Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT

No. 261 BROADWAY, NEW YORK.

O. D. MUNN. A. E. BEACH.

TERMS FOR THE SCIENTIFIC AMERICAN.

One copy, one year postage included..... $3 20
One copy, six months, postage included 1 60

Clubs.—One extra copy of THE SCIENTIFIC AMERICAN will be supplied gratis for every club of five subscribers at $3.20 each; additional copies at same proportionate rate. Postage prepaid.

Remit by postal order. Address

MUNN & CO., 261 Broadway, corner of Warren street, New York.

The Scientific American Supplement

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, postage paid, to subscribers. Single copies, 10 cents. Sold by all news dealers throughout the country.

Combined Rates.—The SCIENTIFIC AMERICAN and SUPPLEMENT will be sent for one year postage free, on receipt of *seven dollars*. Both papers to one address or different addresses as desired.

The safest way to remit is by draft, postal order, or registered letter.

Address MUNN & CO., 261 Broadway, corner of Warren street, New York.

Scientific American Export Edition.

The SCIENTIFIC AMERICAN Export Edition is a large and splendid periodical, issued once a month. Each number contains about one hundred large quarto pages, profusely illustrated, embracing: (1.) Most of the plates and pages of the four preceding weekly issues of the SCIENTIFIC AMERICAN, with its splendid engravings and valuable information; (2.) Commercial, trade, and manufacturing announcements of leading houses. Terms for Export Edition, $5.00 a year, sent prepaid to any part of the world. Single copies 50 cents. ☞ Manufacturers and others who desire to secure foreign trade may have large, and handsomely displayed announcements published in this edition at a very moderate cost.

The SCIENTIFIC AMERICAN Export Edition has a large guaranteed circulation in all commercial places throughout the world. Address MUNN & CO., 261 Broadway, corner of Warren street, New York.

NEW YORK, SATURDAY, APRIL 15, 1882.

Contents.

(Illustrated articles are marked with an asterisk.)

TABLE OF CONTENTS OF

THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 328,

For the Week ending April 15, 1882.

Price 10 cents. For sale by all newsdealers.

A NEW FIELD FOR INVENTION.

A correspondent, writing from New South Wales, calls attention to a wide and promising field of invention which does not appear to have been much explored. In all parts of the world there are many noxious plants, which cultivators of the soil find it difficult or impossible to eradicate by the means now in use. In New South Wales, for instance, there are two plants, rather slow of growth, which have taken possession of many parts to such an extent that the clearing of the land would cost more than the land is worth, where land sells for $20 an acre.

The first, which flourishes in the warmer parts, is a cactus called the prickly pear; the other, which is confined to the cooler parts, is the English sweetbrier, the English wild rose thus proving as severe an affliction to parts of Australia as the Scotch thistle has in other regions.

In view of the similarity of animal and vegetable life, and the ease with which animal pests can be destroyed by poison, our correspondent raises the query whether some means of killing these vegetable pests might not be found that would be cheaper and more efficient than manual labor. "There is a lot of money to be made in this country," he says, "by anything that would answer the purpose; and in other places I suppose it would be still more valuable."

The matter is obviously worthy of thoughtful attention. If poison is used, it should be the inventor's aim to find one that would be fatal to the plant to be exterminated and yet harmless to other plants, or at least not such as to leave in the soil elements that would spoil it for future cultivation. Poisons that would injuriously affect the water supply for use by men, domestic animals, or fish, should be not less carefully avoided.

Obviously the best way to dispose of a plant that is so irrepressibly thrifty as to be a nuisance is to find some way to utilize it. Not a few of our most useful plants were once rank pests, owing to their persistent invasion of lands employed for other purposes. When a use has been discovered for their fiber or other properties, the thriftiness which made them a nuisance now only adds to their value.

