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THE

SUGAR INSECT:

"ACARUS SACCHARI,"

FOUND IN RAW SUGAR.

BY

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PHILADELPHIA:

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Fig. 1.

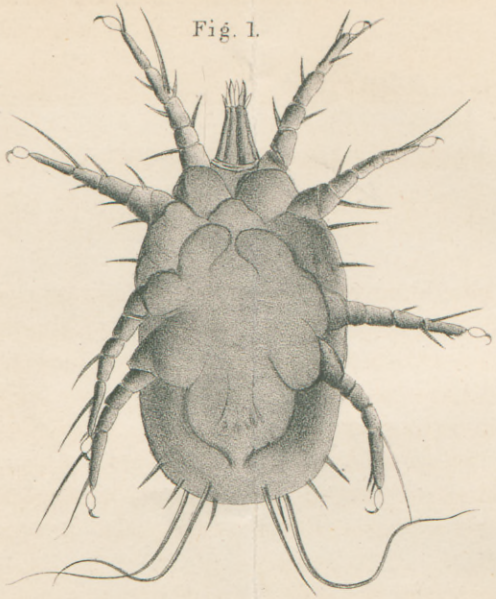
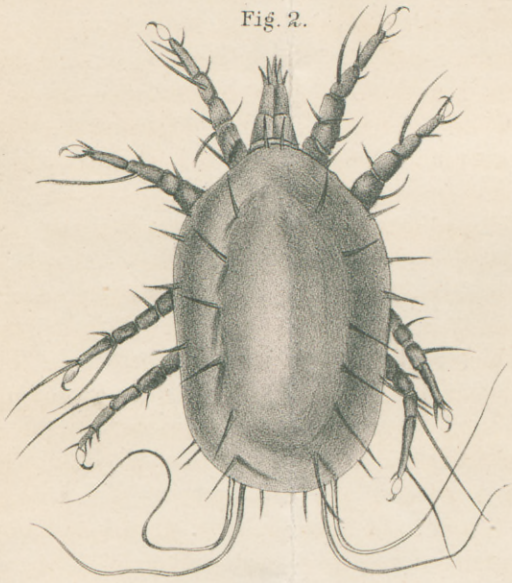


Fig. 2.



DRAWN FROM LIFE FROM INSECTS FOUND IN GROCERY MAURITIUS SUGAR.

By Smith, Beck & Beck, Microscopists, London.

Bowen & C° lith. Phil^a.

The Sugar Insect—"Acarus Sacchari,"

FOUND IN RAW SUGAR.

By ROBERT NICCOL, Esq., Greenock, Scotland.*

RAW sugar should never be used for dietetic or domestic purposes; because it contains organic impurities; and more especially immense numbers of disgusting-looking insects, termed the "Sugar Insect"—found to be invariably present in *raw* or *unrefined* sugar. This insect is known by scientific men as the *Acarus Sacchari;* and when seen by the aid of a microscope, is found very much to resemble the sea-crab in its appearance.—See the accompanying engraving, which represents the insect as magnified to about 200 diameters.

No one, indeed, who has seen the filth and gross impurities extracted from the raw sugar in a refinery, could ever after use anything but the refined article. Pure sugar is, indeed, almost as desirable an article of food as pure water; and all should be anxious to substitute the *refined* for the *raw* material. Bad water and raw sugar abound in animalcules and vegetable impurities; but pure water and refined sugar are free from such. There are many grocers who sell raw sugar under the notion that it is more economical to their customers than the refined article; and the latter parties (unaware of anything to the contrary) readily purchase the commodity under this impression. This is, however, a great mistake, which requires to be at once corrected. The finest qualities of *raw* sugar do invariably contain very gross impurities; but the cheapest kind of *refined* sugar is perfectly pure and wholesome in every respect; and it can be obtained at the grocer's shop at as reasonable a price as the raw material—the refined article being invariably found to be genuine, in so far at least as its purity and wholesome qualities are concerned. This, let it be observed,

* From an Essay on Sugar and Sugar Refining. Edinburgh: Published by Williams & Norgate.

is no mere haphazard assertion; for it is founded on fact: and the writer submits the following in proof of what he now states.

