

taken place in this part of the valley. I have not at present worked out the problem sufficiently to make such an estimate, but can only say in general that while geologically the strata are very recent, they are, as we reckon human history, very ancient, and closely correspond in their age to the human relics reported by Prof. Whitney and others in the gold-bearing gravels under the lava deposits of Table Mountain, in Calaveras and Tuolumne Counties, California. Evidently, therefore, the Scripture saying is here again fulfilled, that "the first shall be last, and the last shall be first." For the portion of the continent earliest occupied by man will only now in these late days be ready to be reoccupied when the great hydraulic schemes inaugurated for irrigating this region shall have been carried out and made realities.

#### THE WASHINGTON BRIDGE.

This beautiful structure, completed in December, 1888, at a cost of \$2,851,684, and accepted from the contractors in March, 1889, appears to be still under the control of the bridge commissioners, not having been officially turned over to the city, although it has been for more than two years in public use. It connects Tenth Avenue at 181st Street, on the west side of the Harlem River, with Aqueduct Avenue on the east side of the river, the length of the bridge and approaches being 2,375 feet. It has two steel arches, each of 510 feet span, giving a clear height of 133 feet above the

#### The Tennessee River Improvements.

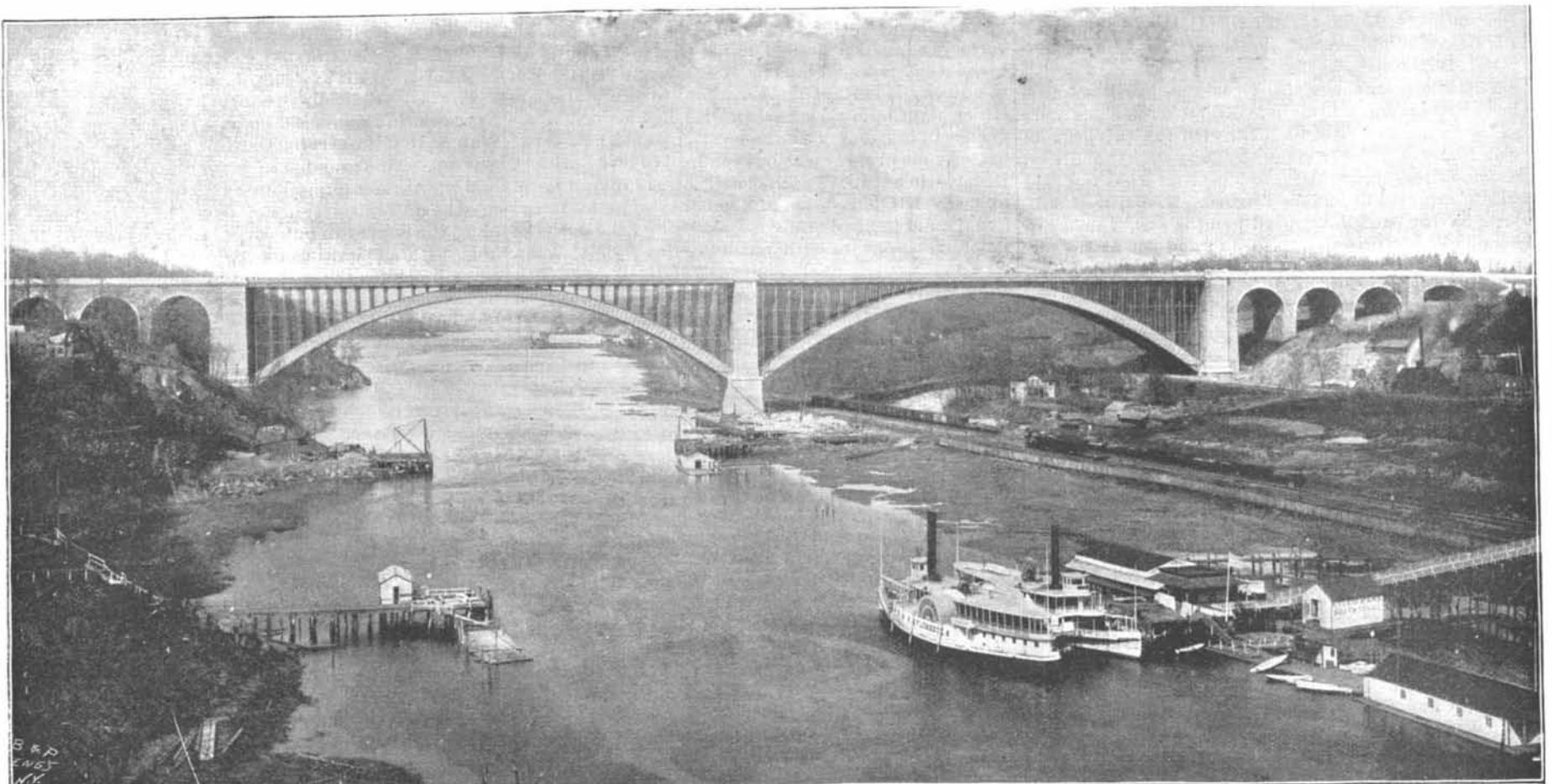
In addition to the many rock reefs and other minor obstructions, the Tennessee River is divided into two sections, which were, until recently, entirely isolated from each other by the chain of reefs and rapids known as the Muscle Shoals (near Chattanooga). More than sixty years ago steps were taken to build a canal around this obstruction, and a canal was finally built, but it soon became useless from damages caused by heavy floods, and for want of funds to make repairs it had to be abandoned. Some eighteen years ago an appropriation was made for rebuilding the canal, and within the past year the work has been so far completed as to permit the passage of boats, though much work still remains to be done to give a satisfactory channel through this obstruction and to complete the removal of minor obstructions in other parts of the river.

