

NEW YORK ACADEMY OF SCIENCES.

ANNUAL EXHIBITION AND RECEPTION.

The fourth annual reception and exhibition of the New York Academy of Sciences was held in the American Museum of Natural History, on the 5th and 6th of the current month, and the presence of several thousand people testified to the value of the event and the interest taken in it. This year the exhibits were limited to the exhibition of the progress made in science in the past year, and it enhanced greatly the scientific interest of the exhibition, while enough popular matter was shown to occupy far more time in its inspection than many of the guests were able to devote to it. Even such cultured assemblages as were present at the three sessions of this exhibition showed the interest aroused in the average human mind by something in motion, and the rock cutting machine, the exhibit in experimental psychology, the two booths in which new Roentgen X ray apparatus was at work, and the electrical furnaces had crowds of people around them all the time. Three sessions were held, that on the evening of the 5th being assigned for members of the academy and guests, while the sessions of the next day were open to the general public and members of the Scientific Alliance and of the museum.

Fourteen departments of science were represented in the exhibition, and a catalogue comprising sixty-two printed pages was needed to enumerate the articles exhibited. The electrical section was especially strong, and its exhibit formed one of the striking features of the reception. A collection of incandescent lamps showed the advances made from the first crude forms to the present 220 volt high efficiency lamps. The oldest one shown was Edison's paper horseshoe lamp, which was described in the SCIENTIFIC AMERICAN, April 17, 1880, and is still in good working condition. The question of producing electrical energy from carbon without the application of heat is one that is always in the minds of electricians, and that always receives much thought. One method of solving the difficulty is by using the Jacques carbon battery, in which carbon and iron are placed in caustic potash (KOH) and air is admitted for a supply of oxygen. The apparatus was shown. The new and improved forms of Roentgen ray tubes and coils in operation in one of the booths were powerful enough to show the shadows of the bones of the human body, though most of the visitors contented themselves with taking a good look at their hands by means of the fluoroscope. One of the curiosities of the electrical department was one of the great porcelain insulators, ten inches in longest diameter, used on the Niagara-Buffalo transmission line to support wires between which exists a pressure of 10,000 volts.

In the chemistry section there was a supplement to the electrical exhibit in the shape of several electrical furnaces, two of which were constantly in operation. In one of them quartz (a mineral until recently regarded as wholly infusible) was shown in a molten state, while the other was used for showing the spectra produced by dropping an appropriate metal into the arc, according to the method of Roberts-Austen. An interesting series of chemical compounds produced by the aid of the electric furnace was on exhibition. The heat developed in these furnaces is estimated to be as high as that developed in the sun (3,500° to 4,000° C.) The furnace used by M. Henri Moissan when he made diamonds before the academy last October was on exhibition, and the great carbons, 3½ inches in diameter, like those used in the aluminum works at Niagara Falls, attracted some attention. A display of the Tiffany favrile glass was made in this section.

The most popular feature of the section devoted to botany was a collection of one hundred water color paintings of Australian wild flowers. These were done from life in their native haunts by Mrs. F. C. Rowan, by whom they were loaned to the reception. Their marvelous fidelity to nature, combined with their artistic merit, have won twelve gold medals at various places from Melbourne to Paris and Amsterdam. A grewsome exhibit in the botanical section was a series of bacteria from our city water. Fortunately, most of them are entirely harmless.

Improved methods of installing exhibits of an archaeological character were shown in a model of an altar mound excavated near Chillicothe, O., last year, showing the manner of doing the work, and in a skeleton mounted in exactly the position in which it was found and surrounded by the personal ornaments which were originally buried with it. The exhibit in the archaeological department which seemed to attract the most attention was a selection of specimens illustrating recent discoveries at the ruins of Omitlan, state of Guerrero, Mexico. The ruins cover a large area and were discovered by Mr. William Niven, in a region that has never been visited by any of the famous explorers and of which no mention is made by any of the Mexican historians. Many of the antiquities found are of unusual form, but most of them have apparently been used as dress ornaments, amulets, ceremonial stones and the like. Seventy mother-of-pearl buttons and pendants were found in a small olla or pot of terra cotta nine feet below the surface of the ground in a temple. These were exhibited, a portion of them still remaining

