

Scientific American.

ESTABLISHED 1845

MUNN & CO., - - - EDITORS AND PROPRIETORS.

PUBLISHED WEEKLY AT

No. 361 BROADWAY, - - NEW YORK.

TERMS FOR THE SCIENTIFIC AMERICAN.

(Established 1845.)

One copy, one year, for the U. S., Canada or Mexico.....\$3.00
 One copy, six months, for the U. S., Canada or Mexico.....1.50
 One copy, one year, to any foreign country postage prepaid, £1 10s. 5d. 4.00
 Remit by postal or express money order, or by bank draft or check.
 MUNN & CO., 361 Broadway, corner Franklin Street, New York.

The Scientific American Supplement

(Established 1876)

is a distinct paper from the SCIENTIFIC AMERICAN. THE SUPPLEMENT is issued weekly. Every number contains 16 octavo pages, uniform in size with SCIENTIFIC AMERICAN. Terms of subscription for SUPPLEMENT, \$5.00 a year, for the U. S., Canada or Mexico, \$6.00 a year, or £1 4s. 8d., to foreign countries belonging to the Postal Union. Single copies 10 cents. Sold by all newsdealers throughout the country. See prospectus, last page.
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NEW YORK, SATURDAY, MAY 29, 1897.

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THE PLANTING SPACES ON THE HARLEM SPEEDWAY.

We are informed by the Park Commissioners that steps are being taken to remedy the defects in the tree-planting trenches which have been built on each side of the Harlem Speedway, New York. By reference to our issues of February 6 and 13 it will be seen that these trenches consist of an inner stone wall, three feet high, adjoining the roadway, an outer wall five feet high, and a bottom of eight inches of concrete, except where the fill is of earth, when the concrete is omitted. We pointed out at the time that the construction of these masonry and concrete trenches was likely to defeat the very end at which they aimed, since they would prevent the spread of the roots, and would also retain the surface water that found its way to the bottom of the trench.

We are informed by Commissioner W. A. Stiles that the alterations which are to be made will be directed to securing drainage through the bottom of the trenches; the provision for securing two feet of good soil between the surface and the top of the trench wall and extending continuously from the tree line under the roadway, and, where practicable, under the sidewalk, and the perforation of the wall at various points where it is in course of construction. There is no doubt that these changes, if they are thoroughly carried out, will go far to remedy the harmful features of the work as mentioned above, and every one who has the beautifying of the city at heart will be relieved to learn that the matter has at last been taken in hand. At the same time no satisfactory reason has ever been given for the construction of this work, and we cannot but feel that it is due to the citizens of New York that some explanation should be forthcoming.

A NEW LOCOMOTIVE FOR THE PURDUE UNIVERSITY TESTING LABORATORY.

Our readers in general, and particularly those among them who are engaged in railroad work, will be interested to learn that the Schenectady Locomotive Works are building a second locomotive for use in the testing plant of Purdue University. The valuable work which has been done with the first locomotive during the past five years has been recorded from time to time in the railroad and technical papers, and the results have proved of great assistance both to the designer and the locomotive superintendent. The engine that was ordered in 1891 was fairly representative of the standard locomotive of ten years ago; but, in order to keep thoroughly abreast of developments, the authorities of Purdue decided to have built a more modern machine which should embody the latest ideas and practice. To this end the new locomotive will be built to carry a pressure of 250 pounds to the square inch in the boiler, and the cylinders will be detachable. Various diameters of the latter will be provided, so that the best ratio of cylinders to boiler can be determined. Bushings will also be provided for the low pressure cylinder, by means of which experiments may be made to determine the best ratio of high to low pressure cylinder. It will be possible to determine on the new locomotive the vexed question of the relative economy of the simple and compound types—a question which, judging from the contradictory reports from the various railroads, is very much in the air at the present writing.

THE LAUNCHING OF THE HOLLAND SUBMARINE BOAT.

