diminution of the sugar-destroying power of the blood dependent on pancreatic extirpation or disease is thus a factor, and perhaps an important one, in the causation of an over-abundance of sugar in the blood, and will certainly have to be reckoned with before the true pathogeny of diabetes is understood.

Effects of Tuberculine on Monkeys.

M. Henocque has recently tried the effect of tuberculine on a monkey which presented no symptoms of pulmonary phthisis. Two days after the first injection, according to the *British Medical Journal*, the animal, which had exhibited the characteristic re-action, presented dullness and a few *râles* at the right apex. After the third injection the dullness was more marked on the right side, and began to be perceptible at the left apex. Soon all the symptoms of acute phthisis manifested themselves, with intense fever, the animal dying ten days after the last injection, after losing a tenth of its weight during that time. The total amount used was six milligrammes of the diluted fluid. On post-mortem examination, four tuberculous nodules of the size of a pea were found in the right lung, and caseous pneumonia involving two-thirds of the organ in the left. In both cases the tuberculous lesions were surrounded by a zone of very intense red hepatization. Pieces of the caseous tissues were injected into two guinea-pigs, in one after mixture with sterilized water, in the other with diluted tuberculine. Both animals showed signs of cutaneous and glandular tuberculosis.

A New Antiseptic.

At the Académie de Médecine, Paris, on April 28, M. Polaillon read a paper contributed by Dr. Berlioz of Grenoble on a new antiseptic agent called "microcidine," which is composed of seventy-five per cent of naphtholate of sodium and twenty-five per cent of naphol and and phenyl compounds. According to the *Lancet*, it is a white powder obtained by adding to fused β-naphthol half its weight of caustic soda, and allowing the mixture to cool. It is soluble in three parts of water, and the solution, which is cheap, is said to possess considerable antiseptic powers, without being toxic or caustic, or injurious to instruments or linen. The antiseptic properties of microcidine, while inferior to those of corrosive sublimate or naphthol, surpass those of carbolic and boracic acids ten and twenty times, respectively. Microcidine is eliminated by the kidneys, and is antipyretic. M. Polaillon has experimented with this new agent largely as a dressing to recent and other wounds, utilizing as a dressing, after a preliminary cleansing of the raw surface with a three per cent solution, gauze soaked in the same and covered with a layer of oil silk and a thick pad of cotton-wool. The results are reported to have been excellent.

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.

Electric Storms and Tornadoes in France on Aug. 18 and 19, 1890.

ON the very day of the tornado at Wilkesbarre, Penn., last year, another, almost unprecedented, was raging at St. Claude, France, near the Swiss frontier, south-east from Paris. On the previous day electric storms and very strong wind-rushes, perhaps tornadic in their character, devasted other portions of France. In the reports of these violent storms there is a continual mention of their similarity to the tornadoes in this country. Quite full accounts by several prominent physicists have appeared in *Comptes Reudus*, and these will be freely quoted from.

On Aug. 18, 1890, at 7.15 P.M., a *trombe* (this word is used for water-spout usually, and seems to indicate, on land, a funnel cloud but of somewhat narrower dimensions than those in this country) struck the commune of Piré, situated in Ille-et-Vilaine, and about 180 miles a little south of west of Paris. It moved to the north-east, and next struck Domagné, 3.5 miles from Piré. The length of its track was about 10 miles, and width 650 to 870 yards. Its velocity was almost 37 miles per hour.

A second *trombe* struck Dreux, situated 45 miles west of Paris, at 10.25 P.M.; then it passed north-east to St. Thibault, and on through the Blaise valley to Fontaine, about one mile from Dreux. It then turned to the left in the valley of the Eure River, and again turning to its former course, it struck Brissard.

On the next day a *trombe* struck St. Claude, at the eastern boundary of France, at 7.37 P.M. It moved north-east 15.5 miles to Brassus, then to Bris-d'Amont, and to the station Croy, which it reached at 8.37 P.M. The velocity was 42 miles per hour, and the width of destruction 220 to 1,100 yards.

These facts show clearly that there were several violent storms on the 18th running in parallel lines, beginning toward the west early in the evening and occurring at points farther east later on; that is to say, the several appearances near Piré and Dreux were separate occurrences, and the violent storm did not go from one to the other, but each devastated its own narrow strip. It will be seen that this bears a most remarkable resemblance to the action of tornadoes in this country.

At Piré the *trombe* was investigated by M. G. Jeannel. There was an apparent whirlwind, transported parallel to itself, and turning counter-clock-wise, as shown by the fallen trees. The first thrown down were from the south-east, the next from the east, and so on to the north-west. The greater damage was on the right hand of the track. The velocity of gyration was great and that of translation relatively much less.

