
II. *On the Poisonous Fishes of the Carribbee Islands.* By
WILLIAM FERGUSON, M. D. F. R. S. EDIN.

(*Read Jan. 18. 1819.*)

THE subject of poisonous fish has long been a source of puzzle and speculation to the inhabitants of the West Indies. Much has been conjectured upon it, and numerous tests and theories been proposed, which have had for a time their believers and advocates ; but all have been found to be equally baseless. The author of this paper, by a narrative of what he has himself seen and observed on the subject, proposes rather to shew to the Society what it is not, than what it actually is, and thereby to clear the way for the future successful investigation of this curious and interesting phenomenon, by dissipating many erroneous notions that stand in the way of the discovery of truth.

Throughout the greater part of the West Indies, the accident of meeting a poisonous fish is a rare and extraordinary occurrence. At Barbadoes, for instance, it happens so seldom, that the majority of even the best informed inhabitants can scarcely be made to believe, that it has ever taken place

amongst them. On the coasts of St Domingo, where I served during the years 1796, 1797, and 1798, and where the British troops, under the scarcity of fresh provisions, always depended much on the sea for subsistence, only two well-authenticated instances of the kind came within my personal observation. Had there been others in the army, it is most probable that I would have heard of them. The nature of the accident, and of the morbid phenomena consequent upon it, was so very similar to what I had much more recent opportunity of witnessing at Guadaloupe, in the year 1815, as to render it unnecessary to trespass on the time of the Society with a detail of both occurrences. I shall therefore proceed to lay before them an account of the last, as being the best within my memory, as well as being officially authenticated by documents that will be referred to in the course of this paper.

Shortly after the last capture of that island, under circumstances much the same as at St Domingo, while the British troops were daily making use, without scruple, of whatever fishes were offered to them in the markets of the island, the Quartermaster-General, attracted by the appearance of a particularly fine horse-eyed cavallo *, purchased it for his family, the members of which, including servants, were numerous (not fewer than twenty). All partook of it, and all, without exception, were taken ill within a few hours afterwards. The symptoms in some were cholera morbus, with florid patches on the skin, not unlike what is seen in phlogistic scarlatina, only the parts affected were more swelled and raised; and, in all, great and most distressing pains over the thinly covered bones, more particularly the bones of the face, with great febrile

* *Harang aux gros yeux* of the French, and *Scomber* of naturalists.

brile disturbance, much painful numbness of the soles of the feet, and more or less of spasmodic twitchings and tremors. All the Negro servants were more severely affected than the white members of the family, and the black cook died from the effects of the poison ; confirming the popular opinion, from the fatality thus falling, as in other instances, upon the blacks, of their constitutions being more amenable to the action of the fish-poison than those of the whites. But it ought here to be remarked, that these last suffered exactly in proportion as they had partaken of the fish, and the General's lady, who had dined almost entirely upon it, felt the effects of the poison for many months afterwards. The numbness of the feet, with the peculiarly painful sensation of the soles, continued for a very long time. . So little danger was apprehended by the inhabitants from the use of this fish, though all of them knew it to be occasionally poisonous, that, two days after the accident, I saw a very large one cut up, and distributed in the market-place amongst a number of purchasers, all of whom treated my interference with merriment, and jeered good humouredly at my warnings against it.

Though the majority of the British Medical Staff had long been resident in the West Indies, the accident in the Quarter-master-General's family was so new to most of them, that we hesitated not to call in the aid of the French Faculty of the place, who prescribed (the necessary evacuations having been premised) the sulphuret of potash in the first instance, in as large and frequent doses as the stomach could bear, and then the saccharine mucilages, in every shape that could be offered ; and this treatment, more particularly that of the saccharine regimen, appeared to be very effectual. It did not appear that the alkaline remedy produced much effect. A very short time after this occurrence, a shoal of the green-backed caval-

loes (a much smaller fish) beset the shores and wharfs of Basseterre, the capital of the island, in such numbers, that they were taken in all kinds of ways by the common people, and an English merchant, attracted by the sight of this fishery, could not resist the temptation of a remarkably fine one, which he purchased for a trifle, and carried home to his family. They were taken ill after eating it, much in the same manner as the Quartermaster-General's, though not so severely*. His lady only had alarming symptoms; but, amongst the many thousands of these fish that had been eaten in the town, this one alone was ascertained to have possessed any poisonous quality. The British Medical Staff was in the closest communication with the French Faculty on the subject, in consequence of the first accident, and if any others had occurred, it is next to impossible that they could have been concealed from us†.

