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(Illustrated articles are marked with an asterisk.)

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For the Week Ending August 20, 1887.

Price 10 cents. For sale by all newdealers.

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THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

Two main ends are accomplished by this association, which has just held its thirty-sixth annual meeting, in Columbia College, in this city. One of these is the interchange of scientific views and consequent increase of knowledge, the other is the social intercourse of scientific people. For both these objects favorable arrangements had been made by the citizens of New York, in expectation of an unusually large attendance. The roll of members, active and associate, showed 564 names up to Friday morning, of which 273 were those of new members. While this list has been surpassed at several former meetings, it should be understood that the rules are more strict than heretofore, especially as to associate members.

The opening meeting on Wednesday morning was called to order by Prof. E. S. Morse, the retiring president, who surrendered his chair to Prof. S. P. Langley, of Washington, D. C., the president-elect. After a prayer by Bishop Potter, Pres. Barnard, of Columbia College, made an address of welcome in the name of the city of New York, reviewing the achievements of the association during the forty years of its career, and paying a fitting tribute to those members whose labors were done and who had gone to their rest. Pres. Langley made an appropriate reply, after which the association transacted the routine business incident to the full organization of the several sections. A number of important changes were made in the constitution, at the recommendation of the standing committee, which is to be hereafter called "the council."

The addresses of the vice-presidents before the sections occupied the entire afternoon. The following is a brief report of these addresses.

Section B was addressed by Prof. W. A. Anthony, of Ithaca, on "The Importance of the Teaching of Physics in the Public Schools." He deplored the prevalent utilitarianism that demanded a commercial value for all scientific work. It is time to reverse this demand and to call for a process by which commerce shall contribute to science. As our nation grows in wealth, the principles and details of science should be made common property, and become the daily talk of the school boys. The precious truths of nature are the best heritage to be left to future generations. Physical science should be taught in the primary schools as well as in the universities. Thus an army will be raised up to push scientific work into new fields. In order to promote the application of science, let science itself be fostered. New experiments with new instruments will be sure to reach remunerative results, especially if invariably directed by scientific knowledge.

Before section C, Vice-President A. H. Prescott spoke on the "Chemistry of Nitrogen as disclosed in the Constitution of the Alkaloids." He said that the character of nitrogen is a challenge to chemical skill. Abundant in its free state, its compounds are so sparingly obtained that they set the values for the nourishment of life. Nitrogen is trusted for the projectile arts of war and peace, holds the structure of the aniline dyes, and governs the vegetable alkaloids. The study of the structural chemistry of the latter includes: 1. Nitrogenous bases as derivatives of ammonia. 2. As represented by aniline. 3. The pyridine type in the vegetable alkaloids. It may yet come to pass that the identical alkaloids of nature will be made by art. This will not be done by chance methods nor premature short cuts, but by well-earned progress through scientific methods faithfully applied.

Hon. Eckley B. Cox, vice-president of section D, spoke on "The Necessity of Scientific Training for Engineers." An occasion like the present, when an engineer who is really a business man is called upon to preside over a scientific body, naturally gives food for reflection. Engineering, though the youngest of the professions, is already divided into civil, mining, mechanical, and other branches. The engineer is deeply indebted to those who have determined experimentally and discussed mathematically the data which are indispensable to him. The great success of the first practical engineers, who were developed in the field or in the workshop, was achieved in spite of—not on account of—their lack of scientific education. There are three classes of engineers—scientific, consulting, and business. A young man should decide which of these he wishes to become, and adapt his studies accordingly. There is as much need of a technical education for the engineer as there is for the lawyer, physician, or clergyman.

The admirable address by Prof. Gilbert, before section E, concerning the "Work of the International Congress of Geologists," attracted so much attention, and awoke so great an interest, as to be made the special subject for general discussion for the whole session on Friday, in the geological section. It was a thorough and able review of what has already been done by the geological congress, with criticisms on what it has attempted to do by imperfect methods, together with novel and original suggestions as to the scope and attainable results of such an organization. The address was quite lengthy, and instead of attempting a synopsis here, the reader is referred to the full report

of it in the SCIENTIFIC AMERICAN SUPPLEMENT for this week.

