ANNUAL RECEPTION OF THE NEW YORK ACADEMY OF SCIENCES.

BY EDMUND OTIS HOVEY.

The fifth annual reception and exhibition of the New York Academy of Sciences was held on the 13th and 14th of the present month in the American Museum of Natural History, and demonstrated anew the great fitness of holding these affairs in connection with such an institution. The exhibition, which forms indeed the main part of the reception, is intended to be confined to the display of instruments, specimens and other things which will show the progress which has been made in the preceding year in all departments of science, pure and applied. This year the rule was applied much more strictly than heretofore and with excellent effect. The size of the exhibition was greatly reduced from what it has been in previous years, making it more nearly attain the object of the reception and at the same time rendering it more nearly possible for a visitor to grasp what there was to be seen. Probably a still greater concentration of effort in showing only what is really new will make future receptions of even higher value and interest.

The set lecture this year was delivered by Prof. George E. Hale, the director of the new Yerkes Observatory of Chicago University, his subject being "The Function of Large Telescopes." The object of his remarks was to refute the criticism that is sometimes made that the large telescopes are not of sufficiently greater advantage over the comparatively small ones to compensate for their vastly greater expense. In doing this he rapidly reviewed the history of astronomy, showing that many of the most important advances in the science had come through the possession and use of instruments of constantly increasing size and power, the great telescopes revealing characters in the planets and stars, especially double stars, which had not been discovered through the use of the small glasses, and, furthermore, correcting errors due to the use of the smaller affairs. The lecture was illustrated by stereopticon views of the Yerkes and the Lick Observatories and photographs of a few star groups obtained through the great telescopes. Brief addresses were made by Morris K. Jesup, Esq., the president of the Museum, Prof. Henry F. Osborn, the president of the Academy, and Prof. R. E. Dodge, chairman of the reception committee.

The most popular feature of the reception was the exhibition of the properties of liquefied air by Mr. Charles E. Tripler, whose experiments and achievements in this line have received so much notice in scientific and other periodicals in the last few months. Most of those present had seen liquid oxygen in very small quantities during their school days, but it was a thoroughly new experience to all to see cans containing several gallons of the strange liquid and to see it used almost as freely as water. All of the experiments shown brought out the effects due to extreme cold, the temperature of the liquid air being 312° below zero Fahrenheit. Bicycle tubing and sheet tin were rendered as brittle as glass, and a hammer of quicksilver was made in a minute or two by immersing a paper bag full of the metal in the fluid. One of the most striking experiments was the placing of some of the liquefied air in a tin tea kettle and heating it over a gas stove. The air boiled furiously, but its temperature was still so low that it condensed into snow the vapors formed by the combustion of the gas and at the same time made a solid cake of ice of some water that had been put into the kettle with the air. Another strange combination was a tumbler of ice in which some of the liquefied air had been placed, then a fine steel wire, first heated to redness, was burned in it as if in a jar of oxygen. Liquefied air is much richer in oxygen than the ordinary atmosphere is, since in the processes of manufacture and evaporation the nitrogen originally in the atmosphere has been lost more rapidly than the oxygen.

Each of the fifteen departments of science which had a section of the exhibition assigned to it had features of great interest to those making a special study of the branch in question, but space forbids mentioning all here. In the electrical section there was a display in action of American apparatus for telegraphing to a distance without wires on the Marconi system. It is said that this apparatus has worked successfully over a distance of twenty miles. An induction coil giving a spark thirty inches in length, and showing a difference in potential of 1,000,000 volts between its poles, gave a very good representation of artificial lightning. In the section of ethnology and archæology the exhibit of the Jesup North Pacific expedition, showing the results of studies along the northwest coast of America, was the most important. One of the most remarkable exhibits in the whole reception was that of vertebrate paleontology. Here there were the caudal vertebræ and limb bones of a gigantic lizard which the American Museum expedition into Wyoming was fortunate enough to secure last year. The portion obtained is perfect, and represents between 50 and 60 feet of the animal's total length. Mr. Charles Knight has continued making his wonderfully lifelike restorations of Tertiary reptiles and mammals, and a series of his water colors and models was on exhibition. The botanists have been very busy the past year, apparently, for they made a large exhibition of specimens and microscopic preparations of new species, almost all of which are from this country. The chief features of the mineralogical exhibit were a set of choice tourmaline crystals from Haddam Neck, Conn., belonging to Mr. Ernest Schernikow, a large crystal of beryl and some curious groups of calcite crystals belonging to the American Museum of Natural History, and a polished sphere of rutilated rock crystal (quartz) five and one-half inches in diameter. The last is the property of the Tiffany Company, and is the largest such sphere ever cut and polished in this country. In this section was displayed, also, a machine which promises to be of use outside the lines of pure science. It is a microsclerometer, invented by Dr. T. A. Jaggar, Jr., of Harvard University, and it determines with great exactness the relative hardness of minerals by means of a rotating diamond point. The number of revolutions required to cut a hole to a given depth in any substance is accurately recorded, and this gives a very direct measure of the hardness of the material worked upon.