These casualties strongly excited the attention of the Governor-General, Sir JAMES LETH, who directed me to call officially upon all the French Faculty, (some of them men of much knowledge and experience) for information on the subject; and from them we learnt, that sixteen different species of fish had been found more or less poisonous, at different times, in Guadaloupe; but that in all, with one exception (that
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* The fish is, comparatively to the horse-eyed cavallos, a much smaller one, and consequently a small portion only could fall to the share of each member.

† Let it not be here supposed, that this fish-poison bears any analogy to the affections that are sometimes induced upon particular constitutions in this country, from eating some particular kinds of shell-fish. The fish-poison affects all who receive it, as generally, and as certainly, as opium or arsenic. In the year 1797, at Cape Nicholas Mole, in St Domingo, almost every officer in the Army and Navy suffered from it, from eating of one large fish, on the occasion of a garrison dinner, and several of the black domestics died.

of the yellow-billed sprat *), it was so perfectly an accidental occurrence, that it never had been deemed necessary to impose any prohibition, beyond what the fears and experience of the people naturally dictated, more particularly, as the best part of their food was at all times derived from the sea. From their information, however, it was clearly ascertained, that the most dangerous fishes were the small yellow-billed sprat, the baracoota †, and horse-eyed cavallo, which three were forbidden, under penalty of confiscation of the fishing-boats, to be ever exposed for sale; and the other thirteen kinds were directed, under a severe pecuniary penalty, to be gutted as soon as caught, (the black fishermen having expressed much confidence in that precaution) and never to be brought to the markets except in that state. No accident occurred after these regulations were adopted, during the remaining nine months that the British continued in possession of Guadeloupe. From the black fishermen we also obtained the curious information, that the deadly yellow-billed sprat was never poisonous when caught in the immediate Bay of Basseterre, even at the time when it would be almost certainly fatal to eat them if taken at a very short distance on either side of the roadstead, and that, at some seasons of the year, they could be eaten with impunity everywhere; the most dangerous times with them being from the month of April till the end of the summer months. They also amply confirmed, what we had previously taken for granted, that the larger fishes followed and preyed upon them at all times with avidity, and that there was no bait they could use more tempting than the yellow-billed

* *Sardine doré* of the French, and *Clupea Thryssa* of naturalists.

† *La Bechune* of the French, and *Perca major* of naturalists.

billed sprat. Indeed they might be seen by any who would take the trouble to attend to them, selecting from their sprat-nets the yellow-billed for bait, reserving the *balahoo*, a fish not unlike the sprat, but about the size of a pilchard or small herring, and the common white sprats of the same size, caught in the same net, of the same shoal, and on the same ground, for market; which last were never known, under any circumstances, to prove poisonous.

The importance and obscurity of the subject, on which so little light had been obtained from our inquiries at Guadeloupe, called for further investigation, and by direction of Sir JAMES LEITH, I circulated the following queries, amongst the faculty of all the colonies:

“ 1. What fish have you knowledge of, as possessing, when eaten, a poisonous quality, in the West Indies?

“ 2. Were these fishes poisonous in all places and seasons, or only at particular times, and in particular places? Did they prove poisonous to the majority of those who ate them, or only to particular individuals?

“ 3. Did the other fishes inhabiting the same places, exhibit, when eaten, more or less of the same poisonous quality, or was it found in only one or two particular species, or only in one or two individuals of the same species?

“ 4. Can it be ascertained whether any species of food, that fishes incidentally eat, can communicate this poisonous quality?

“ 5. It has been seen, that fishes such as the King Fish *, and the different kinds of cavalloes, can be eaten with safety when

* *Xiphias* of naturalists.

when of the ordinary size, but become sometimes poisonous, when they grow very large. What do you suppose can be the reason of this? Do these fish live on a different kind of food when arrived at this gross state, from what they did when smaller? Does the poisonous quality reside in the fat that has accumulated under the skin? or what is the change induced upon the fish in consequence of his increased bulk, that renders him poisonous?

