ASTRONOMICAL NOTES.

BY BERLIN H. WRIGHT.

PENN YAN, N. Y., Saturday, June 22, 1878.

The following calculations are adapted to the latitude of New York city, and are expressed in true or clock time, being for the date given in the caption when not otherwise stated.

PLANETS.

	H.M.		H.M.
Venus rises	2 17 mo.	Saturn rises	0 08 mo.
Mars sets	9 25 eve.	Uranus sets	10 40 eve.
Jupiter rises	9 43 eve.	Neptune rises	1 41 mo.
Jupiter in meridian	2 33 mo.		

FIRST MAGNITUDE STARS.

	H.M.		H.M.
Alpheratz rises	10 06 eve.	Regulus sets	10 41 eve.
Algol (var.) rises	11 46 eve.	Spica in meridian	7 15 eve.
7 stars (Pleiades) rises	2 10 mo.	Arcturus in meridian	8 06 eve.
Aldebaran rises	3 29 mo.	Antares in meridian	10 17 eve.
Capella sets	9 12 eve.	Vega in meridian	0 32 mo.
Rigel rises	5 36 mo.	Altair in meridian	1 44 mo.
Betelgeuse sets	6 10 eve.	Deneb in meridian	2 36 mo.
Sirius sets	5 37 eve.	Fomalhaut rises	0 50 mo.
Procyon sets	7 48 eve.		

REMARKS.

Saturn arrives at western quadrature June 24, after which time he will set before midnight, and therefore be an evening star; near the moon June 22, being nearly 7° south. Venus is near the moon June 27, being about 7° south. She is about 10° southwest of the Pleiades, and will soon pass between that cluster and the Hyades.

Mars is in *Cancer*, and with the *Northern* and *Southern Aselli* (δ and γ *Cancri*) forms a neat equilateral triangle, the sides being about 4°. In the center of this triangle the naked eye may discern a rich cluster of stars, mostly of the sixth magnitude, called *Præsepe*. Algol at minima June 26, 4h. 16m. morning, and 29, 1h. 5m. morning.

PENN YAN, N. Y., Saturday June 29, 1878.

PLANETS.

	H.M.		H.M.
Venus rises	2 12 mo.	Saturn rises	11 43 eve.
Mars sets	9 12 eve.	Uranus sets	10 12 eve.
Jupiter rises	9 13 eve.	Neptune rises	1 14 mo.
Jupiter in meridian	2 02 mo.		

FIRST MAGNITUDE STARS.

	H.M.		H.M.
Alpheratz rises	9 39 eve.	Regulus sets	10 14 eve.
Algol (var.) rises	11 19 eve.	Spica in meridian	6 47 eve.
7 stars (Pleiades) rises	1 42 mo.	Arcturus in meridian	7 38 eve.
Aldebaran rises	3 02 mo.	Antares in meridian	9 50 eve.
Capella sets	8 45 eve.	Vega in meridian	0 04 mo.
Rigel rises	5 08 mo.	Altair in meridian	1 16 mo.
Betelgeuse sets	5 43 eve.	Deneb in meridian	2 08 mo.
Sirius sets	5 09 eve.	Fomalhaut rises	0 23 mo.
Procyon sets	7 20 eve.		

REMARKS.

The earth is farthest from the sun July 2. Mars still illumines the western sky, and is near the moon July 2, being about ½° north. Saturn will soon rise at a more seasonable hour in the evening. His rings may be seen to a better advantage at present than at any other time during the present year, the earth being about 5° above their plane.

Algol will be at minimum brilliancy July 1, 9h. 54m. evening, about one hour before rising; and as the increase in brilliancy occupies 3h. 20m., it will continue to get brighter for about two hours after rising.

How a Distinguished Scientist Raises Strawberries.

Some of the largest and finest flavored strawberries that we have seen this season were from the garden of our valued contributor, Alfred M. Mayer, South Orange, N. J. In forming new beds he invariably takes runners from new plants. Manures in the early spring. After the berries have formed he cuts off all runners and thins out the central leaves. Result: enlargement of the berry; improvement in flavor.

Lightning Conductors and Earth Contact.

The importance of a perfect earth contact for lightning conductors is shown by an accident at Nottingham, England, in 1868, which is mentioned by Dr. R. G. Mann, in the *Journal of the Society of Arts*. A copper lightning conductor, four tenths of an inch in diameter, was attached to the weathercock, one hundred and fifty feet from the ground upon the spire of a new church, and was carried in an unbroken line to the ground, and probably at first had a good earth contact; but after the accident an investigation showed that some thief had drawn it out of the ground and carried away all that was more than six inches below the surface.