The following are extracts from a pamphlet on the subject by Professor Cameron, of Dublin:—

"In my capacity of public analyst for the city of Dublin, I have had occasion to examine, more or less minutely, nearly one hundred and fifty specimens of sugar in quality varying from the purest white to the darkest brown. The greater number of these samples were perfectly genuine: some were of rather indifferent quality: and the rest—about fifteen—were so impure as to be quite unfit for use: they abounded in organic filth, and contained great numbers of disgusting insects. All the samples of very inferior sugar were of the kind known as raw; and in no instance did I detect in the refined article the slightest trace of any substance injurious to the health or repugnant to the feelings. With such facts as these before me, and writing in the interest of the consumer, I advocate the exclusive use of refined sugar. I unhesitatingly assert that no one who pays any attention to the purity of his food, aware of the nature of the impurities so frequently abounding in the raw article, could, without a feeling of loathing, make use of it. If, then, the exclusive use of sugar be a desideratum, it is not less desirable that those who are engaged in the manufacture of that article should receive due encouragement, consistent, of course, with the principles of free trade, from the governing bodies. But it will hardly be credited by those not well informed on the subject of our national finances, that the present method of levying the duty upon sugar is *needlessly* inimical to the British refiner. It is so arranged that it obliges the planter to attempt, under the most adverse conditions, the refinement of sugar: it compels the British refiner to purchase the semi-purified article, and to undo all that the colonial refiner had done; and, finally, it makes the low class sugar consumed by the poorer classes pay more duty, in proportion to the pure sugar present, than the superior article which is purchased by the middle and upper classes. The use of raw sugar is rapidly on the decline and I venture to hope that the publication of this little treatise will aid to utterly extinguish it. Should its pages be glanced over by any influential member of the Legislature, I trust it may be the means of inducing him to turn his attention to the present anomalous method of levying the sugar duty, with a view to its early reformation.

"The insects found in sugar are Beetles and *Acari*, or mites. The

beetles, which are more familiarly known to the sugar dealers than to the general public, may frequently be seen running nimbly along the tables in the sugar warerooms. The *Acari* are minute insects, and do not attract attention. There are several kinds of *Acari*: the cheese mite, the insect found in partially decomposed flour, and the minute parasite, which, by burrowing beneath the skin, produces the disease termed the itch—are all different varieties of *Acari*. The mite found in raw sugar is termed the *Acarus sacchari*, or Sugar Insect: its shape is very accurately shown in the accompanying engravings—Fig. 1 representing the under side, and Fig. 2 the upper side of the insect.*

"The *Acarus sacchari* is a formidably organized, exceedingly lively, and decidedly ugly, little animal. From its oval-shaped body, stretches forth a proboscis terminating in a kind of scissors, with which it seizes upon its food. Its organs of locomotion consist of eight legs, each jointed and furnished at its extremity with a hook. In the sugar, its movements from one place to another are necessarily very slow, but when placed on a perfectly clean and dry surface, it moves along with great rapidity. It has been stated that the *Acarus scabiei*, or itch insect, possesses the power of leaping, but all my attempts to induce the *Acarus sacchari* to make a jump failed, although it was placed in the most favorable positions for the performance of such a feat.

"The disease termed *psora*, or *scabies* by medical men, but more popularly known by the expressive designation of the 'itch,' is, I venture to hope, only known by name to my readers. It is, I admit, not a nice theme to discourse upon, more especially in connection with such a subject as sugar; but as this malady and its cause are intimately connected with my objection to the use of raw sugar as food, I cannot avoid—even at the risk of offending the sensibilities of some of my readers—alluding to them. So early as the twelfth century, an Arabian physician, named Abinzoar, observed that a skin disease was produced by the ravages of little insects. They burrowed, he says, beneath the skin of the hands, legs and feet, and produced pustles, containing fluid. From the description of these insects given by Abinzoar, it is quite evident that they were not 'little lice,' as he terms them, but species of mite, or *Acarus*.

* For this engraving of the sugar insect the author is much indebted to Alfred Fryer, Esq., of the well known firm of Fryer, Benson & Forster, sugar refiners, Manchester.