On Monday, May 17, there was launched at the Crescent Shipyard, Elizabethport, N. J., an extremely interesting specimen of marine architecture, known as the Holland submarine boat. It embodies the results of some twenty years of experimental work on the part of the designer, who firmly believes that the submarine torpedo boat will prove to be the most deadly weapon of future naval warfare. The Holland, as she is called, is the first of her type ever built and launched. The government is at present building another and larger boat of the kind at Baltimore, and it was the long delay in completing the latter vessel that caused a private company to commence the construction of the Holland. The government vessel was described and illustrated in the SCIENTIFIC AMERICAN of April 25, 1896. She is 80 feet long, 11 feet in diameter, and is to be able to launch five torpedoes from a tube in her bow. The Holland is a much smaller boat, being only 55 feet long and 11 feet in diameter. She is to have a speed of 15 knots an hour when at the surface, and of from 8 to 10 knots when submerged. At the surface she will be run by a gas engine, and when submerged power will be furnished by electric storage batteries. With tanks filled and all the crew aboard there will be a reserve buoyancy of 600 pounds, and she is caused to sink by altering the pitch of the diving rudders, the forward motion of the boat and the downward pitch of the rudders combining to force her below the surface. The boat is maintained at the required depth by means of delicate automatic mechanism, similar to that used in the automobile torpedo.

The armament is extremely powerful, consisting of three 18 inch Whitehead torpedoes which are dis-

charged through the bow, and also an aerial gun at the bow and a submarine gun at the stern. The former will throw a 100 pound dynamite shell a distance of one mile and the submarine gun will send its shells some 650 feet through the water. In attacking a ship the Holland would discharge her aerial gun when she was well within range and then, sinking beneath the shelter of the water, she would run up within say 1,000 yards of the enemy. Here she would rise to locate the target, and sinking again she would discharge her torpedoes, and passing under the ship, if this should prove to be necessary, she would discharge her rear gun to complete the work of destruction. The tests of the Holland will be commenced in a few days, and they will be watched with the keenest interest by the whole naval world. It is in this direction that the development of torpedo warfare promises the most effective results. The secrecy of submarine attack, the impossibility of locating the boat, and the swift and complete destruction it is capable of working, will undoubtedly render a successful submarine boat the most powerful and most dreaded weapon of the age. For the defense of our rivers and harbors it would be of incalculable value.

IMPROVED TRANSPORTATION FACILITIES ON THE DOCK FRONT, NEW YORK CITY.

West Street, on the Hudson River front, and South Street, on the East River front of New York, are heavily encumbered with a miscellaneous traffic which is chiefly composed of heavy drays and trucks, surface cars and ferry passengers. The former are continually coming and going between the freight houses and ferries and the business portions of the city, and thickly intermingled with these are the vast crowds that come and go to and from Jersey City and Long Island. The Board of Consulting Engineers of the Dock Department has reported in favor of improving the handling of freight and relieving the general congestion by building a four-track freight railroad along the dock front from Battery Place to Christopher Street on the North River and from the Battery to Corlears Hook on the East River. It is proposed to run the present surface tracks of the street railways on an elevated structure, and overhead bridges are to be provided at the cross streets for foot passengers. The plan seems to be well adapted to meet the necessities of the case. At present the only standard freight tracks in the lower part of the city are those of the New York Central Railroad which run through Hudson Street to the freight depot at Beach Street. The proposed four-track road will be provided with spurs running to the various freight sheds and landing stages, and the freight which is brought across the river in cars will be handled on the New York side with less labor and greater dispatch than under the present system.

THE IRON AND STEEL INSTITUTE ON AMERICAN COMPETITION.

We recently drew attention to the fact that our manufacturers have taken the leading position in the wire industry of the world. The success which we have achieved in this branch is only one feature of our general supremacy in the manufacture of iron and steel. At the recent annual meeting of the Iron and Steel Institute of Great Britain, a leading feature of the discussion was the increasing success of American competition. President Pritchard Martin, in the course of his address, referred to the enormous output of the leading American steel works. He pointed out that the Americans were far in advance of English engineers and builders in the uses to which steel was applied, and the point was illustrated by reference to the steel frame buildings which are rapidly springing up in all the great cities of the United States. He urged the necessity for lower freight rates, and claimed that the British industry was severely handicapped by the high cost of transportation. In this respect, the American and German manufacturers were favored by rates that are considerably less than those in England. This statement on the part of the president will explain in some measure the exceedingly prosperous condition of the English railroads as compared with our own. In the six months ending December, 1896, the leading English companies raised their rates of dividend by amounts varying from $\frac{5}{8}$ to $1\frac{5}{8}$ per cent, some of them paying as much as $6\frac{5}{8}$ and $7\frac{1}{2}$ per cent to the shareholders at the close of last year.

THE MISSISSIPPI FLOODS AS FERTILIZERS OF THE SOIL.