Without going into details, it may be stated that the Muscle Shoals improvement consists of 16 miles of canal and 12 miles of open channel work. The canal is from 80 to 120 feet wide and has eleven substantial locks of cut stone, 300 by 60 feet in the chamber, and with lifts varying from 5 to 13 feet. The lock walls, placed end to end, would make a wall 18 feet high, 7 feet thick, and 2 miles long. Over 270,000 cubic yards of solid rock have been blasted from the bed of the river and canal trunk, more than a million cubic yards of earth excavated, and half a million cubic yards of

was concerned, utterly wasted. There is something rotten in the execution of these torpedo gunboats. We believe that it consists in the nervous dread felt of the new boilers, and in the expensive expedients which are fruitlessly tried in the hope of making the old boilers more effective.—*Spectator*.

#### Use of Hyoscine.

In a paper in the *Journal of Mental Science* Dr. Lionel Weatherly has a very strong word to say in favor of hyoscine in certain conditions. There is little doubt that his warning against mistaking it for hyoscyamine is not unnecessary, and it is now high time that it should be recognized that in these two substances we have to deal with alkaloids of very different characters, from the point of view at least of the clinical physician. Dr. Weatherly believes strongly in the powers of hyoscine as a mental alterative. He has found it particularly useful in that form of mental disturbance which renders the patient violent and abusive, restless and domineering—a nuisance to every one who has anything to do with him. Under the administration of repeated small doses of hyoscine such a patient becomes a changed man. Violence and abusiveness give place to an amiable politeness, and instead of indulging himself in the free exercise of an extensive if somewhat shady vocabulary, the patient subsides into silence. Those are the cases in which Dr. Weatherly finds the drug most useful, and



THE WASHINGTON BRIDGE OVER THE HARLEM RIVER, AT 181ST STREET, NEW YORK CITY.

water, and its roadway is 80 feet wide between the parapets, 50 feet being a carriage-way, while there are two sidewalks, each 15 feet wide, protected by heavy balustrades of iron and bronze. The three main piers are 40 feet thick at the point from which the steel arches spring, and 98 feet long, and the abutments on each side are formed of three semicircular masonry arches, each of 60 feet span. The weight and thrust of the six steel ribs forming each arch are borne by large blocks of granite set normal to the thrust, and backed by granite blocks and concrete. Above this the piers are cellular, the main piers and abutments being crowned with a deep bracketed cornice with parapet.

On the western side of the river, where the bluff rises abruptly from the water, no difficulty was experienced in getting a good rock foundation, but the central pier was built with the aid of a caisson, and it was necessary to go 40½ feet below mean high water before a suitable rock foundation was reached. The foundation of the eastern main pier was carried down 43 feet, and laid on a bed of concrete 6 feet thick. More than 40,000 cubic yards of dressed granite and gneiss were used in the bridge, costing \$827,000, and there are 7,550,000 pounds of steel in the arch ribs and bracing, and nearly 6,000,000 pounds of iron in the posts, bracings, and floor, besides 1,234,000 pounds of cast and wrought iron in the cornice and balustrade, the iron and steel used costing a little over \$900,000.

