Astronomical Notes.

OBSERVATORY OF VASSAR COLLEGE.

The computations in the following notes are by students of Vassar College. Although merely approximate, they will enable the observer to recognize the planets. M. M.

POSITIONS OF PLANETS FOR MAY, 1880.

Mercury.

On May 1 Mercury rises at 4h. 10m. A.M. On the 31st Mercury rises at 4h. 23m. A.M.

Mercury, Venus, and Saturn rise nearly at the same time on May 1, in the hour preceding sunrise, Venus being farthest north.

Mercury and Neptune will be in close proximity on the 18th, but they rise so nearly with the sun that Mercury is not likely to be seen.

Venus.

On May 1 Venus rises at 4h. 18m. A.M. On May 31 Venus rises at 3h. 57m. A.M.

Although Venus rises so nearly with the sun during May its brightness will make it conspicuous.

Saturn and Venus rise nearly at the same time on May 1. Saturn is south of Venus.

Mars.

Mars is the only planet to be seen in the evening sky of May.

On May 1 Mars rises at 8h. 35m. A.M., and sets at 11h. 47m. P.M.

On May 31 Mars rises at 8h. 6m. A.M., and sets at 10h. 52m. P.M.

On May 1 Mars is west of the star Delta Geminorum, at a declination 2° farther north; it passes this star on May 9 at a distance of 1½° north. On the 15th Mars has the right ascension of Castor, but is nearly 9° south of that star. The crescent moon may be seen to move toward Mars on the evening of the 13th.

Jupiter.

Jupiter will be brilliant in the early mornings of May.

On the 1st Jupiter rises at 3h. 41m. A.M.; on the 31st at 1h. 57m. A.M.

Jupiter may be seen south of the waning moon on the morning of May 5.

Saturn.

Saturn, Venus, and Mercury rise nearly at the same time on May 1, Saturn being about 1° south of Venus.

On May 31 Saturn rises at 2h. 31m. A.M., following Jupiter after about half an hour, and making its diurnal path 3½° north of Jupiter. The waning moon and Saturn have nearly the same right ascension on the morning of the 7th. Saturn is nearly 8° south of the moon.

Uranus.

Uranus rises on May 1 at 1h. 9m. P.M., and sets at 2h. 25m. A.M. of the next day.

On the 31st Uranus rises at 11h. 12m. A.M., and sets 27m. after midnight.

Uranus is still very near the star Rho Leonis. On May 31 it is half a degree east and half a degree north of this star, when on the meridian.

Sun Spots.

A large group of spots, inclosing three of more than ordinary size and some ten or twelve small ones surrounded by faculæ, was seen on the sun's disk on April 12. These spots passed out of sight by the motion of the sun on its axis between the 14th and 15th of April.

If this group reappears, as is probable, it will be well advanced upon the sun's disk early in May. A telescope of low power (with a colored glass) will enable an ordinary observer to watch the changes of these spots, as caused by the sun's turning, and also those variations which belong to the violent action on the sun's surface.

A Dangerous Amusement.

As out-door sports begin the girls are sure, this spring, to take their usual turn at rope jumping. Scarcely a season passes without several reports of girls dropping dead after some long continued effort, as in trying to skip the rope a thousand times; and even when not so carried to excess the practice is decidedly hazardous. Dr. Peck, of the Surgical Institute at Indianapolis, pronounces it a prime cause of cripples among girls. Speaking of a recent operation in which the bones of both legs of a little girl had been removed owing to necrosis caused by rope jumping, Dr. Peck says that similar cases are of frequent occurrence, though the mischief more commonly shows itself in necrosis of the spine. Not a month passes but cases are brought to the institute to be treated for injuries brought on by the continuous concussions upon the bones in this amusement. He advises parents and teachers to prohibit the "pernicious pastime" at all times and under all circumstances.

The New York International Exhibition of 1883.