Prof. W. G. Farlow, of Cambridge, addressed Section F on the subject of "Vegetable Parasites and Evolution."

A parasitic plant is one obliged to obtain its organized material from other plants or from animals. Parasites subsisting on dead matter are called saprophytes; those on living substances, true parasites. Mould on bread is a saprophyte; the potato rot fungus, a true parasite. Most parasites belong to the fungi. It is highly probable that vegetable parasites originated from non-parasitic forms. There is reason for believing that the earliest forms of undoubted plants were unicellular and not unlike protococcus. As soon as a protococcus has developed the power of attaching itself to other protococci, lost its chlorophyll, and developed means of penetrating the wall of its host, it has assumed all the essentials of a chytridium. The development of the filamentous and higher parasites from such chytridiaceous forms is possible. When one regards fungi as a single class of plants, and attempts to trace a clear connection between the highest and lowest members, he finds numerous gaps that cannot well be filled. A general parallel, however, exists between the fungi and the chlorophyll-bearing algae, and the development may have been from the lowest to the highest algae, and the different groups of fungi may have arisen from different groups of algae at different periods in the process of evolution.

Address by Professor D. G. Brinton, of the University of Pennsylvania, before the anthropological section, H: "A Review of the Data for the Prehistoric Chronology of America."

Humboldt's hesitancy as to the origin of the human race should disappear, at least so far as the American Indians are concerned. The sources of information are: 1. Legendary. 2. Monumental. 3. Industrial. 4. Linguistic. 5. Physical. 6. Geological.

1. Back of the fifth generation all becomes vague and mythical, and all verbal records are apt to be untrustworthy. Even in the annals of Mexico there is no fixed date prior to A. D. 1325.

2. The stone-built monuments of Peru and Mexico, and the brick buildings of Pueblo, do not warrant the claims for thousands of years—hundreds will do. Many of these structures were built within the memory of the natives, who met their European conquerors. The shell heaps, or refuse heaps, of villages in Maine, Florida, and Brazil contain remains of animals which are now extinct, and the human skulls found are of a different race. That race was familiar with pottery and polished stones.

3. In the oldest relics we find proofs of the palæolithic age—the simplest implements. In other ancient mounds we find fragments showing that the tribes were acquainted with the compound arts. The cultivation of useful plants is important. Maize and tobacco were raised over an area of 5,000 miles in diameter.

4. The exceeding diversity of dialects in America proves high antiquity, but the many incorporative traits show original identity of plan.

5. Physical research is hindered by ideas of race classification. Maylayans and Americans were wrongly classified by Cuvier as Mongolians. The most ancient American skulls prove that in craniological features the American race in time and distribution has been identically one.

6. Man lived in North and South America immediately after the glacial epoch, but the epochs in the two continents may not have been synchronous. The American could not have immigrated from Africa or Asia, though the first American man was an immigrant and not autochthonous. When geology and geography have been studied more thoroughly in their application to anthropology, the lines of migration may be traced.

Prof. H. E. Alvord, Vice-President of Section I, spoke upon "Economy in the Management of the Soil."

Tracing the visible wealth of the country to its source, we find that it has all, with insignificant exceptions, been derived from the soil. Generation after generation has recklessly drawn on the stored fertility of the soil with no systematic effort at restitution. For food, clothing, shelter, and fuel, we depend almost entirely upon the soil. In spite of the rapidly increasing demands of our own country, for twenty years agricultural products have constituted three-quarters of all the exports from the United States; and this superabundance of soil products will continue well into the next century. Every crop removed diminishes its store of plant food, and this reduces its reproductive power. The most important elements of plant food are potash, phosphoric acid, and nitrogen. Much remains upon or is returned to the land, but there is great waste in addition to what is sent abroad. The revival of interest in agricultural studies, and the increasing number of able men who make them their life work, promise some success in the efforts to solve the problem of the perpetuation of the fertility of our soil.

