336. July 4 is mentioned to show how few persons are often at the museum on holidays now, as compared with the attendance on such days in former years, especially in summer, when 'attractions' are offered at the 'Willows,' 'Point of Pines,' and other popular resorts in the neighborhood.

The above figures are undoubtedly under the actual numbers. There is a steady increase, each year of late, in the regular daily attendance, and a corresponding decrease on popular holidays.

The specimens which seem to be of most interest to the general public are the life-size figures from China, Japan, India, and other countries; the general collection of mammals and birds; the Essex county animals and woods; and, perhaps more than any thing else, the human skeletons and crania. The carving 'Heaven and the day of judgment' of course holds the first place for the seeker after the curious and wonderful.

RECENT PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Ottawa field-naturalists' club, Canada.

March 13. — Mr. W. P. Lett read a paper on the deer of the Ottawa valley. Of these, the most important as regards size is the moose, or American elk (Alce americanus), which unfortunately, owing to indiscriminate slaughter and illegal hunting, is rapidly becoming very rare, except in remote districts along the northern tributaries of the Ottawa. The woodland caribou, or reindeer (Rangifer caribou), formerly frequented the whole country on the north side of the river, but was only an occasional straggler on the opposite shore. Like the moose, it has been driven northward, and much diminished in numbers, although sometimes still found on the Des Licores River, fifty or sixty miles from its mouth, on the upper Gatineau, and to the north of Lake Nippissing. It is the swiftest and wildest of all deer; and the only successful method of capturing it is by still-hunting. The magnificent wapiti, or great stag (Cervus canadensis), falsely called the American elk, was, within the memory of persons still living, an inhabitant of the great hardwood forests along the Ottawa, and was seen within four miles of the spot where the city now is. Fragments of its enormous antlers are still turned up by the plough in various localities, but the stately monarch of the forest has retired to the far northwest territories. The common red or Virginian deer (Coriacus virginianus) is still found within a few miles of Ottawa, but owing to pot-hunting and slaughtering during the winter, when the snow is deep, is becoming annually less plentiful. Not many years ago immense yards, containing hundreds of deer, existed along the various tributaries; but, except in remote districts, the yards are now scattered and small, and the deer confined chiefly to the large swamps. Reference was made by the lecturer to the variety of this species known as the 'spikehorn,' and to interesting piebald and white specimens which had been observed by him. A fine collection of heads and antlers of the several species was shown, including some abnormal antlers from old red bucks.

Society of arts, Boston.

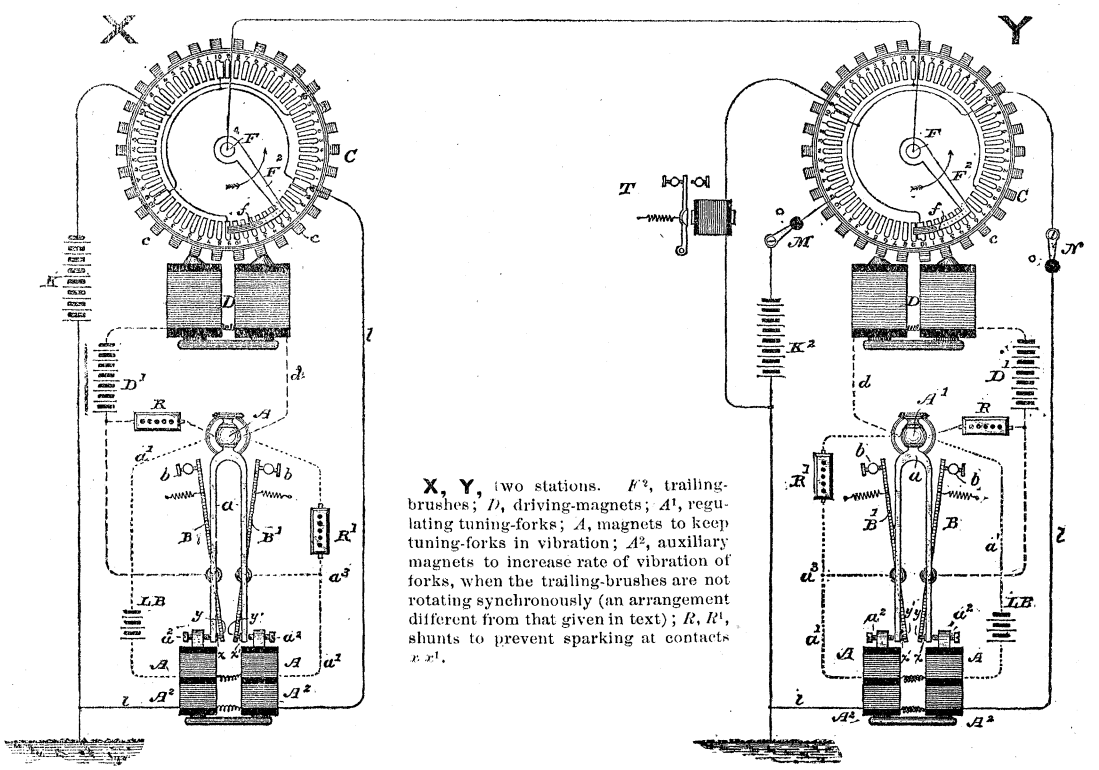
March 13. — Mr. P. B. Delany of New York gave the first public exhibition and description of his new system of synchronous, multiplex telegraphy, — the result of inventions by Mr. P. La Cour (1878), Mr. E. A. Callahan of New York, and himself (1883). By this system any number, up to twelve, of fast Morse circuits can be simultaneously worked over a single wire, the messages going in either direction on any circuit; also a greater number of slow Morse circuits, and as many as seventy-two printing-circuits.