The Senate bill (No. 1160) to provide for an International Exhibition in this city in 1883 was passed by the House of Representatives April 19. It had already been passed by the Senate, but having been slightly amended by the House it was returned to the Senate for the concurrence of that body. The chief amendment consisted in the addition of the names of the members of what is known as the Hilton committee to the original list of incorporators. The changes were concurred in by the Senate April 20. It is to be hoped that the differences between the rival committees will be promptly and amicably settled, and that nothing will occur to hinder the prosecution of the enterprise.

THE GREAT SOUTHERN COMET.

The event which is creating a considerable sensation in the southern hemisphere is the nightly appearance in the southwestern heavens, shortly after sunset, of a large and luminous body, supposed by those conversant with the aspects of such celestial visitants to be a comet of no ordinary kind. It is remarkable that astronomers throughout the British colonies and in England have not given the least intimation or prediction as to its coming.

The appearance of the present comet is what astronomers designate "a beam." Its continuance is uncertain, though it may remain visible for some time, especially as it has not yet attained its perihelion and the nucleus has not been seen, though, doubtless, it will be at the Cape, France, England, and other countries. In brilliancy and grandeur it is vastly inferior to the comet which appeared in the early days of the colony.

Our illustration represents the comet as it appears nightly; that it is wonderful and awe-inspiring, we admit, but the absence of superstition from our minds, and a belief in the opinions of scientific men as to the cause of such phenomena, has banished all dread as to the baneful results which are expected to follow its appearing. The most notable comets of modern times are those of 1843, 1847, 1853, 1858, and 1861. That of 1843 is still regarded as the most marvelous of the present age, having been observed in the day-time before being visible at night—passing very near the sun—exhibiting an enormous length of tail of a fiery character, and arousing interest in the public mind as deep as it was unprecedented. Whether the comet now visible to us has anything to do with the heat of the atmosphere we cannot say, but it is a fact that for days prior to its coming the temperature was higher than usual.—*Frearson's Weekly, Adelaide, Australia.*

WHAT IS THE TIME OF JUPITER'S ROTATION?

The great red, elliptical spot on the visible surface of Jupiter is so long that could the earth be placed at one

Jupiter seen through a 9 in. telescope.—Power 350.—7h. 49m., Oct. 20, 1879.

end of it and rolled it would make nearly a complete revolution before arriving at the opposite end; and so wide at the widest part that the earth would overreach it on either side by but little more than half the diameter of our moon, and stands in such contrast to the surrounding disk as to be visible with large telescopes when the planet is but three hours from the sun in right ascension, and the sun on the meridian.

The authorities, Sir William Herschel, Beer, Mädler, and others, give for the time of Jupiter's rotation 9h. 55m. 26′. The red spot was estimated central on the disk, October 3, 8h. 55′, 1879; on January 10, 5h. 40m., 1880, it was again estimated central, having in 98d. 20h. 45m. made 239 apparent revolutions about the axis of Jupiter—approximate real time of rotation, 9h. 55m. 37″+.

It has been suggested that this spot affords an excellent opportunity for determining the time of Jupiter's rotation; and the attention of amateurs has been called to this work by a note from abroad.

It is generally believed by scientists that no considerable portion of a planet's atmosphere is likely to move much faster in the direction of the planet's rotation than the planet beneath travels; that any considerable motion must be in a direction opposite to the planet's rotation.

If this red spot represents the time of Jupiter's diurnal rotation that planet presents to us the remarkable phenomenon of the whole equatorial atmosphere moving in the direction of the planet's rotation 6,500 miles farther in 24 hours than the surface of Jupiter beneath it travels in the same time.

Most of the cloud forms in the equatorial belt are far from permanent, either in location or outline; some of them change so much in a few days as to be unrecognizable; but a well defined light spot was observed about central on the disk of Jupiter, September 27, 1879, at 8h. 5m., which, after making nearly 356 revolutions about the planet's axis, was last seen, unchanged to any great extent, just coming on the disk, February 20, 1880, at 4h. 55m.—approximate real mean rate, 9h. 50m. +.