We are informed that at Spikenard, Jackson County, Oregon, asbestos, of all grades and in large quantities, has recently been discovered, and active preparations for working the various fields are being made. The mines are near good roads, with plenty of timber and water power close at hand.

embankment built. Two thousand two hundred and seventy-eight tons of iron were used in the construction of the lock gates and aqueduct, and two and a half miles of heavy stone dams have been built.—*W. R. King*.

#### Poor Speed of the New British Fleet.

The London *Times* correspondent's letter from the fleet recently confirmed entirely our view of the failure of the new fleet to attain the speed for which it was designed. "Last night's speed," he writes, under date of July 31, "was rather more than thirteen knots, and though at that speed the *Hero* and *Conqueror*, and especially the former, were at times appreciably astern of station, they would have been perfectly able to keep station throughout a series of tactical evolutions conducted at a speed of twelve to thirteen knots. On the other hand, it seemed as if the torpedo gunboats, which are supposed to have a speed on paper of twenty-one knots with forced draught, could only maintain the speed of the squadron with considerable difficulty. The smoke they emitted gave signs of assiduous stoking, and as night fell, the *Sheldrake* in particular frequently exhibited a pendant of murky flame at her funnel. I noticed this morning that both her funnels were very much blacked with the heat." Yet none the less, instead of attaining the paper speed assigned to them, these torpedo gunboats could hardly sustain the far inferior speed of thirteen knots. The *Sharpshooter*, for instance, was estimated to attain twenty-one knots, and its machinery, planned for the purpose, cost more than double that of the machinery of the *Redpole*, a slow boat. Yet it hardly at all exceeded the speed of the *Redpole*, so that all the enormous extra cost of its machinery was, as far as speed

in which he believes it acts as a true mental alterative. It is also, he says, a useful drug in delirium tremens, and in other diseases in which tremor is a marked symptom, such as disseminated sclerosis, and it has the great advantage of being in most circumstances quite safe. It is not without reason that Dr. Weatherly enters a word of warning against its indiscriminate use as a sudden and powerful hypnotic; yet there would appear to be no doubt that it finds its greatest, and probably its most useful, application in the treatment of maniacal violence and noisiness, and that, at least in ordinary hospital work, it is a drug for emergencies.—*Lancet*.

#### Stimulation of Muscle by Light.

To the usual well known ways of stimulating muscles to contraction, viz., electrical, thermal, mechanical, and chemical, M. D'Arsonval has, says *Nature*, recently added that by means of light. He could not, indeed, get any contraction in a fresh frog muscle, when he suddenly threw bright light on it in a dark chamber; but having first in darkness stimulated a muscle with induction currents too weak to give a visible effect, and then suddenly illuminated the muscle with an arc light, the muscle showed slight tremulation. Not thinking this conclusive, however, M. D'Arsonval attached a muscle to the middle of a piece of skin stretched on a funnel, and connected the tube of the funnel by means of a piece of India rubber tube with the ear. The muscle being now subjected to intense intermittent light, he heard a tone corresponding to the period of illumination, and this ceased when the muscle was killed with heat. Arc light was used, which was concentrated by a lens and passed through an alum solution to stop the heat rays.

### The International Congress of Geologists.

BY H. C. HOVEY.

Fifteen years ago, at a meeting of the American Association for the Advancement of Science, the idea was suggested by Dr. T. Sterry Hunt of a triennial gathering of representative geologists of all nations. The idea met with favor, and conventions of this kind have been already held at Paris, Boulogne, Berlin and London. The fifth meeting of the geological congress has just been held in Washington, D. C., from Aug. 26 to September 1, followed by interesting excursions to the Rocky Mountains and elsewhere, thus enabling the scientists to prolong their friendly intercourse and also to study together many of the most important features of American geology. The business proceedings were regulated by a council; but the greatest freedom of discussion was allowed in the public meetings. Each member wore a bronze medal, struck by the mint, bearing on one side a map of North America, and on the other the inscription over crossed hammers, "Mente et malleo." The brainy and brawny looks of these toilers amid the rocks proved that their thoughtful labors had found a certain reward.

Addresses of welcome were made by Prof. Joseph Le Conte, acting president, in the absence of Prof. Newberry, by Hon. G. G. Hubbard, Major Powell and Secretary Noble. Responses were made by Prof. T. McKinney Hughes, of Cambridge, England, and Prof. Albert Gaudry, of Paris. Evening receptions were tendered by the Geological Society of America, Prof. Emmons, Mr. Thomas Wilson, Major Powell, and by the Legation of Korea in honor of "His Chosun Majesty's Birthday."

