"Distribution of titanic oxide on the earth's surface," F. P. Dunnington.

Among the papers in the Anthropological Section were: "The essentials of a good education, with a new classification of knowledge," M. H. Seaman; "The custom of kava drinking as practiced by the Papuans and Polynesians," Walter Hough; "A linguistic map of North America," J. W. Powell; "Jade implements from Mexico and Central America," Thomas Wilson; "On a collection of stone pipes from Vermont," G. H. Perkins; and "The importance and methods of the science of comparative religion," Merwin Marie Snell. Professor Powell's ingenious map attracted much attention.

Diamonds in Meteors.

BY H. C. HOVEY.

A remarkable paper was read at the Washington meeting of the A. A. A. S., by Prof. A. E. Foote, of Philadelphia, describing a new locality for meteoric iron near Canon Diablo, Arizona, fragments of which contained diamonds. The report at first was that a vein of pure iron, two miles long and forty feet wide, had been found, containing also gold, silver, and lead; and that surface iron could be gathered by the carload. That was in March of the present year. Prof. Foote explored the region thoroughly in June, without finding any such vein; but what he did find was of great geological and mineralogical interest.

Crater Mountain, 185 miles north of Tucson, is a peculiar circular elevation, strikingly like an old crater. It rises 432 feet above the surrounding plain, and its cavity is three-fourths of a mile in diameter. Its interior walls are so steep that animals once entrapped within them never escape, but leave their bleached bones at the bottom. The rim, of sandstones and limestones, is uniformly uplifted on all sides at an angle of 40°, while the bottom lies at a depth of from 50 to 100 feet below the general level of the plain. Although the cavity is thus crateriform, no lava, nor obsidian, or any other volcanic product was found. Small meteoric fragments were scattered over an area about a third of a mile in length and 120 feet wide, and extending northwest and southeast. Exactly in line with it, but about two miles from the base of the crater, were found two large masses, one weighing 154 pounds and the other 201 pounds, which were on exhibition, both of them deeply pitted, and the larger one perforated in three places. The latter is now the property of the Ecole des Mines, Paris. Smaller masses were also found, numbering 131 in all, ranging in weight from one-sixteenth of an ounce to 6 pounds 10 ounces. Several of them were coated with arragonite. About 200 pounds of angular sulphureted fragments, also of meteoric origin, were found near the base of the crater, a few of which showed a greenish stain from oxidized nickel.

A fragment of a mass weighing 40 pounds was examined by Prof. G. A. Koering, who found it to be extremely hard, a day and a half being taken in making a section and several chisels being broken in the operation. An emery wheel was ruined in trying to polish the section. This led to closer inspection of certain exposed cavities, where small black diamonds were found that cut polished corundum as easily as a knife might cut gypsum. These diamonds are mineralogically of great interest; the presence of such in meteoric having been unknown till 1887, when two Russian mineralogists found traces of diamonds in a meteorite mixture of olivine and bronzite. By treating with acid the amorphous carbon in the cavities, a small white diamond, one-fiftieth of an inch in diameter, was found, as well as troilite and daubreelite. The general mass was three per cent nickel. The Widmanstattian figures were not regular. The indications are that a large meteorite, weighing about 600 pounds, had become oxidized in passing through the air, and burst before reaching the earth. It is hardly credible that the crater could be accounted for by meteoric impact, and its origin is a problem unsolved. The fact of special interest may be accepted as proved, that diamonds have been found in meteoric fragments. The specimens were carefully examined by the geologists present at the reading of Prof. Foote's paper, and while there were many opinions expressed as to the so-called "crater," and as to its relation to the meteor, none doubted the genuineness of the diamonds.

POSITION OF THE PLANETS IN SEPTEMBER.

JUPITER

is morning star until the 5th, and then evening star. He is in opposition with the sun on the 5th, at 5 h. 12 m P. M., when he appears on the eastern side of the sun, rises at sunset, is on the meridian at midnight, and is visible the entire night. It is the culmination of his career for the present year, and glorious is none too strong a word to give expression to the majestic grace with which the prince of the solar family treads his starry path during September nights.

Planets have two periods. The sidereal period is the time of a planet's revolution around the sun, from a star to the same star again, as seen from the sun. The synodic period is the time between two successive conjunctions of the planet with the sun, as seen from the earth.

