

### Caisson or Tunnel Disease.

As one of the New York members of the board of consultants of St. Francis Hospital, Jersey City, J. Leonard Corning, M.A., M.D., of New York, had the rare opportunity of studying a number of cases of that remarkable affection known as the "caisson" or "tunnel disease," which he reported in the *Medical Record* for May 10, 1890. The disease is an affection of the spinal cord, due to a sudden transition from a relatively high atmospheric pressure to one much lower. Hence, those who work in caissons, or submerged tunnels, under an external pressure of two atmospheres or more, are liable to be attacked by the disease shortly after leaving the tunnel. The seizure never, however, occurs while the subject is in the caisson, or, in other words, while he remains under pressure.

The chief clinical features of the disease are pain, which may be relatively mild, as when confined to some portion of one or more extremities, or of frightful intensity, as when it appears in the ears, knees, back, or abdomen; anæsthesia and paralysis, usually of paraplegic type; bladder symptoms, assuming the form of retention or incontinence; and, more rarely, rectal disturbances (usually incontinence).

In cases of moderate severity the patient usually recovers in a few days or weeks, while in the very severe ones he gradually loses strength, and eventually succumbs. Besides these extreme phases of the disease, there is an intermediate class of cases in which the patient, though grievously ill, may recover sufficiently to get about with sticks, or even unassisted. In these cases recovery is, however, but partial, the subject remaining more or less feeble and hyperæsthetic during the remainder of his life.

Since Triger, a French engineer, first described the characteristic pains of the caisson-disease in 1841, the affection has several times received attention at the hands of European physicians who were in a position to observe it in connection with the diving-bell, bridge-building, mining, and other operations requiring the use of compressed air.

In the United States several opportunities of studying the disease have occurred during the last few years. The most noteworthy of such occasions were the construction of the St. Louis Bridge in 1868, the Brooklyn Bridge at New York about the same time, and the Hudson River Tunnel at a later date.

### The Inefficiency of Sand Filters.

Drs. Frankel and Piefke of Berlin have recently made an exhaustive study on the filtration of drinking-water through sand (*Zeitschrift für Hygiene*, No. 1, 1890). Their experiments conclusively prove, says *Medical News*, that the danger of infection from impure water is only slightly reduced by filtration through sand; bacteria passing through at all times, but in larger numbers just after the filter has been cleaned, and again after it has been in use for some time.

### LETTERS TO THE EDITOR.

\*.\* Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.

The editor will be glad to publish any queries consonant with the character of the journal.

On request, twenty copies of the number containing his communication will be furnished free to any correspondent.

### Census of Hallucinations.

MAY I ask for the publicity of your pages to aid me in procuring co-operation in a scientific investigation for which I am responsible? I refer to the "Census of Hallucinations," which was begun several years ago by the Society for Psychical Research, and of which the International Congress of Experimental Psychology at Paris, last summer, assumed the future responsibility, naming a committee in each country to carry on the work.

The object of the inquiry is twofold: 1st, to get a mass of facts about hallucinations which may serve as a basis for a scientific study of these phenomena; and, 2d, to ascertain approximately the proportion of persons who have had such experiences. Until the average frequency of hallucinations in the community is known, it can never be decided whether the so-called "veridical"

hallucinations (visions or other "warnings" of the death, etc., of people at a distance) which are so frequently reported, are accidental coincidences or something more.

Some eight thousand or more persons in England, France, and the United States, have already returned answers to the question which heads the census-sheets, and which runs as follows:—

"Have you ever, when completely awake, had a vivid impression of seeing or being touched by a living being or inanimate object, or of hearing a voice; which impression, so far as you could discover, was not due to any external physical cause?"

The congress hopes that at its next meeting, in England in 1892, as many as fifty thousand answers may have been collected. It is obvious that for the purely statistical inquiry, the answer "No" is as important as the answer "Yes."

I have been appointed to superintend the census in America, and I most earnestly bespeak the co-operation of any among your readers who may be actively interested in the subject. It is clear that very many volunteer canvassers will be needed to secure success. Each census-blank contains instructions to the collector, and places for twenty-five names; and special blanks for the "Yes" cases are furnished in addition. I shall be most happy to supply these blanks to any one who will be good enough to make application for them.

WM. JAMES.

Harvard University, Cambridge, Mass., May 10.

