

ERASMUS DARWIN AND BENJAMIN FRANKLIN

EXTRACTS from two previously unpublished letters from Erasmus Darwin to Benjamin Franklin appeared in *SCIENCE*, June 2, 1916. Concerning one of these letters, Dr. L. Hussakof, the author of the article in which they appeared, wrote:

It is addressed simply: "Dr. Franklin, America," and opens in the grandiloquent style of the time (1787) as follows:

"*Dear Sir*, Whilst I am writing to a Philosopher & a Friend, I can scarcely forget that I am also writing to the greatest Statesman of the present, or perhaps of any century. . . ."

The following paragraph from Anna Seward's "Memoirs of the Life of Dr. Darwin," which appeared in 1804, throws an interesting sidelight on this letter:

In allusion to (his) perpetual travelling, a gentleman once humorously directed a letter, "Dr. Darwin, upon the road." When himself wrote to Dr. Franklin, complimenting him on having united philosophy to modern science, he directed his letter merely thus, "Dr. Franklin, America"; and said he felt inclined to make a still more flattering superscription. "Dr. Franklin, the World." His letter reached the sage, who first disarmed the lightning of its fatal power, for the answer to it arrived, and was shown in the Darwinian circles; in which had been questioned the likelihood of Dr. Franklin ever receiving a letter of such general superscription as the whole western empire. Its safe arrival was amongst the triumphs of genius combined with exertion, "they make the world their country."

The other hitherto unpublished letter Dr. Hussakof says is "remarkable chiefly for one sentence near the end, which contains the amazing information that even as far back as that (1772), someone was puzzling over the idea of making a phonograph. 'I have heard,' writes Dr. Darwin, 'of somebody that attempted to make a speaking machine, pray was there any Truth in any such Reports?'"

Charles Darwin in Krause's "Life of Erasmus Darwin" (p. 120), says that a speaking machine was a favorite idea of his grandfather and for this end he invented a phonetic alphabet. Erasmus Darwin himself says in his "Temple of Nature" (1802), note No. 15:

I have treated with greater confidence on the formation of articulate sounds, as I many years ago gave considerable attention to this subject for the purpose of improving shorthand; at that time I contrived a wooden mouth with lips of soft leather, and with a valve over the back part of it for nostrils, both which could be quickly opened or closed by the pressure of the fingers, the vocality was given by a silk ribbon about an inch long and a quarter of an inch wide stretched between two bits of smooth wood a little hollowed; so that when a gentle current of air from bellows was blown on the edge of the ribbon, it gave an agreeable tone, as it vibrated between the wooden sides, much like a human voice. This head pronounced the *p*, *b*, *m*, and the vowel *a*, with so great nicety as to deceive all who heard it unseen, when it pronounced mama, papa, map and pam; and had a most plaintive tone, when the lips were gradually closed.

All the other scientific subjects referred to by Darwin in these letters to Franklin are to be found discussed in one or more of Darwin's published works.

Dr. Darwin's prophetic insight along biological lines is well paralleled in another sphere in the following verses from his "Economy of Vegetation," Canto I.:

Soon shall thy arm, UNCONQUER'D STEAM! afar
Drag the slow barge, or drive the rapid car;
Or on wide-waving wings expanded bear
The flying-chariot through the fields of air.

And again in a footnote:

There is reason to believe it (steam) may in time be applied to the rowing of barges, and the moving of carriages along the road. As the specific levity of air is too great for the support of great burdens by balloons, there seems no probable method of flying conveniently but by the power of steam, or some other explosive material, which another half century may probably discover.

Finally, the following lines from the "Economy of Vegetation," Canto II., may have added interest to-day:

So, borne on sounding pinions to the WEST,
When Tyrant-Power had built his eagle nest;
While from his eyry shriek'd the famish'd brood,
Clenched their sharp claws, and champ'd their
beaks for blood,
Immortal FRANKLIN watch'd the callow crew,
And stabb'd the struggling Vampires, ere they flew.

—The patriot-flame with quick contagion ran,
Hill lighted hill, and man electrified man;
Her heroes slain awhile COLUMBIA mourn'd,
And crown'd with laurels LIBERTY return'd.

LORANDE LOSS WOODRUFF

OSBORN ZOOLOGICAL LABORATORY,
YALE UNIVERSITY

SCIENTIFIC BOOKS

The Modern Milk Problem. By J. SCOTT MACNUTT, Lecturer on Public Health Service, Massachusetts Institute of Technology. Macmillan Co., New York. 253 pages. Price \$2.00

It would seem as if little that is new and interesting could be added to the multitudinous papers, circulars and books on milk that have appeared in recent years. The present book is a distinct acquisition, however, to the literature on the subject. It is written in a clear style, and presented in such a way as to command the reader's attention throughout. While the various important phases of milk production are dealt with at some length, with due emphasis on the necessity of producing clean and safe milk, its most distinctive feature is its illuminating treatment of the economic factors which enter into the present-day milk problem.

Like Rosenau, the author believes that the producer is the victim of unfortunate circumstances, that he is little understood, and that as a rule he does not receive sufficient compensation for the capital which he has invested, the risks which he assumes, and the efforts and long hours which he devotes to his work. On the other hand, milk is milk to the consumer, and he will, with some exceptions of course, not protect himself against possible infection, but relies upon health authorities and medical or civic organizations to stand vigil for him.

One of the chief obstacles to a satisfactory solution of the milk problem is the lack of understanding and cooperation between the producer and those who are entrusted with the enactment and the enforcement of rules and regulations to protect the public. The State

Agricultural Experiment Station is to-day doing much to instruct the farmer in the ways of economic milk production, a duty which no other agency can better perform.

Good and pure milk is a necessity. Aside from an inconsiderable amount of certified milk, milk is either good or bad, according to the author. So long as the ordinary producer stays within the minimum requirements of the law he has no incentive to increase the quality of his products. A premium paid on quality is one of the solutions of the good milk problem. Few producers are paid for the extra effort, and hence are content if they remain unmolested by the prosecutor.

The laboratory method of determining the quality of milk is, in the author's judgment, the most important, while inspection is of little merit, aside from the instruction to the producer in rational methods of clean milk production. The dairy score card also is of relatively little value, as it does not furnish a true index of the real quality of milk. Pasteurization, except for the highest grade, is necessary to protect the consumer. Grading and the laboratory examination are the most important single means of sanitary control, grading being the most important single factor in economic adjustment. Fair milk prices should be paid to both farmer and dealer on the basis of quality.

Several pages of well-chosen references are given, and the last 68 pages of the book are devoted to a comprehensive appendix in which valuable technical and statistical information is contained, as shown in the titles: *Milk Statistics in the United States*, *Grading Systems of the Commission on Milk Standards*, *the North System*, *Costs and Prices*, and *Local Experiences and Investigations*.

The book is designed to furnish information, in the author's words—"not merely for health officials and milk inspectors, but also for dairymen and city milk dealers, agricultural authorities, legislators charged with the framing of milk laws, inquiring consumers and members of organizations engaged in efforts to secure better milk supplies, physicians, and all others who are interested in the