“ 6. Are not fishes that are found to be poisonous generally in the highest season, and of superior flavour?

“ 7. Has any thing remarkable ever been detected in regard to the liver or other viscera of poisonous fishes, or are there any marks by which they can at all be distinguished from others of healthy quality?

“ 8. Is any faith due to the test of boiling a piece of silver in the same pot with the suspected fish, when cooked; and will not all fishes that abound with dark-coloured fats under the skin, imbue silver, more particularly when long boiled, with a tint of the same? Have not these fishes been eaten with impunity after they had stained the silver that had been used for the above test?

“ 9. Has the existence of copper-ore at the bottom of the sea, so as to constitute what is called a *copper-bank*, in contact with the waters, ever been ascertained; and if ascertained, have the fishes caught there proved more remarkably poisonous than in other places?

“ 10. Do fishes eat any species of marine plants, weeds, or mosses, for food, and can any of those that fishes eat have the effect of rendering them poisonous?

“ 11. Are eels, mud-fish, and other species that live stationary in a great degree, amongst the weeds at the bottom of the

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sea, ever poisonous, or more remarkably so than the other species of fish that prey abroad throughout the waters?

“ 12. The poison of the yellow-billed sprat has been found particularly deadly in the month of May, at the time when, according to the vulgar saying of fishermen, coral is in blossom. Can it be ascertained, what is the food of these fish at that time? What particular species of marine insects abound, and sea plants flourish, at that period, in the places where he inhabits?”

N. B. It is said that the yellow-billed sprat can be eaten with impunity at all seasons, when taken in the road of Basseterre, Guadaloupe.

“ 13. Do not all the larger fishes that are found to be poisonous, prey upon the yellow-billed sprat, in common with any other kind of smaller fish they can master? May not the larger fishes, that prey directly upon the yellow-billed sprats, thereby acquire a highly poisonous quality, or one of less intensity, by preying at a farther remove on those fishes that have done so; or is this disproved, by the fact of the larger fishes of some species only being poisonous, while the smaller of the same kind, that may be supposed to prey more immediately on the yellow-billed sprat, can be eaten with impunity?”

N. B. The poisonous quality of the *Baracoota* is in no respect modified by his size.

“ 14. Fish of the larger kinds are never poisonous at Barbadoes, and some other places. Is the yellow-billed sprat found on these coasts?”

“ 15. Is any credit due to the common opinion, that fish are rendered poisonous by eating the gally fish or stinging blubbers?”

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N. B. These blubbers are found in great quantity at Barbadoes, and abound prodigiously on some of the coasts of Europe, where fish are never known to be poisonous.

“ 16. What are the symptoms of fish-poison? Do they bear any resemblance to those of the poison of copper or other mineral poison, or poison from the vegetable kingdom? Is there any antidote against it that can be used at table, such as oil, lime-juice, vinegar, wine, spirits, or spices, and what are the best remedies and modes of treatment after the poison has taken effect?”

The replies from the majority of even the oldest residents in the West Indies professed total inexperience of the subject, so rare it seems is the accident; but from others of them some valuable information was obtained. From the account of my friend Dr NUGENT of Antigua, it would appear that the yellow-billed sprat is at times the strongest native unprepared poison probably in existence, Negroes having fallen down dead when in the act of eating it, with part of the fish, though a very small one, in their mouths; and the same effect has been produced on a dog, from giving him a single fish to eat. It is even recorded by Dr CHISHOLM of Grenada*, that a white person, having unwarily, when eating sprats, put one of the yellow-billed into his mouth, and immediately spit it out again, when informed of his mistake, without swallowing any portion, but only masticating it, died nevertheless from the effects of the poison. These accounts were confirmed by Mr GRIFFIN, staff-surgeon of St Kitt's, who stated a remarkable

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occurrence

* In the Number for October 1808 of the *Edinburgh Medical and Surgical Journal*.

