SCIENTIFIC AMERICAN

ESTABLISHED 1845

MUNN & CO., Inc., - Editors and Proprietors

Published Weekly at
No. 361 Broadway, New York

CHARLES ALLEN MUNN, *President*
361 Broadway, New York.
FREDERICK CONVERSE BEACH, *Sec'y and Treas.*
361 Broadway, New York.

TERMS TO SUBSCRIBERS.

One copy, one year, for the United States or Mexico $3.00
One copy, one year, for Canada 3.75
One copy, one year, to any foreign country, postage prepaid, 18s. 6d. 4.50

THE SCIENTIFIC AMERICAN PUBLICATIONS.

Scientific American (established 1845).... ..... $3.00 a year
Scientific American Supplement (established 1876)..... 5.00 "
American Homes and Gardens..... ..... 3.00 "
Scientific American Export Edition (established 1878). ..... 3.00 "

The combined subscription rates and rates to foreign countries, including Canada, will be furnished upon application.

Remit by postal or express money order, or by bank draft or check.

MUNN & CO., Inc., 361 Broadway, New York.

NEW YORK, SATURDAY, OCTOBER 9th, 1909.

The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are *sharp*, the articles *short*, and the facts *authentic*, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

PHILADELPHIA, THE DELAWARE RIVER, AND JOHN FITCH.

The widespread interest in the early history of the steamboat, which has been aroused by the present splendid tribute to the work of Robert Fulton on the Hudson River, has served to bring into public notice several too-long-neglected inventors, prominent among whom is John Fitch. With the exception of a small craft which he tried on the old Collect Pond in this city, the whole of the experimental work of this worthy man was done in Philadelphia and on the Delaware River.

We are free to confess that although we have always associated the name of Fitch with the development of the steamboat, it was not until we began to make a more thorough search of the history of the early inventors that we realized how important a part John Fitch had played in that period; how meritorious was his work; and how practical the degree of success which he attained.

It has been freely admitted that the present festival commemorates merely the inauguration of successful steamboat navigation on the Hudson River, and that the question as to who produced the first practical passenger-carrying steamboat is still an open one. Therefore we suggest, in view of the fact that during three months of the summer and autumn of the year 1790, John Fitch was operating a passenger-carrying steamboat on the Delaware, which sailed according to a fixed schedule, and was advertised in the daily papers of that day, that it is incumbent on the city of Philadelphia to do justice to the memory of its too-long-neglected citizen.

The story of his life and his heroic struggle to design a successful steamboat, as written by his own hand, reposes at present in the Philadelphia Library, to whose care it was committed by Fitch shortly before his tragic death. This unique autobiography consists of five old ciphering books, dog-eared and thumb-worn, whose five hundred pages, covered with the characteristic writing of the author, contain several drawings, showing the various steps by which he developed the jet condenser, which played so important a part in driving his successful passenger steamboat of 1790. Regarding the criticism that his method of propulsion by means of a set of reciprocating paddles, arranged in a frame at the stern of the boat, was cumbersome and awkward, we would point out that, before making use of vertical paddles, Fitch investigated the rotating paddle wheel, and rejected it on the ground that much of the power of the engine was uselessly expended because of the obliquity of the paddles in entering and leaving the water, the water being alternately forced down and thrown up, with a proportionate loss of propulsive efficiency. On the other hand, argues Fitch, paddles can be made to enter and leave the water in an approximately vertical position, and practically the whole of the power can be used to good effect. Now, in this Fitch showed his engineering good sense; and it was not until over half a century later that the feathering paddle wheel was introduced. In this type, the floats are hinged at the outer ends of radial arms from a shaft, and by means of an eccentric to which each float is also attached, they are made to enter and leave the water in an approximately perpendicular position, a condition which John Fitch secured by his clumsy but effective reciprocating paddle arrangement. That it was efficient is shown by the fact that he attained on a measured mile, as testified to by several witnesses of high standing in the community, a speed of eight miles an hour, and that he ran his boat regularly between Philadelphia, Trenton, and way points at an average speed of seven miles an hour. This, be it remembered, was from two to three miles better than the best speed of the "Clermont" some twenty years later.