The official language of the congress has heretofore been French, but on this occasion all discussions were as far as practicable in English, with the privilege of using any tongue spoken by any of the fifteen nationalities represented, provided that what was said was interpreted into plain English. The special subjects having been announced months ago, the members had come prepared to speak; and yet as no formal "papers" were presented, the discussions had an off-hand style that made them peculiarly attractive, even though often carried on in polyglot. After having sufficiently examined the maps, photographs, minerals and fossils on exhibition in the various rooms of the Columbian University, the congress repaired to the main lecture hall and began their work in good earnest.

The topic first discussed, and to which an entire day was devoted, was the "Genetic Classification of the Pleistocene Deposits." It is well known that the glacial drift is spread over the whole breadth of our continent and as far south as the Ohio River, consisting of sand, gravel and boulders, either in view or underlying the soil; while naked ledges of rocks in this vast region are often marked by furrows and striæ. The accepted theory is that all this was caused by one or more immense glaciers, and the period is known as Post-tertiary, Quaternary, or Pleistocene—the last name being preferred by the Congress.

Prof. Chamberlain, in opening the discussion, admitted that our ultimate goal must be chronological classification, but asserted that nothing stood more in the way of the progress of American geologists than their presumptive haste to fix time limits for which we have not yet sufficient data. There may have been one, two, three, or four distinct glacial periods. We do not know. Meanwhile our primary work is that of genetic classification. He laid an elaborate scheme of this kind before the Congress, illustrating it by a large map of North America, on which the known area of the Ice Age was painted white, extending from the Arctic zone down to the latitude of 38° or 40°, with the exception of a region in Wisconsin which had somehow escaped from the general invasion. His scheme recognized six general classes with many subdivisions, but including only such formations as are directly or indirectly due to glacial action. Dr. Wahnschaffe, from the University of Berlin, strongly advocated a chronological classification, in which he was supported by Baron De Geer, of Sweden, and Prof. Gaudry, of Paris, who maintained that in Europe there were two distinct horizons distinguished by different faunas. Professors Credner, of Leipsic; Diener, of Vienna; Holst, of Sweden; and Hughes, of England, contended that the organic remains, the moraines and pitted plains, the kames and osars, merely indicated the advance and retreat of one continuous ice sheet. Prof. Shaler remarked that there might be an interweaving of glacial deposits with organic deposits occurring near the ice sheet. Prof. Gilbert, of the United States Survey, observed that in Alaska there are existing glaciers covered with forests in which bears and other animals live. Another speaker called attention to the fact that in the Austrian Alps, moraines no more than twenty years old are covered with pasture, and that in the Caucasus the rhododendron grows to the very edge of the ice. Prof. Cope had found in the "Equus beds" a tropical interglacial fauna succeeded by a boreal fauna. Dr. Christie and Dr. Cadell described glacial phenomena observed in Scotland. Prof. Pavlow, of Moscow, spoke for Russia, but was of the

opinion that we needed a more clear definition of Pleistocene before a satisfactory classification could be secured. Mr. W. J. McGee, of United States Geological Survey, proposed a scheme that was favorably received, which, while genetic, like Chamberlain's, was broader, including aqueous, eolic, and volcanic contemporaneous phenomena as well as those that were glacial or aqueo-glacial.