On October 16, 1868, the church was struck by lightning, the fluid passing quietly until within about six feet of the ground. Had there been a good earth contact, all would have gone well, but at this point it was drawn from the conductor to a gas pipe on the inside of the wall, although separated from it by 4½ feet of solid masonry. The lightning then passed along the pipes to the gas mains and off into moist ground; but on its passage it totally destroyed a short piece of pipe near the gas meter and allowed the gas to escape, which, by the way, caused another accident on the following day, when a lighted lamp was carried into the cellar by the person sent to look up the leak. At the point where the electric fluid passed through the wall from the conductor to the gas pipe, the stone work was splintered into fragments through an area of about a square yard on either face of the wall, while the center of the wall, for a thickness of about a foot, was entirely uninjured.

FIRE TELEGRAPHS IN GERMANY.

The principle on which good fire telegraphs are based is that of establishing in sufficient numbers, and in easily accessible places, suitable apparatus by which the outbreak of a fire may be communicated by any person to the nearest fire engine and police stations, or to a central station, from where immediate orders are issued. Various methods may be adopted in order to obtain this result; but that which experience shows to be the most satisfactory, and which has best stood the test of time thus far, is the automatic system in use at many towns where a system of fire telegraphs has been established. By means of the automatic apparatus a certain sign may be telegraphed to the central stations indicating the street and district from which the alarm of fire was sent. It is evident that by sufficient distribution of this automatic apparatus over a town the time required for the dispatch of the brigade must be considerably shortened, thus allowing the fire to be attacked when in its infancy.

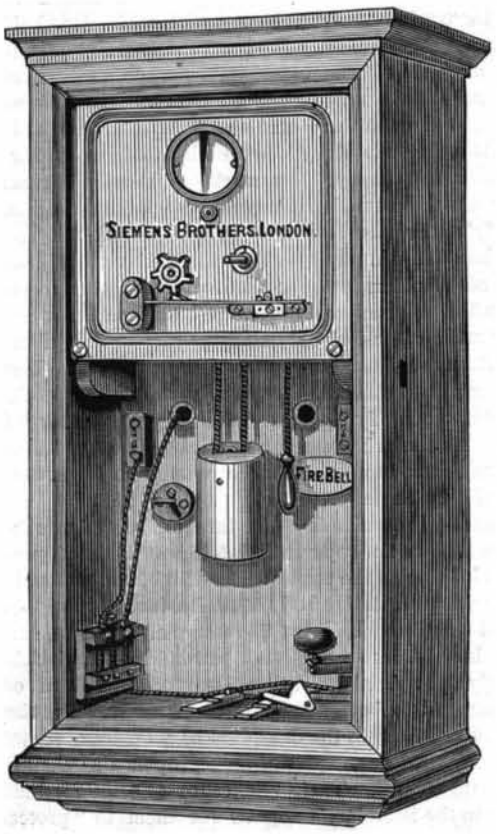


Fig. 1.—AUTOMATIC FIRE ANNUNCIATOR.

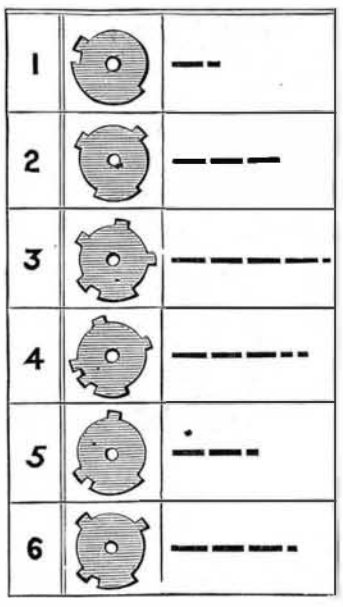


Fig. 2.—CONTACT WHEELS AND SIGNALS.

Mr. R. von Fischer Treunfeld, F.R.S., has recently read before the Society of Telegraph Engineers a valuable paper on this subject, the illustrations of which here given we take from *Iron*. Among other facts he states that in London, although there exists in that city a very efficient fire brigade, but no automatic system of fire telegraph, the proportion of serious fires reaches 10 per cent of the aggregate of all conflagrations; whereas in Berlin, where the fire department is not so well organized, but where an automatic telegraph system does obtain, the proportion is but 2·8 per cent. This difference he attributes to the fire telegraph used in the German cities, an account of which, as located in Hamburg, he gives as follows:

Hamburg possesses two central stations, the central fire brigade station and the central police station. Both stations are connected to seven district lines, which run radially from these centers to the suburbs, each line being connected with a number of fire brigade and police stations, as well as automatic fire annunciators. The chief object of these seven lines, with their annunciators, and fire brigade and police stations, is to send immediate notice to the brigade stations from the locality wherein the fire is first discovered. Besides this, telegraphic communication can be maintained between the different stations (as well as from the annunciators to the central stations), so that the required assistance may be properly disposed of. In this system it will be observed that all fires are first announced to the central station, and that all arrangements for the suppression of every fire are made from this central station, which thus regulates and controls the entire system.

