the play of imagination was markedly careless, and uncontrolled by the inward critic, as compared with the good cases in which it showed itself sober and self-controlled.

As the author says, the sources of error in such observations as these are very numerous; but from repeated observations by many observers, carefully collated, these errors may be in a great measure eliminated, and substantial results arrived at, of whose practical bearing there can be little doubt.

OBSERVATIONS UPON DIGESTION IN THE HUMAN STOMACH.

DIRECT observations on digestion in the human stomach have been very seldom made, as opportunities for such cannot often occur. Those by Beaumont many years ago are familiar to every student of physiology, and, notwithstanding their lack of completeness and their many imperfections, they served a very useful purpose in explaining many of the processes whereby digestion is affected in this organ. These observations have been supplemented by others; but the results of modern physiological researches have been such, that renewed opportunities to make such direct observations must be of great value. Such a one occurred within the past year in the person of Heinrich Baud, a healthy young man twenty-eight years of age, into whose stomach, in consequence of a stricture of the oesophagus that prevented the passage of all food, a surgical opening five centimetres in length was made. The case passed into the hands of Mr. A. Herzen, the well-known physiologist, who improved the opportunity to make a series of experiments upon the digestibility of certain foods and upon the behavior of the gastric juices (*Kosmos*, 1885, ii. 1, 4). The pepsin secreted by the patient was of unusual quantity, and, what has hitherto never been observed in similar cases, or through the artificial fistulas of dogs or other animals, there was a changeable but often considerable quantity of bile present. These circumstances, however, though complicating the experiments, did not especially affect the results.

The author's methods of experimenting were as follows: a substantial meal was given to the patient at 7 o'clock in the evening, and nothing further was permitted to enter his stomach till the next morning, when experiments at 6 o'clock were begun, first upon the empty organ. After an examination of the juices therein contained, there was introduced the albumen from three hard-boiled eggs, with two to three hundred grams of water, together with three small silken nets, each containing eight small pellets of albumen, uniform in size, and regular in shape, and which could be easily withdrawn for examination. These observations through the fistula were made hourly, and one of the nets with its contents removed.

Remarkable and unaccountable conditions were found in which the albumen remained one or even two hours in the stomach without undergoing any perceptible change, notwithstanding the presence of ferment, with which it was impregnated. In these cases the albumen pellets usually retained in their substance precisely the requisite quantity of pepsin for their solution, which, under favorable circumstances afterwards, exactly sufficed to digest them. This furnishes evidence that the pepsin does not act through simple contact alone, and that a given quantity of it can dissolve only a given quantity of albumen, and that consequently the pepsin, by the exercise of its digestive activity, loses its entire potency.

Observations directed toward the ascertainment of the time required for the stomach-juices to impregnate coagulated albumen showed that they penetrated about one millimetre during the first hour and three millimetres within the second. It was also learned that the acids were much more active than the pepsin in penetrating the substance. This last fact furnishes a new proof of the presence of a free acid in the stomach-juices. The juices, however, at such opportunities as it was possible to examine them, were sometimes found to be of a neutral reaction. But, in order to test the action of acid and ferment further, he introduced at times a quantity of soda to neutralize the acid; without, however, materially affecting the activity of the pepsin, although it appeared to somewhat diminish it. It therefore results that pepsin exerts its digestive power almost wholly independently of the acid. The reverse of this, as may be expected, was also found true, — that the acids penetrated the albumen in the absence of the pepsin, and, when the pieces of albumen were small, a sufficient quantity was absorbed to digest them.

Another series of researches was made upon the fluids of the stomach, from which it was found, that, on the mornings after fasting, the secretion usually was small, while at such times following the ingestion, during the night, of milk or any fluids containing alchohol, the secretion was greater. During the first hours of digestion the quantity held a definite relation to the volume of substances introduced, while in the fifth hour the quantity was always more abundant, about three or four hundred grams. The first secretion of the morning was in general a somewhat thick, very stringy, more or less clear fluid, which resembled the white of an egg; that obtained during the

process of digestion was less thick and less stringy; while that of the fifth hour was turbid, thin, and little or not at all stringy.