in the clay which filled the olla. Dozens of highly polished idols of jade, diorite and serpentine and ear ornaments of the same materials, together with masks of trachyte, marble, chert and jade, were on exhibition. One shell object was marked as being an ear ornament, but it bore a closer resemblance to an ordinary napkin ring. A series of fine photographs showed portions of the ruins and the laborers at work. Some 1,400 objects comprise this unique collection, which is now on permanent exhibition in the American Museum of Natural History, having been acquired by that institution. Inasmuch as the Mexican government has just granted to Mr. Niven the right of exclusive exploration in these and other ruins in Guerrero for ten years, under certain conditions, we may reasonably hope for the display of additional material from this wonderful ruined city at future receptions of the academy.

Experimental psychology is a department of science which is receiving much attention now from students and has its strongly popular side. The delicate and ingenious devices for determining the strength, duration and effect of various sensations, the quickness of perception, and other mental processes were in operation at one table and aroused much interest in the visitors. The great advances made of late years in the application of electricity to mechanical devices have rendered great assistance to this as well as to every other department of applied science.

Geology, with its closely allied sciences of physiography, mineralogy, and paleontology, occupied a large portion of the space devoted to the exhibition and showed much that was new in material or method.

The section cutting machine devised and exhibited by Prof. W. B. Dwight, of Vassar College, Poughkeepsie, marks a great advance in this important aid to the study of rocks, minerals and fossils. The special features of the machine lie in the devices for holding the object so as to produce a cut in exactly the desired direction and for the adjustment and control of the cutting disk by adjustable friction rollers, so that the sectioning can be done by either small or large disks (six to twelve inches in diameter) with great accuracy, facility and economy of material. With this instrument can be cut sections of from eight to twelve square inches and from 1/16 to 1/8 inch thick with very true, smooth surfaces.

Progress made in physiography was shown by the display of recently completed maps, charts and topographic models, one of New York City being of special interest.

Paleontology, both vertebrate and invertebrate, showed that its devotees had not been idle the past year. Mounted and unmounted skeletons of marvelous perfection of mammals from the Tertiary lake beds of South Dakota and Wyoming were exhibited as some of the results of last year's expeditions. One of the most important features in this section, from a scientific point of view, was a series of specimens from New Mexico which revealed to Dr. J. L. Wortman the fact that the order of edentates or sloths originated on this continent in early Eocene time, instead of in South America, as has long been supposed to be the case.

Prof. S. H. Scudder, of Harvard University, contributed to the reception a selection from his celebrated collection of Tertiary insects from Florissant, Colorado, some of which are still undescribed and without names. All the principal orders were represented and in considerable variety. Prof. C. E. Beecher, of Yale University, exhibited a set of models of trilobites which gave the results of infinite study and pains. Trilobites are crustacea and may be regarded as the ancestors of the modern lobsters, shrimps and crabs.

In the mineralogical section the most striking specimens were a group, 20 x 12 x 12 inches in size, consisting of three golden calcite crystals and another somewhat larger group consisting of very large crystals of calcite, galena, copper pyrites and zinc blende on chert. These were from a new lead and zinc mine near Joplin, Missouri.

In the physical department Prof. O. N. Rood exhibited a series of photographs demonstrating the regular reflection of the Roentgen. Among many other objects of interest in this department, mention may be made of the ingenious device gotten up by Mr. P. H. Dudley for the purpose of learning the amount of depression of railroad rails under moving trains. It is an electrical contrivance which is firmly attached to the base of the rail in such a way as to register automatically the elongation and compression of the rail as the train passes over it. Experiments with this little instrument prove that the deflecting pressure on a rail from a moving train is from ten to twenty times as great as was calculated from theoretical considerations.

The plans of the zoological and botanical buildings to be erected in Bronx Park were on exhibition.