If no use can be found for the pest, the next best step would seem to be to study the conditions of its local abundance, and correct them, if possible, by means which will make the soil more suitable for other uses. The charming sweetbrier of the English roadside causes no trouble there. Transplanted to New South Wales it finds conditions in the climate and soil, or a lack of vegetable competitors, which enable or allow it to flourish to a degree impossible at home. Most weeds are "exotics" of this class. It may be that in the cases named, and in others like them, some mineral, harmless or else useful to cultivated plants, placed about the roots of the plant to be eradicated, may put an end to its thriftiness or kill it outright. Failing in that, the inventor may find poisons which, while they destroy the plant pests, will themselves be destroyed or made inert by the juices of the plant they act on; or poisons which kill specific vegetable growths without injuring other useful plants or animals.

The field, as has been already noticed, is a wide one, and comparatively unworked. The values to be affected by successful inventions in it are enormous, and the inventions themselves could hardly fail to be remunerative.

COMET *a* 1882.

The first comet of the present year has been discovered. Mr. C. S. Wells, an assistant at the Dudley Observatory, Albany, was the fortunate finder, and there is a fair prospect that the celestial visitor will prove a brilliant member of the cometic family. The comet was picked up on the 18th of March, in the constellation Hercules. It had then a tail five minutes long, and a bright nucleus, shining like a star of the eighth magnitude. The tidings of the discovery quickly made its way over the civilized world, and the newcomer has been closely watched by practiced observers through the best telescopes, whenever the sky has been clear enough to permit a glimpse of its presence. It behaves much like other members of the same family under the same conditions, increasing in brightness, spreading out its gossamer train, and speeding swiftly on a course that every day brings it nearer to terrestrial territory. In the short time that has elapsed since its first appearance it has traveled many million miles through the blue depths of space, nearly doubled its light, and more than doubled its tail.

Astronomers are busy in watching its movements, noting its indications, computing its elements, and deducing from these premises an ephemeris that will be a guide to its present position in the sky, and a means of detecting by a comparison of orbits whether the mysterious stranger is an old friend renewing acquaintance or whether this is its first visit to the clime of the sun.

Mr S. C. Chandler, Jr., of the Harvard Observatory, has computed the elements, and an ephemeris of the comet, from observations made at Ann Arbor and Cambridge, which, however, can only be considered as approximate, until confirmed and strengthened by future observations. Professor Boss, of the Dudley Observatory, has made similar computations, his results differing considerably from those of Mr. Chandler. The medium of the two computations is probably a more reliable guide to the path of the comet.

Some interesting facts and possibilities may be deduced from the combined labors of the two brilliant astronomers who are first in the field.

Comet *a* is remarkable for its small perihelion distance. According to Mr. Chandler it will come within a hundred thousand miles of the sun, passing through the corona and perhaps grazing the photosphere. Mr. Boss estimates the distance at ten million miles, but both observers agree in prophesying a very near approach. Few instances are recorded of comets coming so near the sun. Those of 1880, 1843, and 1680 had nearly the same perihelion distance, but these dates are considered by many astronomers as marking repeated returns of the same comet.

The new comet makes its perihelion passage about the middle of June, and a magnificent display may be anticipated about that time. It is noteworthy for its great brilliancy under present conditions. It is now nearly two hundred million miles distant, and yet it has a bright, well defined nucleus, and a well developed tail. It is reasonable, therefore, to infer that it is a large comet, since it presents so brilliant an aspect at a distance so immense. As it is coming toward us at the rate of 2,000,000 miles a day, it cannot long remain invisible to the naked eye.

This is the history of Comet *a*, as far as it is known, but there is a rich promise of an entertaining visitor in our sky during the months of April, May, and June. The erratic stranger is moving westward and northward, having greatly changed its position since it was discovered. It has passed from Hercules into Lyra, within a few degrees of the brilliant Vega, has now reached the confines of Draco, and is making its way into Cepheus, where it will arrive some time in May, when it will make a sudden turn and seem to plunge headlong toward the sun, till it reaches that fearful proximity to the great luminary which is a groundless cause of anxiety in many minds.

Those who know the most about cometic astronomy are the least disturbed concerning any untoward accidents in its passage; and astronomers are looking forward to its close approach to the sun as a possible means of learning something concerning the physical structure of the huge globe of fire that is intimately and inseparably interwoven with the destiny of the human race.

