

style, and the introduction of numerous carefully executed maps and illustrations wherever opportunity is offered by the text.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications. The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

Soldiers' Rations

In your issue for June 28 (p. 158) Mr. H. Baden Pritchard states in his article on "Soldiers' Rations," "And yet, as we have said, with this apparently liberal feeding, our men do not receive so much actual nourishment, or nitrogenous matter, as the German soldier."

My calculations, based on Prof. Parkes' table of soldiers' rations, and Prof. Frankland's experiments on food and urea, give the following values of the several soldiers' rations:—

	Foot tons.
1. English Military Prison	4,509
2. English Soldier (Home)	3,964
3. Prussian ,, (War)	3,812
4. French ,, (China)	3,683
5. French ,, (Home)	3,580
6. French ,, (War)	3,538
7. Austrian ,, (Home)	3,242
8. Prussian ,, (on the march)	3,223
Mean	3,694

As the average daily external work of a man is 353¹/₇₅ foot tons, the efficiency of man regarded as a heat engine is 9.6 per cent. of the internal work.

An efficiency of 8.2 per cent. can be obtained by engines working at 40 lbs. pressure and steam cut off at half stroke; so that man regarded as a machine, does not occupy a very high position. The explanation of this is, that man is not a machine; he is a machine maker. The mechanism of a cat or beetle is vastly higher than that of man, and yet they are immeasurably his inferiors.

SAML. HAUGHTON

Trinity College, Dublin, July 7

Printing and Calico Printing

In your article on the Caxton Exhibition last week, there is the remark that the beauty of execution in the specimens preserved to us of the work of the earliest known printers suggests a doubt whether the date of the actual invention must not be pushed back farther than the accepted one. But does that follow? Is not the beauty of the first printing simply the beauty of the wood engraving of the time? an art which had attained an exquisite perfection before its application to movable type.

That there should be doubt and obscurity as to the date, name, and claim of the first inventor can surprise no one who will ask himself who, for instance, was the inventor of our present mode of calico printing by roller; and, if he cannot answer, shall turn, as he has every right to do, to the current issue, ninth edition, of the "Encyclopædia Britannica" for the satisfaction of his doubt. He will find there, in that long, elaborate, and amply-illustrated article, not the bare mention of the name, even (unless I have strangely missed what I expressly looked for) of the otherwise remarkable man who conceived the idea, mechanically wrought it out for his own immediate purpose, and himself elaborated its application to the printing of calicoes—revolutionising that important branch of our industry—all well within the lifetime of men not half a century old among us! The Rev. Isaac Taylor—turning a moment from his own researches into the Etruscan mystery—should be able to tell us in what precise year it was, after 1840, that his father, Isaac Taylor, the author of the "Natural History of Enthusiasm," and a long series of subsequent works, sufficient alone for a reputation of a high and lasting order—a teacher of teachers, the

¹ "Animal Mechanics," p. 62.

depth and extent of whose influence and the fulness of whose intellectual stature have not yet been adequately recognised—engraved on the roller illustrations for his new translation of Josephus, undertaken in connection with Dr. Traill. The death of his fellow-worker cut short that enterprise, but a portion of the work appeared; and I myself, as a boy, was often in the little private workshop at Stanford Rives while this idea was struggling on the turning-lathe, through the patient genius of its author, for mechanical existence. In 1855 or 1856 I found him superintending its actual application to the printing of calicoes at Manchester. The discovery received the immediate and inevitable compliment of piracy, and brought to him and his loss instead of gain. But that within five-and-twenty years his very name should seem to have wholly dropped away from what was undoubtedly his own unaided invention, and one withal of so much national importance, and in an age of lime-light publicity like ours, is almost a curiosity of injustice, and throws, as I have said, a flood of light on a crowd of similar miscarriages in the indifferent past. As a hundred years hence this also may be beyond remedy, kindly assist me to arrest a moment the remorseless tooth of All-Father Time by the insertion of this contemporary note.

HENRY CEAL

Breigner, Bournemouth, July 9

Stamping out Noxious Insect Life

THE subject of insect and germ life in its relation to putrefaction and infectious disease is now assuming such importance from the investigations and demonstrations of Dr. Tyndall, Mr. Murray, and other scientific inquirers, that I think you may consider the following curious facts not unworthy of space in your journal.

I observe in a report of Dr. Tyndall's lecture on Germs, in NATURE, he refers particularly to the varying tenacity of life which germs under certain conditions exhibit, and which he refers to the period of incubation or stage of development up to the state of emergence as complete organisms, when they are readily destroyed. He says: "We now turn to another aspect of the question; following the plain indications of the germ theory of putrefaction, we sterilise in five minutes the very infusions which, a moment ago, were described as resisting five hours' boiling. The germs are indurated and resistant, the adult organisms which spring from them are plastic and sensitive in the extreme. The gravest error ever committed by biological writers on this question consists in the confounding of the germ and its offspring. The active bacteria developed from those obstinate germs are destroyed at a temperature of 140° Fahr. Let us reflect upon these facts. For all known germs there exists a period of incubation, during which they prepare themselves for emergence as the finished organisms, which have been proved so sensitive to heat. If, during this period, and well within it, the infusion be boiled for the fraction of a minute, even before the boiling point is reached at all, the softened germs which are then approaching their phase of final development will be destroyed. Repeating the process of heating every ten or twelve hours, each successive heating will destroy the germs then softened, until after a sufficient number of heatings the last living germ will disappear. If properly followed out the method of sterilisation here described is infallible; a temperature, moreover, far below the boiling-point suffices for sterilisation."

Now as the laws of nature apply to all magnitudes alike, whether it be a grain of sand or the planet Jupiter, to the various stages of incubation of the germs of bacteria or of noxious insect life, I think I may claim some credit for having stumbled upon, and for having applied on a practical and large scale, a system for eradicating insect life in animals based on this law of varying tenacity of life in germs and insects. More than two years ago I advocated this system, and in September last issued a circular, in which I stated that "a short time after clip-day I dipped, by immersion, the young lambs, and I repeated the same before harvest; at the same time I made a long narrow pen alongside the stackyard fencing, into which I crammed all my old sheep as close together as possible. I then, with an ordinary watering-pan, watered them all over with diluted fluid; the latter operation was completed in half an hour, and the cost in material was less than one halfpenny per head, the proportions in both cases being 1 to 100. Now for results! I lately minutely examined the whole of my sheep, for the purpose of deciding if it was necessary to give them a final dressing before October, and I can now frankly, and without