A portion of Tuesday evening was devoted to addresses by Prof. R. E. Dodge, chairman of the reception committee, Prof. J. J. Stevenson, president of the academy, and Morris K. Jesup, Esq., president of the American Museum of Natural History, and a lecture by Dr. Nicola Tesla. Prof. Stevenson dwelt upon the fact that the past year had been a memorable one in the history of science in New York City. The Botan-

ical Garden is well under way, the Zoological Garden is an assured fact, and the Natural History Museum has made great enlargements in its building and more are provided for to complete the south front. Private munificence toward all these enterprises has been very great. The scope of the Academy of Sciences has been broadened by the establishment of a section of anthropology, psychology and philology, bringing the association a long step nearer to the older academies of science in Europe. The publications of the academy have been larger and more numerous than ever before, and show the active scientific work that is being carried on under its auspices. Mr. Jesup outlined the status and plans of the great museum in which the reception was held, and spoke of the close relations existing between it and Columbia University, the city Board of Education and the State Department of Public Instruction in the work of popularizing and disseminating scientific knowledge. The growth of the museum and related institutions in the last ten years has done much to remove from New York the stigma of being a purely commercial city, caring nothing for science, literature and art. Every exhibit in the museum was plainly labeled, giving information about the object, rendering a catalogue unnecessary.

The subject of Dr. Tesla's lecture was "The Streams of Lenard and Roentgen, with Novel Apparatus for their Production," and was illustrated by many diagrams and some apparatus. After a brief but concise statement of what is known about the so-called X rays, Dr. Tesla detailed some of his own experiments with them and their production. Toward the close of 1894 he began an investigation into the effects upon covered photographic plates produced by Crookes tubes, and found that some affected the plates and some did not. The destruction of his laboratory interrupted his experiments, and Roentgen's announcement came before they could be taken up again and completed. One great difficulty in the way of success with some lines of electrical study has been to get a machine which will give a sufficient frequency of vibration. Now this problem seems to be solved. Dr. Tesla's latest discovery is that a particular form of the electric arc light gives off X rays which produce results far superior to those emanating from Crookes tubes. He also described a method he had lately discovered of deflecting the X rays by means of magnets and magnetism so simple that any boy could do it.

The reception and exhibition committee this year was R. E. Dodge, H. F. Osborn and C. F. Cox; special committee of arrangements, J. L. Wortman and G. D. Orner; and the chairmen having in charge the special departments of the exhibition were: Anatomy, George S. Huntington; astronomy, J. K. Rees; botany, L. M. Underwood; chemistry, Charles A. Doremus; electricity, George F. Sever; ethnology and archaeology, Franz Boas and M. H. Saville; experimental psychology, J. McK. Cattell; geology, J. F. Kemp; mineralogy, George F. Kunz; paleontology, Gilbert Van Ingen; photography, William Stratford; physics, William Hallock and J. F. Woodhull; physiography, R. E. Dodge; zoology, C. L. Bristol and Bashford Dean.

The officers of the academy for 1897-98 are: President, J. J. Stevenson; first vice-president, H. F. Osborn; second vice-president, N. L. Britton; corresponding secretary, William Hallock; recording secretary, J. F. Kemp; treasurer, C. F. Cox; librarian, Arthur Hollick.

The American Coal and Iron Production in 1896.

According to statistics prepared by the Engineering and Mining Journal, of New York, the output of bituminous coal in the United States during 1896 reached a total of 141,770,099 short tons (2,000 pounds), showing a gain over 1895 of 4,371,752 tons. On the other hand, there was a decrease of 6,782,057 short tons in the anthracite production. The total coal production was, therefore, 193,351,027 short tons, and the total decrease, as compared with 1895, was 2,410,305 tons. The production of coke showed a gain of 445,276 tons, chiefly due to the activity of the iron and steel trades in the earlier part of the year. The price of coal continues very low, the average for bituminous coal at mines being below \$1 per ton. The production of pig iron last year was 8,768,869 long tons (2,240 pounds). The depression in business which made itself manifest in the latter part of the year had less effect than might have been anticipated, the decrease from 1895 being only 677,439 tons, or about 7 per cent.

New Deputy Commissioner for Canada.

In a recent issue we announced the death of Colonel Richard Pope, late Deputy Commissioner of Patents for the Dominion of Canada. A successor has just been appointed in the person of Mr. William Bain Scarth, ex-Member of Parliament, who will fill the dual positions of Deputy Minister of Agriculture and Deputy Commissioner of Patents, reverting to the old system previous to 1888, when the late Chevalier Taché, M.D., held the above important offices. Mr. William J. Lynch, Financial Clerk, has been appointed Chief Clerk of the Patent Office, vice Mr. J. F. Dionne, resigned.

