intestines, which should be of simple hot water sterilized.

Supporting the system by nutritious enema is almost an unknown quantity among surgeons. Only those who have had practical experience are competent judges of its beneficial influence.

What we mean by nutritious enema are enema composed of sterilized milk, wine-whey, animal broths, etc., introducing into these enema any antiseptic that the surgeon may deem necessary. As surgeons we have not respected the digestive glands of the intestines sufficiently. We have not been disposed to give the stomach or intestines involved as much rest as they demand or require when being repaired by the surgeon. We have depended more upon the *vis chirurgica* and ignored the *vis medicatrix naturae*, or the neglect of giving Nature, Dame Nature, the privilege of exercising her proper functions of recuperating energies. Many fatal results from the various laparotomies performed at the present day are the direct result of ignoring Mother Nature.

In operations upon the ovaries, kidneys, uterus and liver we can allow more generous diet, and can give well-digested fluids and solids, but in cases of stomach and intestinal operations we must adhere strictly to a fluid diet, given in small quantities and not too often repeated. Especially is this true where a section of the intestine has been removed. In this operation, as in a fractured rib, we require to apply adhesive strips to control the respiratory muscles. So in the enterotomies, we must prevent the peristaltic action by not inviting it by the administrations of food. Keep the stomach empty and let it rest until the intestinal wound has healed, which is but a short time. The laparotomist approaches his case with a good deal of confidence of success if his patient has had a careful dietetic preparation for the operation, and if he is certain that the dietetic precautions will be adhered to until convalescence has been completed. Too many operators are reckless and careless, and beget as a result, failure—failure invited by their reckless procedure. Too many are anxious to operate, regardless of the condition of the patient. Nowhere within the domains of surgery is the aphorism truer than in the saying, "haste makes waste."

Prepare your patients for the operations. I had rather amputate a limb upon a full stomach and bowel with assurance of success than to plunge my knife into an intestine or appendix with the same stomach and bowel loaded with their contents. Fortunately for humanity our noble profession is working up along this line. The day is not far distant when any form of laparotomy will be a comparatively safe operation, provided due regard has been had to the dietetic part of the treatment. More credit is due to that careful and painstaking physician who prepares his patient for the operation and then leads him safely through a proper dietary following than to the operator who does the work. All true surgeons will admit this. Examine the statistics of all laparotomies performed in this and the old country, and their history attests the truth. Of course we have no reference to those cases where an immediate operation is demanded. Fortunately, these cases are but the exceptions to the rule that governs proper treatment in the majority of cases. Every year has proven in its results the necessity of a proper dietary. Successful results are so sure to follow a proper dietary that it will soon be that any surgeon who neglects it should be held responsible and sub-

ject to prosecution for malpractice. There is no excuse under the heavens for reckless surgery, or for a surgeon who ignores the recuperative powers of nature. Who is so egotistic as to believe that his own surgical procedure will be vindicated by an offended nature? In the language of the immortal, illustrious Gross, "Respect nature, gentlemen, respect her. Relieve her of any dead parts, but for God's sake don't attempt substitution on her." Good, pure water is fine food, is easily digested and contains tissue properties. Good milk properly prepared is nutritious and safe, wine-whey is good, peptones and peptonoids are, to say the least, doubtful. I had rather my patient live on nothing than to use them in many cases.

Total abstinence is a fine diet in many cases. I never knew a laparotomy patient to die from starvation, but I have known them to die from overfeeding and neglect of a proper dietary.

THE IRRATIONAL AMERICAN BREAKFAST, JUDGED BY OUR PRESENT KNOWLEDGE OF THE PHYSIOLOGY OF DIGESTION.

Presented to the Section on Physiology and Dietetics, at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

BY BOARDMAN REED, M.D.

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A witty Frenchman once remarked in substance that Americans partook of a dinner at breakfast time. It is a fact that on the continent of Europe it is the almost universal custom to break the fast in the morning with a very light meal consisting generally of little, if anything, besides rolls and coffee or chocolate. In no other country, probably is so hearty a breakfast eaten as in these United States. This may or may not be prominent among the hygienic faults that make Americans the most dyspeptic people in the world, but it is doubtless one of the causes. It is not reasonable to expect of the digestive organs as energetic and efficient work in the early morning as later in the day. The circulation is then less active and the nervous system not yet aroused to its fullest energy. One would naturally suppose, therefore, that the gastric, pancreatic and intestinal juices would not be so readily supplied in the quantities necessary to digest a very hearty meal at the breakfast hour as some hours later. Healthy, vigorous persons, who exercise much out of doors, can so adapt themselves, no doubt, to the habit of beginning the day with a heavy meal, and such persons may not be the worse for it; but it is different with dyspeptic and delicate people from whatever cause. These nearly always do better when given some light nourishment soon after awakening, their first substantial meal being taken at a later hour.

