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## No. 608,

**For the Week Ending August 27, 1887.**

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### ADVANCEMENT OF SCIENCE.

The American Association, whose meeting at Columbia College has commanded attention, even in a busy city like New York, adjourned on the 16th inst., after a week of really hard work, some of whose results we now lay before the reader. There were enrolled 721 members present, of whom 321 were new—the largest meeting for several years, with the single exception of that at Philadelphia, when the number was swelled by accessions from the British Association. There were in all 272 papers offered to the council, of which 256 were actually read in the various sections, many of them being also made the subject of additional discussion. Aside from official addresses and the routine business, the only scientific address in the general sessions of the association was by Prof. Henry Drummond, of Glasgow, on "The Heart of Africa." The association is subdivided into eight sections, each of which represents one or more branches of science, and usually all were simultaneously in session. This plan, while open to some objections, makes it possible to go over a great deal of ground in a week, and the winnowed results are finally made accessible to all the members by being distributed in a bound volume. Yet the question arises if there ought not, at every annual meeting, to be a larger number of evening addresses in general session by eminent men of science on practical matters of universal interest. We cannot refrain from another suggestion, namely, that those who read or speak in public should give enough attention to the art of speech to make themselves heard. Many of the most valuable papers were marred by indistinct utterance, misplaced emphasis, and false inflections.

We visited all the rooms set apart for the several sections, and were impressed by the vast variety of topics discussed. Some of the papers read bristled with technicalities. It would, perhaps, be difficult to report, in a way to interest the general reader, the paper on "The Amine Salts of Paratoluenesulphonic Acid," or another on a "Critical Revision of the Monticuliporoid Corals of Cincinnati." Yet some papers with formidable titles were made attractive after all by the clear style of the authors.

One paper, by Prof. W. O. Atwater, on the "Physiological and Pecuniary Economy of Food," called for nearly a whole day's discussion. He said, in substance, that the cheapest food is what furnishes nutrition at the least cost; while the most economical food is what is both cheapest and best adapted to the wants of the user. Vegetable foods are, as a rule, less costly than animal foods, but not so richly nutritive. Flour is cheaper than potatoes, because the protein in the latter is inferior and less digestible. The worst form of American wastefulness is the waste of beef, lamb, veal, fish, flour, and potatoes, fruit, and other kinds of food, and this is chargeable both on the rich and the poor. People buy more than is needed, and eat more than can be digested. Much of the excess is actually thrown away. Costly materials are used where less expensive ones would do as well. False economy is practiced in buying what seems to be cheap, but is really dear. Add to this the evils of wrong selection in marketing, careless keeping, bad cooking, and unskillful using in the home, and it will be seen that the financial loss is very great. The physiological waste is still greater. More harm is done by unwise eating and drinking than can be estimated. The rich suffer both in health and in purse, but the poor suffer most of all. The food of the wage classes is large in amount and costly in kind. The German standard calls for 118 grains of nutritive ingredients *per diem*, whereas the American workingman consumes from 95 to 254 grains. But, on the other hand, the latter can do more work, and his superior capacity is largely due to his better nourishment. What ought to be the panurgy of the average American laborer, with his great opportunities, superior intelligence, and the 6,776 foot-tons of potential energy in his daily food?

A paper that aroused much enthusiasm in the section of physics was by Drs. Michelson and Morley, on a "Method for Making the Wave Length of Sodium Light the Actual and Practical Standard of Length." It was claimed that no natural standard had ever been found that would prove unvarying, except this one. This standard was obtained by sliding a reflecting mirror through a measured space, and counting the number of interference fringes produced by the motion, indicating the number of wave lengths, and taking this length as the unit of measurement. Temperature variations were prevented by incasing the apparatus in melting ice. Among approving remarks was that made by Professor W. A. Rogers, who has devoted much time to exact measurements, that this novel idea "went to the bottom of his heart." It was proposed to produce, as soon as possible, a standard unit of length, to be styled the "American Association unit," and a note was taken, asking the A. A. A. S. to appropriate money in order to continue the investigation.