The automatic fire annunciator, Fig. 1, is a very simple mechanical contrivance, introduced into the telegraph line, through which circulates a permanent current from a battery established at the central station. The annunciator, when brought into action, breaks the circuit, and thus sends a certain signal to the central station. The breaking of the circuit is caused by the rotation of a contact wheel, Fig. 2, the periphery of which is so shaped that the contact breaking corresponds to a certain Morse signal, and each signal to a certain district or street of the town. The annunciator is protected by a glass front, and is placed at street corners, in guard or railway stations, or in pillars situated in a prominent position, and where there is little likelihood of its being willfully damaged. On the discovery of a fire all that has to be done is to run to the nearest annunciator box, open or break the protecting glass, and pull the handle. The contact wheel then rotates, and the letter corresponding to the annunciator is transmitted several times in succession to the central fire brigade station, whence orders are telegraphed to the various engine and police stations.

There are, besides the two central stations, forty-seven Morse stations and fifty-three automatic annunciators, that is to say, 102 places from which the outbreak of a fire can be announced by telegraph. Both annunciators and Morse are connected to the same line, the former being situated at prominent places, as previously mentioned, the latter at fire brigade and police stations. The apparatus employed in the stations at Hamburg are Morse ink writers, with the usual complement of details. From the batteries, consisting of 350 Meidinger elements, fifty for each district line, a permanent current flows through the lines, all signals being made by breaking the circuit. The seven radial district lines all unite at the central fire brigade station, to which all fire alarms are first sent, and from which the requisite orders are immediately issued to the stations in the vicinity of the fire. By the different stations being thus connected together every facility is afforded to each station to give its help to the others as circumstances may require.

The telegraph lines are preferably underground, and consist of 151,631 feet of underground cable and 126,641 feet of overground line, the latter in the suburbs of the town only.

The working of the system is as follows: All stations except the central have their Morse instruments cut out, and only a loud sounding alarm in circuit. A signal sent by any of the annunciators or Morse stations is recorded at the central station on a self-starting Morse, attached to that line. The central station, after receiving this signal, sends, by means of a magneto-inductor, the fire alarm to all the stations of the district, or, if need be, to all the stations of the seven districts simultaneously, by means of a commutator fixed for this purpose. The operator at each Morse station, by a slight pressure of his foot on a lever, brings his instrument into circuit, and by this means each station is ready to receive orders from the central station, to which the exact position of the fire has been previously made known. The arrangement is such that when the operator takes up his po-

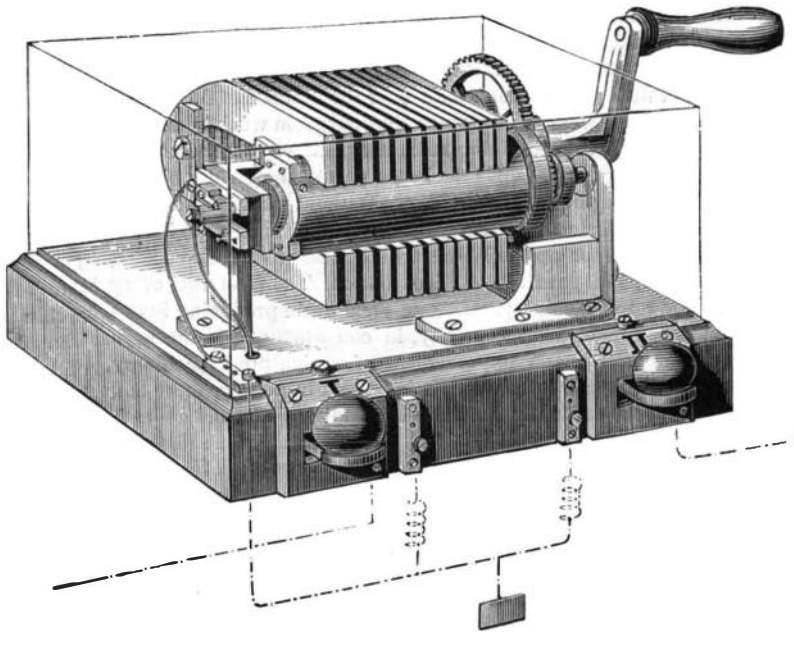


Fig. 3.—INSTRUMENT FOR TRANSMITTING ALARMS.