Two days were next devoted to discussing the "Correlation of Geological Formations." Prof. Gilbert had the honor of opening and closing the discussion. His proposed scheme included six physical and four biotic methods of correlation. *Physical*: 1. Visible continuity. 2. Lithologic similarity. 3. Similarity of lithological sequence. 4. Breaks, or unconformities. 5. Simultaneous relations to physical events. 6. Comparison of changes due to continuous geologic processes. *Biotic*: 7. Matching by species. 8. Matching by genera and families. 9. Divergence from status of fixed dates. 10. Relation to climatic episodes. Biotic methods are limited by the facts of geographic distribution; and correlations at short range are better than those at long range. The great body of correlation is based on similarity of sequence. Examples of (4) are found in our Triassic areas; of (5) in formations in Utah related to certain lake beds, also in alluvial, littoral and subaqueous deposits. In biotic methods insects were the most useless and marine mollusks the most valuable. Fucoids have too wide a range in time and the vertebrates too narrow a range in space. This brought Prof. O. C. Marsh to his feet in defense of the vertebrates, which he had found the surest guides for correlation, especially in the Mesozoic and Tertiary of the Rocky Mountain region, where invertebrates are either wanting or lacustrine. He had named a sequence of horizons after the most characteristic vertebrate genus in each, which is confined to it exclusively. He gave an outline of such classification brought down to date. His description of the bones of great beasts found amid the bad lands of Dakota and the parks of Colorado was heard with much interest by all. Prof. K. Von Zittel regarded plants as relatively unimportant; while Prof. Walcott explained their value, especially amid the coal measures. Baron De Geer insisted on the importance of a numerical comparison between different species. Prof. Hughes declared that all kinds of evidence are useful, whether positive, negative or circumstantial. We must have a system so varied that if ordinary criteria fail, others can be employed. Major Powell spoke of the necessity of specialization, and said that in his surveys he had gained excellent results by a union of physical and biotic methods. Mr. W. J. McGee advocated physical methods altogether. After the episodes of continental growth are mapped, and their fossils studied, a geographical distribution of organisms may follow that shall place paleontology on a new and higher plane. Prof. Lester F. Ward held that the great types of vegetation mark geologic epochs. Even a small fragment of a carboniferous plant is decisive as to the age of the rock in which it occurs. But more ample material is needed in order to fix the relative age of deposits in the same geologic series. Geologists have expected too much of the paleobotanists, and the latter have erred by trying to meet their demands. Prof. Claypole said that the marine fauna is to the geologist what a primary triangulation is for the geodist, marking out the main divisions for subsequent subdivision by the aid of plants and vertebrates.

Prof. C. D. Walcott spoke on the correlation of the Cambrian rocks by both physical and biotic data, on the Atlantic coast, the Rocky Mountain areas and the interior continental plain. He eulogized the pioneers of the New York Survey, whose system was essentially in use to-day.

The venerable Prof. James Hall, who undertook the survey of New York in 1836, and who fifty years ago undertook to correlate the strata west of the Mississippi, described the difficulties and results of labors which were arduous under the circumstances. He urged the importance of both physical and faunal criteria.

Prof. Williams emphasized the fact that species may vary with environment. Near-shore fauna may differ from deep-sea fauna of the same age. Outside the centers of abundance varieties may appear that are not typical, though often called so.

Dr. F. Frech, of Halle, noted the identity of certain faunas of America and Europe, *e. g.*, of the Niagara and the Wenlock shales; of the Tully limestones and the Naples beds; of the carboniferous in Iowa, Spain and middle Germany. But after all many genera in one country are wanting in the other, although the rocks may have been formed under like physical conditions. Dr. Barrios, of Lille, admitted that European geologists encounter many of the same difficulties met by Americans, and thought it impossible to compare in detail the rocks of the two countries, although some individual zones might be correlated. Autopsy is the only basis. Geologists must see the beds before a comparison can be instituted. Otherwise there was no general basis.

Prof. C. R. Van Hise elaborately described the dis-

tribution, character and succession of the pre-Cambrian rocks. We have been retarded by the idea that lithological character is a test of geologic age. Silurian, Devonian, and even Carboniferous rocks have been known to become as highly crystalline as those that are more ancient. We shall have to abandon such terms as Huronian and Laurentian, and in the absence of any well known pre-Cambrian fauna, include all the series under the general term Algonkian, as is now done by the U. S. Geological Survey. Prof. Pumpelly confirmed this by his observations in the Green Mountain region, citing a formation that varied from quartzite to gneiss, to conglomerate, and to mica schist at different localities.

Prof. Cope said that there is a marked difference in the present faunas of continents, and that we need to study vertical as well as horizontal ranges. He inclined to think that certain vertebrate forms did not spread from a single center of origin, but from different places; adding that life in its progress had its own laws and differed from minerals and rocks.

Prof. Gilbert, in concluding this very interesting and extended discussion, was of the opinion that many methods of correlation must be used, and expressed his gratification that his scheme of general classification had served the Congress so well, although subjected to modifications.

In connection with the foregoing discussion an official bulletin by Prof. H. S. Williams, on the classification of the Devonian and Carboniferous systems, was distributed; with the statement that seven or eight similar bulletins are to follow, aiming at a complete correlation of the systems of North America.

The last public discussion held by the Congress was as to coloring geological maps. The best and simplest plan is that in use by the United States Geological Survey. Nine grand periods are represented by colors, and the various formations by patterns, of which there may be an endless series of devices. This scheme enables the Survey to publish as rapidly as may be desirable, without waiting for two or three generations, till its work for the continent is complete. There will be 7,000 or 8,000 maps in all, but any one of them can be issued at any time, so that the interests of the people can continually be served by a method so simple as to be understood by any intelligent farmer or mechanic, as well as by the scientist. The order of periods and their corresponding colors are as follows: Neocene, orange; Eocene, yellow; Cretaceous, yellow-green; Jura-Triassic, blue-green; Carboniferous, blue; Devonian, violet; Silurian, purple; Cambrian, pink; Algonkian, red.