Recent Patent and Trade Mark Decisions.

Klein v. City of Seattle (U. S. C. C. A., 9th Cir.), 77 Fed., 200.

Insulating Pins.—The Klein patent, No. 297,699, for an improvement in pins for holding insulators for electric wires, consisting of making the pin of wrought metal, with a soft metal head adapted to be screwed into the insulating material, has been held void for want of patentable novelty.

Extensive Sales as Evidence of Invention.—The fact that a device has gone into general use, displaced other devices, while in some cases evidence of invention, is not conclusive of patentability, where the changes made over the prior art are mere changes of mechanical construction or of form, size or materials.

McDowell v. Kurtz (U. S. C. C. A., 3d Cir.), 77 Fed., 206.

Protection for Pipe Threads.—The Kurtz patent, No. 440,168, for a band or ring to protect the screw threads of pipes, has been held valid and infringed on motion for preliminary injunction.

Public Acquiescence.—Where plaintiffs have manufactured and sold their device without opposition for more than five years, there is sufficient proof of public acquiescence, and it is immaterial that a large number of other devices were not marked "Patented" when it appears that enough were so marked to give general notice of the patent.

Cleveland Faucet Company v. Syracuse Faucet Company (U. S. C. C. N. Y.), 77 Fed., 210.

Hydraulic Air Pump.—The Weatherhead patent, No. 504,097, has been held valid as showing patentable invention and infringed by a pump containing a mechanism which accomplishes a similar result in the same way, although it differs in the construction somewhat.

Matheson v. Campbell (U. S. C. C. N. Y.), 77 Fed., 280.

Color Compounds.—The Hoffman and Wynburg process and product patent, No. 345,901, for the naphthol black color compounds, have been held valid and infringed on rehearing.

Anticipation.—Where it is shown that a coal tar dye, similar to a dye covered by a process and product patent and answering to the chemical tests of the patent, was on sale in this country prior to the application, it does not amount to anticipation of the patent, where it appears that it was made from a different starting material, was inferior in quality, and was sold at a higher price.

Validity of Product Patent.—Where a patent first describes a new patentable process, producing an article chemically and technically identical with an article formerly known, but superior thereto, the invention is a meritorious one, and the claim on the product will be held valid as well as the claim on the process.

Burden of Proof of Infringement of a Process Patent.—The complainant has shifted the burden of proof resting upon him as to infringement of the process patent when he has shown that the defendant's product corresponds with that claimed in the patent when subjected to chemical tests, and then the burden is upon the defendant to show that it was made by a different process.

Heaton Peninsular Button Fastener Company v. Eureka Specialty Company (U. S. C. C. A., 6th Cir.), 77 Fed., 288.

Sales of Patented Machines with Conditions Limiting Their Use.—It is lawful for the owner of a patent for a machine to sell such machines subject to a condition that they shall be used only with a certain article manufactured by the seller, and that, in case of a breach of the condition, the title shall revert to the original owner. This is true, although such articles which must be used with the machine are not patented, if such restriction gives the owner of the machine patented a monopoly of their manufacture and sale. This is not void as in restraint of trade or against public policy, for the purchaser of the machine is a mere licensee, and the breach of the condition would not only be a breach of the contract, but a violation of the monopoly, for which an injunction would lie. In such case, too, it is immaterial that the patent owner sells the machine through jobbers and not directly to the users where the machines bear a conspicuous metal label with the conditions of the sale thereon and all parties have notice of it. Where, for example, machines for fastening buttons on shoes are sold by the patentee on condition that only staples made by said patentee, although not patented, shall be used therein, any other party will be enjoined from selling staples which are intended to and can only be used in such machines, for he is guilty of contributory infringement. And in such case it is immaterial that the defendants did not use the patented machines or that they are making and selling an unpatented article.

International Tooth Crown Company v. Bennett (U. S. C. C. A., 2d Cir.), 77 Fed., 313.

Artificial Teeth.—The Low patent, No. 238,940, for a device for permanently inserting artificial teeth without a plate and without using the gum as a support, was held void as to the first two claims.