sition at the table the instrument is brought into circuit by means of the lever contact maker. As soon as he departs from this position the instrument is cut out of circuit. In this way there is no chance of delay or failure from forgetfulness on the part of the operator. The alarm signal is instantly followed by definite orders to the fire brigade and police stations nearest the fire. Having thus shown the arrangements and working of the radial system as in operation at Hamburg, the author explains the circular system of fire telegraphs, taking that in use at Amsterdam as an example.

The town is divided into three main circles (not including the suburban circle), the offices in each of which are in communication with the central station. Only fire brigade and police stations are in these main circles, and they are so connected that the police stations are situated in one half and the fire brigade stations in the other half of the circles. By this arrangement the two may be disconnected from each other, and enabled to communicate independently with their own central office. To each of the three main circuits a number of divisional circuits is attached, having their centers in one of the fire brigade stations. These divisional circles contain, as a rule, only automatic fire annunciators, although, as will be gathered from the diagram, this rule is not altogether absolute. The entire arrangement shows that there are 50 Morse apparatus and 135 annunciators in use. In all there are 159 places from which fire alarms may be given by telegraph. All the lines are worked on the closed-circuit system, the batteries of the Meidinger form being at the central station. The automatic annunciators have, besides the clockwork required for the movement of the contact wheel, a Morse key, a galvanoscope, and a lightning protector. By means of the key messages can be sent to the station of the division if required. The Morse apparatus in the stations is fixed in the same way as in the Hamburg system. In the central station is a magneto-inductor, by which the alarms of all stations may be rung, and, by an agreed combination of bell signals, either all or any single station may be called by the central station. The working of the system is similar to that in use at Hamburg. All stations, except the central, have their Morses "out" and their inductor bells "in." As soon as the central station receives a fire signal the alarm call is given by the magneto-inductor, and each station puts its Morse in circuit in the manner already described, to receive orders from the central station. The latter is provided with a special commutator by which any of the stations may be individually called by bell, or all sections simultaneously called together, and a message dispatched to all at the same time. The magneto-conductor is shown in Fig. 3. This inductor sends a series of alternating currents, giving the fire alarm, which is received on the station bells.

Fig. 4 shows a gong which is in use on the banks of the canals and rivers for the purpose of warning the fire boats moored in the channel; and Fig. 5 shows the detailed electrical arrangement which arrests and frees the spindle acting upon the hammer of the gong.

Fig. 4.—FIRE ALARM GONG.

Labor in England and Ireland.

The United States Consul at Birmingham reports that trade is very much depressed, partly owing to the diminution of exports to this country and the increase of imports hence. The better classes of mechanics receive about 17 cents an hour, or about $4.25 a week, an increase of 14 per cent over the rates paid five years ago. The increase in the cost of living has been small. The Consul at Londonderry reports that Irish farm laborers are getting about six dollars a month, with board and lodging. Lotters get 8 or 9 shillings a week, and day laborers from one to two shillings a day. A teamster may receive 15 shillings a week; and a factory girl, if steadily employed, as high as 7 shillings a week. Negotiations have been opened with American steamship companies for the return passage of English cotton operatives who have emigrated to this country and now want to get home again.

Anthracite Needed in Switzerland.

The United States Consul at Geneva reports that American anthracite might easily command the Swiss market. Wood is scarce and costs $18 a cord; coke brought from Lyons sells for $11 a ton; and a very poor oily coal is brought from Saarbrück. The Consul believes that anthracite could be introduced and sold for less than is now paid for inferior fuel, in which case it would be used almost exclusively. The matter is one which deserves attention.

A New Source of Lead Poisoning.

The occurrence of numerous cases of sickness among children, with symptoms of lead poisoning, has led to a remarkable discovery by the Imperial Health Office of Germany. It appears that the enameled cloth used in covering children's carriages is largely charged with lead, different specimens, of both German and foreign make, showing as high as 45 per cent of the metal. The fabric burned readily, and drops of the reduced metal were seen to fall even when a small piece of the cloth was ignited.

SHAD IN LAKE ONTARIO.—Seth Green's attempt to stock the waters of Lake Ontario with shad promises to be a success. The Ogdensburg *Journal* reports that the Oswegatchie river has lately been full of strange fish which experts pronounce to be genuine shad. They measure from six to seven and half inches in length.