In reply to an inquiry as to why black was not used for coal, Major Powell replied that it had been thought of, but abandoned, because there was really more coal in either the Cretaceous or the Eocene than in the Carboniferous period, and therefore such marking would mislead. Many views were advanced, and while general admiration was expressed for the American scheme, it was evident that the time was not yet ripe for its adoption by foreign countries. Indeed, it might be said in summing up the entire results of the Congress that progress was made by a comparison of opinions rather than by the vote of the majority.

After the customary resolutions and farewell speeches the International Congress adjourned to meet in 1894 in Switzerland. A invitation from the Emperor of Russia was accepted to meet in 1897 in the city of St. Petersburg.

### A Locomotive Explosion.

An esteemed correspondent writes us that the boiler of one of the large freight engines of the Norfolk and Western Railroad exploded at 5 o'clock A. M., Aug. 27, at Tazewell Station, Va., killing the engineer and seriously injuring the fireman and breaking the arm of Engineer Philips, who was standing some 150 yards distant. The explosion was caused by injecting water into the empty boiler. It seems that the train engineer, Carpenter, was advised to take water at Pounding Mill tank, but relying upon his own judgment he concluded to run to Tazewell Station, some 15 miles distant, but just before arriving at the tank the engine refused to pull the loaded train, when the engine was uncoupled and run down to the tank, some half mile distant. The boiler being empty and red hot, no sooner was the pump put to work than there was a terrific explosion. Both ends of the boiler were blown out to some distance, followed by a great spurt of steam, which scalded the engineer and completely demolished the cab. The door of the cab was blown some distance, striking Mr. Philips, who was washing his face and hands at a pump some 150 yards distance, and breaking his arm above and below the elbow. The fireman was burned and otherwise slightly injured.

### Artificial Marble.

H. Bruck says this composition ("marmorit") contains 2 parts of magnesia, 2 parts of lime and quicklime, 1 part of carbonic acid,  $\frac{1}{4}$  part of silicic acid,  $\frac{1}{4}$  part of argillaceous earth, and 1 part of magnesium chloride.



### Military Bicycling.

The Connecticut National Guard has made an experiment in military bicycling. The men rode safety machines and carried Colt's lightning magazine 44 caliber carbines and Colt's regulation army revolver. When mounted each man carries his carbine slung across his back by means of a strap. The carbine has a capacity of 12 shots and the revolver of 6 shots, giving to the nine wheelmen a total of 162 shots to be fired without pausing to reload. The weight of the carbine is five pounds. The manual used by these wheelmen was compiled by Lieutenant Giddings from United States Infantry and English cycle tactics. The Hartford Post thus describes a sham fight between the wheelmen and a detachment of infantry and a squad of cavalry:

The wheelmen appeared at the battery in a column of twos. Then they came to company front and advanced down the parade ground toward headquarters. About half way they encountered the infantry, who opened fire upon them. Instantly the command to halt was given, the wheels were dropped to the ground, and the line, deploying as skirmishers, fired several volleys, advancing about 20 feet each time and lying flat on the ground. The infantry retired and the recall to the wheels was sounded. When the wheels were reached the cavalry appeared, advancing at a full gallop to support the infantry. The wheelmen formed a "zebra" by inverting their machines and, kneeling or lying behind the whirling wheels, received them with their repeating rifles and revolvers. The cavalry used revolvers, and in a few moments, when the wheelmen had exhausted their ammunition, the order was given to retreat at double quick time. In a moment they were all mounted and "scooting" down the parade ground. They could not keep pace with the horsemen, however, who galloped in among the flying wheelmen and drove them to their tents.

The wheelmen were also tested as messengers, but the flag signaling with which the wheel messenger competed seems to have been very slow. Colonel Doherty, of the Second Connecticut Regiment, was supposed to be attacked on his flank when two miles away from camp. He sent a message of some ten or fifteen words to headquarters by means of the regular flag signal service, asking that a machine gun be sent to his assistance at once. At the same time he gave the message to one of Lieutenant Giddings' wheelmen for delivery. For the first half mile the message was carried for the regular service by a horseman to a house from whose roof the first flag began to wig-wag. The bicyclist reached his destination and delivered his dispatch in 10 minutes, while the same message did not get in until 40 minutes later through the ordinary signaling by flags. In fact, the gun had reached its position and was already firing in support of Colonel Doherty, two miles away, when the message asking for it reached headquarters according to the usual method.