The ultimate failure of John Fitch was due to a lack of influential backing and to a combination of unfortunate accidents. During the winter following his successful season of 1790 he was engaged in the construction of a larger and more powerful vessel called the "Perseverance," which, unfortunately, was torn adrift and wrecked during a heavy storm on the Delaware River. Fitch understood full well the value and significance of his work, and he also realized that if he failed, it was not because of any inherent fallacies in his plans, but merely for lack of influence and the necessary financial support. Pitifully prophetic is the following sentence from the diary of this disappointed inventor, who evidently foresaw at that time his early death: "The day will come when some more powerful man will get fame and riches from my invention; but nobody will believe that poor John Fitch can do anything worthy of attention." The remains of Fitch lie in an unmarked grave. The scene of his labors is to-day barren of monument or memorial to bear tribute to his remarkable work.

We commend these facts to the consideration of the citizens of Philadelphia and those towns along the Delaware River which were the scene of his early labors and triumphant but short-lived success, in the hope that they may see their way to honor the memory and perpetuate the work of Fitch by some such services and permanent memorials as have marked the present Hudson-Fulton Celebration.

PALESTINE AND SYRIA THE ORIGINAL CEREAL COUNTRIES.

The origin of the cultivation of cereals has seemed lost in the night of time. At the beginning of the historical period, the culture of wheat had extended throughout the ancient world. It was practised in Egypt 4,000 years before the Christian era, and wheat is one of the five plants included in the annual sowing ceremony which the Chinese Emperor Chin-nung instituted 2,900 years before that era. Wheat and barley have also been found, in considerable quantities, in the palafittes or lake dwellings erected on piles in prehistoric times.

Ten years ago the problem of the origin of cereal culture was deemed insoluble, for botanists thought that wheat would never be found growing wild in any part of the world. Subsequently, however, much light has been thrown on the question by the theoretical views of Koernicke, who has reorganized the classification of cultivated varieties of wheat, and especially by the diligent historical researches of Aaronsohn.

Among the specimens of wild barley (*Hordeum spontaneum*) collected in 1855 by Kotschy, at the foot of Mount Hermon, near Damascus, was found a single example of a different grain, the importance of which was ignored at the time. Koernicke observed this plant in 1873, but devoted little attention to it until 1889, when he described it under the name *Triticum vulgare; var. dicoccoides*. He regarded it as the parent of our cultivated varieties of wheat, and his opinion was adopted by Ascherson and Schweinfurth. But this theory was founded on a single plant, which might well have been a plant of cultivated wheat accidentally mixed with the wild barley, for two other botanists had failed to find additional specimens in the same locality. Aaronsohn was equally unsuccessful in 1904, when he went to Mount Hermon in quest of the plant, but in 1906 he found the *Triticum dicoccoides* growing abundantly and in a great variety of forms on Mount Hermon, up to an altitude of 6,000 feet, and at other points in Syria and Palestine. It should be noted that wheat is not cultivated in either of these countries.

The plant is always found associated with wild barley, and grains of wheat and barley have always been found together in lake dwellings and Egyptian ruins, so that our ancestors appear to have cultivated the mixture of barley and wheat with which nature provided them. The Arabs have only one name for the two wild grains.

In 1907 Aaronsohn found a few rye plants in Syria. It is generally supposed that rye is a native of Europe and is, and always has been, unknown in the Orient. In 1908 Aaronsohn found wild barley in the valley of the Dead Sea, and wild wheat (*Triticum dicoccoides*) associated with wild barley on the slopes of Mount Moab and Mount Galaad, in the valley of the Jordan, and on the plateau of Es Sali, always growing in thin soil, parched by the sun, in crevices of limestone and basalt rocks.

HOME-GROWN SUGAR-BEET SEED.