The address of Professor E. S. Morse, the retiring

president of the association, was delivered on Wednesday night, in the library hall, before a large and appreciative audience. His subject was "A Decade of Evolution," and he reviewed with great earnestness and enthusiasm the work that had been done in the last ten years, especially by American naturalists, to prove and illustrate the Darwinian theory of the derivation of species. The address abounded in facts of the most curious and instructive nature, and was well received, except that the speaker felt impelled to retaliate on the church for its alleged obstruction of the progress of modern science. The entire speech will be printed in the proceedings of the association, and will have a high degree of value as a contribution to the history of scientific progress. Next week we shall give an outline of the more important work done in the various sections.

It should be added that the members of the association, while fairly diligent in their allotted duties as scientists, availed themselves of the privileges of the metropolis and enjoyed a reasonable amount of sight-seeing. The excursions around the harbor and to West Point and Long Branch are popular features. The general reception on Thursday evening at the Metropolitan Opera House was a brilliant affair, and brought together a delightful company representing all parts of the nation.

REVIVAL OF PATENT EXTENSIONS.

The last Congress may be said to have revived the almost obsolete custom of extending patents beyond the original time for which they were granted, and the probability is that the Congress which meets in December next will be strongly urged to pass a new general law upon the subject.

By the amendment of the patent law passed March 2, 1861, the term for which letters patent are granted was changed from fourteen years to seventeen years, and the provision of the statute for the extension of patents was altogether struck out, the additional period of three years on the original term being held to be tantamount to an extension of all new patents for that much time. Patents granted subsequent to March 2, 1861, were issued without any privilege of extension, and the only way in which they can be lengthened is by a special act of Congress in each individual case. Hundreds of applications for extensions have been made to the Congressional committees, but, except in two or three cases, they have always been refused, and it had come to be generally understood by patentees that there was little or no chance of getting a Congressional extension. But Mrs. Henrietta H. Cole, of New York, inventor of the fluting machine patented June 12, 1866—twenty-one years ago—has been more fortunate. The last Congress granted her petition, authorizing an extension. The Commissioner of Patents has heard the required evidence, and has granted the extended patent. So this patent monopoly, after having expired and become free to the public for four years, is again revived and put in force for seven years, dating from June 12, 1883, the date of the expiration of the first term of the patent.

The grant of this extension will be a justifiable encouragement for all patentees whose patents already have or are about to expire to besiege Congress for special acts of relief in each particular case; and we hope no one will hesitate or be backward in filing their applications. There are undoubtedly many cases involving the greatest hardship to the inventor, in which an extension would be a relief. There are many inventions, of most extraordinary value, for which the inventors have not received a tithe of reward as compared with the benefits their devices have conferred upon the nation. Congress should either hear and determine each individual petition, and grant it, if just; or it should pass a general law, under which all patents may be extended; or it should put a stop to the grant of any patent extensions.

Last year a bill was introduced, but failed to pass, providing for the extension of all expired patents, and this, under proper conditions, would seem to be the easiest and fairest way of disposing of the matter. But it must not be forgotten members of Congress are politicians, and many of them seem rather to like to have their constituents run to them with their little private bills, as in that way a certain home influence and power is secured.

At present, the way to proceed for any one desiring to obtain an extension of a patent is to make application by petition to Congress, to be presented and pressed by the senators and members from the State in which the petitioner resides. No official fees are required to be paid. Personal interviewing of members to explain the particular merits of the case is often of great assistance, particularly so if the lobbyist be a woman. Tears and tresses are a power at the Capitol.

SUNFLOWERS are used in Wyoming Territory for fuel. The stalks when dry are as hard as maple-wood and make a hot fire, and the seed heads with the seeds in are said to burn better than the best hard coal. An acre of sunflowers will furnish fuel for one stove for a year.

A Great Bell for Cologne Cathedral.

