

ron passed the target and four times they belched tons of steel that made the sea around the bobbing triangle look like an angry lot of breakers on a rocky coast. The Raleigh won the honors. Several times the signal, "Well done, Raleigh!" was displayed from the flagship. Naturally Capt. Miller and Lieut.-Com. William J. Barnette, the executive officer of the Raleigh, were elated. From the Raleigh's main battery 207 shots were fired within eight minutes."

Subsequently the squadron indulged in torpedo practice. Buoys were placed a short ship's length apart, and at a speed of six, nine and eleven knots, each ship banged away with her torpedoes. The target was 400 yards from the ships, and each ship had three shots at it. Every torpedo didn't strike between the buoys, but every one would have hit an ordinary war vessel.

The American Chemical Society.

Buffalo Meeting, August 21-22, 1896.—The American Chemical Society, one of the societies affiliated with the American Association for the Advancement of Science, met at Buffalo, August 21 and 22, with an attendance of members nearly equal to the combined attendance of all the other affiliated societies, and with a long programme of papers, which included several of much importance. Dr. Charles B. Dudley, of Altoona, Pa., presided. The opening address of welcome was by Dr. Roswell Park, of Buffalo, as president of the Buffalo Society of Natural History, in which he said that that society now greeted the American Chemical Society for the first time, but hoped to meet them again in 1906, as they had met the American Association for the Advancement of Science in 1866, 1876, 1886, and were now to meet them in 1896. He said that it is not generally known outside of Buffalo that Buffalo is the sixth commercial city of the world, and in tonnage of freight entering and leaving the port it is surpassed only by Liverpool. He urged the chemists to devote their best energies to discover that great desideratum of therapeutics, some chemical compound which shall be toxic to pathogenic germs, but innocuous to the tissues of the human body.

President Dudley responded briefly on behalf of the society.

Dr. Park's address aptly introduced a very important paper in its sanitary bearing by Cass L. Kennicott on the "Inspection and Sanitary Analysis of Ice." Abstracts of other papers follow.

ALUMINUM ANALYSIS.

By James Otis Handy.

Although the aluminum industry is not a large one in the sense that the iron industry is, it is growing very rapidly. The output of the United States in 1894 was 550,000 pounds, and in 1895 it was about 850,000 pounds. The Pittsburg Reduction Company, with works at New Kensington, near Pittsburg, Pa., and at Niagara Falls, N. Y., is a representative American producer of aluminum. The material is made by electrolysis, in carbon-lined pots of alumina, the material being dissolved in a fused bath of fluorides. The product of each pot is ladled out at intervals, and is graded according to analyses. Some of the aluminum is sold as it is made and some is alloyed. The aluminum at present produced with the best ores available contains from 99 to 99.9 per cent of aluminum, 0.3 to 0.05 of silicon, 0.50 to 0.0 per cent of copper, 0.20 to 0.0 of iron. Carbon is sometimes present.

Second grade aluminum contains 96 to 98 per cent aluminum, silicon and iron making up the remainder. Aside from analyses of metallic aluminum, there are required in the pursuit of the aluminum industry analyses of aluminum alloys of copper, nickel, manganese, chromium, tungsten, zinc and titanium; of aluminum solders, containing tin, zinc and phosphorus; of aluminum hydrate, bauxite and electrode carbons; of hydrofluoric acid and fluorides. The method of these analyses was described in detail.

THE DEVELOPMENT OF SMOKELESS POWDER.

By C. E. Monroe.

Dr. Monroe gave an elaborate history of the work of other investigators and then described his own powder, called "indurite." To manufacture this powder he began by purifying his dried military gun cotton, which was done by extracting it with hot methyl alcohol in a continuous extractor, and when this was completed the insoluble, nitrated cellulose was again exposed in the drying room. The highly nitrated cellulose was then mixed with a quantity of mono-nitrobenzene, which scarcely affected its appearance and did not alter its powdered form. The powder was then incorporated in a grinder by which it was colloidalized, and converted into a dark translucent sheet or mass resembling India rubber.

