the ligature sloughed into the canal, and the obstruction was thus destroyed. In all others, the tube was distended *above* the stricture to a variable extent. *Below* the stricture, the intestine was usually empty and contracted for an inch or two. The *contents* of the tube varied both in quality and quantity; uniform fluidity being associated with a large quantity of contents, while their smaller amount was often attended with differences of consistence. The date at which the vomiting acceded varied considerably. In one or two instances this symptom did not occur at all. These differences appeared mainly dependent on—

1. The amount of fluid ingesta,
2. The distance of the stricture from the stomach.

The date of death seemed to vary chiefly with the degree of distension.

He therefore deduces the theory,—That, in an obstructed intestine, a movement of the ordinary (and probably peristaltic) character propels the contents onwards to the seat of occlusion; that a continuance of the process distends, first this part of the tube, and next, those portions above it; that, if the contents are fluid, the ordinary peristalsis tends to develope an axial and reversed current, which returns matter from a lower to a higher point of the intestine;—often from the obstruction to the stomach, whence they are ejected by vomiting.

That in some cases, however, the action is probably much less perfect than this; the consistence of the contents preventing the perfection of these currents throughout the whole course of the tube. But still a mixture results, although a less intimate one.

The author next glances at the mode in which obstruction appears to affect peristalsis, and the nature of the distending fluid. He compares the obstructed intestine to the healthy stomach, to the obstructed artery and duct; referring its peculiar appearances to the dilatable yet muscular structure of its coats.

In conclusion, he indicates the possible result of this theory on practical medicine.

The following papers were also read:—1. "On the Determination of the Difference of Longitude, by means of the Magnetic Telegraph." By Elias Loomis, Esq., in a Letter to Lieut.-Col. Sabine, R.A., For. Sec. R.S. Communicated by Lieut.-Col. Sabine, R.A., For. Sec. R.S.

The writer first refers to a series of experiments made under the direction of Professor Bache, for the determination of the difference of longitude between New York, Philadelphia and Washington, by means of the magnetic telegraph. By this series of experiments he considers it established that, by means of Morse's telegraph, two clocks distant from each other 200 miles, can be compared together with the same precision as if they were placed side by side; and that the difference of longitude of two places can be determined with the same precision as the relative error of the clocks. These results were so satisfactory that Professor Bache determined to prosecute them more extensively, and during the past summer comparisons have been made between New York and Cambridge observatory near Boston. The plan of operation this season was more matured than during the former. The comparisons were all made between a solar chronometer at Cambridge and a sidereal clock at New York. At ten o'clock in the evening, the two observatories having been put in telegraphic communication, when the seconds hand of the solar chronometer came round to 60^s, a signal was given at Cambridge, by pressing the key of the telegraph-register; at the same instant a click was heard at New York, and the time was recorded according to the sidereal clock. At the end of 10^s a second signal was given, which was also recorded at New York; at the end of another 10^s a third signal was given, and so on for sixty seconds. The Cambridge astronomer then commenced beating seconds by striking the key of the telegraph-register in coincidence with the beats of his chronometer. The New York astronomer compared the signals received with the beats of his clock, and waited for a coincidence. When the beats were sensibly synchronous the time was recorded, and the astronomer waited six minutes for another coincidence of beats. The Cambridge astronomer continued beating seconds for *fifteen minutes*, during which time the New York observer was sure of two coincidences, and might obtain three. When these were concluded, the New York astronomer in the same manner gave signals for one minute at intervals of 10^s, and then beat seconds for fifteen minutes, during which time the Cambridge astronomer obtained four or five coincidences upon his chronometer. This mode of comparison was practised every night, and it is considered that the uncertainty in the comparison of the time-pieces cannot exceed two or three hundredths of a second on any night; and in a series of comparisons the error may be regarded as entirely eliminated.

Another mode of comparison which was practised is that of telegraphing star transits. A list of stars which culminate near our zenith at intervals of five or six minutes was prepared, and the observers, both at New York and Cambridge, were furnished with a copy. They then proceeded as follows: Cambridge selected two stars from the list, which we will call A and B, and struck the key of his register at the instant when the star A passed each of the seven wires of his transit. These signals were heard at New York, and the times recorded. Cambridge then observed the transit of star B in the ordinary manner without telegraphing. New York then observed the transit of star A on his meridian in the usual manner; and struck his key at the instant the star B passed each of the seven wires of his transit, which signals were heard and recorded at Cambridge. The difference of longitude between New York and Cambridge is nearly twelve minutes, affording ample time for all these observations. Thus New York obtained upon his own clock the times of transit of star A over the meridians of Cambridge and New York; and Cambridge obtained upon his chronometer the times of transit of star B over the same meridians. The difference of these times gives the difference of longitude independent of the right ascension of the stars. Both observers then reversed the axis of their transit instruments; Cambridge selected a second pair of stars from the list, and the same series of observations was repeated as with the first pair. The error of collimation was thus eliminated, and by confining the observations to stars within about five degrees of the zenith, the influence of azimuthal error was avoided. The level being read at every reversal, the correction for it was applied by computation. In this manner it is hoped to eliminate every possible source of error, except that which arises from the personal habits of the observers. In order to eliminate this error, a *travelling* observer worked for a time at Cambridge and compared with the Cambridge astronomer; then came to New York and compared with the New York astronomer; then returned to Cambridge again, and so on as often as was thought necessary. Finally, at the conclusion of the campaign all the observers were to meet at Cambridge and make a general comparison of their modes of observation.

On one or two nights the preceding programme was changed, and each observer telegraphed both star A and star B.

2. "On the peculiar cooling effects of Hydrogen and its compounds in cases of Voltaic Ignition." By W. F. Stevenson, Esq., F.R.S.

In this communication the author gives several theorems which he considers to be established by the experiments cited in a pamphlet which he published, entitled "The Non-decomposition of Water distinctly proved." He then states, that when we apply the principle of these theorems to Mr. Grove's discovery of the cooling properties of hydrogen, it will be found to admit of a most simple solution: "for instance, when the coil of platinum wire is connected with the poles of the electric battery, and the current is established, it is evident that the electric matter thus passed through the wire must escape at the contrary end (the air with which the wire is surrounded not being a conductor of electricity), and as the quantity of electric matter thus transmitted is considerable, and its exit from the wire confined but rapid, that commotion before noticed (in one of the author's theorems) necessarily ensues and causes the ignition of the wire; but when the coil of wire is immersed in hydrogen, which is a conductor of electricity, it is evident that the electric matter must be, at the same moment, abstracted or conducted from every portion of the wire, and consequently the commotion or rush of the electric matter at the extremity of the wire, which causes the ignition, is suspended and the comparative coolness of the wire is the necessary result."

3. Postscript to a paper "On the Ganglia and Nerves of the Heart," with two drawings. By Robert Lee, M.D., F.R.S.

The author states that since his former communication was presented to the Royal Society he has made a very minute dissection in alcohol of the whole nervous system of the young heifer's heart.