At each end of the main line a drum, called a distributer, is maintained in uniform rotation about a vertical axis by the intermittent attraction of an electro-magnet on the toothed circumference of a horizontal circular plate carried by the drum. A tuning-fork, vibrated electrically (about eighty-five vibrations), opens the motor circuit at each vibration, and thus produces the intermittence in the motor magnet driving the distributer. If the forks at either end of the line were in absolute unison, and the toothed circumference had the same number of teeth each, the drums would rotate synchronously. The impossibility of absolute and continued unison is met by automatic regulation of the rate of the forks, the principle involved being an automatic shunting of a resistance-coil which is normally in the circuit driving the fork; thus increasing the current in that circuit, and hence amplifying the excursion of the prongs, intensifying the field of magnetic force in which this vibration occurs, and thus diminishing (by even five per cent) the rate of the fork. This slowing-down of the fork would immediately result in a corresponding lessening of the speed of rotation of the distributer at that end of the line.

The main principle of the multiplex use of the single line consists in giving the line synchronously, and in sufficiently rapid succession, to the corresponding instruments or circuits at the opposite ends of the line. In the apparatus shown, the rotating drum or distributer carried a brush which trailed over a circular series of eighty-four narrow, insulated, radial plates or segments of metal. Of these, twelve were utilized for the synchronizing arrangement, and the remaining seventy-two were divided among six circuits; the terminus of the same circuit being thus connected to twelve equi-distant segments, each circuit containing merely the ordinary polarized relay, reversing key and ground; the relay serving to close the local circuit through a sounder, as usual. Thus, when the brushes at both ends of the line make contact at the same instant with any one of the twelve segments of the same circuit, that circuit, and no

other, can be in operation. As the synchronous rotation continues, each circuit will be in turn closed through the single main-line wire in succession, and each twelve times in a rotation, and thirty-four times in a second. The frequency of successive closings of the same circuit is thus so great, that, in the fast-working Morse instrument, one closing at least will occur in even the shortest signal, so that no dot can be missed.

The automatic synchronizing device consists in having three equi-distant segments in each set about twice as broad as the others, the segment next preceding each of these being idle. The relative positions of these broad segments are not the same in the two sets; but, in the position corresponding to every broad segment of either set, there is, in the other set, an ordinary narrow segment connected with a grounded battery (the same battery serving, of course, for all three segments of each set). The broad segments are all grounded. The two distributers will be synchronous when the brush of one is on any one of its narrow-battery segments at the same instant that the brush of the other is on the idle segment next preceding the broad one. If the synchronism is perfect, both brushes will pass off these segments at the same instant. If, however, the brush on the idle segment is ahead of such a synchronous position, it will pass on to the broad segment while yet the other brush is on the narrow-battery segment: a current through the line and broad-segment contact to ground will ensue. This current excites a relay (located between the broad segment and the ground), which opens a local relay circuit (normally closed). As the armature of this second relay comes sharply to its back-stop, it short-circuits the resistance-coil previously alluded to as being in the circuit of the fork-driving battery, and thus effects a slowing-down of the fork and distributer, as before described. As there are three broad segments to be touched in each revolution, this synchronizing pulse may be sent thrice, twice, once, or not at all, as may be necessary, in either direction during each revolution. The two distributers may thus be kept within one-quarter of the width of the narrow segments of each other; this corresponding to a synchronism of about 0.001 of a second, or about 0.002 of a revolution.



X, Y, two stations. F^2, trailing-brushes; D, driving-magnets; A^1, regulating tuning-forks; A, magnets to keep tuning-forks in vibration; A^2, auxiliary magnets to increase rate of vibration of forks, when the trailing-brushes are not rotating synchronously (an arrangement different from that given in text); R, R^1, shunts to prevent sparking at contacts x x^1.

Trenton natural history society.

March 11. — W. S. Lee remarked on New Jersey as a paradise for the botanist, particularly commending the region about Trenton as one rich in rarities of plant-life. A certain hillside sloping to the south presents many spring flowers two weeks earlier than similar locations in even the same state; and several rare species grow there, among others Corydalis aurea and C. flavula. Other rare New-Jersey species mentioned as found near Trenton were Fedia olitoria, Ellisia nyctelea, Onopordon acanthium, Potentilla

argentea, Viola striata, and Cornus canadensis. —— Dr. T. S. Stevens exhibited a little garter-snake (Eutaenia sirtalis) preserved by nature in an interesting manner. It had been taken from beneath a wheat-stack in its present condition, the body thrown in graceful coils and curves, the head erect, the whole appearing like a snake on the alert, yet dead, perfectly dry and mummy-like, and presenting only the slightest changes externally. According to Dr. Stevens, it has remained in this condition, without any special attention, for ten years.

