

of this juice stuck to the ant, which became so affected by it that it rolled down from the leaf. The conclusion drawn from this experiment was that milk juice is, wherever it is found, protective against ants, and keeps them away from the plants.

"It is easily understood that it is unallowable to draw such general conclusions from facts so uncertain and which prove so little. Before such a conclusion could be drawn, we ought to find answers to the following questions:

"1. Are the ants kept away from the plant by the milk juice?

"2. How much damage would the ants make, and how would they eventually make it?

"3. Is this damage so extensive that it would be in proportion to the energy used in producing the milk juice?

"4. Is the milk juice produced for a certain purpose, or is it only an inevitable by-product of metabolism?

"5. Does the milk juice of *Sonchus* serve for other purposes?

"6. Is the milk juice not serving for different purposes in the different plants?

"To give an answer to these questions would take years of study; therefore, it is easier to draw conclusions from the observations made in a few minutes, by means of imagination. The importance of imagination to the investigator is not to be underestimated, but critical consideration must separate out the chaff. However, it occurs to me that he who looks round, at present, in the science of plant biology, will find more chaff than grains."

This is another reason why biology should not replace physiology. It is pleasing to know that excellent biological theories have been established by Darwin, Bütschli, Schimper, Schwendener, Haberlandt, Mueller, Moeller, Lundström, Warming, Delpino and many others, and the most important facts put on record by such men as Trelease, Robertson, and many Europeans; but outside of flower-biology a great deal of the work done—especially when the facts have been arranged in order to prove a theory made beforehand—cannot stand close inspection.

LETTERS TO THE EDITOR.

* * * Correspondents are requested to be as brief as possible. The writer's name is in all cases required as a proof of good faith.

On request in advance, one hundred copies of the number containing his communication will be furnished free to any correspondent.

The editor will be glad to publish any queries consonant with the character of the journal.

THE IMAGINARY RACE OF CANSTADT OR NEANDERTHAL.

Dr. D. G. BRINTON, in his "Current Notes on Anthropology"—XXII (*Science*, Feb. 10, 1893), has given a brief summary of what has been said about the skulls of Canstadt and Neanderthal at the twenty-third meeting of the German Anthropological Association at Ulm (August, 1892). According to this summary, many facts allied by von Holder, Virchow, Kollman and Fraas, show that the skull of Canstadt, in all probability, belongs to the fourth or fifth century, A.D., and that the Neanderthal skull is hardly more ancient. In short, the human race of the quaternary period, described by de Quatrefages and Hamy, has never existed,—it is an "imaginary race," and "it should be recognized, once for all, that there is no sort of foundation for these scientific dreams."

Mr. Henry W. Haynes has answered to two points of Dr. Brinton's article (*Science*, Feb. 24, 1893). This answer was followed by Dr. Brinton's reply (*Science*, March 10, 1893). Finally, Mr. E. W. Claypole (*Science*, April 7, 1893) has sent a short note in answer to Dr. Brinton.

In their answers, Mr. Henry W. Haynes and Mr. E. W. Claypole have discussed the historical aspect of the question, but the main point has not been handled. This will be my aim.

According to the explanations given in 1867, 1872 and 1892, by Dr. von Holder, Dr. Fraas of Stuttgart, and Virchow, it is stated that the Canstadt skull has no date.

Be it so, I do not object.

According to the statements of the same German anthropologists, Dr. Fullroth's relation concerning the skulls of Neanderthal discovery is false, and it is by no means demonstrated that this celebrated skull is a fossil one, but, on the contrary, it has probably belonged to a Frank.

Be it so, if you like; I can agree with it.

But I cannot agree with Dr. von Holder concluding: "Die Rasse von Canstadt ist also meiner Ansicht nach ein Phantasiegebilde wenn ich so sagen darf, in vielleicht eben so hohen Maasse wie die schönen Gedanken es sind, die über den Neanderthaler Fund in die Oeffentlichkeit gedrungen sind"—and I must protest against Dr. Fraas's like conclusions: "Wir dürfen füglich die Cannstatter Rasse für immer zur Ruhe legen, und hoffen dass sie nicht mehr auferstehe, die Geister zu beunruhigen."

I may forsake to the anthropologists of the Congress at Ulm the skull of Canstadt, and, perhaps, the skull of Neanderthal; but the fossil human race of Europe—which we are speaking about—has not been established *over those two documents only*. There are, further, the fossil bones or skulls of Staegenaes (Sweden); of La Denise (France); of L'Olmo (Italy); of Eguisheim (Germany); of Clichy (France); of Brüx (Bohemia); of Schipka (Moravia); of Tilbury docks (London); of Arcy (France); of Gourdan (France); of Malarmand (France); of Goyet (Belgium); of La Naulette (Belgium); of Spy (Belgium).

The Congress of Ulm has forgotten all those, and discussed the skulls of Canstadt and Neanderthal only, *as if the fossil race of our ancient European ancestors were personified in these two skulls*.

People certainly know that de Quatrefages and Hamy have given to every one of the pre-historic races they established a name recalling the most ancient or the most celebrated locality where were found human remains reported to one of those types. The names "race of Canstadt," "race of Cro-Magnon," "race of Furfooz," have no other meaning for those anthropologists, and must not have any other signification for ourselves.

Logically, therefore, M. Virchow, von Holder and Fraas could only conclude "that de Quatrefages and Hamy had been unlucky by choosing precisely Neanderthal and Canstadt in order to christen that race." They could affirm nothing more.

Before being empowered to conclude that there is no fossil human race presenting the type of the Canstadt's or Neanderthal's skull, they ought to have examined every other discovery and demonstrated that those discoveries were of no more value than the one of Canstadt or Neanderthal. Then only they could rightly call that race a "Phantasiegebilde." But they did not.

I do not wish to examine by myself every one of the discoveries I have quoted, and to discuss their value. I will only examine the human remains of Spy—having been an actor by their discovery and author of their description. For seven years I have been now busy with the study of these remains.

One of the discoverers, Professor Max Lohest, will show in a forthcoming issue of *Science* the geological value of the human remains found at Spy; and I myself will endeavor, in my following letters, to show the anthropological signification of those remains.

American readers will then be able to decide if this ancient race, established by de Quatrefages and Hamy, is an "imaginary" one and a "Phantasiegebilde" or not.

JULIEN FRAIPONT.