ing is less; (2) because the ulcer by the position assumed is relieved of the acid's immediate presence; (3) by the high location of the ulcer the irritating fluid falls below the ulcer or is pressed away from it; and (4) peristalsis eases when the body is at rest, or when pressure is applied. This differential point of position is much more clearly felt in history taking than seems apparent in our final percentages and should, we think, be considered.

Ulcers located toward the greater curvature, ulcers with extensive surfaces, and many saddle ulcers tend to more constant symptoms, thus exhibiting the symptoms of chronic complicated ulcers situated elsewhere. Perforations and adhesions seem more often to affect gastric ulcers than duodenal and, as before stated, peristalsis plays a more important part in pain production when adhesions limit the normal movements.

Eruetation of burning sour-water (heartburn) or of tasteless or salty water (water brash) is more often mentioned by those who have gastric lesions. Also, bloating and its distress are more frequent in the cases of higher ulcers.

Pain that comes immediately or soon after food intake seems to point to cardiac, fundic or other extensive ulcerations, perforations, adhesions or obstructions. Coarse and large amounts of food may increase pain in any ulcer, but more constantly in gastric rather high in position, and high ulcers often seem to have periods of shorter duration (1 to 5 days) and shorter intermissions, or remissions which show a lighter grade of symptoms and tend to constant complaint. Thus the case may run month by month, pain earlier, not constant and decided food or soda ease; all symptoms varying somewhat as the amount and kind of food varies, giving one the impression of irregularity yet constantly of gastric origin. Duodenal or pyloric ulcers more often run an exact course day by day for days or weeks with decided food ease.

However, each case necessarily calls for its own careful consideration, because no symptom, or group of symptoms, can more than suggest location and often, as our histories show, the gastric case may have the pure duodenal syndrome and the duodenal case may quite as clearly give the gastric type of symptoms. The diagnosis of a gastric lesion being made, the question of its exact location is not paramount. How best to treat the lesion and conserve the patient's health is the vital point.

CASES OF INFECTIOUS DISEASES reported to the Boston Board of Health for the week ending Sept. 21, 1915: Diphtheria, 57, of which 16 were non-residents; scarlatina, 17, of which 5 were non-residents; typhoid fever, 18, of which 4 were non-residents; measles, 8; tuberculosis, 61, of which 3 were non-residents. The death-rate of the reported deaths for the week was 13.47.

Clinical Department.

THE USE OF CALCIUM IN THE TREATMENT OF EPILEPSY.*

By JOHN BRYANT, M.D., BOSTON.

[From the Neurologic Out-Patient Department, Massachusetts General Hospital.]

My share in the study of this unfortunate class of epileptics to which Dr. Clymer has referred, is an inquiry into the physical characteristics of the epileptic with regard to type, and into the relationship (if any) between disorders, organic or nutritive, originating in the gastro-intestinal tract or in the fuel supply, on the one hand, and on the other, manifestations of ductless gland disorder and disturbance of function of the nervous system.

One phase only of the observations in progress can be referred to in the brief time at disposal, and this concerns the metabolism of calcium. In addition to faulty heredity, overwork and undernutrition or malnutrition, seem with considerable frequency to precede the onset of the attacks. Prolonged periods of malnutrition at once raise the question of dietary errors.

The time has gone by when it is complacently assumed that man ingests sufficient of the necessary mineral elements, no matter what may be his diet. It is well known that many poverty rations, such as white bread and potatoes, are very deficient in calcium. Bunge, in his "Physiologie," some years ago drew attention especially to the increasing use of alcohol and sugar as factors in the production of a calcium deficiency in the dietary of the poor, arguing that these substances satisfy appetite which otherwise would impel the ingestion of a larger proportion of calcium rich vegetables or fruits for the obtaining of the coveted sugars. It is also known that analyses of brain substance have demonstrated the presence in this tissue of less than the normal amount of calcium, in certain disorders marked by hyper-irritability of the nervous system; and recently Foote¹ has demonstrated a decreased calcium content in the femur of an idiopathic epileptic. Thirdly, calcium has been used in such explosive conditions as tic and tetany with reported success, but hitherto apparently only to a limited extent in the treatment of epilepsy. Therefore it has seemed worth while in the course of other observations to see what effect, if any, its use would produce.

The results have in some cases been sufficiently striking to warrant mention in the hope that they may be checked up by other workers. The official syrup of calcium lactophosphate has been used in doses of 5i-ii t.i.d. either a.c. or p.c. Calcium bromide could, of course, be used, and it is planned to employ this later, but at first the calcium preparation was simply added to pre-

* Presented at a clinical demonstration at the Massachusetts General Hospital, June 8, 1915.