Academy of natural sciences, Philadelphia.

March 4. — Professor Joseph Leidy stated that he had recently been supplied with specimens of a wheelless rotifer, attributed to Apsilus, which had been found abundantly last autumn, in a pond at Fairmount Park, attached to Anacharis, and in the Schuylkill River, near by, attached to Potamogeton. They were recognized as Dictyophora, first described in 1857; and as a result of the last examination, Professor Leidy was led to the opinion, that this form, the Apsilus lentiformis of Mecznichow, the Capelopagus lucinedax of Forbes, and the Apsilus bipera recently described by Miss Foulke, are all the same species. In the recent specimens, he had recognized the lateral antennae ending in exceedingly delicate and motionless cilia, as indicated by Mecznichow, and which previously, from the wrinkled condition of the specimens detached from hard objects, had escaped his attention. In all the forms described, the prehensile cup, in the same manner, is projected from, and withdrawn within, the mouth of a compressed oval or nearly spherical carapace, dotted with minute tubercles. This cup, substituting the usual rotary organs of rotifers, communicates with a capacious, variably sacculated, and dilatable stomach, followed by the ordinary gizzard with its mastax, and then a second sacculated stomach. The size of the European forms is fully thrice that of the one now described. —— Miss S. G. Foulke described a species of ciliated infusorian of the genus Trachelius, found in the form of a white speck in water from the Schuylkill River. —— Rev. Dr. H. C. McCook, referring to the spinning-work of spiders, stated that the orb-weavers have, as a rule, but one egg-nest; but this, in the different species, varies widely in form, size, position, etc. There are, however, four species which make several cocoons in connection with their webs. The labyrinth spider, Epeira labyrinthica, weaves a web of right lines crossing at all angles above the orb-web. In the midst of these right lines the spider lives, almost always under a dried leaf. Under the leaf is a little white silk tent or belt-shaped nest connected with the web by a trap-line. Hanging above the tent are nearly always five cocoons, braced above and below by a strong silken line. They consist of a lower cup portion, covered by a sort of lid, and each contains about twenty eggs. The tailed spider, Cyrtophora caudata, generally makes five nests, containing in the aggregate a hundred or a hundred and twenty-five eggs. These are strung along the median line of the orb-web. They are at first composed of a yellowish, slightly viscid plush, and are afterwards covered with fragments of captured insects. This may be an instance of protective mimicry, as the cocoons so covered closely resemble the spider itself; or it may be due to the maternal impulse to protect the repositories of the young as far as possible. Epeira basilica, which forms a beautiful dome-like web placed over a silken sheet, suspends its cocoons vertically in the centre of the snare. They consist of a dusky gray silken sac, within which is a hard ball like a cherry-stone. This ball is quite black, but proves, when placed under a microscope and illuminated, to be woven of a fine-textured yellow silk. It is filled with finely chopped silk, in which the young spiders are hatched. Uloborus riparia makes a horizontal web, the cocoons being strung horizontally from the centre. They are double cones, covered with little protective points.

Mathematical section, philosophical society, Washington.

Jan. 30. — Mr. G. K. Gilbert made a communication on the Knight's tour, on other fields than those of sixty-four squares. He showed that a complete tour was impossible if the number of squares was odd; that a tour having *bilateral* symmetry (latter half of the moves symmetrical with former half, with respect to a line through the centre of the field) was impossible if the number of squares was divisible by four, and hence altogether impossible on square fields; that a tour having *quadri-radial* symmetry (divisible into four parts, which exactly repeat themselves when the board is turned through a right angle about the centre of figure) was impossible if the number of squares was divisible by eight; that the only symmetry possible on the ordinary chess-board was therefore *bi-radial* (of two parts that coincide when the board is turned through two right angles). Upon a field of thirty-six squares, twenty tours with bi-radial symmetry are possible: of these, five have also quadri-radial symmetry.

NOTES AND NEWS.

THE following communication, kindly placed in our hands by the committee on invitations and receptions of the Philadelphia meeting of the American association, will interest the members of the association: —

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE,
22 ALBEMARLE STREET, LONDON, W.,
Feb. 27, 1884.

DEAR SIR, — The resolution of the American association, inviting members of our association to visit Philadelphia and take part in its meeting, was read to our general committee by Principal Dawson, and was received with enthusiasm. No definite resolution in reply was, however, proposed; because it was felt that the visit to Canada was only then assuming definiteness as to its outlines, and it was impossible to say what arrangements might be made in that country. But the members of the association were fully sensible of the courtesy and kindness of their American brethren; and the enclosed resolution, which was passed by the council at their last meeting,