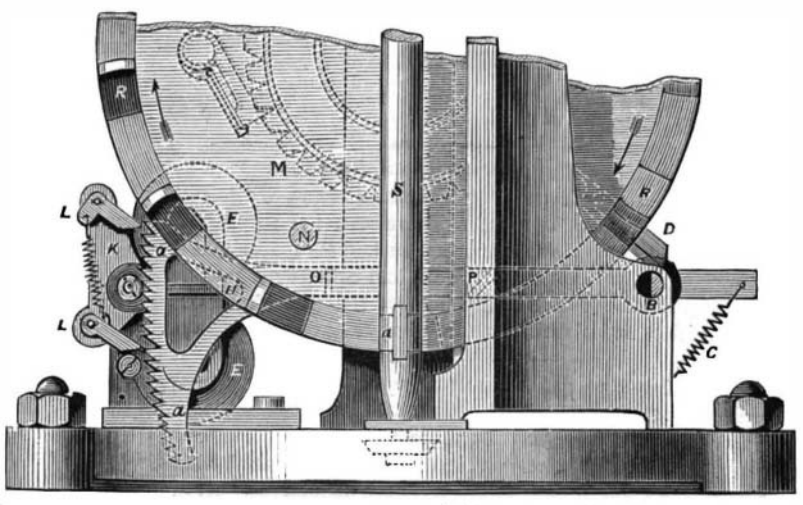


Fig. 5.—MECHANISM OF FIRE GONG.

New Mechanical Inventions.

A novel Dental Engine, invented by J. M. Stebbins, D.D.S., of New York city, is operated by an electric engine whose motion and power are controlled by a series of resistance coils, any number of which may be placed in the circuit. There are also improvements in the air forcing apparatus and in the mechanism for operating the burrs and pluggers.

Mr. John Collom, of Golden, Col., has invented a new Ore Separator, for which important advantages are claimed. It is of the "wet" type, and separates the ore by agitation over screens, placed just above the water level in a tank, motion being communicated to the water by means of suitable intermittent plungers. The tank is divided into compartments provided with screens of different mesh, so as to treat ores of varying fineness simultaneously.

An improved Former for Making the Truck Sides of freight cars has been patented by Messrs. R. H. Briggs and J. H. Dougherty, of Whistler, Ala. It is an attachment to be applied to the anvil and piston of a steam hammer, which bends the side bars rapidly into the proper shape and at the same time marks them for drilling.

Mr. E. H. Smith, of Keeler, Mich., has contrived a simple and effective Current Wheel, consisting of a horizontal disk carried by a shaft and having on its under surface a number of hinged buckets provided with bracket stops, the buckets on one side dropping down by the action of the current, while those on the other are automatically folded up against the face of the wheel.

Mr. A. Stoner, of Stony Point, La., has invented a Machine for Separating Yucca Fiber, which is designed for treating the blades of the yucca plant in its green state, so as to separate the fibers mechanically from the green glutinous mass, without exposing them to a rotting or wilting process. It has an endless feed apron, a sprinkling device, revolving mashing rollers, and a series of toothed brushing cylinders working in connection with a metallic plate, over which the fibers pass after leaving the roller.

Mr. G. A. C. Meyer, of Hannibal, Mo., has patented an ingenious Automatic Fan, which is attached to a chair, and is operated by mechanism put in motion by the weight of the person in the chair. A regulating escapement neutralizes the difference in the weight of the persons using the chair. The device is applicable to other light work.

Mr. F. W. Wilson, of Manchester, N. H., has invented a convenient Retort Lifter, for facilitating the operation of setting gas retorts in position in the bench. The lifting device is so constructed that it distributes the strain equally over the whole face of the retort in handling it, which, in view of the brittle nature of the material of which such retorts are made, is an important point.

Mr. E. R. Dingley, of New York city, is the inventor of an improved Automatic Cut-off for steam engines, in which a novel arrangement of mechanism, consisting of a secondary valve chest and its connections, is introduced for the purpose of cutting off steam automatically at each stroke of the piston should the motion of the engine become too rapid, until the engine is slowed down to the proper speed.

An improvement in the Sand Blast apparatus for engraving glass has been patented by Mr. John Whittaker, of Greenpoint, N. Y. The object is to provide an expeditious method of applying the stencils. The inventor uses a curved shield, having either fixed or removable stencils, and adapted to the surface of the ware to be engraved, and having spring handles, by which it is clasped to the ware and by which both are held under the sand blast.