The roofs damaged were peculiar. On the right of the path those facing north were carried away, while those facing south were unharmed; on the left of the track just the reverse was true. During the whole time the lightning was continuous. The odor of ozone was noted at different places. At Reinou a woman tending a cow, grazing in the meadow, saw her enveloped in violet flames. These were so intense that the woman, from fright, covered her face with her handkerchief. A moment later the wind struck down every thing.

At Domagné Dr. Pettier suddenly heard an extraordinary indefinite roaring. He rushed toward the garden, where the firs were being plucked up. At the gate he felt a kind of pressure from above; he noticed an unusual smell of ozone; then he felt himself raised up, and this not by the wind, for it was calm, but as though by some invisible force. On many trees the foliage was scorched. About a mile west of Domagné, hail of the size of a walnut fell to a depth of over three inches, covering the ground.

At Dreux the report was by M. Bort. At 10 P.M. a great cumulo-nimbus thunder-cloud was seen to the south-south-west of the town. On its upper part a very brilliant plume of sparks was directed toward heaven. In this cloud the lightning was incessant and the thunder loud. After some hail had fallen, at about 10.25 P.M., a loud roar was heard, like that of a train entering a tunnel, and in less than a minute the storm reached the town. It blew off the tiles, plucked out the trees, and destroyed many houses. At the moment of the passage the sky was on fire, and some persons saw a cloud which reached the height of a house. Reaching the Blaise valley it plucked up many poplars, and left them lying generally from south-south-west to north-north-east. In the environs of Fontaine many trees were uprooted. At Brissard the hurricane made a passage through the western part of the village, destroying twenty houses. At another point most of the trees lay from south-west to north-east, but there were many, 220 yards from the first, that lay in an opposite direction.

Lightning strokes were very rare, because no traces were found upon trees, and no houses were fired. There was a remarkable exception, however, in the Vivien house, built solidly of brick, which had traces of electric discharges. Some window-panes were pierced by circular holes, and these holes had a sharp edge on the outside. On the inside the edge had suffered a beginning of fusion, which had rounded it off. The damage was reported at $300,000 in Dreux, and one person was killed. At the instant of the passage all the gas-lights were extinguished, and it is suggested that "this indicated a rarefaction of the air near the centre of the whirl." By the synoptic charts it appears that the passage of this *trombe* was coincident with the existence of a secondary

barometric depression in the west of France, its path being recognized from Vendir to Ardennes.

The tornado at St. Claude, on the 19th, was studied by M. Cadenat. The giratory movement was recognized by prostrate trees, by pieces of board, *débris* of roofs, etc. On the right of the track many trees were blown down toward the north-east. On the left less trees were uprooted, and some lay in an opposite direction. In some places trees were blown down at right angles to the track, their roots invariably to the right. At some places bunches of trees were left intact in the centre of the tornado's track. The whirl was counter-clock-wise. "This trombe-cyclone in its narrowness furnishes the character of a *trombe* or tornado, and in its whirling, of a cyclone. I give the following secondary phenomena in the order of importance: —

"(1) The liberation of considerable electricity.

"(2) The straight currents.

"(3) The division of the principal branch.

"(4) The funnel-shaped cloud.

"(5) The aspiration.

"(6) The lateral wind."

"At 8 P.M. the sky is like a vast conflagration; the air is calm. Some great drops of rain, some few hail-stones, very great (40 grams), formed of agglomerated grains, preceded the disaster. A lightning stroke fired a house at Bois d'Amont (Jura). At the Swiss frontier the people saw fire on all sides. At another place globular lightning was seen. Some people were killed by lightning strokes. On all sides was a smell of ozone. Walls were prostrated, holes bored in window-panes, stoves destroyed, keys and bars of iron twisted, etc. On all sides thunder-bolts were very evident from their mechanical effects.

"We see on the left and right of the track through a forest, and in front of each point struck by a thunder-bolt, trees thrown down in great number, the top directed against (*contre*) the point struck. The direction of some fir-trees was perpendicular to the path.

"The funnel-cloud, thanks to numerous and intense lightnings, was seen by an observer at Aigh, some 35 miles from the tornado. The aspiration produced by the whirl was shown by the transport to 300 and more yards of great and solid *vachers*, by the removal of roofs, by the plucking up of a heavy boundary-stone weighing a hundred pounds, by the transport of objects 31 miles, mostly to the north. Hail fell at more than two miles to the north-west."

M. Faye also received a private report from M. Cadenat, and remarks: "It is very remarkable that in the United States tornadoes are rarely accompanied by electric balls similar to those at Dreux or at St. Claude, or at the ancient tornadoes of Assonval (1822) and of Chatenay (1835)." He thinks this is because they occur here mostly in daylight. He also suggests that the mechanical action of tornadoes is well understood to-day.