On September 28, 1879, it was noticed that the red spot and the markings on the equatorial belt were separating at a rate which would bring them again together in about 43 days. Since then it has been observed that when the red spot has made 105 to 109 revolutions about Jupiter's axis the equatorial belt will have made one more.

When Jupiter rises on the morning of May 22, 1880, the red spot will probably be on the disk, and that portion of the equatorial belt above mentioned north of the spot. At 4h. 10m., Washington mean time, it is estimated that the red spot will have passed the center of the disk, and the planet will be high enough for observation in the eastern part of the United States.

Accepting 9h. 50m. as the time of Jupiter's rotation, the spot is traveling rapidly westward. Suppose it to have an independent rotary movement, in the direction taken by the hands of a watch, which on the circumference is not less than 250 miles an hour, sometimes much more, and it will account for about all the observable phenomena in the region of the spot. H. G. FITZ.

Peconic, N. Y., April 7, 1880.

The Geodetic Union of Europe and Africa.

The important work of connecting the systems of triangulation covering Western Europe and Northern Africa was consummated in the latter part of October last. Preparations for it had been going on for several years under the direction of General Ibañez and M. Perrier, acting respectively for the governments of Spain and France.

Four mountain heights were selected for signaling operations, namely, Mulhacen and Tetica, in Spain (the former being the highest in that country), and Filhaoussen and M'Sabiha, between Oran and the frontier of Morocco. It was decided not to trust alone to solar signals, but also to employ the electric light at night, and the event fully justified this resolve, for the solar signals totally failed, being seen neither in Spain nor Algeria. The difficulties of the enterprise, then, will be obvious on consideration, for to produce the electric light with sufficient intensity it was necessary to have recourse to electro-magnetic apparatus driven by steam engines, and the problem was that of hauling up Gramme machines, engines of six horse power, and various instruments, to summits of 1,000 to 3,550 meters height, making roads on these desert mountains, organizing supplies of water and fuel, and finally providing accommodation and sustenance at each station for twenty to one hundred men and fifteen or twenty beasts. There was a military guard attached to each station (in Algeria especially this was necessary), and the soldiers worked in roadmaking, etc. The time open for operations was short between the intense heat and the early snows. On August 20 all were at their posts—Colonel Barraquer on Mulhacen, Major Lopez on Tetica, Captain Bassot on Filhaoussen, and M. Perrier on M'Sabiha. But in vain were solar signals sent by day and electric by night; the vapors from the Mediterranean proved impervious to the beams. At length, however, on September 9, after twenty days' feverish expectation, M. Perrier perceived the electric light of Tetica, visible sometimes to the naked eye, like a round reddish disk, as bright as Alpha in Arcturus, which appeared near the horizon. On the 10th he perceived the electric light of Mulhacen. The Spaniards also perceived the French signals, and a period of definite observation was entered upon, extending from September 9 to October 18. The geodetic junction of the two continents was at length realized. The numerical results arrived at with regard to those four immense triangles of some seventy leagues length of side are given in a communication by M. Perrier to the French Academy, and are shown to have satisfactory accuracy.

By this work the geodetic operations in the British

Islands, France, Spain, and Algeria, were united into one grand system of triangles, reaching from the Sahara (34° N. L.) to the northernmost of the Shetland Islands (61° N. L.), giving a meridian arc of 27°, the greatest hitherto measured on the earth.

NEW LIFE PRESERVER.

The engraving shows a novel life preserver recently patented by Mr. Rufus E. Rose, of Gretna, La., which maybe combined with different garments wornupon the person, or it may be made as a separatearticleand worn independently of the clothing.

The invention consists in several air chambers, A, provided with inwardly opening valves, C, which may be operated independently, and an air supply tube, B, communicating with the several chambers through separate valves.