The sheet was now stripped off and cut up into flat grains or strips, or it was pressed through a spaghetti machine and formed into cords, either solid or perforated, of the desired dimensions, which were cut into grains. Then the granulated explosive was immersed in water boiling under the atmospheric pressure, by which the nitrobenzene was carried off and the cellulose nitrate was indurated, so that the mass became light yellow to gray, and as dense and hard as ivory, and it was by this physical change in state, which could

be varied within limits, that he modified the material from a brisant rupturing explosive to a slow-burning propellant.

The indurite thus formed stood severe tests. The chief of the bureau informed Dr. Monroe, before the firing began, that a powder giving 2,000 feet initial velocity would be a complete success. In two successive rounds of a six inch rapid fire gun using twenty-six pounds of this powder, and a 100 pound projectile, the pressures were 13.96 and 13.93 tons, and the velocities 2,469 and 2,456 feet per second respectively.

Dr. Monroe sums up the desiderata of smokeless powder thus:

1. That it shall be physically and chemically uniform in composition.
2. That it shall be stable and permanent under the varying conditions of temperature and humidity incident to service storage and use for all time.
3. That it shall be sufficiently rigid to resist deformation in transportation and handling.
4. That it shall produce a higher or as high a velocity with as low a pressure as the service charge of black powder for a given piece.
5. That it shall be incapable of undergoing a detonating explosion.
6. That the products of its combustion shall be nearly if not quite gaseous, so that there shall be no residue, and little or no smoke.
7. That it shall produce no noxious or irrespirable gases or vapors.
8. That it shall not unduly erode the piece by developing an excessive temperature.
9. That it shall be as safe as gunpowder in handling and loading.
10. That it shall be no more than ordinarily dangerous to manufacture.

Indurite wrapped in felt in an iron vessel was exposed to a temperature of 208° Fah. for six hours without undergoing change, and again at a temperature of 212° Fah. for twenty-four hours before any change was observed, and again to 5° Fah. without being affected.

Edward Hart presented some notes on the preparation of glucinum, reporting progress in the investigation for which the A. A. S. some time ago appropriated a fund. He finds it better to handle large quantities, and has reduced beryllin quantities of 100 pounds at a time. The presence of silicon in crucibles first used impaired the purity of the product, and he substituted crucibles made of pure glucina, following the analogy of the reduction of aluminum, which is now made in crucibles of pure alumina. He described other details of his work, which is still in progress.

L. M. Dennis, in presenting a paper on "Some New Compounds of Thallium," mentioned incidentally that in the progress of investigating these compounds, he had discovered that potassium platino-cyanid, $K_2P-(CN)_6$, is by far the most efficient substance yet discovered to cause fluorescence of the X rays; hence is better adapted to paint fluorescent screens than any of the salts generally used. Prof. Dennis also read a paper on "Separation of Thorium from the Other Rare Earths."

Other papers read were: "Composition of Certain Mineral Waters in Northwestern Pennsylvania," A. E. Robinson and Charles F. Mabery; "Mercuric Chlorthio-cyanate," Charles H. Herty and J. G. Smith; "Zirconium Oxalates," F. P. Venable and Charles Baskerville; "Rutheno-cyanides," James L. Howe; "The Reduction of Concentrated Sulphuric Acid by Copper," Charles Baskerville; "Some Analytical Methods Involving the Use of Hydrogen Dioxide," B. B. Ross; "An Analytical Investigation of the Hydrolysis of Starch by Acids," George W. Rolfe and George Defren; "The Effect of an Excess of Reagent in the Precipitation of Barium Sulphate," C. W. Foulk; "Estimation of Thoria, Chemical Analysis of Monazite Sand," Charles Glazer; "Determination of Reducing Sugars in Terms of Cupric Oxide," George Defren; "Acidity of Milk Increased by Boracic Acid," E. H. Farrington; "Accuracy of Chemical Analysis," Frederic P. Dewey; "Some Extensions of the Plaster of Paris Method in Blowpipe Analysis," W. W. Andrews; "Device for Rapidly Measuring and Discharging a Definite Amount of Liquid," Edward L. Smith; "Table of Factors," E. H. Miller; "A Modified Form of the Ebullioscope," H. W. Wiley; "A New Form of Potash Bulb," M. Gomberg, communicated by A. B. Prescott; "Morphine in Putrefactive Tissue," H. T. Smith, communicated by A. B. Prescott; "The Signification of Soil Analysis," H. W. Wiley; "A Complete Analysis of Phytolacca Decandra," G. B. Frankforter and Francis Romaley; "The Crystallized Salts of Phytolacca Decandra," by same; "The By-products Formed in the Conversion of Narcoline in Narceine," G. B. Frankforter; "Notes on the Determination of Phosphorus in Steel and Cast Iron," George Auchy.