In an improved Railway Car, patented by Messrs. R. L. Dabney, of Hampden Sidney, Va., and C. W. Dabney, Jr., of Emory, Va., the inventors apply timbers alongside the car body, near the bottom, and suspend cross-timbers, on which the car body is supported. The car body is thus hung low, and the upper segments of the wheels are inclosed by boxes projecting above the floor of the car interiorly. Provision is also made for passing around curves with little friction, by supporting the car bodies upon balls placed between them and the side bars of the trucks.

Messrs. Joseph Ogden and Joseph Garrett, of Chester, Pa., have secured a patent upon an improvement in Spinning Mules, which consists in constructing a cop building rail with a double incline, or in attaching to said rail a block having a similar angle. With this double incline the faller arm works in frictional contact, so that when the mule carriage runs in the faller will be caused to "dip" suddenly so as to crosswind the yarn, and thus bind the

regular contacted spiral coils or layers of yarn firmly together.

Mr. Floyd Heavener, of Laramie City, Wyoming Ter., has made certain improvements upon the Car Coupling for which letters patent were granted the same inventor August 28, 1877, the design being to secure greater strength and reduce the wear upon the operating parts.

OUR IRON INDUSTRY.

With no less surprise than interest we note the prominent remedies which in various countries are proposed for restoring the vitality of the iron industry.

While here the two political parties are urging in Congress, the one an increase, and the other a decrease of tariff—each party deriving its opposing arguments and support from the iron manufacturers themselves, the English and French manufacturers are almost unanimous in favor of protective duties, and the government of Belgium has appointed a commission to inquire into the best means of enlarging the field for the consumption of iron, so as to increase the demand for the products of the Belgian works.

Evidently none of these measures would afford more than local and temporary relief; the trouble lies deeper, we think, and is to be reached and remedied only by discovering and adopting new methods and economies in manufacture.

Prominent among the many methods that have been presented to the iron manufacturers in the past ten years are two which with great cost and long experiment have been so far developed that but little apparently remains to be done to perfect them sufficiently for general adoption.

The manufacture of wrought iron directly from the ore—the direct process—and the application of pulverized coal to puddling and heating furnaces, are the two improvements we speak of.

The ideas are old and familiar, but their present improved methods of expression are of recent date, and have had but little publicity, especially among manufacturers on this side of the water.

Though, doubtless, quite as many new points in regard to these processes have been determined here as in England, we are able to obtain from the Reports of the Associations of the English Iron Manufacturers fuller knowledge of the progress made there.

And we would here remark that in these associations, at whose meetings every new process or improvement is fully examined, discussed, and criticised, our English cousins possess great advantages over us. While they act together for their mutual benefit, we act independently of or in opposition to each other, because of jealousies of competitive and sectional interests.

Without dwelling on the worth of Clay, Chênot, and scores of others who have successively added to our knowledge of the manufacture of wrought iron directly from the ore, we come to one of the latest experimenters on the subject—Siemens—who has recently obtained results indicative of a very near approach to a practical and economical solution of the problem through intelligent recognition of the necessity for fine pulverization and ultimate mixtures of the ore and reagents.

In our judgment the failure to recognize the importance of these factors has been the chief cause of the non-success that has accompanied the labors of most experimenters in this direction, for we have long held the opinion that unvarying and satisfactory products and proper economies in time and fuel could in no other way be attained; as only by fine pulverization of the furnace charge can the intimate mixture requisite to prompt and effective chemical reactions be secured.

The only things seemingly now required for the perfection of this process are a furnace of less cost and a manner of firing more simple than that of Siemens, for in the matters of economies in fuel, ore, and reagents, and in character of product, but little remains to be desired.

In the application of pulverized coal to the puddling and heating of iron, Crampton in England, at Woolwich and elsewhere, has achieved fair success by using the Danks revolving furnace; and the most intelligent criticism seems to establish the fact that the method would be completely successful, not only with the revolving but with all other heating and puddling furnaces, were the coal economically reduced to a finer powder.

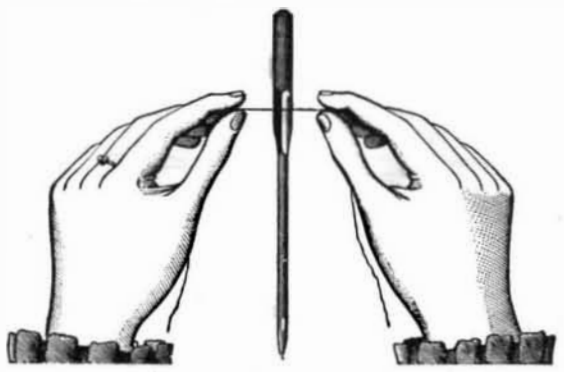
It would therefore appear that the cost of the revolving furnace and auxiliary machinery, and his imperfect yet expensive method of pulverizing, are the only obstacles which retard the general acceptance of Mr. Crampton's process.

