

## LETTERS TO THE EDITOR.

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**The Extirpation of the Tsetse-fly: a Correction and a Suggestion.**

IN my letter published in NATURE of October 25 on the breeding haunts of the tsetse-fly discovered by Dr. Bagshawe, I stated that there were no banana plantations on the deserted island of Kimmi, on the Victoria Nyanza, and suggested that the flies there must have some other breeding-places than the plantations. I am informed, however, by my friend and colleague Lieut. A. C. H. Gray, R.A.M.C., who has just started for Uganda, that he and the late Lieut. F. M. G. Tulloch, when collecting flies on Kimmi, came across deserted banana plantations, overgrown by the forest and bearing ripe bananas (a sure sign that no natives visit them or know of them). I must correct, therefore, my former statement.

If the banana plantations should prove to be the sole or principal breeding-place of the tsetse-fly, the question at once arises, what means could be taken to exterminate the fly or check its increase? To destroy the plantations would be impossible, as I have said, because the banana is the staple food of the country. I venture to suggest that an efficient means of keeping down the tsetse-fly would be to encourage or constrain the natives to keep fowls in their plantations in places where the fly is abundant. These birds would scratch up and discover the pupæ much quicker than a man could, and would probably devour them greedily when found. In forest districts it might be seriously considered whether it would not be advisable to introduce the Indian jungle-fowl for the same purpose. It is, of course, always a risky thing to introduce exotic wild species into a country, but the jungle-fowl, being a valuable game-bird, could hardly be a serious nuisance, however much it multiplied.

I would suggest, further, that a most suitable place in which to try experiments on the extirpation of the fly would be the island of Kimmi already mentioned. Within easy reach of Entebbe, uninhabited, covered with forest or jungle, and swarming with tsetse-flies, it is a locality in which it would be very easy to introduce the jungle-fowl and to watch the effects. As there are no monkeys, so far as I am aware, on the island, the fowl would probably be able to flourish and multiply unchecked. Such an experiment, even if it failed to produce the desired effect, could do no harm, and if it succeeded would be of very great importance.

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Lister Institute of Preventive Medicine, November 2.

**The Efficiency of the Present Process of Natural Indigo Manufacture.**

IN NATURE of September 20 (vol. lxxiv., p. 526) I find mention of a paper read before Section B at the recent meeting of the British Association by Mr. W. Popplewell Bloxam, on a new method of determining indigotin. It is stated that "the author concludes that the present process of manufacture is a wasteful one, the highest efficiency attained not reaching 50 per cent., whilst on the average only 25 per cent. of the indigotin in the leaves is extracted."

In justice to the indigo-planting community in India, I think this statement should not go unchallenged. The grounds on which Mr. Bloxam draws his conclusion are not given in the brief *resumé* of his paper in NATURE, and I am therefore obliged to seek an explanation in his communication to the Journal of the Society of Chemical Industry of August 15 on the same subject, in which a similar statement of the low efficiency of the indigo-manufacturing process is made. In this paper Mr. Bloxam gives the analysis obtained by his new method of the indigo turned out each day during the manufacturing season at a certain factory in Bihar. From the figure so obtained, and the total daily outturn of finished indigo recorded in the factory

"mahai" book, he calculates the amount of indigotin produced day by day, and from the proportion existing between the amount so calculated and the amount theoretically obtainable, deduced from the weight of green plant placed in the vat and the assumption that this plant contains 0.6 per cent. of indigotin, he arrives at his estimate of the efficiency of the manufacturing process.

Now it is clear that in this method of calculation error may occur in the following particulars:—

(1) The analysis of the finished indigo.

(2) The weighment of the daily outturn of finished product.

(3) The weighment of the green plant.

(4) The assumed content of indigotin in the green plant.

The first point is one for discussion elsewhere. It is sufficient for my present purpose to point out that the average of Mr. Bloxam's results (60 per cent. indigotin) agrees substantially with the average quality usually accepted as typical of Bihar indigos, and that, therefore, his results probably do not differ very widely from the truth. The same cannot be said of the second point. Separate weighment is hardly ever made of the daily outturn of an indigo factory, and I know as a fact that this was not done in the case on which Mr. Bloxam bases his figures. A rough estimate of the outturn is arrived at by measurement of the cakes produced in a wet condition, and the result obtained generally falls short of the actual production by 10 per cent. to 30 per cent. Mr. Bloxam must therefore have obtained his figures from cake measurement—at best a very inaccurate proceeding.

Similar inaccuracies occur in the weighment of the green plant in the ordinary factory routine; but the culminating error on which Mr. Bloxam's figures are based occurs in his assumption of 0.6 per cent. as the amount of indigotin occurring in the green plant. It has been my privilege to serve the indigo planters in Bihar in a scientific capacity for nearly five years. During this time I have carried out some hundreds of analyses of indigo plants of all varieties, ages, and sizes, and in only one or two cases has so high an indigotin content as Mr. Bloxam assumes is normal been recorded. These were in cases of the Java plant (*Ind. arrecta*, which contains an exceptional amount of indigotin, and was only being cultivated on a small scale during the season from which Mr. Bloxam's conclusions are drawn) under peculiar conditions of manuring. It would be more accurate to place the average indigotin content of the plant used during the season quoted by Mr. Bloxam at 0.3 per cent., so that his estimate of the efficiency of the manufacturing process should be doubled.

As a matter of fact, recent work, carried out with attention to the details I have enumerated, has shown that the process may with care, but with no modification other than is available to every planter, be rendered as efficient as 70 per cent. to 80 per cent., and that as it is carried out by the average planter it seldom falls below 60 per cent.

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October 10.

**The Leonid Meteors.**

THOUGH the Leonid epoch of 1905 does not seem to have been marked by a great abundance of shooting stars, a magnificent aurora having unexpectedly taken the place on the evening of November 15 of the shower anticipated later on that night, yet it is probable that in the absence of moonlight and cloud the radiant in Leo would have been found to be more active than seemed to be the case. The phase of the moon renders the conditions for good observations more favourable in the present year, and it is probable that if the weather during the critical period turns out fine, Leonids will be observed in considerable numbers. In 1906 these meteors become due on the night of November 15. The anticipated display is connected by the nineteen-year period with the shower of November 14, 1868, and, like the latter, will be visible over both Europe and America. As calculated by the writer, the principal maxima take place on November 15 at 12h. 45m., 14h., 19h., and 21h. 40m., G.M.T. These maxima will therefore occur on the morning of November 16, the first two being visible here, while the remaining two, which repre-