The geological section also contained exhibits of economic as well as scientific interest. One such series was a lot of European clays and kaolins collected by Dr. Heinrich Ries, of this city, and exhibited by him for comparison with American clays. During the past winter Prof. F. D. Adams, of McGill University, Montreal, has been studying the behavior of marble when subjected to enormous pressure in a confined space. He placed a cylinder of Carrara marble in an iron tube which it fitted exactly and then he brought to bear upon it a pressure of 60,000 pounds to the square inch, with the result that the rock was compressed, but did not lose its cohesion, and the microscopic thin section showed that flowage and rearrangement of the particles had taken place, such as is known to have occurred in the crystalline rocks under the influence of mountain-building forces. The breaking pressure of Carrara marble under ordinary circumstances is 9,000 pounds to the square inch. Other interesting geological specimens were a suite of gold-bearing conglomerates from the so-called "banket" reefs near Johannesburg, South Africa, belonging to Columbia University, and a large piece of the "fulgurite" from the summit of Little Ararat, Russian Armenia, belonging to the Natural History Museum. Fulgurite is the name applied to the glass-lined holes which are formed when lightning strikes some rocks, melting the material along its path. The rock itself in this case is a lava. Mention must not be omitted of the zoological section, which contained several very interesting exhibits, the most popular of which by far was that shown by H. E. Crampton, Jr., of New York, who has been making many curious experiments upon moths, producing monstrosities and anomalies by grafting the cocoons of the same or different species together. At the reception he displayed many examples of grafted cocoons and the insects hatched from them. One "tandem" moth was hatched during the first night of the reception and there were two other living compounds to be seen under glasses, besides many which had been preserved in alcohol or other fluid. Moths with two bodies and no head, those with two sets of wings, those with the body of one growing out of the back of another, and those with two sets of antennæ were some of the curiosities on exhibition. An ingenious contrivance in the section devoted to experimental psychology registered upon paper the effect produced on the nervous system by various mental emotions, such as those of pleasure or pain. This machine was devised and exhibited by W. L. McWhood, of Columbia University.

The sections into which the exhibition was divided and those who had charge of them were as follows:

Anatomy, George S. Huntington and Jos. A. Blake; Astronomy, J. K. Rees, Harold Jacoby and H. S. Davis; Botany, George V. Nash; Chemistry, Charles A. Doremus; Electricity, George F. Sever; Ethnology and Archæology, Franz Boas and L. Farrand; Experimental Psychology, Charles B. Bliss; Geology, Arthur Hollick; Mineralogy, Edm. O. Hovey; Paleontology, Gilbert Van Ingen; Photography, Cornelius Van Brunt; Physics, William Hallock; Physiography, R. H. Cornish; Zoology, E. B. Wilson; Philology, Lawrence A. McLouth and A. V. Williams Jackson.

PRESERVING PLANT COLORS.

A. F. Woods describes a method of preserving the green color of plants for exhibition purposes which appears to be similar in principle to the coppering of green pease. Air is removed as completely as possible from the surface and intercellular spaces of the plants by immersion in 90 to 95 per cent alcohol, or an air-pump may be employed. The plants are next immersed in dilute glycerin (5 per cent) to which a bluish tint has been imparted by means of copper sulphate or acetate. The copper combines with the chlorophyl, forming copper phyllocyanate, which is practically insoluble in any ordinary preservative medium except strong alcohol, and is not affected by light. Any access of copper salt may be dissolved out by a mixture of dilute glycerin and formalin, which may also be employed with advantage as the preservative medium.—Botanical Gazette, xxiv., 206.