As a matter of course, the paper by T. A. Edison (read by Professor G. F. Barker), on the "Pyromagnetic Dynamo: a Machine for Producing Electricity from Fuel," elicited much interest, as the problem is one that has occupied the closest attention of the ablest inventors for many years. If the enormous energy latent in coal could only be made to appear as electric energy by some simple means, and at a reasonably economical rate, it would certainly revolutionize the mechanical methods of the entire world. This fact has marvelously stimulated research as to thermo-electricity; the most satisfactory results thus far being gained by Moses G. Farmer. He never succeeded, however, in converting one per cent of the energy of the coal into electric energy. Lord Rayleigh's recent experiments have led him to conclude that, from a thermo battery of copper and iron working between the extreme limits of temperature possible under these methods, not more than one three-hundredth of the energy in the coal can be converted. Edison's opinion therefore is that the result sought must be attained by other means. He suggests that the magnetism of the magnetic metals is strongly affected by heat; nickel losing its power at 400°, iron at a cherry red heat, and cobalt at a white heat. By placing an iron core in a magnetic circuit, and varying its magnetizability by varying its temperature, a current can be generated in a surrounding coil of wire. This he calls a "pyromagnetic generator of electricity," and he has constructed a small motor upon this principle, the details of which were explained to the section, and are illustrated on our first page.

These experiments seem to promise a solution of the problem of the economical production of electricity direct from fuel.

The whole of one afternoon was devoted by the sections of engineering and economic science in joint session to the discussion of the Nicaragua Canal. Elaborate and interesting papers on the subject were presented by Commander H. T. Taylor, Engineer R. E. Peavy, Surgeon John F. Bransford, U. S. N., and J. W. Miller, General Manager of the Boston and Stonington Line. Both the Tehuantepec and Panama schemes promise to be failures, while the Nicaragua Canal is certain of success. With regard to this canal, the public is not asked to take anything on the strength of simple assertion, but it has all the means of arriving at certain results placed fully, clearly, and without reservation before it, in such a way that every one can form an independent judgment about it. The papers discussed the climatic and sanitary conditions along the proposed route, showing that while the line of the canal from the coast would lie for some ten miles through swamps where the work would have to be done by machinery and the natives, the beauty, fertility, and salubrity of the Pacific slope beyond are unsurpassed. The length of the canal from ocean to ocean will be 169·8 miles, of which only 40·3 miles is actual canal, the remainder being free water route through Lake Nicaragua. The advantages of this lake as a great harbor are of immense importance. The undeveloped water power of the lake will be very great and under perfect control for commercial and manufacturing purposes.

Concerning the "Strength of Nicaraguan Woods," a special paper was read by Prof. R. H. Thurston, of Cornell University, describing investigations made recently by Mr. Rufus Flint to secure data that may lead to the introduction of the woods of his country into the markets of the world. Some resemble mahogany, others the yellow pines, oaks, and other hardwoods of our own forests, but excelling them in density, strength, elasticity, and durability.

The "Increase of Blindness in the United States" was the subject treated of by Prof. Lucien Howe. While the population of the country increased 30 per cent between 1870 and 1880, blindness increased 140 per cent, and now it costs more than $25,000,000 annually to support our blind.

Mr. Geo. F. Kunz, of the house of Tiffany & Co., in this city, described a remarkable crystal skull and also a gigantic jadeite adz from Mexico. He exhibited magnificent specimens of agatized wood from Arizona, polished to the brightest luster and showing the richest imaginable play of colors.

Prof. F. W. Putnam, the faithful secretary of the association, gave a brief description of the famous "serpent mound" of Adams County, Ohio, and its purchase for preservation by the Peabody Museum of Harvard University.

The transactions of the geological section were of special interest and importance, and will be made the subject of a separate article.

No account of this meeting of the association would be complete without at least a reference to the two papers presented on the Chinese in America. The first, by Stewart Culin, an American who has adopted the Chinese religion, and will soon go to the Celestial country to live, and who, in his paper, spoke especially of the social life of the Chinese in the Eastern cities of the United States. The other address, "The Chinese Question from a Chinese Standpoint," was by Mr. Yan Phou Lee, who has adopted the Christian religion, has taken out his first papers for American citizenship, and is a graduate of Yale College. His eloquent appeal for justice to be done to his countrymen, although more oratorical than scientific, was received by a crowded audience with generous applause.