On Friday afternoon the members of the society visited Lang's brewery and the city reservoir, and then separated into three parties, to visit (1) the Milson Rendering and Reduction Works and the Garbage Reduction Works, (2) the Aniline Works, (3) the Buffalo Reduction Company's Works (copper smelters).

On Saturday an excursion was made to Niagara Falls

by boat and to Lewiston by the Gorge road. The Calcium Carbide Works, power house of Cataract Construction Company, and Cliff Paper Mill were visited.

RECENT PATENT AND TRADE MARK DECISIONS.

Loewer Sole Rounder Company v. Gibbon (U. S. C. C. Penn.) 74 Fed. Rep. 555.

Effect of Decision of Another Court Sustaining the Patent.—The decision of a Circuit Court sustaining a patent will be followed by another court unless new evidence is produced, which, if it had been introduced in the other court, would have resulted in invalidating the patent.

Sole Cutting Machine Patents.—The Loewer & Blair patent No. 407,735 has been held valid and infringed as to claims 1, 4, 5, 6, 9 and 14.

National Sewing Machine Company v. Willcox, Gibbs & Company (U. S. C. C. A. 3d Cir.) 74 Fed. Rep. 557.

Construction of a Royalty Contract.—The Willcox & Gibbs Sewing Machine Company agree to pay the National Sewing Machine Company a royalty of 40 per cent on its receipts from sales or leases of machines covered by the latter's patents, provided, however, that if the defendant "shall sell or lease or cause to be sold or leased" in any foreign country the machine at less rates than those in this country, "then the royalty rate to be paid shall be 45 per cent in lieu of 40 per cent as hereinbefore provided." After operating several years in the home market, the defendant began selling and leasing in a foreign country at a less rate. Plaintiff claims that the provision was retroactive, giving it a right, on the happening of the condition provided for, to 45 per cent of all previous sales and leases from the commencement of the contract. The Court held that the plaintiff was entitled to only 40 per cent of sales and leases prior to such operation in a foreign country at a less rate and 45 per cent of all subsequent sales and leases, both at home and abroad.

Kilmer Manufacturing Company v. Griswold (U. S. C. C. A. 2d Cir.) 74 Fed. Rep. 561.

Bale Ties.—The Kilmer patent No. 282,991 for bale ties of wire, where a bent wire is clutched in a V shaped clasp made of heavier wire, is void as to claims 1 and 2 in view of the patent of Smith, No. 159,463.

Cozman v. Amia (U. S. C. C. A. 1st Cir.) 74 Fed. Rep. 634.

Atomizers.—The Shurtleff patent No. 447,064 is void as to claims 1 and 2 for want of novelty and invention, as there is no patentable novelty in securing directly to the cap or stopper of an atomizer a nozzle adapted to be applied to the nostrils, or in so constructing the cap or stopper that its top shall form a seal for the nozzle.

Campbell v. H. T. Conde Imp. Company (U. S. C. C. Ind.) 74 Fed. Rep. 745.

The Elements of a Combination Presumed to be Old.—A failure to separately claim any of the elements composing a patented combination raises a presumption that each of such elements is old.