Archæological News.

A life sized bronze statue of Poseidon was recently discovered in the sea near Mount Cithæron by a fisherman. Though it is badly rusted, the head is untouched and only the hands are missing. Near it was a splendid marble pedestal with an inscription. The statue is assigned to the sixth century before Christ by archæologists, who say it is as fine as the Jupiter Olympus found at Delphi.

Cologne has been celebrating the carnival by a historical and artistic procession around the cathedral, including young women who represented St. Ursula and her eleven thousand virgins, the town tower, and the mercenaries employed by the archbishops when they were secular princes. It is asserted that the carnival has been held at Cologne since pre-Christian times and that it is the direct representative of the Roman Saturnalia.

Edmond de Goncourt's Oriental china, for which he and his brother spent 400,000 francs, brought 237,046 francs at the recent sale in Paris. His eighteenth century drawings, however, were sold for much more than he paid for them. So far the collections have brought in 1,162,352 francs, and there are four more sales to come, but the sum is much smaller than was expected, and the Goncourt Academy will be poorly provided for, even if the will is held valid by the courts.

The Romanesque tower with its Roman foundations at the entrance to the mausoleum of Diocletian, at Spalato, in Dalmatia, has been destroyed. A new structure is taking its place. Fragments of capitals, sculptures, and stones that date from the third to the twelfth century are lying about the ground; some of them are being built into the new structure which is taking the place of the old. This is not very likely to make Dalmatia as popular a place of resort for the tourists as Italy or Sicily, and if the antiquities of this interesting region are to be rebuilt in this wholesale manner, it will not tend to encourage visitors.

M. Berthelot has recently published in the Comptes Rendus analyses of weapons, tools, etc., from Tello, in Chaldea. Their date is put from 4000 to 3000 B. C. A large lance and a hatchet were found to be approximately pure copper, and another hatchet was of copper with traces of arsenic and phosphorus, by which it seems to have been hardened. No trace of tin was present in any case. Thus in Chaldea an "age of copper" seems to have preceded the "age of bronze." An egg-shaped object from the same locality, weighing 121 grains, was of iron; an ingot of white metal was 95 per cent silver; a leaf of yellow gold was found to contain considerable quantities of silver.

Prof. Thomas D. Seymour, chairman of the managing committee of the American School at Athens, says that on account of the threatened war the excavations projected by the school this season at Corinth, and perhaps elsewhere, will not be undertaken. The Corinthian excavations, on account of the great depth and the purchase of valuable land, would this year have meant a considerable undertaking, and the government has had no time to give to the matter of expropriating land and superintending the work. At this season of the year it is always somewhat difficult to obtain laborers, and this year, with the demand on the men for service in the Greek army, the effort to hire them would be useless.

The lake village of Glastonbury, England, is very interesting. During the last year fifteen additional dwelling houses and 500 feet of palisading have been disclosed, and nearly two-thirds of the boundary have now been unearthed. According to the Academy many valuable relics have been obtained, among them being a saw, a wooden ladder seven feet long, a small door, and a mirror—a feature of late Celtic art. The pottery was abundant and was ornamented in late Celtic style, uninfluenced by Roman art. Hence, the discovery of this lake village cannot fail to shed much light upon one of the obscurest periods of British art. The discovery is of great importance, for it reveals the manner and avocations of the prehistoric people who occupied Glastonbury in the iron age.

The Athenæum of February 20 reported the discovery at Athens of an ostrakon, or potsherd, bearing the name of Themistokles. Of this curious find we are able, says The Builder—thanks to the Berliner Philologische Wochenschrift, February 27—to give our readers some further particulars. The ostrakon in question is a fragment of the brim of a large vessel, of black terra cotta ware. On its surface has been scratched with a sharp tool the words "Themistokles Phrearrios," in archaic letters. There can be no question that Themistokles is the famous statesman, and that one of the actual ostraka that condemned him to banishment in B. C. 470 has come to light. Up to the present time only three similar voting ostraka had been discovered, one on the Acropolis, with the name of Megakles, son of Hippokrates, the uncle of Perikles; another, also on the Acropolis, with the name of Xanthippos, the father of Perikles; and a third, bearing the same name but found in the Kerameikos. All three are published, and we hope the Themistokles ostrakon will shortly appear. It was found in the excavations being carried on by the German institute near the Areopagos.