### The Winnebago County (Iowa) Meteorites.

ON Friday evening, May 2, 1890, at 5.15 P.M., standard western time, a meteor was observed over a good part of the State of Iowa, and is described as a bright ball of fire, moving from west to east, leaving a trail of smoke which was visible for some minutes. It was accompanied by a noise likened to that of heavy cannonading or of thunder; and many people rushed to the doors, thinking it was the rumbling of an earthquake. Substantiated reports have been received from Des Moines, Mason City, Fort Dodge, Emmetsburg, Algonia, Ruthven, Brett, and Forest City. The noise was also heard at Sioux City. Some of these places were at a distance of over a hundred miles from the point where the meteor fell. It exploded about eleven miles north of Forest City, Winnebago County, in the centre of the northern part of Iowa, latitude  $43^{\circ} 15'$ , longitude  $93^{\circ} 45'$  west of Greenwich, near the Minnesota State line. The fragments were scattered over a considerable surface of ground. Up to the present time, there have been found a 104-pound, a 70-pound, and a 10-pound mass, and a number of fragments weighing from one to twenty ounces each; and a part of the main mass of the meteorite is believed to have passed over into Minnesota. The pieces are all angular, with rounded edges.

This meteorite is a typical chondrite, apparently of the type of the Parnallite group of Meunier, which fell Feb. 28, 1857, at Parnallee, India. The stone is porous, and when it is placed in water to ascertain its specific gravity, there is a considerable ebullition of air. The specific gravity, on a fifteen-gramme piece, was found to be 3.638. The crust is rather thin, opaque black, not shining, and, under the microscope, is very scoriaceous, resembling the Knyahinya (Hungary) and the West Liberty (Iowa) meteoric stones. A broken surface shows the interior color to be gray, spotted with brown, black, and white; the latter showing the existence of small specks of meteoric iron from one-tenth to four-tenths of a millimetre across. Troilite is also present in small rounded masses of about the same size. On one broken surface was a very thin seam of a soft black substance, evidently graphite (?), and soft enough to mark white paper; a felspar (anorthite?) was also observed, and enstatite was also present. I present a paper on this meteorite at the meeting of the New York Academy of Sciences, May 12, and will give full particulars at the next meeting.

This is the fourth meteorite that has been seen to fall in Iowa. The other three falls were as follows: at Hartford, Linn County, Feb. 25, 1847; at West Liberty, Iowa County, Feb. 12, 1875; and the great fall of siderolites at Estherville, Emmet County, May 10, 1879, which fall comprised over two thousand pieces weighing from a tenth of an ounce to four hundred pounds.

GEORGE F. KUNZ.

New York, May 8.

A REMARKABLE meteor, or meteoric shower, passed over this State at 5.30 P.M., Friday, May 2. In spite of the brightness of the sun, shining at the time in a nearly cloudless sky, the light of the meteor was very noticeable. Its great size, powerful illumination, discharge of sparks, comet-like tail three to five degrees in length, and the great train of smoke which marked its course for a full ten minutes after its passage, made a strong and lasting impression on the minds of all who saw it. Unfortunately the clamor over an exciting game of ball prevented the many members of the college who saw it from making as careful observations as they would otherwise have done: so it was impossible to tell whether its passage was accompanied by sound or not, although farmers near here report a faint hissing noise. It appeared to enter the atmosphere about twenty to thirty degrees south of the zenith, and, descending at an angle of about fifty to sixty degrees, passed below the horizon north-north-west of this place. By telegraphing, one small meteorite weighing one-fifth of a pound, and several fragments from a 70-pound one, were secured, and analyses and microscopic sections at once made. They contain a large amount of metal for the "stone" class of meteorites.

Following is the analysis of the matrix of the 70-pound meteorite: silica, 47.03; iron oxide, 29.43; oxide aluminium, 2.94; lime, 17.58; magnesia, 2.96; total, 99.94.

The specific gravity is 2.63. The shower covered an area at least two and a half miles long by one wide, near Forest City, Io. There the meteorites are said to have fallen in great numbers; and already many have been found, varying from a few ounces to sixty or seventy pounds in weight.

It seems worthy of mention, that, in accordance with theories entertained here, a 100-pound aerolite has just been found in Kosuth County, some thirty or forty miles farther north. These meteorites all have the characteristic burned, blackened surfaces. Within they are light gray, interspersed with innumerable irregular spots of iron. The many exaggerated and excited reports make it difficult to get at facts: so it seems best for the present to make only a preliminary statement and analysis, until we can make a full and accurate report on this last and highly interesting Iowa meteor.

JOSEPH TORREY, JR.

ERWIN H. BARBOUR.

Iowa College, Grinnell, May 9.

#### BOOK-REVIEWS.

*Die Entstehung der Arten durch räumliche Sonderung.* Von MORITZ WAGNER. Basel, 1889. 8°.