### Remarkable Scene at a Revival Meeting.

A few weeks ago the Free Methodists began a series of revival meetings in Sydenham, Ontario, Canada, so says the New York World, and made many converts. As the number of converts increased so did the excitement, and the meetings, which were held in the town hall, grew so noisy that complaint was made to the authorities and the revivalists adjourned to a large vacant lot in the edge of town. Here they were addressed by J. F. Frasier, a revivalist, who sailed into the prevailing mode of female dress, and said women are born beautiful and die misshapen because of the wearing of corsets. Frasier is an earnest and powerful speaker and his words created great excitement among the women present.

"Throw off the accursed invention!" he cried, "throw it off and go to God as you left him! Burn them rather than burn yourselves in everlasting fire!"

This suggestion struck a responsive chord, and he had hardly ceased speaking when an enthusiast piled up material for a bonfire and applied a match. It was a weird scene, the dusky evening, the crowd of religious enthusiasts, quivering with excitement, surrounding a fire which shot up long tongues of flame.

"Throw off the garment!" shouted the revivalist.

"Burn them!" hysterically cried a feminine voice in the crowd, and pushing and panting a young woman of twenty-five forced her way to the center near the bonfire. She was tugging at her dress. There was a sudden gleam of white shoulders in the glare of the fire light and she flung her corset into the flames, saying she would die as God made her and not as she had made herself.

Her example was contagious, and in less than half an hour not a woman in the crowd wore a corset, and nothing remained in the blaze but a mass of grotesquely twisted corset steels, amid which the flames playfully flickered. The excitement was so great and the nervous strain so tense that several women grew faint, but they had burned their corsets and were happy.

The Free Methodists consider the revival a great success, and talk of carrying the war into the States.

### THE VANISHING LADY.

All that is necessary for the performance of this trick is a chair, a newspaper, and a shawl made of very light silk. The prestidigitator takes the newspaper, unfolds it and spreads it on the floor under the chair, so as to separate the latter entirely from the floor. A screen is placed a short distance back of the chair. After this has been done a lady enters dressed in any style of costume, but generally in a Roman or Greek dress, and takes her seat in the chair. She is then covered by the shawl which we mentioned above, as shown in Fig. 1, until she is entirely enveloped, even to

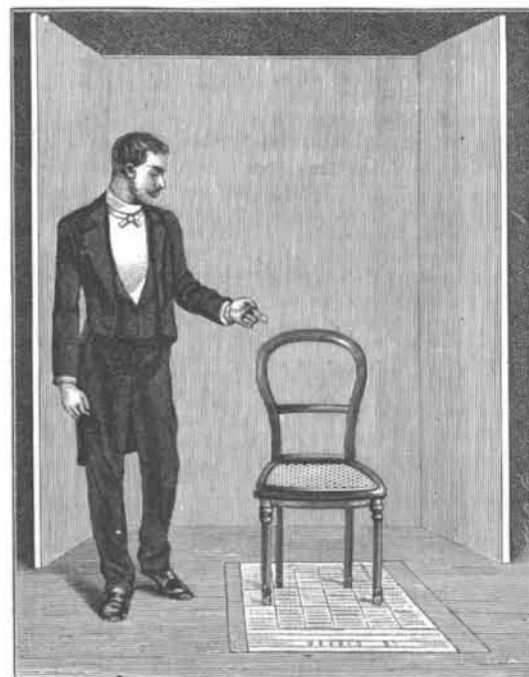


THE VANISHING LADY IS COVERED WITH A SILK SHAWL.

her knees and feet. The sleight of hand performer then withdraws and calls out solemnly "one, two," and at the word "three" the shawl and the lady disappear as if by magic, leaving only the newspaper and the chair, Fig. 2. The effect is very startling, and until the trick is explained it is almost impossible to believe one's eyes.

Since this trick was first introduced it has been more or less perfected or modified in its form, but the following description states the methods generally employed in performing the trick.