Jupiter's sidereal period is 11.86 years, so that it takes him nearly 12 years to complete a revolution through the constellations of the zodiac, and he, therefore, requires a year to make his way through a zodiacal constellation. He will be found in Aquarius during the present year, in Pisces during the next year, and so on.

Jupiter's synodic period is 399 days, a little more than a year and a month, a number easily remembered, and one which makes it easy to calculate his successive oppositions. Jupiter's opposition occurs this year on September 5. It will occur 34 days later in 1892, or about October 9. It will thus be seen that the careful observer may readily keep the run of Jupiter's position in the zodiac, and the date of his opposition from year to year.

The moon is in conjunction with Jupiter on the 17th, the day before the full, at 0 h. 47 m. A. M., being 3° 45' south.

The right ascension of Jupiter on the 1st is 23 h. 2 m., his declination is 7° 50' south, his diameter is 47".4, and he is in the constellation Aquarius.

Jupiter rises on the 1st at 6 h. 40 m. P. M. On the 30th he sets at 3 h. 33 m. A. M.

SATURN

is evening star until the 13th, and then morning star. He is in conjunction with the sun on the 13th, at 8 h. 38 m. A. M., when he passes to the sun's western side, and will soon be seen playing his part as morning star. Saturn is too near the sun to be visible, but an interesting epoch occurs in his September course. The rings will disappear on the 22d, when the plane of the ring passes through the earth, and is seen edgewise. It will not reappear until October 30, when the plane of the ring passes through the sun. The southern surface of the ring that has been illumined by the sun for fifteen years will now be in shadow for the same time, and the northern surface will be illumined in its turn for the same time, when the ring will again disappear. Saturn's sidereal period is 29.5 years. He is now found in the same position in the zodiac that he passed in 1862.

The three-hours-old moon is in conjunction with Saturn on the 3d, at 6 h. 26 m., being 3° 6' north.

The right ascension of Saturn on the 1st is 11 h. 22 m., his declination is 6° 7' north, his diameter is 15", and he is in the constellation Leo.

Saturn sets on the 1st at 6 h. 58 m. P. M. On the 30th he rises at 4 h. 37 m. A. M.

MERCURY

is evening star until the 13th and then morning star. He is in inferior conjunction with the sun on the 13th at 0 h. 11 m. A. M., passing then between the earth and the sun, as the moon does at new moon. He reaches his greatest western elongation on the 28th, at 4 h. P. M., when he is 17° 53' west of the sun. This is the last opportunity during the year for seeing Mercury as morning star with the naked eye. He must be looked for an hour before sunrise, and 8° north of the sunrise point, and is visible at elongation and for a few days before and after.

The right ascension of Mercury on the 1st is 11 h. 47 m., his declination is 3° 14' south, his diameter is 9".6, and he is in the constellation Virgo.

Mercury sets on the 1st at 6 h. 50 m. P. M. On the 30th he rises at 4 h. 26 m. A. M.

VENUS

is morning star until the 18th, and then evening star. She is in superior conjunction with the sun on the 18th at 10 h. 8 m. A. M., when she takes her first steps on the path which will make her during the winter months the radiant evening star. She is at present too near the sun to be visible.

Venus, four days before her superior conjunction, meets Saturn, the day after his conjunction. The event occurs on the 14th at 6 h. 32 m. P. M., Venus being 32' south. The actors in the scene are of course too near the sun for terrestrial vision.

The right ascension of Venus on the 1st is 10 h. 32 m., her declination is 10° 44' north, her diameter is 10", and she is in the constellation Leo.

Venus rises on the 1st at 5 h. 3 m. A. M. On the 30th she sets at 5 h. 49 m. P. M.

MARS

is morning star. He rises about an hour and three-quarters before the sun, but it is hard to find him, for he is only a ruddy point in the sky.

The waning moon is in conjunction with Mars on the 2d at 0 h. 9 m. A. M., being 4° 5' north.

The right ascension of Mars on the 1st is 10 h. 2 m., his declination is 13° 16' north, his diameter is 3".8, and he is in the constellation Leo.

Mars rises on the 1st at 4 h. 28 m. A. M. On the 30th he rises at 4 h. 7 m.