We have more than once been asked by correspondents whether it is not a mistaken policy on the part of the government to attempt to keep the Mississippi within its banks, and whether it would not be better to allow the waters to overflow and deposit each spring a fresh layer of rich soil upon the land. Attention is drawn to the annual overflow of the Nile, upon the regular occurrence of which the people of the Nile valley depend for their crops. In reply it may be said that no just comparison can be drawn between the two rivers. The rise of the Nile is gradual and it rarely overflows its banks in the cultivated districts with any

destructive effect upon the surrounding country. The water is drawn off by artificial canals and spreads quietly over the adjacent country. The Mississippi on the other hand works far more harm in many of the inundated districts than any richness it may impart to the soil can compensate. If the velocity of the overflow waters exceeds a certain rate, it begins to exercise a loosening and cutting effect upon the soil, carrying away the rich loam and laying bare the coarser gravel and rocks. Moreover, the seasons are too brief to permit the bottom lands of the Mississippi to lie so long under water. By the time the waters have receded, and the lakes and large pools left in the hollows have dried up, the season is too far advanced for the crops to be put in to good advantage. The equable climate of the Nile valley, on the other hand, presents no difficulties due to the shortness of the seasons.

THE HEAVENS FOR JUNE.

BY WILLIAM R. BROOKS, M.A., F.R.A.S.

THE SUN.

The sun's right ascension on the first of the month is 4 h. 39 m. 25 s.; and its declination north 22 deg. 9 m. 43 s.

On the last day of the month its right ascension is 6 h. 39 m. 34 s.; and its declination north 23 deg. 8 m. 31 s.

On the twentieth day of June the sun reaches its greatest northern declination, 23 deg. 27 m. 12 s., and entering Cancer, summer commences.

MERCURY.

Mercury is morning star. On June 2 it is stationary. On June 15 Mercury reaches its greatest elongation west of the sun, 23 deg. 4 m., and this will be the most favorable time to see Mercury, either with the naked eye or telescope, as morning star. On the same date that this planet reaches its greatest elongation from the sun, but five hours later, it is at its greatest heliocentric latitude south. On June 28, at 7 h. 26 m., Mercury is in conjunction with the moon, when Mercury will be 5 deg. 11 m. south of the moon. On June 29 Mercury is in conjunction with Neptune, when Mercury will be only 14 minutes of arc south of Neptune, or less than half the apparent diameter of the moon.

The right ascension of Mercury on the first of the month is 3 h. 38 m. 0 s.; and its declination north 15 deg. 29 m. 18 s. On the last day of the month its right ascension is 5 h. 34 m. 57 s.; and its declination north 22 deg. 37 m. 24 s.

VENUS.

Venus is now morning star and is at its greatest brilliancy on June 3. Throughout the month it will be found to be the same gorgeous object as morning star that it was for so many weeks as evening star.

Venus will be so bright during June as to be easily seen with the naked eye in the daytime if its position be even approximately ascertained. On June 15 Venus will be on the meridian or due south at 9 o'clock A. M. at an altitude of 12 deg. 38 m. above the celestial equator. This, for the latitude of the middle States, would be from 12 deg. to 15 deg. above the half way point from the horizon to the zenith. These directions will apply with sufficient accuracy for several days before and after the above named date.

On June 25, at 3 h., Venus is in aphelion, or in that part of its orbit farthest removed from the sun. On June 26, at 1 h. 4 m., Venus is in conjunction with the moon, when the planet will be 8 deg. 38 m. south of the moon.

On the first of the month Venus rises at 2 h. 47 m. A. M., and crosses the meridian at 9 h. 25 m. A. M. On the last day of the month Venus rises at 2 o'clock A. M. and crosses the meridian at 8 h. 52 m. A. M.

The right ascension of Venus on the fifteenth day of the month is 2 h. 42 m. 18 s.; and its declination north 12 deg. 37 m. 53 s.

MARS.

Mars is evening star, and in the constellation Cancer, about half way up the western sky at dusk. Its orbital motion is plainly marked from night to night, with reference to the two bright stars Castor and Pollux in Gemini, and the little cluster called the Bee Hive, in Cancer, toward which Mars is now moving.

On June 5, at 6 h. 10 m., Mars is in conjunction with the moon, when Mars will be 1 deg. 49 m. north of the moon.

On June 1 Mars crosses the meridian at 4 P. M., and sets at 11 h. 15 m. P. M. On June 30 Mars crosses the meridian at 3 h. 15 m. P. M., and sets at 10 h. 5 m. P. M.

The right ascension of Mars on June 15 is 10 h. 20 m. 36 s.; and its declination north 11 deg. 45 m. 48 s.

JUPITER.