The same kind of insect was noticed some centuries afterwards by many distinguished physicians and naturalists, one of whom, named Bonomo, described it by the aid of a drawing, in the year 1683. The itch, then, is proved to be produced by this *Acarus* making burrows beneath the skin, and depositing therein its eggs; and hence the insect has been named the *Acarus scabiei*, or scab mite. Mange in horses, cattle and dogs, and scab in sheep, are essentially the same disease as itch in man. As a general rule the persons most liable to be preyed upon by the *Acarus scabiei* belong to the lower classes—in fact, are members of the 'great unwashed' family: the disease is very rare amongst the middle and upper ranks, and, indeed, wherever the abundant use of soap and of clean linen prevails. Now, it is a note-worthy fact, that grocers' assistants and sugar warehouse-men are peculiarly liable to a kind of itch which affects their hands and wrists, but does not extend to any other part. These persons are usually of cleanly habits, and do not belong to the classes amongst whom the ordinary itch is so prevalent; there is, therefore, but one way of accounting for their tendency to contract that disease—namely, that the *Acarus sacchari*, having, like its congener, the *Acarus scabiei*, burrowing propensities, bores into their skin, and breeds there. The two kinds of *Acari* resemble each other very closely,* but the sugar insect appears to be the larger and more formidable. So common is this pustulous disease amongst persons engaged in the 'handling' (*i. e.* mixing) of sugar, that it has been termed the 'grocer's itch;' but I doubt very much that it differs in any specific respect from the ordinary variety of that nasty complaint. My colleague, Dr. Symes, surgeon to Dr. Steevens' Hospital, assures me that persons suffering from 'grocer's itch' are always to be found amongst the extern patients treated at that institution.

The number of *Acari* found in raw sugar is sometimes exceedingly great, and in no instance is the article quite free from either the insects or their ova (eggs). Dr. Hassall (who was the first to notice their general occurrence in the raw sugar sold in London,) found them in a living state in no fewer than 69 out of 72 samples. He did not detect them in a single specimen of refined sugar. The results of my examination of the sugar sold in Dublin coincided pretty closely with Dr. Hassall's experience. In the refined sorts, I found nothing but crystalizable and non-crystalizable sugar, and

* By some authorities they are considered to be identical.

a little saline matter; in the raw kinds, organic and mineral filth—often in great abundance. One of the samples which I examined, contained a larger number of insects than I believe had previously been noticed, or at least recorded, by any other observer. It was sent to me, together with other articles, in May last (1863), by Mr. Horner, the master of the South Dublin Union Workhouse, and the following is the report which I made upon it: I have rarely examined a more inferior sample of sugar; it is extremely damp, contains a very large proportion of treacle, and a considerable amount of such impurities as sporules of a fungus, particles of cane, albumen, and starch granules. These substances, however, though greatly detracting from the value of the sugar, are not injurious to health. I cannot say as much for another impurity which exists in great abundance in this sample—namely, a species of *Acarus*, closely resembling in appearance and nature the insect which, by burrowing into the skin, produces the itch. It is no exaggeration to affirm that there cannot be less than 100,000 of these insects in every pound of this sugar. In ten grains weight, I estimated no fewer than 500, most of which were so large as to be distinctly visible to the naked eye. It is inconceivable that thousands of these creatures can be introduced into the stomach of a human being without serious endangerment to health. But not only is such sugar as this sample detrimental to health, it is also the least economical kind which can be employed. It greatly impairs the flavor of tea and coffee; and its high proportion of water and other useless ingredients lowers its sweetening power to an extent which even its low price fails to compensate for. Many persons believe that coarse brown sugar sweetens better, or, to use the common phrase, "goes farther' than white sugar; but that is a mistake. A tea-spoonful of damp brown sugar will certainly sweeten a larger quantity of fluid than a spoonful of white sugar; but it does so because it is much heavier than the latter; but if equal weights be used it will be found that the white variety is by far the better sweetener. *The kind of sugar which is both healthful and economical is the dry, large grained, and light colored variety.* If you cannot obtain such an article, you should purchase the lightest brown kind; and bear in mind that such sugar as I have examined for you is the most inimical to health, and the least value for your money which you could possibly get.