occurrence of the kind that had lately taken place in that island. Dr OSBORNE of Antigua, by whom all the above was fully admitted, professed, nevertheless, much confidence in the precaution of gutting the fish, and stated an instance of a Creole lady, who would venture to eat the yellow-billed sprat at all times, when she could depend on the fishermen cleaning them out as soon as caught; but this must in all probability have been owing to peculiar idiosyncrasy in the person, as no cleaning out of the fish, however promptly and perfectly performed, rendered them safe to others. It was proven at the same time, by a report from an eminent physician at Martinique, transmitted through Staff-surgeon Woulfe, that not even salting the fish after cleaning it, could at all times do away the poisonous quality; a family in that island having just been severely poisoned by eating a baracoota that had been in salt twenty-four hours. The blacks always profess the utmost dread for the yellow-billed sprat, during the months when, according to their vulgar saying, the coral is in blossom, but at other times they eat them without scruple, and with impunity, giving no other reason but that the season of danger is past. I see no room to doubt of the madreporæ being in particular activity at certain seasons of the year, and that fishermen are more sensible of the growth of coral at these times than at others; but I think there is much reason to doubt of this growth at all affecting the quality of the fish that feed upon the corallines, seeing that Barbadoes, which is a coral formation in all its coasts and shores, is of all the islands in the West Indies, the one, I believe, where poisonous fish are most rarely seen. Besides, it is not on the coasts of coral formation where these animals are commonly found. Antigua may be a partial exception; but their more favourite resort would appear to be the shores of the volcanic islands of the West Indies,

dies, such as the leeward shore of Guadaloupe, immediately under the great Souffriere, where hot boiling springs are found within the high-water mark, or in the channel between the volcanic promontories of St. Kitt and St. Eustatia, where the fish are so remarkably poisonous, that fishermen rarely exercise their trade in that part of the sea. It abounds, I have heard, in a particular manner, with the yellow-billed sprats, and no inhabitant will venture to eat a baracoota or other large fish taken thereabout.

Most of the accounts agreed in what I had myself observed, of the fish that proved poisonous being always in the very best condition, and generally the largest of their species, without marks of disease of any kind in any part of them, and I never heard of a single exception to this, the sufferers having always been induced to eat heartily, from the peculiar excellence of the fish; and all who were capable of examining the subject, were convinced of the inutility and frivolity of the tests usually employed, such as boiling a piece of silver, &c. with the fish, adducing instances where the severest poison had been received when the test declared security, and *vice versa*; the only test hitherto discovered, in the least to be depended on, being that of giving a portion of the fish, the offal in preference, to a cat, a duck, or a pig, and witnessing its effects upon them, before proceeding to make use of it.

The commonly received opinion, too, of copper banks at the bottom of the sea, that is to say, uncovered and insoluble copper ores in contact with the waters, the very existence of which is a most improbable gratuitous supposition, communicating a poisonous quality, such as that found in the yellow-billed sprat, to the wandering fishes that roam in the waters, I need scarcely say to the Society, was refuted and shewn to be impossible; as well as another opinion, almost as general,

that the stinging blubbers (the *Medusæ* and *Holothuriæ*) which we have no reason to suppose that fishes ever eat, communicated the poisonous quality. Another article in the creed of the French Creoles on this subject, viz. that fish were made poisonous by eating the deadly manchineal apples that were carried by the rivers into the sea, was too absurd to be investigated, as its obvious refutation was at once conveyed, in the fact of no poisonous fishes having ever been found in any of the numerous rivers that flowed or stagnated amongst groves of the manchineal tree ; but they believed it from the curious circumstance which induces me to mention their opinion here, of the sea-water being an excellent remedy against the manchineal poison ; and they therefore believed, that from having the remedy so perfectly at hand, the fish could eat with impunity what made him so dangerous an article of food to those who caught him.