NEPTUNE

is morning star. He is in quadrature with the sun on the 1st at 3 h. P. M., when he is 90° west of the sun. His right ascension on the 1st is 4 h. 20 m., his declination is 20° 15' north, his diameter is 2".6, and he is in the constellation Taurus.

Neptune rises on the 1st at 10 h. 26 m. P. M. On the 30th he rises at 8 h. 31 m. P. M.

URANUS

is evening star. His right ascension on the 1st is 13 h. 47 m., his declination is 10° 32' south, his diameter is 3".5, and he is in the constellation Virgo.

Uranus sets on the 1st at 8 h. 25 m. P. M. On the 30th he sets at 6 h. 34 m. P. M.

Mercury, Mars, Saturn and Neptune are morning stars at the close of the month. Venus, Jupiter and Uranus are evening stars.

Edward Burgess.

The death of Mr. Edward Burgess, of Boston, on July 12, at the age of 43, removed one of the few persons in America who have made important contributions to insect anatomy.

His work was not voluminous, but it was very careful and exact. He was the author of, in 1880, an excellent review of the then recent literature in insect anatomy and physiology. His own most important and extensive paper was on the anatomy of the milkweed butterfly, but he worked out in more or less detail the anatomy of the perfect stage in Anabrus and Aletia, and studied minutely the male abdominal appendages of butterflies, the structure of the head of Psocidae, the mouth parts of the larva of Dytiscus, and the varied course of the aorta in Lepidoptera. He was also the first to show the precise structure and working of the apparatus for feeding in the imago of Lepidoptera.

A large part of his work was in aid of the researches of others, in which he was generous almost to a fault, and his unselfish devotion to his duties for sixteen years as secretary of the Boston Society of Natural History, in whose publications most of his papers were issued, brought the office to a high state of efficiency—a devotion further signalized in his will, in which he made the society his contingent residuary legatee. Besides, although he published but a single short paper on Diptera, his knowledge of this group, in which he rendered large service to others, was unsurpassed among our countrymen.

To entomology, which he had cultivated with such signal success, Mr. Burgess, it is true, died several years ago when he parted from his collection and library and turned his attention exclusively to naval architecture, in which he had been interested from boyhood, and which offered far more promise of financial returns, then first absolutely necessary for him to consider. His world-known success in his new field (for he fairly leaped into fame) it is not the place here to consider, but, clearly the greatest genius our country has ever produced in this branch of science. his naturalist friends without exception will agree that in losing him from their immediate ranks science at large has been the gainer. They were indeed eager to applaud his success, his old scientific friends being, we believe, the very first to give him a tangible proof of their pride in his fellowship—a pride all the greater for the almost painful modesty with which he received every mark of his growing fame. Selfishness could not live in his sight. When the city of Boston gave him a public reception, his shrinking boyish figure as he rose to return his thanks, in which he tried to turn public attention rather to the one whose means, whose confidence, and whose sympathy had rendered the realization of his scientific genius practically possible, will not soon be forgotten by those who witnessed it. But the gentleness and sincerity of his character, the refinement of his life and manners, his truthfulness and loyalty, and all those other delicate traits which revealed his heart and rendered him so dear to his intimate friends, will remain to them a source of perennial inspiration.—*Psyche.*

The Battle of Bennington Monument.

On August 19 there was dedicated with appropriate ceremonies, marked by the attendance of the President and many distinguished visitors, a monument in commemoration of the battle of Bennington, Vt., in our revolutionary war. The monument has been in progress of building for several years, and has cost $100,000. It was paid for by appropriations. It was paid for by the States of Massachusetts, New Hampshire, and Vermont, and by private subscriptions. It is 301 feet 10½ inches high from base to the top of the capstone, and stands on a site 283 feet high. Its base is 37 feet 4 inches, and it is built of native stone faced with Sandy Hill dolomite. It has a lookout room, 188 feet above the foundation, reached by an interior iron staircase.

THE coffer dams of cruisers 9 and 10, building at the Columbian Iron Works, Baltimore, Md., will be filled with cellulose, which has been adopted by the navy department. The living apartments and store rooms of the cruisers are being painted with cork paint, which consists of a heavy coat of white lead and varnish, over which is sprinkled cork. It forms a non-conducting material which keeps the ship dry in warm climates and moist atmospheres.