Great progress, too, in these directions has been made with us in the past few years, especially toward the point arrived at by Mr. Crampton, so that, judging from the reports from the United States Armory at Springfield, Mass., where a pulverized fuel process has been in operation for several years, but little if any more experiment is required for its perfection. The furnace and the appliances for comminuting and injecting the coal are reported as simple, inexpensive, and durable, and as leaving but little more to be desired.

These two methods, then, which have been of very gradual growth, would seem to offer the iron manufacturer a way out of existing troubles. The manufacturers of iron *per se* must make cheaper and better iron if they would enlarge the field for its consumption, or even if they would hold their own against the steel manufacturers. They must seek new methods of manufacturing rather than changes in tariffs

COMBINATION NEEDLE AND THREAD CUTTER.

The annexed engraving represents a handy little arrangement, which every lady who uses a sewing machine will readily appreciate. It consists simply in forming on the shank of the sewing machine needle a knife edge, by which the thread is divided when pressed against it. Scissors are apt to be mislaid and time lost in searching for them, but with this device, so long as the machine is used, the thread



cutter is constantly at hand. The cutter is of the same fine steel, and receives the fine temper of the needle itself, so that it will retain its edge over an indefinite period. For further particulars address the Domestic Needle Works Company, Middleborough, Mass.

Cotton.

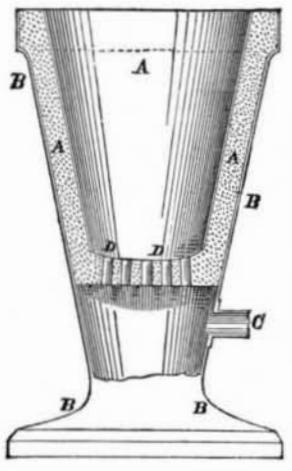
In 1860 the United States took 227,000,000 yards of British cotton goods. In 1877 we took only 61,000,000 yards. In the year first mentioned, Great Britain used half the whole cotton crop of the world; last year she used only 3,017,000 bales, against 8,959,000 bales used elsewhere. English manufacturers explain the relative falling off by the increase of capital elsewhere, and the ability of other nations to cope with them in power of organization; and add that the race will be to the frugal, the industrious, and enduring. They might well have added also the honest; for the credit of English makers has been sadly lowered in the East, and American competition favored, by the excessive adulteration of English goods, aggravated by short measure.

Risky Mining.

Speaking of the terrible explosion at the Haydock colliery, and the appalling frequency of such disasters in British mines, the *Tribune* remarks that these great slaughters do not prove that the skillful inventions and ingenious systems devised to reduce the danger of coal mining are worthless; they indicate rather that for every step of invention there has been a parallel step in taking greater risk. Mines that could not have been worked at all before are now filled with busy laborers, and the chances for loss of life have been little reduced. The frequency of such accidents is a disgrace to the supervision of mining which the British Government undertakes.

A SIMPLE FURNACE.

Mr. M. A. Beck, of Waterloo, Iowa, sends us the annexed sketch of a simple little furnace, well suited for brazing, hardening, and tempering small taps, dies, drills, etc. A is an ordinary flower pot, having a number of small holes, D, drilled in the bottom. B is a frame or casing made of sheet metal, and C is a blast pipe, to be connected with a small blower. The plan might be still further cheapened by setting the flower pot bodily into another one of smaller size, the space between the bottoms then forming the chamber into which the blast is conducted, without materially affecting the result.



Strength of Solar Heat.

Sir John Herschel ("Familiar Lectures on Scientific Subjects," page 64) says: "I have seen the thermometer four inches deep in the sand in South Africa rise to 159° Fah., and have cooked a beefsteak and boiled eggs hard by simple exposure to the sun in a box covered with a frame of window glass and placed in another box so covered."

HONOR TO AMERICAN SCIENCE.—The Huyghens medal of the Society of Sciences, at Haarlem, Holland, a medal awarded once in twenty years to the astronomer who has, during that time, contributed most to science by his discoveries and investigations, has been unanimously given to Professor Simon Newcomb, of Washington, the Superintendent of the Nautical Almanac.

To prevent the hair falling out, the common application, in Oriental countries, is the bruised bulbs of the *Asphodelus bulbosus*, garlic, or onions, mixed with gunpowder. An infusion of the small leaves of the orange or lemon tree in red wine, containing 20 grains of tannin per liter, has also proved serviceable.