I note (1) there seems to be an enormous variety of terms which are applied in France to phenomena of this kind. In the four reports, covering eleven pages, the following are noted: *coup de vent*, used 6 times; *cyclone*, 6; *meteor*, 11; *orage*, 13; *ouragan*, 9; *tempete*, 4; *tourbillon*, 12; *tourmente*, 1; *tornado*, 19; *trombe*, 13; *trombe-cyclone*, 2. The fact that "tornado" heads the list in frequency is significant.

(2) It is hardly probable that there was a diminution in the gas pressure at Dreux through a diminished air pressure. A similar fact was noted at Cleveland, O., when there was no tornado, and at Louisville, Ky., during the tornado last year. An investigation of this question has shown that the diminished pressure is due to the forcing of the gas-holder at the works, by the wind, against the upright posts (see "The Tornado," p. 136).

(3) It is hardly probable that the absence of the observation of fire-balls in the tornadoes in this country is due to the light of day hiding the appearance. At such a time the sky is black, and the light is sufficiently diminished to show any bright, fiery object. The lack of this observation is due, partly to its not having been investigated, partly to the fact that most every one seeks safety in a cellar or dug-out, where it cannot be observed, but mostly, I think, because in the severer tornadoes the electric action, while abundant, does not manifest itself in this way. We are but just beginning to learn about unusual manifestations of electricity in storm phenomena. One of the most recent utterances is this, regarding the action of a lightning flash: "The seat of the electrical energy is, and must be, not in the cloud or in the earth, just preceding a flash of lightning, but in the air column between cloud and earth" (*American Meteorological Journal*, April, 1891, p. 599). If it can be once proved that it is possible to intensely electrify a column of air, we shall have gone a long way toward determining the cause of our funnel-clouds and the destructiveness of the tornado. It should be noted that fire-balls were observed at Louisville ("The Tornado," p. 134).

(4) I think we have hardly made a beginning in a determination of the causes of the mechanical effects noted either in our general storms or tornadoes. I can do no better than close with a quotation from "Bay of Bengal Cyclone Memoirs, Part III.," just received in this country.

The author, Mr. Eliot, himself an ardent supporter of the ordinary condensation theory of storms and tornadoes, by a course of reasoning almost identical with that previously adopted in this country, has arrived at the following conclusion, on page 285: —

"A cyclonic circulation cannot be resolved into the translation of a rotating disk or mass of air. The fact that the main supply of the energy is applied in front of the cyclone suggests that it is perpetually renewed in front, and that in fact its motion and transmission are hence rather to be explained by some process analogous to the transmission of a wave." This may be regarded as a noteworthy corroboration of views seriously antagonistic to present theories, and seems to indicate a significant advance in theories of storm generation. (See also in this connection this journal, No. 423, p. 150, and *Scientific American Supplement*, Jan. 18, 1890.)

(The following journals have been consulted in making up the above paper: *Comptes Reudus*, Aug. 20, 1890; Sept. 15, 1890; Oct. 6, 1890; Dec. 22, 1890; *Das Wetter*, December, 1890; April, 1891; and *American Meteorological Journal*, April, 1891.)

H. A. HAZEN.

Washington, D.C., May 22.

BOOK-REVIEWS.

Our Common Birds, and How to Know Them. By JOHN B. GRANT. New York, Scribner. Oblong 12°. $1.50.

THIS is an attractive little volume which cannot fail to interest any one who loves nature and to be helpful to him who wishes to become intelligent upon our common birds.

To quote from the modest introduction: "The author desires to disclaim great scientific knowledge of birds and their ways, his object being not so much to impart information as to point his readers to the way of acquiring it for themselves." It becomes quite evident, however, that Mr. Grant can tell us much more than he does, when we have mastered the first steps.

Some seventy portraits of birds on separate plates are given; the significant characteristics of each are so closely brought out, that, in connection with the text, it makes identification of the real object a comparatively simple matter.

The writer succeeded, during one hour spent in a small thicket a few hundred feet from his house, in New Jersey, in matching bird and picture of about a dozen specimens.

The book is of convenient size for carrying about, and would be as valuable an addition to the library of every school boy and girl as it is interesting to any one who, in his love of nature, "holds communion with her visible forms."

Appletons' School Physics. By JOHN D. QUACKENBOS, literary editor; ALFRED M. MAYER; FRANCIS E. NIPHER; SILAS W. HOLMAN; FRANCIS B. CROCKER. New York, Cincinnati, Chicago, American Book Company, 1891. $1.20.

THE title of this book shows what place it is intended to fill, and the list of authors shows how earnestly the publishers have attempted to make a book that shall fill that place with satisfaction. The literary editor, Dr. Quackenbos, is a professor of English at Columbia College, and is a member of the New York Academy of Sciences and a fellow of the New York Academy of Medicine. To each of the four scientific men whose names follow that of Dr. Quackenbos on the title-page has been assigned a special department of physics. Professor Mayer of the Stevens Institute,