If the newspaper is carefully examined, it will be found to be made of India rubber and to contain a large rent at about the center. The paper is placed directly over a trap door and the chair is placed upon it and in such a position that the trap will open directly under the feet of the lady as she sits in the chair. While the lady is being enveloped in the shawl an invisible frame is raised which sustains the shawl, and gives it the form of the figure. When the shawl is finally in place, the lady tilts the seat of the chair and passes between the legs, through the paper, into the trap



THE SHAWL AND LADY HAVE VANISHED.

opening which has been prepared for that purpose, and slides under the floor. At the same instant the chair tilts back to its original position, and at the word "three" the shawl is suddenly drawn behind the screen by means of an invisible thread. It appears as if it were the woman and the shawl which both suddenly disappear, as the movement of the shawl cannot be followed by the eyes of the spectator. The frame disappears at the same time, leaving nothing behind but the chair and the paper. The rubber newspaper returns to its

natural form and leaves no trace of the opening beneath.

We are indebted to *La Nature* for the article and the engravings, as well as for the article on a somewhat similar trick which was described in the SCIENTIFIC AMERICAN of April 25, 1891. In this latter article the lady was placed in a palanquin carried on the backs of four men, and at a certain part of the performance the curtains were dropped and in an instant were raised again, when it was discovered that the lady had vanished.

### Molasses as Fuel.

Our Louisiana crop of molasses is about 450,000 barrels, and will be a constantly increasing quantity; a large part of it is of superior quality which finds a ready market, and the lower grades are constantly increasing; for these lower grades there is now scarcely any market, and their value has fallen so low that the question of the fuel value of such goods has arisen; the lower grades will increase in quantity comparatively, as the more thorough the manufacture of sugar is, the lower the grade of the resulting molasses.

The analysis of low grade Louisiana molasses indicates 32 per cent sucrose, 25 per cent glucose, 23 per cent other solids not sugar, and 20 per cent water. We thus have an article containing but 20 per cent of water, and the rest of it largely carbon, and it would seem, theoretically at least, to have a comparatively good fuel value. Its present market value leaves its value on the plantations at about 2 cents per gallon, or \$3.33 per ton, which price per ton is about the present value of coal. If it could be demonstrated that such molasses has a fuel value equal to or about to coal, pound for pound, it would quickly solve the problem which is now exciting much attention in Louisiana.

The distillation of molasses into alcohol may be a more profitable method for its disposition, but as no experiments have been made here in that direction for many years, we are comparatively in the dark there also. If our correspondent would make some tests with molasses and be prepared to give guarantees that his apparatus [device for burning liquid fuels] would successfully burn it, and with adequate economic results, he would certainly have no trouble in introducing it into Louisiana.—*La. Planter*.

### American Iron for Canada.

The *Monetary Times*, of Toronto, says: Our market reports indicate that the iron and steel trade of Canada with Great Britain is undergoing a marked change. Ontario is now importing pig iron largely from the United States, where a year or two ago she bought exclusively from Great Britain. Bar iron, too, she is beginning to buy from the Americans. Steel boiler plate tubes she still buys from the old country, but the Londonderry Works, in Nova Scotia, manage to keep out the cheap steel. It is worth while to notice that the Canadian duty on bar iron is equal to \$14.56 on a gross ton of bar which costs £5 10s.; also that the duty on common steel is 60 cents per 100 lb. There are hardly any stocks of pig held in Montreal or Toronto now. A large proportion of the pig iron sold in Canada nowadays is American; this is especially true of Ontario, which is the nearest province to that market. Quebec still buys from Great Britain. The American "drummers" from New York and Philadelphia and a firm representing furnaces in Buffalo, Cincinnati, and Chicago, are canvassing Ontario cities every week. They sell pig iron in Toronto which comes all the way from Alabama, and which is probably the cheapest in the market.

### The Eastern Boundary of Alaska.

A government coast and geodetic survey party, which has been two years in Alaska, has recently reported that the Yukon gold fields, which have thus far attracted the most attention, are in Canadian and not in United States territory, as had hitherto been supposed. The boundary line is the 141st meridian of west longitude, but its location had not before been marked by the surveys, and will now have to be more exactly fixed by a joint commission of the two governments. There were several hundred miners in the district, and the upper Yukon territory lying just along the border line is said to be attracting large numbers of seekers for the precious metals.

### The Densities of Oxygen, Hydrogen, and Nitrogen.

The densities of the three gases are within less than 1-10,000 part.

|               |        |
|---------------|--------|
| Hydrogen..... | 0.0695 |
| Oxygen.....   | 1.1050 |
| Nitrogen..... | 0.9720 |

From these values the mean centesimal proportion may be deduced as 23.235 by weight and 21.026 by volume. According to these experiments, the atomic weight of nitrogen would be 13.99, and that of oxygen 15.905.—*A. Leduc*.