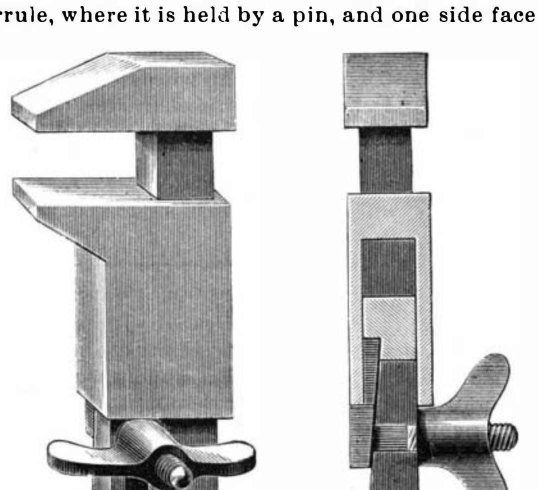
A Steel Chimney.

Steel is being used in the construction of the immense chimney of the Fair building at State, Adams and Dearborn Streets, instead of brick. The chimneys of the Leiter building, at State and Van Buren Streets, will also be constructed of the same material. This new feature of construction has been introduced by Architects W. L. B. Jenney and W. B. Mundle. The chimney when completed will be 250 ft. high, being considerably higher than any other in the city. The outside diameter is 9 ft. 5 in., while the steel varies in thickness from five thirty-seconds at the top to three-eighths of an inch at the bottom. The lower 75 ft. of the chimney is lined with fire brick eight inches deep, formed to fit the shell compactly all around. Above this it is lined with hollow tile. This lining is supported at intervals of 25 ft. by angle iron riveted to the steel shell; in other words, the chimney is lined in a manner similar to blast furnaces and foundry cupolas, and no expansion by heat can lessen its strength. The joints are all hot riveted. The steel shell is carefully protected from corrosion and from any attacks by the weather by painting inside and out. The weight of the chimneys is spread to the foundations in the same general way as that of the columns of the building, the base or foundation on which it rests being constructed in the same manner. The ground first is covered with a layer of cement, then two layers of steel rails in cement and one layer of I-beams, on which the cast iron shoe which takes the shell of the stack rests. The capacity of the chimney is twelve 60 in. boilers 20 ft. in length. The chimney is now up to a height of 150 ft. The cost will be about $7,000. In the one to be constructed in the Leiter building the diameter will be a trifle larger, being 10 ft. 3 in., while the height will not be so great, being calculated at 200 ft. This will afford an escape for the smoke from the fire boxes of nine 72 in. boilers, each 20 ft. long.

This is the first time this material has been used in the construction of the chimneys of mercantile buildings. The magnitude of the building and the necessity of economizing in space, the foundations for the columns occupying about all the ground, led the architects to adopt steel as the material for this purpose. Brick has been used almost entirely heretofore, but upon investigation it was found that the weight of a brick chimney of this size would be almost 700 tons, while of steel construction it would weigh, including the linings, a little less than 250. The outside diameter of the present chimney is 9 ft. 5 in., while were it constructed of brick it would be 16 ft. 6 in., thus making a great saving in space.—*Chicago Journal of Commerce.*

A SIMPLE AND DURABLE WRENCH.

In the wrench shown in the illustration, one of the jaws may be moved toward or from the fixed jaw, and held in the desired position, without threading the shank of the fixed jaw or the guide bar of the movable jaw. The improvement has been patented by Mr. Samuel Stock, of Pontiac, N. Y. The movable jaw has a large rectangular opening in front of the shank, as shown in the sectional view, in which enters a guide bar, which also serves as a lock bar, and is longitudinally slotted. The outer end of this bar is seated in a socket formed in a side projection from the ferrule, where it is held by a pin, and one side face of

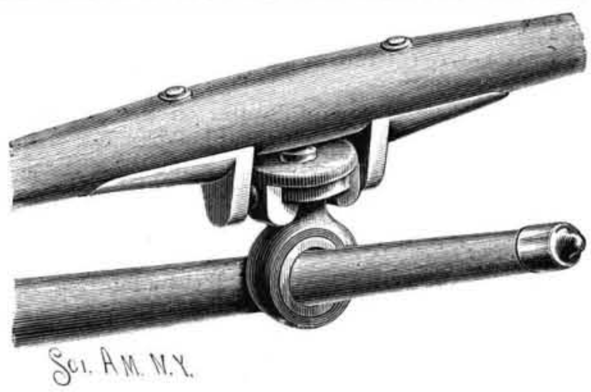


STOCK'S IMPROVED WRENCH.