"The publication of the foregoing report in the newspapers

excited considerable interest in the public mind; for, excepting a few scientific men, no one in Dublin appeared to have been previously aware of the existence of the *Acarus sacchari*. The assertion that one pound weight of raw sugar contained a hundred thousand active insects, must, no doubt, have appeared incredible to some people; but that I was not guilty of exaggerating the number was proved by the results of subsequent examinations made by other observers. A committee of microscopists, composed of Drs. Aldridge, Minchin, Symes and Booth, and Mr. Reynolds, visited the workhouse, and, in the presence of his officials, examined the sugar and satisfied themselves that my account of it was, in every respect, an accurate one. Two samples of the sugar were also examined, one by Dr. John Barker, Curator of the Royal College of Surgeons, Ireland, the other by Dr. Hassall, of London, a very eminent authority upon the subject. In fifteen grains weight, Dr. Hassall found considerably over 100 living insects, or at the rate of 42,000 per pound; and Dr. Barker estimated no fewer than 1,400 in forty-five grains weight, or at the rate of 268,000 *Acari* in each pound weight of sugar.

"With the exception of the date sugar made in the East,* every kind of raw sugar contains *Acari*. They are least numerous in the very damp, treacley kinds, because, as they are air-breathing animals, they cannot exist in treacle or water. If a spoonful of raw sugar be dissolved in a wine-glass full of water, the animalcules will speedily come to the surface, from which they may be skimmed off and transferred to the object-glass of the microscope. On the surface of the water they appear as white specks, and as they swim about vigorously, their movements are quite apparent to the naked eye.

"The *Acari sacchari* do not occur in refined sugar of any quality for the following reasons:—Firstly, because they cannot pass through the charcoal filters of the refinery; secondly, because refined sugar does not contain any nitrogenous substance (such as albumen) upon which they could feed—and I have already shown that even the most insignificant animals cannot subsist solely upon sugar, or upon any other kind of food destitute of nitrogen. The only impurity found, and that rarely, in refined sugar, is a trace of iron; its origin is easily explained: At the refinery, the sugar,

* The date sugar, which is free from *Acari*, is practically a refined kind; its crystals having been repeatedly "clayed," or washed with water.

after its solution in water has been effected, is sometimes put into iron cisterns, where it remains until filters are ready for its reception. If, through negligence, the solution is allowed to remain too long in contact with the iron, it is certain to dissolve a minute portion of the metal, from which its subsequent treatment fails to entirely separate it. When iron in solution is brought into contact with the body termed *tannic acid*, the two combine and form a black substance, which is the basis of most kinds of black ink. Tannic acid is a natural ingredient of tea; if, therefore, sugar containing iron be dissolved in an infusion of tea, the fluid will instantly acquire an inky hue. The presence of a small quantity of iron in sugar does not in the slightest degree injure its nutritive or healthful qualities; still as tea resembling ink in *appearance*, however agreeable to the palate, would be displeasing to the eye, sugar which would thus affect its color is unfitted for domestic use.

"Would any one, with the slightest pretension to cleanly notions, drink stagnant water if he could as easily obtain the element pure and sparkling from the fountain? May I not add, is there any one so indifferent as to the purity of his food, who would consume raw sugar, *knowing* it to be teeming with disgusting forms of animal life, if the pure article were as readily obtainable? The sanitary reformers have clearly proved that the health of a community is, to a great extent, dependent upon the quality of the water they drink; and the public at large accept the results of the philosopher's reasoning. At the present moment the citizen's of Dublin are heavily increasing their already ponderous load of taxation for the purpose of obtaining an abundant supply of pure water. The water which the citizens of Dublin at present use is considered unwholesome, because it contains low forms of vegetable life, and abounds in animalcules; and these are just the kind of impurities which exist—but in immensely greater quantities—in raw sugar. Is it not, therefore, but rational that if we substitute the pellucid water of the Vartry for the stagnant fluid of the canals, we should for the same reason reject the filthy raw sugar, and supply its place with the purified products of the refiner? The parallelism, in a sanitary point of view, between bad water and raw sugar is complete: it is equally so between pure water and refined sugar."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