From the whole of our inquiry, I think it was established, that no fish, with the exception of the yellow-billed sprat, which, from its small size, is fitted to be the prey of almost every other, could be called regularly or certainly poisonous at any time ; but that with all the rest it was an accidental variety, communicated from some particular kind of food. That in the larger fishes of prey, the poisonous quality most probably arose from their having recently preyed upon the yellow-billed sprat (these fishes being found most frequently poisonous where the yellow-billed sprat abounds), but in all of that description, it would appear to be a transitory quality, communicated to the animal from the food he had just eaten, and passing away soon after its digestion was completed ;—a supposition the less improbable, when we consider the quickness of the process of digestion, that, from the shortness of the alimentary canal, and great size of the liver, must take place in
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these voracious animals. How else are we to account for the fact so often witnessed by ships crews, or in fleets, of two dolphins caught on the same line, the one proving wholesome, the other poisonous ; or, amongst other species, for one or two only of a shoal, caught in the same net, proving dangerous to eat ; or for the chances being so much greater, of falling in with the larger poisonous fishes, where poisonous prey abounds, yet the poisonous quality of the former never being sure or permanent ? I have laid so much to the account of the yellow-billed sprat, that I was long much puzzled to account for well authenticated instances of the larger fishes having more than once, though certainly very rarely, been found poisonous at Barbadoes, on the coasts of which I believe that the yellow-billed sprat is never seen ; and it was not till after I had been a long time in the island, I ascertained beyond all doubt, that the smaller *Jack fish*, a species of the *Perca marina*, well fitted from their size to serve the same purpose of prey to the larger fish as the sprats, were occasionally poisonous in some of the bays at the north-east end of the island.

Could we ascertain what it is that communicates the poisonous quality to the smaller fishes mentioned in this paper, the question, in respect to discovery of cause, might be considered as at rest. The existence of a local marine poison, when eaten by the fish, communicating noxious impregnation, or inherent poisonous quality, in these little animals, may both be inferred and disproved on nearly equal grounds. The first would seem very probable, from the local and temporary nature of the quality in regard to place and season, were it not that the dreadful potency of the impregnation renders it most unlikely that it could be derived from any species of food whatever, or be otherwise than inherent in the fish, to say nothing of its incommunicability, in the case of the yellow-billed sprat,

sprat, to other fishes of the same size and genus, such as the white sprat, which is always found in the same place, and may be supposed to feed in the same way.

The subject is of great importance, for no misfortune can be conceived more terrible, even when death does not ensue, than being served with this undistinguishable poison in the shape of the edible fishes, the best and most delicious, as well as the most common food by far, which the Caribbee islands afford. Most pitiable cases were related to me in the French settlements, by persons worthy of credit, where the patients, after escaping with difficulty, from imminent death, suffered during the rest of their lives all the miseries of exfoliation of the bones with hideous ulcerations, or paralysis, and all its distressing accompaniments; and the same accounts are confirmed by Dr THOMAS, who practised long in the West India colonies, in the 2d edition of his *Practice of Physic*. For these secondary symptoms no adequate remedy could of course be found; but as an antidote to the poison, before it could have time to operate in this baneful manner, there could be no doubt of the astonishing efficacy of sugar, more particularly in the form of the expressed cane juice. This fact was established by a great body of evidence, and to my mind it in some degree explained the curious circumstance of white guests generally escaping better from the fish-poison than their black domestics, at the same entertainment; the former making use of punch, sweet liquors, &c. which seldom fall to the lot of the latter, for we had no clear proof of any spice or seasoning, or vinous or spiritous liquor, that did not contain sugar, possessing any efficacy as an antidote.

I feel that I owe an apology to the Society for having thus offered a paper to their notice, which proves so little ; but the subject belongs to an element into which we cannot enter, and all familiar knowledge of its inhabitants must consequently be impossible.

III.

III. *Account of a Mineral from Orkney.* By THOMAS STEWART TRAILL, M. D. F. R. S. EDIN.

(*Read April 21. 1817.*)

WHILE examining an abandoned lead-mine in the vicinity of Stromness, in the year 1803, I found a mineral which, from its weight and appearance, I supposed to be carbonate of barytes. A few hasty experiments soon convinced me that it was a different substance; but circumstances occurring which prevented a more accurate investigation, the mineral lay neglected among the duplicates of my collection till last autumn, when having mentioned my doubts and conjectures respecting it to my friend Dr MURRAY of Edinburgh, I was strongly urged by that gentleman to undertake its analysis. During his short visit to Liverpool, a few preliminary experiments were begun, from which it appeared, that the mineral contained carbonate of strontia, and I have since completed its chemical examination.

I may here observe, that a specimen having previously been submitted to several very able mineralogists, they were unable, from its external characters, to ascertain its nature; a circumstance which affords a fresh proof of the necessity of uniting chemical investigations to a knowledge of the external appearance of mineral bodies.