the bar is beveled the length of the slot. A bolt used with the device has an outer end portion beveled to correspond to the inclined face of the lock bar, the portion of the bolt passing through the slot being square, to prevent the turning of a winged lock nut, the bolt and nut forming supports for the movable jaw. When the jaws are adjusted to clamp the object, the bolt head and nut are brought to bear against the outer portion of the movable jaw, and the nut is screwed in upon the bolt. With this construction the shank is not weakened by having a thread cut on it, and the wrench has a neat appearance and is inexpensive to make.

AN IMPROVED NECK YOKE.

A durable, safe and inexpensive yoke center, for connecting the neck yoke with the poles of a vehicle, one which moves freely in relation to the pole and will not permit the yoke to pound thereon, is shown in the accompanying illustration. It has been patented by Messrs. David H. Gotshall and Herbert Petit, of No. 507 Second Street, Astoria, Oregon. The yoke is of the usual construction, and in elbow lugs attached by bolts to its under side are journaled the trunnions of a circular plate having a depending flange, which extends around all but the front side of the plate, and which is doubled under at right angles to receive the flat head of a pole ring. The head may be readily



GOTSHALL & PETIT'S NECK YOKE.

slipped into the recess of the plate, and a neck between the body of the ring and the head comes opposite the bent portion of the flange, so that the ring may have all necessary movement. The ring is prevented from accidental removal by a pin extending downwardly through the plate and into the head of the ring, but there will be little strain on the pin, the lateral strain from the flat head coming on the flange of the plate. The ring is lined with leather or other suitable material to prevent wear and rattling.

Squandering a Nation's Patrimony.

At the recent celebration of the Fourth of July at Woodstock, Conn., Mr. Murat Halstead delivered a striking address, to which he gave the title of the "Preservation of the People's Inheritance." It could be more accurately described as an account of the reckless way in which mankind in general, and Americans in particular, had squandered, and were continuing to squander, their inheritance. In speaking of the decline of certain nations, Mr. Halstead said:

The lands have been wasted, the forests are no more, the soil that once made fruitful hills and blooming valleys is at the bottom of the seas, and the streams that watered the peopled plains are lost in the sands that are the tombs of the profligates who have perished. The elements of possibility, the foundations of prosperity, are gone, never to be restored, and those cancers of the earth, the deserts, are eating away more and more that which should sustain the generations to come.

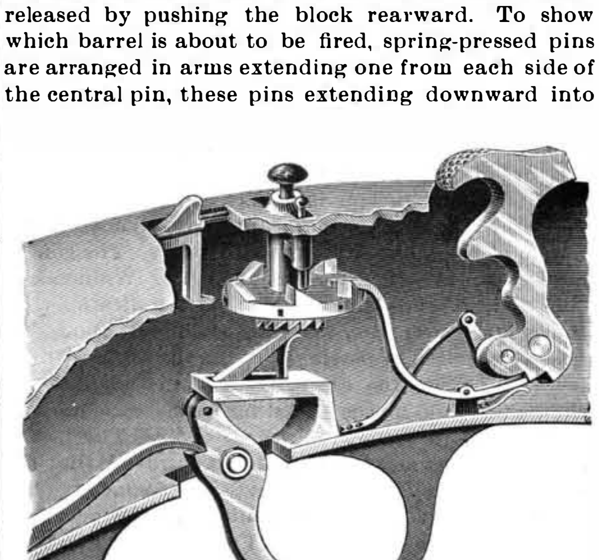
Coming down to our own country, the speaker referred to the exhausted fertility of tobacco lands and wheat fields; to the extermination of food fish and noble game and water fowl; particularly to our vanishing forests.