Science Notes.

The Italian physicist Signor Pettinelli has been making a number of observations in the minimum temperature of visibility. He finds that the larger the hot surface, the lower the temperature required. With a surface equal to 23 square inches in area placed 2 feet from eye the minimum temperature necessary to render the surface visible in the dark is 400° C.

The death is announced of James Joseph Sylvester, the Savilian professor of geometry at Oxford; Professor Georges Ville, of the Paris Natural History Museum, who was professor of botanical physics and author of important works on fertilizers; also Professor Henry Drummond, the author of "Natural Law in the Spiritual World," "The Ascent of Man," and other works aiming at the reconciliation of theology with science and evolution.

The photography of ripples is a subject which seems to be of great interest, as is demonstrated by experiments by Mr. J. H. Vincent before the Royal Institution. Ripples produced on a mercury surface are invisible to the naked eye, but by means of an electric spark, photographs of ripples set up in mercury by a stylus attached to the tuning fork can be obtained. These photographs show in a novel way the phenomena of interference, diffraction, and spherical aberration.

There has been placed in the Treasury Whips' room at the House of Commons, London, for the inspection of members, a section of the barrel of a new Lee-Enfield rifle which has never been used, and a section of a similar weapon through which 4,050 rounds of cordite ammunition have been discharged. The latter is in a perfectly serviceable condition, and experts declare that it is good for another 8,000 rounds. As 300 rounds a year is the average number fired by a soldier, it follows that the life of a Lee-Enfield barrel is considerably over ten years, the official estimate of their period of utility.

The Sinking Fund Commissioners of the city of New York adopted a resolution, on March 25, setting aside 261 acres, the entire southern portion of Bronx Park, for the establishment of a zoological park, under the condition that the zoological society shall raise \$100,000 before beginning to use the park and \$150,000 within three years from the date that the work of improvement is begun by the park department. The society contributes the buildings and the collection of animals. The city of New York will spend \$125,000 immediately in the preparation of the land and will during the first year of occupation provide a maintenance fund not exceeding \$60,000 for the care of the animals and the further improvement of the park.

The international aerostatic ascents, which for some time past have been contemplated, took place on the 18th ult., at Paris, Berlin, and Strasburg. Three unmanned balloons were liberated at about 10 A. M.—local time—at each station. The Berlin balloon burst; the Strasburg balloon disappeared in the northeast, and has not yet been recovered; the Paris balloon descended, after having traveled during a little more than two hours in the N. N. E., and ran 102 kilometers, the temperature recorded being 60°, at an altitude of more than 10,000 meters. An apparatus, constructed by Cailletet, for bringing back to land a sample of the air of the upper atmosphere, was successful, but the gas captured has not, says Nature, yet been analyzed.

An ingenious application of Michelson's interference refractometer to the study of alternate currents and magnetic induction is described by Carl Barus in a recent number of the American Journal of Science. The slender iron cores of two identical coils are placed horizontally at right angles to each other and at the same distance from their point of convergence. The semi-transparent mirror is placed at that point, and a small mirror is mounted on the fore end of each core, the other ends being rigidly fixed. The distances are so adjusted that interference fringes are seen in the telescope. These disappear when one of the cores expands or contracts, but not when both do so to the same extent. Hence a delicate means is afforded of determining whether the oscillatory changes of length produced by an alternating current traversing both coils in succession have the same phase.

It is intended to establish at the Yerkes Observatory a museum for the preservation and exhibition of photographs, charts and drawings of the sun, moon, planets, comets, meteors, stars and nebulae and their spectra, and of optical phenomena observed in the laboratory; photographs and drawings of astronomical and physical instruments; and portraits of astronomers, astrophysicists and physicists. Scientific men, learned societies and directors of laboratories and observatories are earnestly requested to assist in the formation of a library for the observatory by contributing to it copies of their publications. Photographs of scientific subjects, on glass or paper, will be very welcome for exhibition in the museum. Drawings and catalogues of scientific instruments are also desired. It is expected that the observatory will ultimately be able to make some return for such contributions in the form of its own publications and photographic results.