Corn Planters.—The Campbell patent No. 324,983 for the combination of a planter and fertilizer distributor, consisting of a hopper having the rear portion inwardly curved in circular form and extending across both disks through which the corn and fertilizer pass, geared together for simultaneously dropping the corn and fertilizer, is void as being simply for a new collocation of old elements producing no new function, operation or result.

French v. Alter & Julian Company (U. S. C. C. Ohio) 74 Fed. Rep. 788.

Trademark.—A preliminary injunction forbidding the use of a trademark which has not been established by adjudication will not be granted if affidavits are filed that indicate a prior use.

Kite Photographs of Boston.

William A. Eddy, of Bayonne, N. J., has succeeded in making several distinct photographic views of Boston from a great height, by means of a camera supported from kites. The kites were of the tailless type used at the Blue Hill Observatory, where an altitude of 7,441 feet was obtained, and were six and seven feet in diameter. Four to eight of these kites were required to support the camera, depending upon the strength of the wind. Distinct views were obtained of the Common, Beacon Street, Commonwealth Avenue, Charles River, and the outlying suburbs, and Mr. Eddy estimates that in one of the views the camera was, at the moment of exposure, 1,500 feet above the pavement.

Andree Home Again.

Mr. Andree has arrived at Tromsø, Norway, from Danes Island, Spitzbergen, on board the Virgo. He has abandoned, for this year, his idea of crossing the Arctic regions in a balloon, the season having become too far advanced to justify an ascension.

The Polar Snow of Mars.

A dispatch of August 24, from Lowell Observatory, Flagstaff, Arizona, to John Ritchie, Jr., of Boston, announces that the polar snow of Mars has been observed in latitude 75, longitude 36, about two degrees in diameter.

Six New Variable Stars.

Lists of suspected variable stars are published in the Results of the National Argentine Observatory, vol. xvi, p. xxxii, and vol. xvii, p. xi. These lists contain 527 and 232 stars, respectively, in which the magnitudes were found to be discordant in the observations of the Corboda Durchmusterung. Especial attention is there called to 26 stars which are indicated by exclamation marks. These stars have been looked for on a number of Draper memorial photographs by Miss E. F. Leland, and the results confirmed by Mrs. Fleming. From this examination, confirmation of the variability of the stars —24° 12600, —27° 15203, —33° 185, —34° 224, —38° 138, and —38° 13089 has been obtained, the change exceeding one magnitude in all cases. The variation of —22° 13401, —22° 13700, —23° 8083, —24° 13621, —25° 1197, —30° 12799, —33° 13321, —35° 11936, —35° 14568, —37° 11462, —38° 2639, and —41° 12360 on from 8 to 25 nights did not exceed two or three tenths of a magnitude, and the variation of these stars is accordingly not as yet confirmed. In each of these cases two comparison stars were selected, differing about half a magnitude in brightness, one a little brighter and the other a little fainter than the suspected variable. The star —22° 15937 does not appear on photographs taken on 16 nights, although the adjacent star —22° 15939 is well shown on all. The confirmation by Miss Leland of the variation of —24° 7693 has already been announced (H. C. O. Circular No. 7). The confirmation by Mr. Robert H. West of the variation of —25° 1602, —26° 892, and 30° 375 has already been announced by him (Astron. Jour., xvi, p. 85). —25° 1602 and —30° 375 have also been confirmed here from the examination of the photographs. —30° 19092 is R Piscis Austrini. The variation of —33° 13234 was discovered independently by Mrs. Fleming (H. C. O. Circular No. 6). The star in the Bonn Durchmusterung —22° 4346 and not found by Thome does not appear on photographs taken on 8 nights.

It therefore appears that of these 26 stars, 12 are variable, the variability of 12 is not confirmed, and 2 do not appear on the photographs examined.

The laborious work of taking out all the photographs of the regions containing these six new variable stars, measuring the brightness, the magnitude at maximum and minimum, the period and form of light curve, as has been done for other variable stars discovered here, is now in progress. EDWARD C. PICKERING.