As a result of an experiment which has been conducted near Phoenix, Arizona, it has been found that sugar-beet seed can be grown successfully in that section of the country, and better still, that it can be grown in a single year. In Arizona it is customary to plant sugar-beet seed the latter part of November, harvesting the crop the following July. It has been found that if the seed is planted a month earlier in the fall the beets will produce a crop of seed the following year. This takes sugar beets, for that section of the country, out of the biennial class, and puts them in with the winter annuals. It means the saving of a year in the production of seed, and will greatly simplify the process.

Nearly seven million pounds of sugar-beet seed are used in the United States every year. At present the bulk of this supply comes from Germany, and costs the American grower about ten cents a pound. The German method of producing sugar-beet seed is rather complicated. When the beets are dug in the fall a number of the best specimens, averaging in size from 20 to 24 ounces, are selected for "mothers." A sample taken from each of these mothers is analyzed for sugar content. In some cases the density and purity of the juice are also determined.

These mothers are divided into grades, according to sugar content, and stored in silos during the winter. Those that fail to come up to the required standard are discarded. In the spring these mother beets are set out and cultivated carefully. From them the seed of commerce is produced. By these painstaking methods the sugar-producing ability of the beets is kept up to its present high standard, and even increased from year to year.

Recently beet seed has been grown to a limited extent in the United States in Utah and Washington. This home-grown seed has shown greater yielding ability than the seed from Germany. The beets from home-grown seed have better quality and higher vitality, and seem better adapted to American conditions. Owing to the difficulty of production, however, beet-seed growing in Washington and Utah has not spread very rapidly.

With more favorable climatic conditions prevailing in Arizona, especially the absence of severe winter weather and the dryness at harvest time, it may be possible to make beet-seed growing an important industry there. Of course, since the beets are not dug in the fall, they cannot be selected as carefully as is done in Germany. Whether the quality of the product can be kept up by other methods of selection remains to be proven. Perhaps some method of breeding like that which is giving such good results in the corn fields of the Mississippi Valley may be adapted to sugar beets. The United States Department of Agriculture has been asked to investigate the matter. The results of this investigation will be awaited with much interest by the people of the sugar-beet-growing districts.

THE PLATINUM MARKET.

Platinum is likely to be raised in price, according to the measures which the Russian producers are taking. About 95 per cent of all the platinum in the world comes from the mines at Nijni Taguil and the neighborhood. The mines are now operated by English, German, French, and Russian companies, but there is now a movement in Russia to keep the platinum production in the hands of a native company or a State enterprise, so as to have Russia benefit by the platinum production instead of foreigners. Last spring the aide of the minister of commerce and industry, M. D. Konovaloff, presided at a meeting of the platinum producers, and the assembly came to the following decision in principle, namely, that all the platinum extracted in Russia should be turned over to a State establishment, which would deliver it to a commission charged with the sale of the same, and to be composed of seven members, a delegate of the lesser manufacturers, one from the mean and four from the leading producers who handle more than 800 pounds annually, also a government delegate. This commission will make a reckoning before the end of the fiscal year, and will publish the least price established for the following year. For the first year the price will be 21,000 roubles the pound ($710 per pound) for 83 per cent platinum. Upon the products which are turned over to the State establishments there will be allowed an advance of 80 per cent of the value, at a 5 per cent interest. It will be forbidden to export crude platinum, and the refining must be done in Russia. This decision is not as yet legalized, but it may be done in the future, and it is expected that the price of platinum will be accordingly raised.

A report on the resistance of rivets is presented by M. Ch. Fremont to the Bulletin de la Société d'Encouragement. It is pointed out that the resistance of riveted plates to statical forces or shocks should be borne as much as possible by the adhesion of the plates, and as little as possible by shearing of the rivets themselves, and the author emphasizes the necessity of standardizing the heads of rivets and of regulating the maximum temperature during the process of heating, so as not to destroy the elastic qualities of the rivet. The increased efficiency obtained by the application of continued pressure during the riveting is also mentioned.