The woods have been torn from the mountains, and brooks have departed because the springs have ceased to flow; and, when not dwindled almost to dust beds, the ancient mill streams are roaring floods, for the slopes of the ridges are bared and the rainfalls rush from them as over roofs of slate; the hillsides are plowed up and down, preparing gutters to feed the freshets with the soil that is far more precious, in the eyes of those who have been taught the art of seeing, than the precious metals. It is the passion and pride of the average American to smite the trees and shoot the birds and slaughter the last of our running game —and if there are laws for the protection of trees in parks, or game laws to save the quail and squirrel, or to prevent scouring the rivers with seines out of season, and to provide fish ladders and abolish fish traps, they are regarded as tyrannical, a style of oppression identified only with effete monarchies and the tottering despotism of worn-out worlds. The buffalo have been exterminated, a noble race murdered, so that they are hardly enough to supply museums; and if there is a moose left in Maine he has been accidentally spared, and must be pursued by the hunter with remorseless fury to shed his blood to the final massacre. It is a crime to cut down the woods on a mountain, a crime to heedlessly kindle fires to burn forests; but our people have no realizing sense of the sort, and sneer at the Swiss and Germans, who require three permits to fell one tree. In New York there is a struggle that seems hopeless to preserve the remnants of the once majestic and always romantic Adirondack wilderness. In our new States the statesmen dare not stand against the timber thieves.

In some parts of the address Mr. Halstead's rhetoric was rather too intense for scientific accuracy; but, after all, the real sting of the indictment is in its truth. To the speaker's hopeful spirit the establishment of fish hatcheries by the government, the effort to protect the seals of Behring Sea, and the reservation of the Sequoia groves were acts which gave promise of a time coming when more serious thought would be given by our nation to the preservation of its heritage. He noted, too, as hopeful indications, that arbor days were celebrated in many States; that tree planting by children had become fashionable, and that the discussion over the Adirondack woods, although it might not save the wilderness, would ultimately, perhaps, save many other forests. We feel inclined to consider it another cheering sign that an orator of national repute has felt impelled, on that anniversary when Americans are in their most exultant mood, to raise his voice in earnest protest against the reckless destruction of our forests. No higher public service can be rendered by the country's leading men than the reiteration of warnings like this, until it comes to be universally understood what the ruin of our forests means.—*Garden and Forest.*

A TRIGGER MECHANISM FOR GUNS.

A mechanism by which guns having more than one barrel may be fired by a single trigger, with a safety catch, so that the gun cannot be accidentally fired, and a device to indicate the barrel to be exploded, is shown in the accompanying illustration. It has been patented by Mr. Frank D. Granger, of Ellsworth, Kansas, an assistant in the United States Coast and Geodetic Survey. Extending down from the top of the breech is a hollow casing in which is vertically mounted a pin normally pressed upward by a spring, and on the lower end of the pin is loosely mounted a firing disk having on its upper surface a series of cam teeth adapted to alternately raise the sears and release the hammers. Only one sear and a simple style of hammer are shown to illustrate the mechanism, but the improvement may be connected with any of the common forms, especially those generally found in double barreled guns. The hammers have tumblers at their lower ends engaged by the forward ends of the sears, and the hammers are normally pressed forward by springs secured in the lock case, the hammers being thus held in cocked position until the sears are raised at their rear ends by the cam teeth of the firing disk. The under side of the disk has twice as many cam teeth as there are on its upper surface, to engage a pivoted spring-pressed trigger arm which extends upward through a slotted guide, so that when the trigger is pulled the disk will be turned, one of its cam teeth engaging a sear to raise it and fire the gun. When it is desired to fire a barrel which would not normally be fired by a sear, the pin in the top of the breech is pressed downward, carrying the disk down, so that its teeth will not engage the sears, while the disk will be pushed around one notch by the trigger arm, and may be brought into the right position for firing either barrel. A slide block carrying a safety catch is held in the breech behind the vertical pin, by which the disk may be locked so that it cannot be turned, the catch being released by pushing the block rearward. To show which barrel is about to be fired, spring-pressed pins are arranged in arms extending one from each side of the central pin, these pins extending downward into



GRANGER'S LOCK FOR FIRE ARMS.

the path of the cam teeth on the firing disk, so that as the latter is revolved one pin or the other will be made to project above the top surface of the breech, indicating the barrel to be fired.

DISSOLVING CAOUTCHOUC.—Caoutchouc can be dissolved more readily by adding from 5 to 15 per cent of oil eucalyptus to the benzol or carbon bisulphide used; in the latter proportions, the mixture of carbon bisulphide will dissolve nearly 20 per cent of caoutchouc.