But this beginning of the day with a large complicated meal, scarcely less in extent and variety than the dinner, is not the only dietetic error of which the majority of our people are pre-eminently guilty. The relative order in which the average American takes the various kinds of foods entering into his generous breakfast is in defiance of the teachings of physiology. For example, it is well established that the digestion of starch is begun by the action upon it of the ptyalin in the mouth, as well as on its way to the stomach and during the first twenty or thirty minutes of its sojourn in the stomach—that is to say, while the gastric contents continue to be either

neutral or only faintly acid. The percentage of acidity at which starch digestion is arrested is stated differently by different authorities. Ewald and Boas found it retarded by .07 per cent. of hydrochloric acid and stopped by .12 per cent. Chittenden states that it is stopped by .003 per cent. This is reached by the normal stomach at the end of the first fifteen or twenty minutes after the beginning of a meal and in much less time when the secretion of hydrochloric acid is excessive, as it very frequently is with dyspeptics. When meat or an animal broth forms one of the earlier courses of the meal, the stomach contents become acid sooner than when milk or vegetables or cereal food is taken. It follows then that our amylaceous foods when forming part of a mixed meal should: 1, always come in the earlier courses, and 2, be as thoroughly masticated and insalivated as possible, so as to insure a prompt conversion into the forms of sugar in which only they are capable of absorption and assimilation.

The breakfasts which are served in most of the better-class American hotels, as well as in a large proportion of the wealthier private families in this country, begin with fruit (often highly acid kinds, such as grapes, oranges, or grape fruit), followed by some form of mush (largely starch) washed down with milk or cream, and with scarcely any admixture of the saliva. Enough of the sour fruit has often been taken before to render the stomach contents too acid probably for the digestion of the farinaceous foods to take place, even if any saliva—the only fluid capable of digesting them which they can encounter before entering the duodenum—had been incorporated with them. In the table given by Boas as representing the results obtained by both Ewald and himself, the organic acids are credited with a decided power of inhibiting the digestion of starch, though less than that exercised by hydrochloric acid.

The third course is usually beefsteak or mutton chops, which, in the normal stomach are almost sure to stimulate the secretion of the gastric juice to a degree which carries the acidity of the stomach contents above the starch-digesting point, supposing that the acid fruit of the first course has not already done this. To render it still more impossible that any further starch digestion should take place in the stomach at this stage of the breakfast, most persons, including children and healthy young adults having presumably an abundant gastric secretion, are usually encouraged to stimulate their peptic glands to a still greater secretion of the acid gastric juice by a free use of pepper, hot sauces or other condiments. If the meats were taken without accompanying or following starchy foods, it would not be so bad, but as a rule potatoes and hot bread in some form are eaten at the same time, and very often the meal is topped off with griddle cakes and syrup, one of the most indigestible and flatulent of the combinations of carbohydrates.

Another peculiarly American habit is the drinking of ice-water, often in large quantities, with every meal. This retards digestion, both by lowering the temperature of the contents of the stomach and by an over-dilution of the gastric juice. It is also capable of damaging seriously the delicate mucous membrane and ultimately causing catarrhal inflammation in patients otherwise predisposed to that affection. Is it any wonder that Americans so generally suffer from stomach troubles, and especially from the manifold consequences of the indigestion of starch?

If one must eat so large a meal in the morning, the viands might be served in the following order with much less risk of harm: 1, cereals well masticated and accompanied by rolls or bread and butter to carry down plenty of saliva; 2, potatoes with more bread and butter if desired; 3, meat or eggs, accompanied by a little salad; 4, fruit; 5, coffee or chocolate.

A NEW THERAPEUTIC MEASURE—THE ELECTRIC-LIGHT BATH.

Presented to the Section on Materia Medica, Pharmacy and Therapeutics at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

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In a paper read before the American Electrotherapeutic Association, at its meeting in New York City, in September, 1894, I presented a description of a new method of applying heat to the body, using, as the source of heat, the incandescent electric light. I also gave in this paper the details of many experiments which I had conducted for the purpose of determining the physiologic effects of this bath, and also a comparison of the effects obtained by this bath with those obtained by the Turkish and Russian baths. The general conclusions to which I was led by this investigation were as follows:

1. The electric-light bath stimulates the production of the elimination of CO_2 in a very marked degree. In an electric-light bath lasting for thirty minutes, the percentage of CO_2 elimination during the last ten minutes was 5.13, as compared with 3.60, the average of CO_2 elimination before the bath. In a Russian bath the percentage of elimination was 3.96. In a Turkish bath of thirty minutes' duration the percentage of CO_2 elimination was 4.01.

2. The elimination of nitrogenous wastes, represented by urea, and also the elimination of total solids, was greatest in the Russian bath and least in the electric-light bath, doubtless the result of excessive skin activity.

3. The amount of perspiration produced by the electric-light bath was fully double that induced by the Turkish bath in the same length of time. The time required for the first appearance of perspiration was, in the electric-light bath, about one-half that in the Turkish and Russian baths. The reason for this is apparent when one recalls the fact observed by Bouchard, that perspiration begins when the temperature of the blood has risen .7 degrees F. above the normal. In a study of the physiologic effects of the electric-light bath in 1891, when I made my first experiments upon this subject, I found the internal temperature was raised by the bath 1.6 degrees F. in five and a half minutes, the surface temperature rising in the same time 2.3 degrees F.

From these facts it is evident that the electric-light bath raises the temperature of the blood more quickly than any other form of bath. The reason for this is apparent when it is remembered that the skin and other structures of the body readily permit the transmission of the radiant energy of the electric light, which, entering the body as light, becomes by the resistance which it meets transformed into heat. This heat is developed in the deeper tissues instead of being slowly carried in by conduction from the surface. The skin is, like glass, a poor conductor, but at the same time allows the passage of radiant energy