The elements of the orbit of Comet *a* are thus given by Professor Boss: Time of perihelion passage, June 15; longitude of perihelion, 49° 35′; longitude of node, 206° 39′; inclination, 74° 47′; perihelion distance about ten million miles.

April 14, R. A. 18h. 50m., Dec. 51° 9′ N. Mr. Chandler's computations give: Longitude of perihelion, 62° 30′; longitude of node, 200° 11′; inclination, 70° 51′.

As the comet approaches nearer the earth other astronomers will doubtless map its course, and repeated observations will modify results. Even if the figures are at fault in minute particulars, there is every reason to expect that a comet of grand and awe-inspiring proportions will in the coming months span the heavens with its gossamer train; that there will be intense excitement in watching its near approach to the sun; that it will be observed and studied as comet was never observed and studied before; and that unless men of science are greatly mistaken, it will take rank with the distinguished comets of 1811, 1843, 1858, 1861, and 1880 on the cometic annals of the nineteenth century.

FISH CULTURE IN AMERICA.

The eleventh annual meeting of the American Fish Cultural Association began in this city April 3. A large number of the more active State and national Fish Commissioners and other friends of fish and fishing were present.

The meeting was called to order by the Vice-President, Mr. George S. Page, of this city, who gave a most encouraging account of the success which had attended the artificial propagation of trout, shad, and black bass.

The Secretary, Mr. Barnet Phillips, read a paper by Mr. H. D. McGovern, of Brooklyn, on the habits, endurance, and growth of the carp. He advised the putting of a few carp in trout ponds to keep the ponds clean.

Assistant United States Commissioner Mather read an interesting paper on a remarkable development of embryo salmon. It had been his belief that the absorption of the sac was necessary for the complete development of the young fish, but he had been convinced of the contrary by an accident which happened in a newly constructed hatchery at Roslyn, L. I. The imperfect tarring of one of the troughs caused a liver disease in the young fish, leading to a casting off of the sac; but when placed in another trough the fish lived, took food, and developed naturally. The cause of the trouble he suspected to have been turpentine absorbed by the water from the exposed and freshly cut pine boards of the trough. Once before he lost a lot of young California salmon by hatching them in an oaken trough, the tannin of which perceptibly impregnated the water. These experiences led him to consider the cause of the extinction of trout below sawmills. He said:

"The theory of the fishermen near sawmills is that sawdust gets into the gills of trout and kills them. This may be true to some extent, but I doubt it, for the reason that sand or other material does not appear to injure the gills, and I have taken adult trout below sawmills. I am inclined to think that the mills are destructive merely to the young by covering the spawning beds to some extent, but more by the absorption of turpentine from the pine or tannin from the oak, the evil effects of which we know too well."

Commissioner McDonald, of Virginia, described a successful method of transporting impregnated eggs to long distances, their development being retarded by reduction of temperature.

Mr. Blackford spoke of the recent shipment of 14,000,000

codeggs from New York to Washington, and said that it was intended to have the steamer Fish Hawk, with its appliances for hatching, sent here, and offered, if this was done, to furnish 100,000,000 eggs per diem for hatching purposes. This could easily be done, in his opinion, as a large cod will strip 9,000,000 good eggs. This method will save the expense of sending out a special steamer to catch fish with ripe eggs, and will save a great waste of both fish and eggs.