Harvard College Observatory, August 13, 1896.

Princeton's New Library.

Ground has been broken for the new university library of Princeton, N. J. The building will be about 200 by 180 feet, and will cover all the ground now occupied by the old chapel, most of that occupied by East College, and a big piece of the lawn back of East College. The new building is to be almost square, with a large court in the center. The plans and contract filed in the county records show that the new structure will be four stories high and will cost \$598,000. Henry M. Potter, of New York City, is the architect, and the style of architecture is to be Gothic.

Besides the new library, a huge dormitory soon will be erected on the western part of the campus, and the faculty is to receive distinguished accessions. New fellowships and scholarships are to be founded. The old chapel has been torn down, and many of the ancient elms have also been removed to make room for the foundations.

Eclipse of the Moon.

Director E. S. Holden, of Lick Observatory, sends the following report of the partial eclipse of the moon on August 22. The observations were made by Professor C. D. Perrine:

"Light clouds partially obscured the first contact of the shadow, but they soon cleared away, and the sky was clear during the remainder of the eclipse. The first certain darkening by the penumbra was at 8:35.

"The first contact with the shadow was at 9:23:31. The last contact with the shadow was at 12:31:50.

"The obscured portion of the moon was quite bright, the more prominent markings being easily visible. The earth's shadow was a copper color near its center, shaded to a somewhat greenish tinge at the edges, the penumbra being of a light pink tinge."

A Bibliography of Power Locomotion on Highways.

Mr. Rhys Jenkins, M.I.M.E., has conferred a real favor upon those interested in horseless carriages and traction engines by the publication of a guide to the literature relating to traction engines, steam road rollers, horseless carriages of every description, including books, papers read before technical and scientific societies, and periodical literature.

The latter is of the utmost value, the horseless carriage being so comparatively new. We note that the SCIENTIFIC AMERICAN and the SCIENTIFIC AMERICAN SUPPLEMENT are referred to many times.

DISCOVERY OF A BRONZE STATUE AT DELPHI.

In the beginning of May, the lower portion of a bronze statue of natural size was discovered to the north of the temple of Delphi, behind a thick wall, at a depth of about thirteen feet, and above a sewer, as shown in our first engraving. The legs were covered with a long skirt, girt very high and extending to the ankles in symmetrical folds. The arrangement of the garment and the form of the elongated feet, with bony toes and projecting heels, indicate a work of the fifth century still marked by archaism. A break had occurred along the girdle at the point where the two halves of the statue were formerly joined, they having been cast separately and then soldered together. Aside from a small hole in the right side of the body, the piece was intact and in all the freshness of its patina.

The interior of the bronze was completely filled by a



FINDING OF THE STATUE.

compact core of blackish color that resisted the action of the knife as well as that of water, like earth that had been submitted to the action of fire at a very high temperature. The feet had been cast separately and affixed to this central core. Upon the researches being continued at this same place, there were met with in succession in an interval of a few days the following pieces: (1) A torso clad in a short-sleeved chiton, intact like the lower part of the body, and fitting accurately upon the waist. The composition of the fabric and naked parts and the proportions of the face agreed in style with the fragment already discovered and confirmed the hypothesis emitted as to the date of the work. The arms were discovered toward the middle of the biceps at the level of the sleeve, the folds of which concealed the joints of the forearms. A slight puff in the garment



BRONZE STATUE RECENTLY DISCOVERED AT DELPHI.

above the girdle served to hide the joints. (2) A forearm bent at the elbow and extending forward. The hand still held three loose bronze reins. This detail, along with the costume of the figure, which is that of the drivers of chariots, left no doubt as to the interpretation of the work. The statue represented an auriga—a conqueror in chariot races, one of the principal attractions of the Pythian games. (3) Several pieces of a chariot pole, around which the reins were wound; and of a yoke which rested upon the necks of the horses, along with the pads that supported it. (4) Three hind legs of horses and a shoe of a forefoot. (5) A right arm of the same work, but derived from a smaller statue.