Of the hundred and forty-two specimens examined, one hundred and seven showed a yellow or green color, more or less intense, and which indicated the presence of bile. It is worthy of note, that, despite the almost constant presence of bile in the stomach, the digestion was not perceptibly disturbed, and analyses of the contents of the stomach during different hours of digestion clearly proved that the activity of the fluids was not impaired by its presence. It was also observed that the entrance of bile into the stomach partook of a sort of periodicity, a less quantity being found during the first two hours of digestion than at the time either before or after, and that the quantity was still less during active digestion, when fluids, especially beer, were taken in.

The hydrochloric acid of the juices during digestion was found, in a mean of eighty-seven examinations, to be from 1.8 to 1.9 per cent in weight of the entire quantity, — a somewhat higher percentage than that given by Richet. The acidity gradually increased during the first hours of digestion, reaching its maximum at the third hour, from which time it gradually decreased. A few times the juices were found neutral, and the highest acidity attained was 4.2 per cent.

Since Dr. Koch has shown that an acidity equivalent to two per cent of the gastric juices suffices to destroy the cholera microbe, it has been recommended that table-salt should be employed during cholera epidemics to increase the quantity of acid in the gastric juice, and thus prevent the entrance of these germs into the alimentary canal; but from a series of experiments it was ascertained that the direct reverse was the result, and that the larger the quantity of salt introduced, the more considerable and permanent was the decrease of the acidity, so much so that at times the juices were rendered entirely neutral. Contrary to the opinions which have been expressed by physiologists, that salt increased the activity of the secretion of pepsin, experiments seemed to prove that it hindered such secretion, and when large quantities were taken, either into the stomach or by injection, the stomach digestion was most impaired. Mr. Herzen, however, would by no means deny the probability that salt injected directly into the blood increases the secretion of pepsin. On the other hand, it was established that the introduction, either by the stomach or the rectum, of some good peptogenic substance, such as broths or dextrine, uniformly hastened digestion in the stomach, and that this resulted independently of the increase of acidity, and despite the frequent presence in the stomach of the contents of the duodenum. In other words, the digestion may be hastened, and a richer secretion of pepsin brought about, by their use; while others, such as tea, wines, and grape-sugar, produce no effect whatever. Of the practical results of such observations, corroborating and adding to, as they do, conclusions previously and in other ways arrived at, there can be no doubt. Those who would aid an impaired digestion may seek in certain foods, such as broths, stale bread, milk or coffee, taken a while before regular meals, efficient helps; while alcoholic drinks, and especially the sour wines, sugars, and others, may be not only of no use, but even actually prejudicial. To the child and the invalid the results are no less useful.

BLINDNESS IN RUSSIA.

AT the first congress of Russian doctors, which was held in January last, many important papers were read, followed by discussions of considerable interest, some of the most eminent members of the profession from the different provinces and universities of the empire taking part in them. A very striking contribution to the study of social and sanitary questions, says the *Lancet*, was afforded by a paper by Dr. A. T. Skrebitski, on the 'Distribution and statistics of blindness in Russia.' The data employed were chiefly those collected by the military authorities who have to examine young men as they become liable to service in the army. Taking the total for the five years 1879 to 1883, the number examined was 1,388,761, of whom 13,686, or almost one per cent, were blind in one or both eyes. In certain districts the proportion was much higher than the average; and some of the largest, or rather most populous, provinces seem to have presented the greater proportion of the blind: thus in that of Kieff, which sent up almost the largest number of recruits, — namely, 43,118, — no less than 660, or 1 in every 65, were found to be blind in one or both eyes. The smallest proportion of blind was found in Archangel, where it was 1 in 390; but even this is far above the proportion in other European countries.

To make the comparison with the statistics of other countries, it is necessary to subtract the number of those blind in one eye, which in Russia is found to be only a fifth of the total blind: thus, we may consider that four-fifths of the 13,686 recruits returned as blind were blind in both eyes, so that the ratio of totally blind is about 1 to 125. The ratio in England and Ireland is 1 to 1,015, and that in several other European coun-