MORITZ WAGNER, traveller and journalist, was born Oct. 3, 1813, at Bayreuth, and died at Munich, May 30, 1887, by his own hand. He regarded the principal achievement of his life to have been the enunciation of his theory of the origin of species by geographical separation. He wished, toward the close of his life, to publish a comprehensive work on this theory; but an accident having crippled him, and illness interfering, he never carried out his purpose. His nephew and namesake, Dr. Moritz Wagner, 2d, of Baden by Zurich, has collected most of the elder Moritz' essays in a single bulky volume, to which he has added his own "rider" in the shape of a speculative dissertation on the origin of life and the evolution of species, and prefixed a memoir by Von Scherzer. In judging of Wagner, we have to remember always that journalism was his profession and means of support, and that natural history, though his favorite study, always occupied a second place until the latter part of his life. His father was a school-teacher in poor circumstances, and with six children. Young Moritz showed his master passion by keeping animals and making large collections. When only fifteen years, he contributed editorial articles to some of the local newspapers of Augsburg, where his family were then living. In 1836, when twenty-three years old, he undertook his first journey, going to northern Africa, where he secured an appointment to accompany the French Army in Algiers. The necessary preliminary outlay was covered by advances made by his brothers and friends, and all the expenses were finally met by the sale of his collections and the earnings of

his pen. He sent frequent letters to the *Augsburger Allgemeine Zeitung*, then as now a leading journal. These letters were eminently successful; and from this time on, Wagner undertook one journey after another, earning the means by his writing. After his first journey he felt the lack of scientific training, and accordingly spent two years at Göttingen, studying geology principally, maintaining all the while his newspaper activity. His next enterprise was a journey to the Caucasus, Black Sea, and Persia, and later followed his principal journey. In company with Von Scherzer, he came to New York, May, 1852, travelled over the United States for a year and in Central America for two years, much of the time collecting archæological material for the British Museum. His reputation as a writer and traveller attracted the favor of the King of Bavaria, who gave him liberal aid for another long exploring journey to Central and South America.

Except as regards the Australian and polar regions, Wagner possessed an intimate acquaintance with all the principal faunas and floras of the world, and the central interest of all his work lies in the study of the geographical distribution of species. The phenomenon which attracted his attention most was that of closely allied species occupying separated areas of distribution. Thus among rattlesnakes, all of which are American, *Crotalus durissus* belongs to the Atlantic fauna; *C. rhombifer*, to Central America; *C. miliarius*, to the south-western United States; *C. tergeminus*, to the Rocky Mountains; *C. horridus*, to Brazil; and so on. Similar instances recur in all classes of plants and animals. The most striking examples are furnished by the humming-birds, some of which are widely distributed, like our own *Trochilus colubris*, which ranges from Mexico to Labrador, while others are exceedingly restricted, there being a number of species which are limited not merely to a single mountain, but also to certain altitudes. There is, says Gould, a new species about every thousand feet. The genus *Orestrochilus* occurs only at great heights, 10,000 feet and more, and is represented by distinct species on Aconcagua, Cotopaxi, Chimborazo, Cayambe, and other mountains. *Orestrochilus chimborazo* lives up to 16,000 feet, and hunts for flies above the snow limit. Wagner's writings give these examples and many others. This class of facts acquired an immense importance in his mind, and led him to think that species always are distinguished by separate areas of distribution; and as a corollary from this opinion he maintained that species arise by a common stock, having two or more areas of distribution, which become distinct or separated by some physical barrier, and that the separation causes the differentiation of the original single species into a corresponding number of new species.

The first formal announcement of his theory was made by Wagner in a brochure published at Leipzig in 1868, and entitled "Die Darwin'sche Theorie und das Migrationsgesetz der Organismen." He defended the theory in 1870 in a pamphlet on the influence of geographical isolation, and also in three articles published in the periodical *Kosmos* for 1880. All of these, and others bearing upon the subject, are included in the volume before us. Wagner's essays show the journalist. They are all discursive and pleasant, it is easy to read along in them, but there is a complete absence of that formidable marshalling of facts and unconquerable logic which is the stamp of Darwin's work. Wagner nowhere compiles all the facts of geographical isolation, nor enumerates those which conflict with his theory, either to acknowledge their force or explain them away. He leaves us, moreover, completely in the dark as to how geographical isolation causes new species. All that he has done is to make the generalization that in a large class of cases closely allied species have distinct areas of distribution, — a fact which indicates that separation is a favorable condition for the development of species, but does not prove it to be a cause. Moreover, the fact that often closely allied species have similar or even identical areas of distribution shows that species arise from other influences than mere separation. Nor can Wagner's theory explain the phenomena of mimicry. These objections have all been urged against Wagner's theory of the origin of species,<sup>1</sup> and their force has justly prevented the general acceptance of the theory: at the same time naturalists have recognized the value of the array of facts presented by Wagner.

<sup>1</sup> See especially August Weismann's criticisms, published in 1872.