An official notice has been published of the great bell for the Cathedral of Cologne, the solemn inauguration of which took place some days ago with great pomp. The bell weighs 27,000 kilos., or about 26 tons 13 cwt. The clapper alone weighs 800 kilos., or nearly 15½ cwt. Its perpendicular height is almost 14½ feet; its diameter at the mouth nearly 11½ feet. Twenty-two cannons taken from the French were assigned by the Emperor William for its manufacture; 5,000 kilos. of tin were added. It was cast by Andreas Hamm, of Frankenthal, and 21,000 m. (£1,050) were paid for the casting. It will be known as the Kaiserglocke, or Emperor's bell; and as the two other large bells in the cathedral bear the epithets respectively of Pretiosa (precious) and Speciosa (beautiful), this one is styled Gloriosa. It bears above an inscription recording that "William, the most august Emperor of the Germans and King of the Prussians, mindful of the heavenly help granted to him whereby he conducted the late French war to a prosperous issue, and restored the German empire, caused cannons taken from the French to be devoted to founding a bell to be hung in the wonderful cathedral then approaching completion." A likeness of St. Peter, the name patron of the church, is on the side, beneath which is a quatrain in the style of the mediæval conceits, praying that, as devout hearts rise heavenward at hearing the sound of the bell, so may the doorkeeper of heaven open wide the gates of the celestial mansion. On the opposite side is inscribed a sestet in German, of which the translation is:

"I am called the emperor's bell;
I proclaim the emperor's honor;
On the holy watch tower I am placed.
I pray for the German empire,
That peace and protection
God may ever grant to it."

The bell was solemnly blessed in the cathedral by the Archbishop of Cologne, according to the elaborate ritual set out in the *Pontificale Romanum*. The ceremony was very long, many psalms being chanted by the clergy and choristers while the bell was being sprinkled with blessed water and anointed with chrism, and the portion of St. Luke, x. 38-42, was chanted by a deacon. Incense and myrrh were burnt within it, and many symbolical rites performed. The opinions of experts are divided as to whether the note which the bell sounds is C sharp or D.

A Million Dollar Diamond—the Largest Brilliant in the World.

A model of the Victoria, the Great White Diamond or the Imperial, has been sent to this city lately, and Mr. G. F. Kunz gives in *Science* the following:

Concerning its early history very little is known; in fact, where the stone was found is only a matter of conjecture—a remarkable circumstance when we consider that this is the largest brilliant in the world.

An explanation by a letter in the *London Times* was given, as follows: "That this stone was not found in English dominions at all, but in the neighboring Orange Free State; that it had been found by a boor on his farm, who, knowing it to be a diamond, but fearing being turned out of his farm by a mob, kept the secret a whole year, until a Mr. Allenberg of Port Elizabeth saw it, and forwarded it to London."

It is, however, believed that it was found by some one in one of the Kimberley mines, South Africa. The first intimation that any of the various mining companies had of its existence was when they heard of its safe arrival in London. It is generally supposed that in the month of June or July, 1884, the stone had been found by one of the surveillance officers of the Central Mining Company in the Kimberley mines. It being his duty to search others, he had the privilege of not being searched himself, and so the stone was passed through the searching house, and he was afterward supposed to have found means of communicating with four illicit diamond buyers. Owing to the stringency of the diamond laws of Griqualand West, the trading in rough diamonds is forbidden any one not owning one of the "patents" or "licenses," as they are called, costing £200 and a guarantee of £500. All purchases made by them must also be entered in a special registry, and are duly signed every week by the police authorities. £3,000 was the price paid to obtain the stone from the first possessor. To prepare themselves for the ordeal of transporting the stone out of the district, they assembled at night, commenced drinking, then gambling, and after a night's debauch two of the party lost their share in the big stone. The other two reached Cape Town in safety, where the diamond laws are not in force, and from a dealer there received £19,000 cash for their stone. An outward duty of one-half per cent is collected on all shipments of diamonds from Cape Colony; but this diamond is said to have been carried by one of the passengers of a mail steamer, and was hence undeclared. We next hear from it in London, causing considerable sensation at Hatton Garden, the great diamond market. After considerable time had been spent in trying to find a capitalist who could afford to buy such a gem, it was at last arranged by a former resident of the Cape mines to form a company of eight persons, who bought the stone together for

£45,000 cash, on condition that if they should dispose of it each should receive a ninth share in the eventual profits.

