THE BOSTON MEDICAL AND SURGICAL JOURNAL.

VOL. XIII.]

WEDNESDAY

SEPTEMBER

1835.

[NO. 7.]

RESEARCHES OF M. EDWARDS ON THE INFLUENCE OF GELATINE.

TRANSLATED FROM THE JOURNAL DE CHIMIE MEDICALE, DE PHARMACIE, ET DE TOXICOLOGIE, FOR JULY LAST.

BY J. CHICKERING, M.D. BOSTON.

[Communicated for the Boston Medical and Surgical Journal.]

IT is well known that there has of late been a discussion relating to the alimentary properties of Gelatine, in which one of our colleagues (M. Julia Fontenelle) has taken an active part. We here publish the results obtained by M. Edwards.

This physiologist, in order to determine the variations of strength, and whether they were subject to a regular law, endeavored to measure that of the same individual at five different times of the day : at 7 and 11 o'clock, A. M. and at 1, 7, and 11, P. M.

These experiments, repeated on ten successive days, under the most similar, the most ordinary and simple circumstances, gave for the force of the hands, by the dynamometer, the following means :—

At 7, A. M.	67° 7.
" 11, " "	72°.
" 1, P. M.	73°.
" 7, " "	71° 12.
" 11, " "	67° 6.

Thus, from the hour of rising at 7, A. M., up to 1, P. M., the force was increasing ; afterwards, it decreased in the interval from that time to 11, P. M. Thus, the course of muscular strength is ascending the first half of the day, and descending the last half. Finally, the least intensity occurs at the two extremes of the day, especially at the commencement.

What produces this effect ? Is it the food taken in the morning an hour after rising, which develops the strength during this period ? Or, is it the course natural to our animal economy, independently of every foreign exciting cause ?

In order to know to which it belongs, the hour of the repast was changed, but in such a manner as not to affect the subject of the experiment. The breakfast, taken as above at 8, was deferred till half past 10. During this interval, we measured by the dynamometer, at 7, 9½, and 10½, the strength of the individual. The mean of these trials showed that during the interval, without taking any food, and without the perceptible action of any exciting cause on the strength, it was progressively increased.

Therefore, when we fast, we experience after rising a progressive de-

velopment of muscular strength during a great part of the morning, without any exciting cause but the regular play of our organs, and the genial action of external agents, under the free air and the direct rays of the sun.

The influence of food seems, then, to be nothing in this case ; at the same time, as it is certain that this influence exists, in order to show the effects, we must change the process.

The means which M. [redacted] was to make trial of the dynamometer immediately before the [redacted] then to repeat it immediately after, and at successive intervals. By this method, having determined the strength at 7, 9½ and 10½, in the preceding series of experiments, breakfast was taken immediately after ; as soon as that was over, a new trial was made of muscular strength, which was found considerably augmented ; it had increased 7°. The repast in question consisted of a bowl of chocolate and a little bread ; the object was, first, to know if the water which formed a part, would produce the whole or a part of the determined effect.

Thus, under circumstances perfectly similar, and on the next day after the preceding experiments, the same person took simply water in the proportion it entered into the bowl of chocolate, and, after the same space of time (eight minutes), he had recourse to the dynamometer, which, instead of an increase, showed a diminution of 2°. The experiment, repeated on three successive days, gave the same result.

The second element to be appreciated was the sugar, which was tried in connection with the water, but the sweetened water gave also a sensible diminution.

Trial was then made of chocolate sweetened and prepared with the usual quantity of water ; there was now no longer a diminution, but an increase of 3°, 7 by the dynamometer. This result was constant during the three days of the experiment. Thus, the only substances in the repast, which were efficient in increasing the strength, were the chocolate and the bread.

The object of the following experiments was to examine, but always by the same analytical process, the effects of gelatine on the variations of the muscular strength. The ordinary broth was first used, but it being customary to take it hot, it became necessary to determine the effects of an elevated temperature ; for, in the preceding experiments, the sweetened water was taken at the temperature of the air.

Six ounces of water was drank at 122° F., the ordinary temperature of taking the broth ; after 8 minutes, as in the preceding experiments, the dynamometer showed a diminution of force of 3°, 3 ; there was the same result on three successive days. Thus, the elevation of the temperature, far from increasing the strength, on the contrary diminished it, though water, taken at the common temperature, caused less diminution.

The effect of temperature being thus ascertained, trial was made of broth of a very good quality ; the effect was very great, and, for four days, the sudden increase was from 6 to 8 degrees.

A broth was then made by substituting two ounces of gelatine for the three pounds of meat, which is used for the same quantity of water. This broth is not to be distinguished from the ordinary broth ; taken at the same hour, and under the same circumstances as in the trial of the first

kind, it gave, by the dynamometer, an increase of force of 9 degrees—that is, greater by two degrees than in the preceding experiments.