Jupiter is evening star, and in excellent position for telescopic scrutiny in the early evening hours. After remaining apparently stationary for several days within two degrees to the eastward of Regulus, Jupiter is now moving slowly away from the star and toward the east, thus affording another interesting illustration of a planet's orbital motion among the stars.

The following are some of the interesting phenomena of Jupiter's satellites:

On June 5, at 8 h. 16 m., the shadow of satellite I will enter upon the disk. At 9 h. 4 m. satellite IV will disappear in occultation. At 9 h. 20 m. satellite I will leave the disk of the planet, and at 10 h. 35 m. the egress of the shadow of satellite I will follow.

On June 12, at 8 h. 58 m., satellite I will enter in transit; and at 10 h. 11 m. the shadow of satellite I will enter in transit.

On June 19, at 8 h. 0 m., satellite II will pass off the disk; and at 10 h. 15 m. the shadow of satellite II will leave the disk.

On June 26, at 7 h. 52 m., satellite II will enter upon the disk in transit; and at 10 h. 14 m. the ingress of the shadow of satellite II will occur.

On June 7, at 1 h. 30 m., Jupiter will be in conjunction with the moon, when the planet will be 3 deg. 43 m. north of the moon.

On the first of the month Jupiter crosses the meridian at 5 h. 35 m. P. M., and sets at 20 m. after midnight.

On the last of the month Jupiter crosses the meridian at 3 h. 55 m., and sets at 10 h. 30 m. P. M.

The right ascension of Jupiter on June 15 is 10 h. 24 m. 19 s.; and its declination north 11 deg. 10 m. 58 s.

SATURN.

Saturn is in the southeastern evening sky, and good telescopic observations may be made after 9 o'clock, although its southern declination is an unfavorable feature.

On the first of the month Saturn is on the meridian at 10 h. 55 m. P. M., and this would be the best hour to observe this interesting planet.

On June 12, at 9 h. 31 m., Saturn is in conjunction with the moon, when the planet will be 7 deg. 15 m. north of the moon. The right ascension of Saturn on the fifteenth of the month is 15 h. 34 m. 43 s., and its declination south 16 deg. 58 m. 38 s.

URANUS AND NEPTUNE.

Uranus is also in the southeastern evening sky just below Saturn. On June 18, at 8 P. M., Saturn and Uranus are in conjunction, when Uranus will be 2 deg. 3 m. south of Saturn, a most favorable opportunity to identify this far-away world.

Neptune comes into conjunction with the sun on June 10 and hence is invisible.

Smith Observatory, Geneva, N. Y.

JOHN M. THATCHER.

Ex-Commissioner of Patents John M. Thatcher died recently at Proctor, Vt. He was born at Barre, Vt., in 1836, and received a common school education, and finally graduated at the University of Vermont. He fought in the civil war. After being mustered out of service he engaged in teaching. He received an appointment as a clerk in the Patent Office in 1864 and was assigned to duty in the examining corps. He seemed exactly suited to the business, and in less than twelve years he was at the head of the Patent Office as Commissioner, passing through each one of the intermediate grades in turn. During this time he studied law and was admitted to the bar in 1870. In 1875 he resigned the office of Commissioner and became the law partner of L. L. Coburn. Mr. Thatcher was, with one exception, the only person who ever rose from the grade of clerk in the Patent Office to that of Commissioner. As Commissioner his decisions evinced the most painstaking and thorough study of the cases.

In 1871 he was appointed a member of the Civil Service Sub-Commission of the Interior Department. He exercised a controlling influence in carrying into effect reforms in the appointments and promotions in the executive departments in Washington. He was an excellent illustration of the possibility open to the youth of America who is possessed with an indomitable will, patience and intellectual ability.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.

The annual business meeting of the Institute was held on May 18, at 12 West Thirty-first Street, New York City, and was called to order by President Duncan at 4 P. M. The counting of the ballots by Mr. Hamilton and Dr. Pupin, who were appointed tellers, resulted in the announcement of the election of the council ticket as follows:

For President, Dr. Francis B. Crocker, of New York City; for Vice Presidents, Dr. A. E. Kennelly, of Philadelphia, Pa., Mr. Cha. S. Bradley, of New York City, Prof. Dugald C. Jackson, of Madison, Wis.

The announcement by the tellers of the election of Dr. Crocker was greeted with hearty applause, and the President-elect was escorted to the chair and briefly acknowledged his appreciation of the honor bestowed upon him.

The report of the committee on a new design for the Institute badge, which had been referred to this meeting by the Executive Committee, was taken up and thoroughly discussed, resulting finally in the adoption of the new design recommended by the committee. Arrangements for the withdrawal of the old design and substitution of the new one will be made at an early date.