There is no doubt that all these bronze pieces, found united, and all belonging to one and the same subject (the chariot race), all treated in the same spirit, at the same epoch, by the same processes and apparently by

the same hand, relate to one and the same work. Such work is easy to restore in thought from the descriptions that Pausanias gives of the ex-voto addressed at Delphos or at Olympia by the rich trainers—the powerful princes who raced in the hippodromes and won the Pythian and Olympian crowns with so great honor. Standing in his chariot, not in the heat of the contest, but in the pride of triumph, the conqueror defiles at a slow pace. Above him floats the Victory that crowns him. At the sides of the chariot very young epebes restrain the impatient horses.

This is the way in which we should figure the group, the auriga of which has been preserved to us. An attentive study of the figure and a comparison of the work with the Greek sculptures of declining archaism will permit of recognizing therein (1) traits common to the various schools that flourished between B. C. 480 and 460, such as the rounded form of the contours, the partly open mouth, the form of the feet, etc.; and (2) characters proper to the Peloponnesian studios. Whence the following conclusions: The work belongs to the fifth century B. C. (between the years 480 and 460), is of the Peloponnesian school and represents a group commemorative of a victory in the chariot races at Delphi. For our figures and description we are indebted to Tour de Monde.

A Neglected African Island.

Napoleon effectually prevented St. Helena from ever sinking into obscurity. Nevertheless, for some years past the island has been getting deeper and deeper into financial straits, while the population has been steadily diminishing. St. Helena is only some 1,600 miles distant from Capetown, and yet the island is comparatively unknown to South African colonists, as the outward and homeward steamers to and from Capetown only call there once in three weeks and make a very brief stoppage. And yet this historic island is well worthy of a visit, not only from its associations with the great Corsican, but also because it possesses, probably, the finest climate in the world. A constant southeasterly trade wind, straight from the pole, blows over the island, and sweeps away those germs of disease which lie latent in less favored spots. As a consequence, the longevity of the inhabitants is probably much greater than in any other portion of the globe. In spite of all this, and proximity of the island to the Cape, hardly a solitary African finds his way there from one year's end to the other.

So much in reference to St. Helena as a health resort. Now let me briefly refer to a matter that is of more vital importance. The strategical advantages of the island have been fully recognized by both naval and military experts, and the Royal Commission which was presided over by the late Lord Carnarvon recommended that it should be strongly fortified and constituted an important naval and coaling station for the vessels of the squadron within the Cape command. These recommendations have, however, not been carried into effect. Certainly something was done to improve the fortifications ten or twelve years ago, but the guns are now of an obsolete type, and the diminutive garrison maintained in the island is utterly inadequate to defend it. Moreover, though St. Helena is supposed to be a naval coaling station, the Admiralty maintain no coal supply there, the coal for the ships on the Cape and west coast of Africa stations being kept at Ascension, which does not possess even a solitary gun, but is a cinder heap upon which many thousands are annually wasted.

The defenseless condition of St. Helena is a matter that intimately concerns the South African colonies, and should engage their attention. The island is utterly unable to help itself. The opening of the Suez Canal ruined its prosperity; and ever since it has been drifting nearer and nearer to bankruptcy. The greater portion of its adult male population has migrated to the Cape, and the whole revenue of the island is now only some £6,000. There are only half a dozen officials, and the governor fills innumerable other offices, including that of chief (and only) justice. It is deplorable that Great Britain should allow one of its possessions to sink into such a condition of decrepitude, and especially an island which, lying in the direct route to the Cape, must ever be of considerable importance.—African Critic.

End of an Old Steamship.

The old steamship Dessoug, which was made famous by successfully transporting hither from Egypt the obelisk that now stands in Central Park, has been towed around to Cow Bay, Long Island, to be broken up for the metal that is in her. She was originally the British steamship Denton, and was built at Hartlepool, England, in 1864. She was 1,367 tons gross measurement and was an iron vessel. She had been in the Savannah line of the Ocean Steamship Company in late years, but had been laid up for some time and her class expired last autumn.