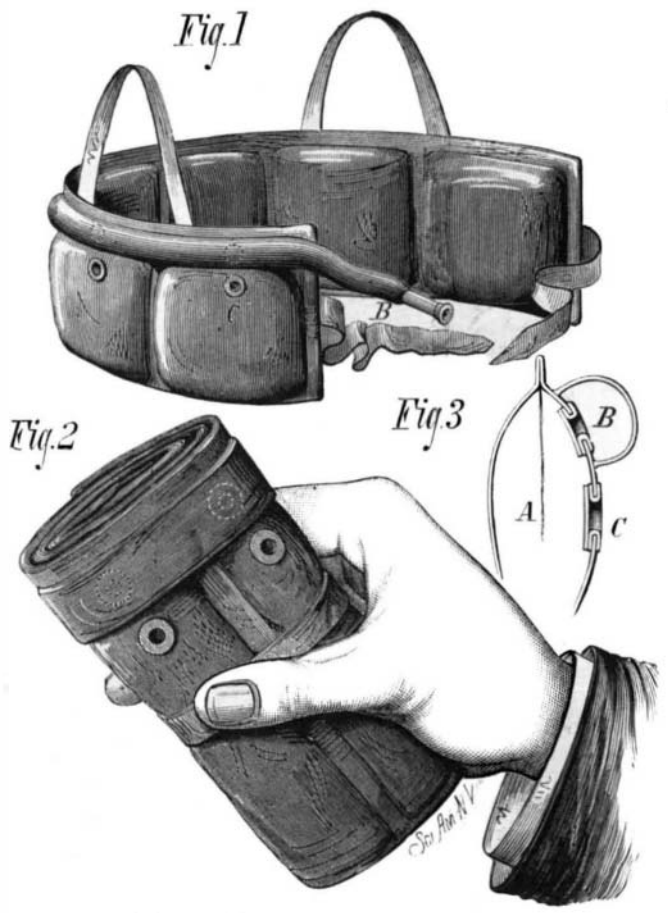
Fig. 1 shows the life preserver inflated and ready for use; Fig. 2 gives a good idea of the size of the life preserver when rolled up and out of use, and Fig. 3 is a transverse section showing the arrangement of the valves.

The chambers are inflated by blowing through the supply tube, which is provided with a suitable mouthpiece. The great advantage of this form of life preserver lies in the separate chambers. One or more of the chambers may be punctured without destroying the efficiency of the device, as the remaining chambers will retain their charge of air.

This life preserver when uninflated is so light and compact that it may with convenience be combined with some of the garments worn by the user, when it will always be in position for use. The form shown in the engraving is fitly called a "pocket life preserver," as it may be rolled into so small a package as to be conveniently carried in the pocket, occupying no more space and weighing less than an ordinary diary or memorandum, and when it is inflated it is sufficiently buoyant to sustain two persons.

The inventor informs us that this invention was suggested by an article in the SCIENTIFIC AMERICAN some time since which pointed out the necessity for such an invention.

Further information in regard to this life preserver may be obtained by addressing the inventor as above.



ROSE'S LIFE PRESERVER.

Endurance of Boilers.

Some idea of the difficulties encountered, in the use of the impure water in locomotives in some of the Western States, may be formed from the following extract from a letter from a master mechanic in that region to the *Railroad Gazette:*

"At this end of the road, where we have so much alkali water to contend with, we are obliged to change the flues every six months to get the scale out of the boiler and from around the fire box. Along with this we wash our engines thoroughly the best we can for every four hundred miles run, with a force pump and seventy pounds pressure, taking out the blind flues, mud drum head, and all the washout plugs in the sides and in the legs of the boilers, and even with this constant work our flues will not last longer than six months without giving us a great deal of trouble from leaking on account of the mud and scale."