The next meeting of the association will be at Cleveland, Ohio, in August, 1888. Major J. W. Powell, of Washington, D. C., was chosen as president. There was also the usual election of other officers for the association and for the sections.

## POSITIONS OF THE PLANETS IN SEPTEMBER.

VENUS

is evening star until the 21st, and then morning star. On the 21st, at 11 o'clock in the morning, she arrives at inferior conjunction, and, passing between the earth and sun, completes her course as evening star, changing from the eastern side of the sun to the western, and commencing her course as morning star. She sets on the 1st about a quarter before 7 o'clock, a little less than half an hour after sunset. On the 30th, she rises at 20 minutes before 5 o'clock in the morning, an hour before sunrise.

JUPITER

is evening star. He will be the brightest star in the heavens for nearly the whole month, as Venus sets soon after the sun in the early part of the month, and is quickly lost to sight. Jupiter will be found in the west, soon after sunset, in the constellation Virgo, 11° east of Spica on the 1st and 16° east of the star on the 30th. He sets on the 1st a few minutes before half past 8 o'clock in the evening, two hours after sunset. On the 30th he sets at a quarter before 7 o'clock, an hour and a quarter after sunset.

MERCURY

is morning star until the 10th, and then evening star. On the 10th, at 1 o'clock in the afternoon, he is in superior conjunction with the sun, passing beyond the sun and reappearing on his eastern side to run his short course as evening star. He is invisible during the month, rising on the 1st about half past 4 o'clock in the morning, and setting on the 30th about 6 o'clock in the evening.

URANUS

is evening star, is very near the sun, and nearly at his greatest distance from the earth. He sets on the 1st at half past 7 o'clock in the evening, and on the 30th soon after half past 5 o'clock.

SATURN

is morning star. He is an interesting object for observation in the early morning hours, as he moves eastward among the small stars of Cancer, being about 9° southeast of Pollux and about the same distance northeast of Procyon. He rises on the 1st at 2 o'clock in the morning, and on the 30th about a half hour after midnight.

MARS

is morning star. He is still small in size and luster. At the commencement of the month he is about 2° northeast of Saturn, and may be found with the aid of an opera glass. He rises on the 1st soon after 2 o'clock in the morning, and on the 30th at a quarter before 2 o'clock.

NEPTUNE

is morning star, and is nearly at his greatest distance from the sun. He is in the constellation Taurus, south of the Pleiades, rising on the 1st about a quarter before 10 o'clock in the evening, and on the 30th about a quarter before 8 o'clock.

## THE BLOT UPON OUR STATUTE BOOKS.

A recent event has directed our attention to the operation of the Chinese immigration laws in a manner that is not particularly flattering to our pride as citizens of the greatest and freest republic in the world. The circumstances, when briefly related, are these: Two tea-carrying steamers, the Monmouthshire and the Glenshiel, started from Amoy nearly the same time, for New York. They raced with each other over a whole hemisphere, with the Glenshiel coming into port several days ahead, having made the trip in forty-two days and thirteen hours—the fastest time on record.

It seems that the crew of the Glenshiel consisted of Chinamen. As soon as she arrived, an inspector of customs was placed in charge of the vessel, "in order," as one daily paper stated, "to prevent any of them landing to degrade American labor."

Now, observe that the men thus watched and guarded by the argus-eyed inspector of customs were not criminals, nor paupers, nor even workmen competing with Americans in the labor market, but simply sailors who desired to recreate on land after the toil and hardships of a long ocean voyage. To forbid the landing of sailors ordinarily would be the refinement of cruelty; but in the present case it was an exhibition of barbarism hardly to be expected from the most enlightened nation on the globe.

Imagine the feelings of those gallant and plucky seamen on being told that they were forbidden to land, lest they degraded American labor! that America, free to the rest of the world, including the wild men of Borneo and the degenerate Hottentots, was not free to them, simply because they were Chinese, and that they must content themselves with a sight of the land flowing with milk and honey, but were not to enter it. Imagine their disappointment and their disgust with the loud pretensions of this country to be a land of refuge! What must they have thought of the mockery of Bedloe's Island—Liberty enlightening the world? The irony of the French sculptor is not the less keen because unintentional.