THE HEAVENS IN MAY.

BY GARRETT P. SERVISS.

In the evenings of May the Milky Way occupies a very peculiar position. Instead of crossing the dome of the heavens, the "starry baldrick" lies along the northern horizon, stretching from the west to the east point, and visible only where there are no buildings or lofty hills to intercept the view. From the eye of the ordinary observer it has completely hidden itself, but those who know how to look can see it running, like the last delicate glow of twilight, around half the circle of the sky.

In its center, just under the pole, at 9 P. M., in the middle of May, almost touching the hills in our northern latitudes, and dipping under them in the southern, hangs Cassiopeia's chair. Toward the west from Cassiopeia appear Perseus and Auriga setting, and toward the east the Northern Cross and Lyra rising. Overhead are the Great Dipper and Coma Berenices, while Virgo is on the meridian in the south, and the quadrangle of Corvus is just to the west of it. In the southeast the fiery Scorpio is lifting himself with sprawling claws from the horizon.

THE PLANETS.

Jupiter, in Virgo, crossing the meridian at a commanding elevation soon after 9 o'clock in the first part of the month, is a splendid phenomenon, the delight of all possessors of small telescopes. The first view of Jupiter with a telescope is a memorable experience for any one who has knowledge and imagination sufficient to appreciate it. The increasing clearness of the air, the agreeable temperature, and the convenient situation of the great planet all combine to make amateur observations of Jupiter especially attractive this month.

On the 9th, at 8:08 P. M., Jupiter's first satellite will begin to transit the planet's disk. At 9:04 P. M. the shadow of the same satellite will appear on the disk. At 10:23 P. M. the satellite will pass off the disk, and the shadow will follow it off at 11:20.

On the 10th, at 8 o'clock, 26 minutes, 32 seconds, the first satellite will reappear from eclipse in Jupiter's shadow. The reappearance of one of Jupiter's satellites after an eclipse is always an interesting phenomenon. The eye is startled as if a new star had instantaneously sprung into being out of black space. In watching for the reappearance on this occasion, keep the attention fixed on the sky, close to Jupiter, on the side from which the planet appears to be moving when allowed to drift across the telescopic field. The time given is Eastern standard.

On the 16th both the disappearance and reappearance may be witnessed in an eclipse of Satellite III. The disappearance will occur at 8 o'clock, 43 m. 48 s. and the reappearance at 11 o'clock, 11 m. 35 s. On the same evening the transit of Satellite I. and its shadow may be watched, the transit of the shadow, which, for small telescopes, is the most interesting part of the phenomenon, beginning at 10:59 P. M.

Mercury, which was conspicuous with Venus in the evening skies of the middle of April, comes into conjunction with the sun on May 1, and after that becomes a morning star. It remains throughout May in the constellation Aries.

Venus is nightly growing more beautiful in the west after sunset. Toward the close of the month it will not set until after 9 o'clock. It moves from Taurus into Gemini, crossing the Milky Way. It will be in conjunction with Neptune early on the morning of the 19th.

Mars, remaining throughout May in Pisces, is a morning star, rising about 3:30 o'clock at the beginning of the month and about an hour earlier at the end. It is inconspicuous.

Saturn rises about a quarter after 9 in the evening on the 1st of May and soon after 7 o'clock at the close. It is on the borders of Scorpio and Ophiuchus, and its rings are beautifully opened for observation.

Uranus is in Scorpio, a few degrees west of Saturn, and close to a pair of little stars, the Omegas.

Neptune is on the horns of Taurus, setting early in the evening.

THE MOON.

May opens with the moon approaching the full, a phase that is reached early in the morning of the 6th. Last quarter occurs on the afternoon of the 12th, new moon on the morning of the 20th, and first quarter at noon on the 28th.

The moon is nearest the earth on the 7th and farthest on the 23d. Its greatest eastern libration occurs on the evening of the 1st and western on the morning of the 14th.

The lunar planetary conjunctions occur as follows: May 3d, Jupiter; 7th, Uranus; 7th, Saturn; 16th, Mars; 18th, Mercury; 22d, Neptune; 22d, Venus. On this occasion Venus will be less than one degree south of the moon, a little before 1 o'clock P. M.

On May 6th occurs a meteoric shower having its radiating point in the constellation Aquarius, the center of which rises about 1 o'clock in the morning.