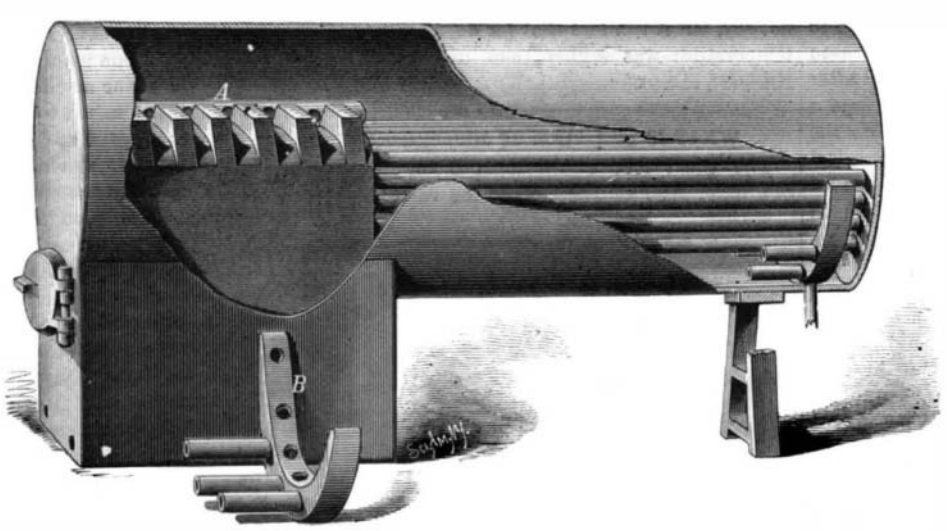
NEW BOILER CLEANER.

The operation of removing the sediment and loose scale from beneath the tubes of locomotive boilers, when conducted in the usual way, is laborious, expensive, and damaging to the boiler, as no means of access to this part of the boiler is provided, and the steam pipes and exhaust nozzles have to be removed and the ends of the tubes cut off before the bottom of the boiler can be reached. This being the case the examination of the boiler is often deferred, so that a great mass of scale and sediment accumulates and hardens so that it can be removed only by means of the hammer and chisel.

The invention shown in the annexed engraving is intended to overcome these difficulties, and to furnish a convenient and effectual means of loosening and moving the scale so that it may be easily removed. The invention is applicable to all kinds of tube boilers, but is more especially useful on boilers of the locomotive type.

It consists of two tubes, A B, provided with jet openings or tubes, and having external connections leading to a boiler for supplying steam or to a supply of water under pressure. The inventor prefers to make these jet tubes of brass, and to place them in the positions indicated in the engraving. The jets of the tube, A, are directed across the crown sheet, and the jets of the curved tube, B, point toward the water leg of the boiler, and in the upper surface of the curved tube, B, there are jets pointing upward. When jets of steam are admitted to the boiler through the tubes, A B, the scale is loosened and moved to the water leg, from which it may be easily removed through the hand holes. The inventor states that steam removes the scale from the tubes with surprising rapidity, so that they are left in good condition for generating steam. When two or more stationary boilers are used in one locality the steam from one may be used to clean the other. Where there is only one boiler a well jacketed steam drum may be used to store up a sufficient quantity of steam to clean the boiler. In the case of large round houses the inventor proposes to apply a large stationary boiler to this purpose, placing it centrally and providing it with suitable connections for conveying the steam to the cleaner in any of the empty locomotives. By an arrangement of this kind two locomotives could be cleaned and washed at once. The inventor does not confine himself to any special form or arrangement of this cleaner, as it can be adapted to any style of boiler. The application of this device to a boiler economizes fuel, improves its steaming qualities, prevents pitting, and saves a great deal in the way of repairs.

This invention is protected by United States patents issued to Mr. Winslow Titcomb, of Waterville, Me.



TITCOMB'S BOILER CLEANER.

ENGINEERING INVENTION.

