less than that of the oxygen gas which has disappeared, it is probable that a part of the latter is absorbed by the grain,

* From Scherer's *Allgemeines Journal der Chemie*, No. 7, for January 1800.

† It should be Cruickshank.

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