After making these experiments on the same individual, M. Edwards, in order to obtain comparative results, experimented upon 31 soldiers of the 43d regiment. The trial of the dynamometer gave, before breakfast, $79^{\circ}, 87$; after, $82^{\circ}, 33$; before dinner, $82^{\circ}, 32$; after, $82^{\circ}, 16$. This trial was repeated on another company of the same regiment, composed of very strong men. The experiments were on 26 grenadiers; the difference, before and after breakfast, was 3° (3° for those of the centre); before and after dinner, 6° (5° for those of the centre).

The strength of the same soldiers of the company of the centre and of that of grenadiers, was tried before and after soup, at breakfast and at dinner.

Increase after soup.

Company of the centre.	-	-	-	Do. Grenadiers.
At breakfast, 1,42.	-	-	-	3,93.
At dinner, 4,51.	-	-	-	5,35.

The 26 grenadiers all showed an increase of strength after breakfast : of 31 soldiers of the centre, 25 only ; after dinner, 28. In four cases, a diminution of strength was observed after breakfast and after dinner. The author thinks from this, that with strong men there is an increase of strength after every moderate meal, and that the exceptions observed were owing to the subjects being less vigorous. In order to be convinced of this, he experimented on young men of a boarding school ; the mean result was contrary to what he observed in the soldiers. So likewise, in subjects who, by reason of age, present a feebleness in a healthy and sound constitution, there was an immediate diminution of muscular strength after each repast.

This difference between the immediate effects of food on the muscular strength, arising from individual vigor or feebleness, deserves attention. The elevation or depression of strength, which follows the ingestion of food, is, we may say, instantaneous ; it is the effect of the passing contact, and ought to be distinguished from the subsequent effect, arising from the digestion of ingested substances. This operation, commencing immediately after the arrival of the food into the stomach, tends to concentrate in this organ the strength of the individual, and consequently to counter-balance the other effect. Thus, after the ingestion of food, there are two opposite tendencies, and the difference only is recognized by the dynamometer. This difference is less in feeble persons, and more in the vigorous.

If the quantity of food is moderate, the call for strength to the stomach will be less, while for the excitement produced by contact, there will be the same as if the repast had been more copious. Whence we think there may be cases in which, after soup, the development of muscular power will be greater than at the close of dinner ; this happens with many females. This is, adds M. Edwards, one of the greatest advantages of spiced gelatine broth, which, in this respect, is unequalled. These experiments have been repeated at the Hospital of Saint Louis.

At dinner hour, when the repast commences with a soup made with a solution of spiced gelatine with a prescribed portion of meat, a certain

number of the sick in the male wards of M. Biett, have been put to three trials of the dynamometer ; one before, another after the soup, and the last at the close of the dinner. The mean result is as follows :—Before gelatine soup, 66° ; after it, 68°.

From similar experiments made on 37 female patients under the care of M. Alibert, the means were :—Before gelatine soup, 45° ; after it, 48°. In the two cases the effect, at the close of the repast, a mean augmentation of strength.

"All these results," continues M. Edwards, "show the effect of spiced gelatine broth with meat, such is prescribed by the author, and such is prepared at Saint Louis."

We should think that the gelatine serves only to give substance to the body, and that the excitation of strength depends solely on the palatable and fragrant qualities of the broth. In order to decide this question, broth was prepared, some with two ounces of spiced gelatine, and some with four ounces. The subject of the first experiments used for three days each of these two kinds of broth. The first gave an increase of strength of 9° ; the second gave one of 11°. "Thus," says M. Edwards, "we may say in general terms, that the intensity of the action of gelatine on the muscular strength, tends to increase in the proportion of this substance ; whence it will result, that meat broth, made with two ounces of gelatine and one pound of meat, will act or tend to act more energetically, and for a longer time, on the muscular strength, than the ordinary broth prepared with four pounds of meat."

It ought to be seen by this abstract, that M. Edwards has confirmed the statement of M. Julia Fontenelle in his memoir read in September, 1834, before the Institute, in which he first maintained that good food is to be known less by the weight which the body may acquire, than by the increase of muscular power. This is the fundamental idea in the work of M. Julia Fontenelle, who noted not merely the strength of the hands, but also that of the body. We have thought it proper to make the remark here, because M. Edwards has nowhere mentioned the labors of this last, although they preceded his own by more than eight months.

September, 1835.

CASE OF CORNEITIS, WITH DEEP CENTRAL ULCER OF THE CORNEA.

BY EDWARD J. DAVENPORT, M.D.

[Communicated for the Boston Medical and Surgical Journal.]

JOHN CRIMMENS, aged 2 years, a stout healthy child, was brought by his father, April, 1835, for advice for an inflammation that had existed in the right eye for six weeks. He had employed no medical advice of consequence, and the eye had been constantly getting worse ; and for the last two or three weeks the child has been unable to open the eye at all. Such was the intolerance of light, that some force was necessary to enable me to inspect the eye, so as to ascertain with any degree of certainty the actual state of the organ. Upon inspection, the external tunics were found to be much inflamed ; the inflammation was most intense immedi-