An electric car brake, patented by Mr. Philip V. Conover, of Uvalde, Texas, consists of a pinion attached to the car axle, the pinion taking in a ratchet wheel provided with a projecting pin that enters into the slots of a wheel provided with a sleeve, upon which the brake chain is wound, which sleeve can be moved on the axle by means of a lever that is actuated by a rod passing into a helix connected with a battery on the locomotive. A pawl tooth that is held in place by a slide prevents the unwinding of the brake sleeve until the slide is removed by a lever actuated by a rod passing into a helix likewise connected with the battery on the locomotive.

Practical and Useful Inventors.

In almost every community is to be found at least one man who professes to have given the first hint toward the perfection of some invention that has brought its introducer fame and fortune, neither of which the suggester shares. It may be that in some instances this claim is correct, but usually the sympathies of the people are with the man who does rather than with the visionary who dreams; for there is generally a hard road to travel between the conception of an improvement and its practical adaptation and final success.

There was a time when the inventor was essentially a dreamer; when he environed himself with mystery and was content with the homage of the ignorant. No paternal and wise government extended over him the protection of letters patent; the people did not want his improvement; the world was not ready for him. Chemistry was used to discover the transmutation of metals or the elixir of life, and mechanical knowledge to construct a toy with which to amuse and astonish the ignorant. These men, who thought and wrought in the twilight of science and the dawn of the arts, undoubtedly contributed something to us of the after ages, although in many cases they left their records in ambiguous puzzles. The shadows of the great minds who walked in the slant rays of the rising sun are projected across the plane on which our inventors travel.

But such men as Watt and Arkwright and others diverged from the secluded paths of these impractical thinkers and essayed the broad road of utility. Under their hands the scientific toys of the philosophers became the useful adjuncts to man's needs. This is the true secret of the inventor's success. Utility should be his guide and aim. It is not enough either that he conjectures and speculates: he must demonstrate by actual experiment, on a scale sufficiently large to prove the value of his invention, before he is legally or even properly entitled to the distinction or the reward of the inventor. One may sit and dream day after day of a conjectured improvement, and even feel assured of its value, but it will avail him nothing unless by experiment he builds a foundation better than "the baseless fabric of a vision." While he dreams it may be another is working out a similar dream. It cannot be doubted that many valuable improvements, now in general use and yielding handsome incomes, would have borne another's name and enriched another's pocket if the original inventor had wrought out his discovery to a practical result.

The work of the inventor is not, then, as the Boston *Journal of Commerce* further adds, merely to devise and calculate—to dream and imagine—but to demonstrate and prove by experiment. The true inventor is not a mere visionary, seeing the road and pointing to it, but is a moving, animated man, clearing obstructions from his path and leading the way. If he is independent enough to strike out a new path to a result, he must not be content merely to survey it, but must lay out the road, grade it, and propel himself and his improvement over it, before he can expect to levy toll on those who travel after him.

Testing Railway Employes for Color Blindness.

The work of examining the 5,000 employes of the Pennsylvania Railroad Company to discover their capacity to distinguish colors and forms, was begun in Jersey City, April 1. Acuteness of vision was tested by means of printed cards placed at a distance of about twenty feet; also by means of small openings in a screen illuminated on the further side. Many who successfully passed these ordeals failed signally on the color tests. Three skeins of woolen yarn were used, one being light green, the second rose, and the third red, and were marked respectively 1, 2, 3. Each of these was placed on a table in front of the person examined at a distance of three feet, and, with the vision of either eye obstructed by a spectacle frame, the man under examination was requested to name the color. He was also directed to pick out a similar shade to the one in question from different skeins of woolen yarn, numbered from 1 to 36. One young man correctly designated the test skein as red, but on being told to select a similar shade from the skeins before him he picked three shades of blue, two of yellow, and one of red. He could distinguish no difference, and the same thing happened to half a dozen others who followed him. The skeins on the row were then divided into three sets, with twelve numbers in each, and the men were then examined as to color blindness. Some were able to distinguish all the shades of green, but failed lamentably in picking out the different shades of red.

It is said that the officers of the road were greatly impressed