Suppose our American sailors, the bravest and pluckiest of all that plow the high seas, were forbidden by Chinese law to land on the Chinese coast! How indignant we would be, and how eloquently we would declaim on Chinese heathenism and exclusiveness! And yet, under our very noses, the laws against Chinese immigration are so enforced as to perpetrate the grossest injustice and inhumanity.

Every day we meet with cases where the mischievous operation of the anti-Chinese laws can be plainly seen. But while we can trace many evils directly to the enforcement of these laws, the evils that result indirectly are neither to be traced nor to be adequately calculated. The persecution, distress, and wrongs to which the Chinese in this country are subject in consequence of those laws and their harsh execution are unknown quantities; but it does not require much intelligence for any one to understand that when our government refuses to acknowledge the rights of these poor strangers, and shows itself reluctant even to accord them the protection of the laws, this will be taken advantage of by their mortal enemies, the foreign miner, the sandlotter, the hoodlum, and the saloon politician. We quote the following from *Fire and Water*, to show that we are not talking at random:

"When calling attention last week to the danger of a destructive conflagration at Los Angeles, Cal., we might have added to the other hazards that contributed by the presence of a large and extremely unpopular Chinese element. It seems that barely a fortnight ago the agents of most of the insurance companies canceled their policies on buildings occupied by Chinamen, upon the ground that the existing feeling against them made the hazard too great. They have reason to congratulate themselves upon their foresight, for early on last Sunday morning a fire of unknown origin, which started in a gambling den in the Chinese quarter, consumed twenty-five buildings, in which about 1,000 of the "almond-eyed" had been housed, the losses being estimated at $100,000; and the press dispatches mention significantly that, although the fire companies came promptly to the spot, the slow and deliberate way in which they went to work 'seemed to indicate that they were not over-anxious to save the buildings.'"

It is true that the fire started in a gambling den, but the majority of those who were burned out of house and home were, doubtless, industrious and peaceable men—not addicted to gambling. Could there be a meaner exhibition of depravity than that shown by those firemen? They did not put out the fire, but they extinguished every spark of honor and humanity in their own breasts.

As Americans, we are ashamed to own that such things are possible within our boundaries. We are not proud of the position we occupy of being the only nation that carries out a policy of exclusion, and we denounce the ill-treatment of the Chinese as unchristian, barbarous, and inhuman.

## Philosophy of Longevity.

There is much in modern life that tends to shorten existence and to diminish the probability that a man or woman will reach ninety, to say nothing of a hundred. We lead more exciting and more wearing lives. It is in vain that a person has a splendid constitution to begin with, wears flannel, or the equivalent of flannel, next to his skin, dwells in a warm, dry house, and eats and drinks everything that is good and wholesome, if at the same time he habitually overtaxes his strength, looks upon his muscles as mere machinery to be driven at high pressure, and ruthlessly calls upon his nerves to squander their reserve power when every other source of energy is exhausted. Men or women who intend to be centenarians in these days must combine something of the old mode of life with something of the new mode of living. They must, while availing themselves of all the scientific discoveries and sanitary appliances of the age, imitate their grandsires in the steady and tranquil habits that prevailed before the invention of locomotives and the telegraph. They must have their eight hours of sleep regularly; they must have intervals of repose and vacancy in the daytime; they must spend a goodly portion of their waking hours in the open air. Nor will that suffice; there will have to be regularity in the hours of their meals, and discipline in the ordering of the dishes of which the meals are composed. We cannot believe that anybody will ever live to one hundred who eats a heavy dinner every night of his life at eight o'clock. Champagne in abundance, and Bordeaux or Burgundy *ad libitum*, should be forsworn by persons who deliberately set before them the attaining of their hundredth birthday. Neither, with such an end in view, would the active life of a politician, a lawyer, or a doctor be a sane enterprise. In order to reach that distant goal there must be a training, if not severe, at least regular and unflinching. Most of all there must prevail in the existence of such a person a tranquil serenity, an unruffled calm. Neither generous passions nor enthusiastic ideals must be allowed admittance. The pulse must never be driven up beyond a certain point, either by work, by anxiety, by fear, or by hope. At the same time, mere stagnation will, in all probability, never enable a person to live to one hundred. There is such a thing as rusting out as well as wearing out. If a candle does not burn brightly enough, it does not consume the wax with rapidity, and goes out for want of adequate combustion. It is so, no doubt, with the human body and the human spirit.—*London Standard.*