The paper on "The Synchronograph," presented April 21 by Dr. Crehore and Lieut. Squier, was then

taken up for discussion. Mr. F. W. Jones opened the discussion, which was participated in by Dr. Kennelly and Mr. Delany. A paper on "The Application of Hyperbolic Analysis to the Discharge of a Condenser" was presented by Dr. Macfarlane. Owing to lack of time, discussion was postponed until the general meeting, July 26.

A 7 P. M. the meeting adjourned and the members reassembled at the "Arena," 41 West Thirty-first Street, where arrangements had been made for the annual dinner under the direction of Mr. Herbert Laws Webb, chairman of the Committee on Papers and Meetings, and Mr. T. C. Martin. Although a sudden increase of about fifty per cent in the number of guests necessitated the laying of ninety-three covers, the overflow was provided for, and the event passed off pleasantly under the skillful guidance of Toastmaster Martin. Toasts were responded to by Dr. F. B. Crocker, Mr. F. W. Jones, Dr. M. I. Pupin, Dr. C. E. Emery, Dr. A. E. Kennelly, Mr. Ralph W. Pope, Mr. J. W. Lieb, Jr., Mr. Herbert Laws Webb, Mr. Nelson W. Perry and Mr. Joseph Sachs.

The exercises were interspersed with instrumental and vocal music by Mr. George Hali Guy and Mr. Charles McL. Paine. Mr. Guy played a waltz of his own composition, which he dedicated to the American Institute of Electrical Engineers.

SUNDAY FEEDING.

Under the heading of the "Sunday Penalty of Irregular Feeding" the Medical Record points out that in our progress from barbarism we have evolved a people with whom regularity in eating is absolutely necessary to good health. As a result of this artificial existence, the secretions are poured out and ready for action with the monotony of clockwork. If this custom is neglected, the violator not only suffers bodily discomfort, but an actual injury is done to the digestive apparatus, which has been so educated that it requires a definite amount of exercise and positive promptness in feeding that requirement. The stomach having poured out its secretions, as customary, waits only a short time before allowing them to be absorbed without the accompanying nutrition which goes to the formation of more secretions. After a few such experiences, the secretions become less in amount and activity, and indigestion ensues. Dyspeptics are ordered to eat at inflexibly regular intervals. Normal stomachs are by no means many, yet this rule, so imperative to sufferers, is regularly disregarded by the well. Once a week, the three regular daily meals are replaced by late rising and abstinence, followed by gluttony. The gastric juices know nothing of a seventh day of "rest," and the result is discomfort, stupidity and loss of appetite on Monday.

ST. PETERSBURG-PEKIN RAIL ROUTE.

The British Trade Journal says: "Speculations are being made as to the effect of railway communication between St. Petersburg and Peking. It is pointed out that when such a line of railway is in working order St. Petersburg would be only five days and London only eight days from the Chinese capital. It is asked, what would be the effect upon British trade with China? That all depends upon the cost of sea as compared with railway carriage. Estimating the railway rates at the low average of seven miles for 1d., which prevails to a large extent in the United States, the cost of sending goods from St. Petersburg to Peking at the same rate would mean a total charge of about 50s. per ton—a figure which does not compare favorably with the present rates of transport by sea, so that the Russo-Chinese line would not have much effect upon the trade between British ports and Hong-Kong. Yet if Russia develops her manufacturing enterprises, it would ultimately lead to severe competition. In the event of such a Russian state line carrying goods to China at a nominal rate, we would find our trade with Chinese ports being affected in the same way by low railway rates as our trade with southeastern Europe, where the Germans and Austrians are able to send goods very cheaply compared with the cost of sea carriage from London."

JUDGE GREELEY, ASSISTANT COMMISSIONER OF PATENTS.

We are pleased to note that Judge Greeley, heretofore one of the Examiners in Chief at the United States Patent Office, in Washington, has been made Assistant Commissioner of Patents, Examiner Steward succeeding Judge Greeley in the Board of Examiners. It will be remembered that Judge Greeley was one of the judges to pass on the SCIENTIFIC AMERICAN prize essay contest, for our fiftieth anniversary number, last year. Judge Greeley is a graduate of Dartmouth College, and a lawyer by profession. He entered the Patent Office as a fourth assistant examiner in 1884. He has served in the practical work of the office in many divisions, and has had under his own personal consideration and examination nearly every important art represented in the Patent Office. The promotion is eminently proper and well deserved.