Communications.

The Microphone.

To the Editor of the Scientific American:

In *Nature* of May 16th is an article upon the above subject, in which it appears Professor Huxley presented to the Royal Society the microphone as an invention of Professor Hughes, of Kentucky. The device used on that occasion was a glass tube about 2 inches long, fitted with pencils of carbon, through which the battery current was transmitted. Professor Huxley on speaking to this was enabled to transmit words to an ordinary Bell telephone. If Professor Huxley had placed ordinary lead shot in the tube, about number 12, he could have received as well as transmitted by pressing the neck of a common glass funnel to the tube and applying the ear to the cone. We have repeatedly received through such an arrangement, and also by a device arranged on the principle of the Trevelyan rocker; that is to say, we have received without a diaphragm or electro-magnet. As to the wonderful discovery accredited to Professor Hughes, we can only say that we see no need whatever of supposing that "we are beginning to tap sources and modes of energy hitherto undreamed of," nor that the discoveries furnish "a new method of attaching and quantifying molecular motions." Nor is Mr. Edison justified in supposing that he has discovered new and important properties in carbon, for all his results, as well as those of Professor Hughes, can be explained by old and well known causes, which are present in all the experiments published. We have been engaged in investigations on this subject in the same direction as Professor Hughes for the past half year. Many of our experiments are identical with his, and give the same general results. While we agree with him as to facts, we cannot, however, accept his conclusions, nor those of Mr. Edison. All our own experiments, as well as those published by Professor Hughes and Mr. Edison, when closely examined, support us in our conclusion that the effects produced must be ascribed to the well known facts of *contact resistance* at the surfaces of contact between the different parts of a non-continuous conductor. This was in fact the point of departure for all our investigations, and all our experiments were especially arranged so as to determine whether or not this cause is sufficient to produce the required effect (transmission of articulate speech). We succeed not only in transmitting articulate speech where nothing but contact resistance could have been the cause, but also in receiving with some of our contact transmitters, as indicated above. We are still engaged in experiments to determine the conditions under which a conductor containing surfaces of contact can act as telephonic receiver. Now, as contact resistance can be proved to be sufficient to produce all the effects obtained by Professor Hughes and Mr. Edison, and as this element is certainly present in all their experiments so far published, the true and simple logic of science compels us to reject their conclusions until they have obtained the same results after having completely eliminated that element from their experiments. At a future day we expect to give to the public a detailed account of the experiments which have led us to our conclusions.

W. H. PITT,
W. H. DOPP.

Central School Laboratory, Buffalo, June 11, 1878.

The Antiquity of Civilization.—A Query for Professor Newcomb.

To the Editor of the Scientific American:

Under the heading "Planetary Population," in your number for June 1st, 1878, page 346, Professor Newcomb is reported as saying, "The latter (the earth) has probably been revolving in its orbit 10,000,000 years; man has probably existed on it less than 10,000 years; civilization less than 4,000 years." As a student of archæology and anthropology, I would like to ask Professor Newcomb, who being a scientist of some eminence in his line is supposed to know what he is talking about, how and where he obtained the data for these most astonishing figures—especially the two latter (although I imagine paleontologists and geologists would be equally anxious concerning the first).

Under these estimates of time what becomes of the discoveries of Lepsius, Mariette, and others in Egypt, where they declare they have unearthed structures, monuments, tombs, statues, etc., dating back 4,500 to 5,000 years before our era? The deciphering of hieroglyphics, which has attained a high degree of certainty, shows us that nearly, if not quite, 7,000 years have passed since the Fourth King of the First Dynasty built the Pyramid of Cochomé, the first that greets the traveler toward the desert on leaving Cairo. Three thousand years before Solomon built his temple to the "most high" God on Mount Moriah, or the Assyrian reared his altars to Baal on the platform of Koujunjik, Egypt was an old country, her architecture grand and imposing in style and perfect in execution, her language not only fully formed, but reduced to writing, her statuary natural, and her paintings vivid in coloring and truthful in design. I have before me on the table a *fac simile* of the hieroglyphs on the "Gliddon Mummy Case," in the National Museum (*Smithsonian Contributions to Knowledge*, No. 208). Egyptologists are agreed that this case and the writings on it date back to a period antecedent to the reign of Sesorthus or Tosorthus, who flourished B.C. 3,240 to 3,211. Who will look at the exquisite drawing and coloring of this ancient piece of work and be willing to admit that the scribe who executed it was not civilized? nay, that he lived 1,000 years before civilization existed upon earth? And this was already in the fifth dynasty