Before cutting, it was estimated that the crystal would furnish either of the following gems: If cut as a brilliant, 300 carats; as a drop, 230 to 240 carats; as a lozenge, 250 carats; and as a mathematically perfect brilliant, 150 carats. If cut in the latter form, it would have furnished cleavages that would cut into one 40 carat, one 20 carat stone, and 40 carats of smaller stones. It was finally decided to cut it into the largest possible brilliant, still preserving a good shape, and Amsterdam was selected as the place where the gem could best be cut.

It was accordingly sent to the polishing mills of Jacques Metz, who erected a special workshop for the purpose. In order to better obtain the brilliant form of cutting, a piece was cleaved off which furnished a 19 carat diamond, and was sold to the King of Portugal for £4,000. The cutting of the large stone, which was commenced on the 9th of April, in the presence of the Queen of Holland, took about twelve months, since, instead of being cut by abrasion with another diamond, as diamonds are usually cut, it was polished down on the scaif; and a great amount of time was consumed by the cooling of the stone, as it heated after an hour's running on the wheel. The cutter of the stone was M. B. Barends. The stone in its finished condition weighs 180 carats, and is a beautiful, perfect, steel blue diamond, and is the largest brilliant in the world.

It is 39.5 mm. (1 9-16 inches) long, 30 mm. (1 11-64 inches) wide, and 23 mm. (15-16 of an inch) thick, being exceeded in size by one diamond only, the Orloff, belonging to the Russian crown, which weighs 194¼ carats, but is a large deep rose, and not a brilliant. The Victoria exceeds the Regent in weight by 44½ carats. The Kohinoor weighs only 106 1-16 carats.

The form of the Imperial is not entirely even. On one side of the girdle there is quite a flat place, a natural unpolished surface, necessary, in cutting, to preserve the large weight of the stone. It is, however, a perfect 58 facet brilliant.

The original weight of the stone was 457½ carats, 3 1-60 ounces troy. The stone to-day is held by a London syndicate for £900,000.

Treatment of Dysentery.

In a correspondence from Bombay, Dr. C. MacDowall, physician in the British army of East India, speaks with great enthusiasm of the treatment of dysentery by *ipecaquanha*. Like other friends of this treatment, such as Docker, Ewart, Cunningham, Malun, etc., he says that it is almost a specific, renders the disease easy to cure, and prevents the complication most feared, *i. e.*, hepatic suppuration. But he emphasizes, particularly, that "the remedy be given early in the disease, at the proper time, and in the proper manner." The principles of the treatment are:

1. To give a large dose of ipecac, at least thirty grains for an adult.
2. To prepare the stomach to accept and retain such a large dose by about twenty drops of laudanum *an hour before* giving the ipecac; also the application of a sinapism over the stomach, and to administer the ipecac in the form of large pills, not in solution. It must also be given at night, at the time of going to sleep, never in the morning, and not during the day, and no liquid is to be taken after the dose has been given.

Sometimes the patient vomits a little mucus toward the morning hours, but the greater portion of the remedy has by that time been absorbed. This treatment must be renewed every night, and usually the improvement is marked by the third morning, or sooner; blood, mucus, pain, all three having disappeared. A disease which formerly made us despair now has lost its terror to us.

The opium may be substituted by a hypodermic injection of morphia. Bismuth subnitrat. may be given during the day. Small doses of ipecac are more than useless; they have been tried in India for over two centuries without lessening the mortality in dysentery. Since more than twenty years the above has been adopted as almost the only treatment in British India, and has given the best results.—*Progres Medical*.

Electric Meteorology.

Mr. G. A. Rowell, of Oxford, says the *Electrician*, sends us a pamphlet with the above title, in which he discusses the cause of the changes in magnetic declination. He adduces evidence to show that the European and American magnetic poles are coincident with the centers of greatest cold for the two continents. Hence he attributes the shifting of the magnetic poles to the same series of astronomic and geologic causes which produce the secular changes in climate. This theory leads to the uncomfortable conclusion that as the magnetic declination in this country continues to decrease, so our winters will increase in length and severity. Without laying undue stress on the point, the author is certainly able to appeal to our recent melancholy experiences as an argument upon his side.