## PHOTOGRAPHIC NOTES.

*Reproductions on Erythrosine Bathed Plates.*—The most favorable illumination for oil paintings is a direct front light, by which shadows cast from very thick strata of paint and strong brush marks are considerably allayed, and the structure of the canvas is made invisible.

Black or neutral colored screens, placed at certain angles toward the object to be copied, will absorb the objectionable light, and leave the original free from reflections. Gloss and flares may cause disturbances; but these may be overcome by placing reflecting mirrors behind the lamps, and by adjusting one horizontally directly under the picture.

When very old oil paintings have hung for a long time, exposed and subjected to dust, moisture, and other destroying influences, the surface of the painting is sometimes so much incrusted with dirt as to make a good copy from it an impossibility. If it is practicable, which sometimes it is not, the picture should be cleaned with a soft sponge, water and soap, and, after allowing to dry slowly, rubbed over first with a dry soft sponge, and afterward with oil or glycerine and water.

Line engravings, manuscripts, and other old documents, yellowed by age, copy exceedingly well upon erythrosine plates; and equally so do old photographs. The grain of the paper, making enlarged photographs look rough and coarse, disappears almost entirely upon orthochromatic plates, and they are used, therefore, for that purpose quite extensively. In fact, for all kinds of photographic copying, with the exception, perhaps, of those showing pure whites and blacks, color-sensitive plates do good service.—*Photo. Times.*

## The Detroit Electric Street Railway.

"Do you make any speed with the electric motor?" a reporter of the Detroit *Free Press* asked of Frank H. Fisher, inventor of the system in use on the Highland Park road.

"Come out and receive a practical demonstration," was the reply.

The invitation was accepted, and shortly afterward the young inventor and the reporter were at the power station. Here were found two dynamos, one for operating two cars and a larger one for handling six. These dynamos are driven by one engine, and it was impossible to tell that the machines were delivering the current to the track, there being no spark and very little noise. The current is taken to the car by means of a third rail, which in the city limits is placed in a conduit entirely below the level of the street, but at the toll gate it is raised somewhat and protected by wooden stringers on the remainder of the road. The equipment of the road has been largely increased, and cars now run every half hour. While inspecting the conduit, the car Ampere came dashing down the track. It had hardly stopped when the crowd of waiting passengers began to scramble for seats. Mr. Fisher and the reporter took a position on the front platform. The conductor gave the customary yell of "All aboard," and then a signal to the motor man. The latter didn't yell "Get up," and pound a tired horse with a whip. He simply moved a little switch, and the car glided noiselessly and rapidly in the direction of Highland Park. The trip to the end of the road, which is three and one-half miles, was made in fifteen minutes. On reaching the switch, the car Volta passed without any perceptible difference of speed in either car. This explodes the erroneous idea that two cars going in opposite directions and propelled by electric currents cannot pass each other. On the return trip, when the pretty stretch of road from the post office to Kaiser's was reached, Mr. Fisher gave a signal to the motor man, who moved another switch and "let her out." The car shot forward, and rushed past Highland Park and Captain Stevens' farm at a rate of twenty-five miles per hour. The speed was maintained until the switch was reached, when it slowed down to twelve miles an hour into the city.

The new cars Franklin and Faraday, recently placed on the road, show marked improvement in mechanical construction. The motors are placed on the front platform, entirely out of the way of passengers, and there is an entire absence of wires and other paraphernalia. Each car is provided with an ammeter, which indicates the amount of current being used by the motor. The cars themselves, which were built by the Pullman Company, of Detroit, are fine specimens of railway architecture.