¹ Foote: BOSTON MED. AND SURG. JOUR., 1915, Vol. clxxiii, p. 392.

existing medication without other change in the treatment. When thus used the calcium appears to produce at least three effects, in favorable cases; it promotes sleep, it decreases nervous irritability, and it acts in some measure as an antidote to bromide acne.

Favorable cases are those of *petit mal* type, which, according to Dr. Taylor, have hitherto been the least affected by bromides. Members of the clinic staff, familiar with the condition of some of the cases in question for months, if not years, before the present experiment commenced, have expressed themselves as struck by the sudden improvement in general appearance which has been displayed. Nearly all cases have shown some benefit, which may, of course, be partly a psychic reaction; but in a few cases it has been decidedly dramatic to note in the course of two or three weeks the change from surly and depressed irritability to a condition of apparent cheerfulness and regained faith in the future.

Calcium is not presented as a panacea. It may not cure any case, but it at least can be said that when added to existing only partly successful treatment by bromides, it has in some cases produced results sufficiently encouraging to make it seem desirable to mention its employment and possible value.

In closing, it is desired to focus attention upon a broader question related to calcium metabolism. It has been held that such manifestations, as for instance chorea, migraine, tic, tetany, and epilepsy, are absolutely unrelated disease entities. Proof is lacking. It is, on the other hand, not impossible that proof may be forthcoming to show that these diseases are, at least in some cases, merely different expressions of an underlying abnormality common to all, bearing to each other somewhat the same relation as do the visible and varying wave crests to the sea beneath. Three facts suggest that a lack of calcium may be such a common underlying factor in more than one of these conditions: many diets are deficient in calcium, calcium is deficient in the brain tissue of those afflicted with certain explosive manifestations, and some of these diseases have been markedly relieved by the administration of calcium.

These facts make it advisable to determine the extent to which a lack of the mineral constituents of the diet, and a lack of calcium in particular, may underly the manifestations, not only of epilepsy, but of various other explosive disorders of the nervous system which have hitherto been looked upon as disease entities.

WALTHAM TRAINING SCHOOL GRADUATION.—The annual graduation exercises of the Waltham Training School for Nurses were held in that town on September 24. The principal address was made by Dr. Alfred Worcester, and Dr. C. Benjamin Fuller presented diplomas to a class of 17 pupil candidates.

SYNCHRONOUS INSPIRATION AND SYSTOLE IN A PATIENT EXHIBITING EQUAL RESPIRATORY AND PULSE RATES.

BY PAUL DUDLEY WHITE, M.D., BOSTON.

[From the Medical Service of the Massachusetts General Hospital, Boston.]

An Italian boy of six years of age with partial heart block and probable miliary tuberculosis, was under observation for three weeks (April 7-26, 1915). Involvement of the lungs was indicated by the Roentgen ray. He showed on at least six occasions on different days equal rates of respiration and pulse with synchronous inspiration and systole. In the record made with the Mackenzie ink polygraph (Fig. 1) inspiration, represented by the downstroke on the respiratory curve, precedes the pulse at the wrist, represented by the upstroke on the radial curve, by a little more than one-fifth of a second. Deducting from this interval the length of time from the beginning of systole to the appearance of the pulse at the wrist, which is about 0.18 second, the onset of systole is seen to be almost synchronous with the onset of inspiration, following it by a small fraction of a second. This interval varied in different records taken, at times systole preceding inspiration by a like interval. Sometimes, when an irregularity of the block occurred (3 to 1 and 3 to 2, instead of 2 to 1) the radial pulse became irregular but the respiratory rhythm continued unchanged. Similarly, when the breath was held the pulse kept on at a steady regular rate; at such times a loud systolic murmur ordinarily heard over the precordia, disappeared, to reappear when the patient resumed his respiration. An electrocardiogram shows clearly the 2 to 1 heart block present (Fig. 2).

FIG. 1.—Simultaneous tracings of radial pulse (lower curve) and respiration (upper curve). In the respiratory record, downstroke = inspiration, upstroke = expiration. Time interval = 0.2 sec.

FIG. 2.—Lead I of electrocardiogram showing the presence of 2 to 1 heart block. The blocked auricular complex *P* falls on the upstroke of the ventricular deflection *T*. Abscissa, 0.2 sec. Ordinate, 10⁻⁴ volt.