Professor C. W. Smiley, of the Smithsonian Institution, read an important paper comparing the statistics gathered by the United States Commission in 1871 and those gathered in 1879 for the census statistics. The total number of pounds catch reported in 1872, with four large points wanting, was 42,350,000 pounds. Making a fair estimate for missing ports, the total catch was 50,000,000 pounds, During the year 1879 the total catch was 68,742,000 pounds, which was probably smaller than in the intervening years. The greatest decline in the catches was shown in returns from the ports of Buffalo and Cleveland, and the greatest increase in the returns at Chicago, where, in 1872, the catch marketed was 7,462,150 pounds, and in 1879, 17,247,570 pounds. As fishermen have more effective apparatus for capture than formerly, and the lakes are more thoroughly and exhaustively fished than before, the slight increase in the catch during the decade virtually means a decrease in the quantity of fish, and that a gradual depopulation is following the introduction of small meshed nets and the use of steamers. In support of this theory Prof. Smiley gave a large number of statistics showing the gradual but certain extermination of the whitefish and salmon trout. This was due in part to the fact that there were enough nets used in Lake Michigan alone to reach, if stretched in a continuous line, from one end of the lake to the other. The whitefish now caught are rarely ever large enough to rate higher than No. 3, and no fish large enough to rate as Nos. 1 and 2 are ever caught. Old fishing places once fairly alive with fish are now exhausted and deserted by the fishermen to superannuated Indians and gulls. Another cause for the disappearance of the fish is the prevalence of quantities of sawdust near the mouths of rivers, which destroys the fish. In Lake Erie, though whitefish and trout have decreased, the quantity of bass, pike, and sisco has increased since alewives were introduced.

The Secretary read a paper by Seth Green on the hatching of sturgeon and striped bass, in which he insisted that the artificial propagation of these fish was necessary to keep them from extermination. The chief enemy to the sturgeon is the eel, which, when the female sturgeon is ripe and ready to deposit her spawn, often enters the vent and remains there until it has stripped her of all her ova. As a remedy against this evil he recommends the placing of the fish in a car, and placing about it a harness of some kind that will prevent the eel from entering her and destroying the spawn. With such apparatus and properly protected waters in which to further breeding, he is of opinion that sturgeon may be successfully propagated. He has succeeded in hatching out in his shad-hatching boxes 155,000 sturgeon fry, which experiment he offered in proof of his claim. The striped bass he thinks can, by the use of racks or slides, be caught in a sufficiently ripe condition for use in artificial propagation in Southern waters.

Mr. Blackford read a letter from S. M. Johnson, of Boston, urging the more strenuous enforcement of the laws against the sale of small lobsters; and a resolution was adopted instructing the officers of the association to forward to Albany a request for an increase of the number of game constables for the purpose.

The Secretary read a paper by Prof. John A. Ryder on oysters, treating particularly of the possibilities and probabilities of the artificial propagation of this toothsome bivalve. The view taken was not hopeful, as the methods employed had failed to keep an embryo oyster alive more than a week. The trouble seems to be that the experimenters are working on an entirely impractical plan, based on an erroneous theory as to the conditions of the problem.

The migration of shad, the recurring failure of the Canadian salmon fisheries, the food value of the sword fish, and kindred topics were among the other subjects discussed.

The officers elected for the ensuing year are: President—George Shepard Page, New York; Vice President—James Benkard, New York; Treasurer—Eugene G. Blackford, New York; Corresponding Secretary—Barnet Phillips, Brooklyn; Recording Secretary—James Annin, Jr., Caledonia, N. Y.; Executive Committee—Fred Mather, New York city; G. Brown Goode, Washington, D. C.; Seth Weeks, Pennsylvania; Benjamin W. West, New York city; T. B. Ferguson, Washington, D. C.; C. B. Evarts, Vermont; and William M. Hudson, Connecticut.

The association adjourned to meet in Boston on the first Wednesday and Thursday of September next, at which time an effort will be made to have Prof. Baird call a meeting of the Fish Commissioners of all the States in the Union to meet in conjunction with the fish culturists.

LOCOMOTIVES AND MALARIA.

Dr. Wm. S. King, Surgeon United States Army, claims that the frequent movement of railway trains tends to diminish or prevent malarial diseases in localities where all the necessary conditions for the development of malarial effects seem to be present. His theory is that the heated locomotives, by continually passing through the infected districts, rarefy the air, and create a constant atmospheric disturbance by inducing warm upward currents, such currents acting, with the pure air which rushes in from all directions, as agents in the dispersion or annihilation of the miasmatic influence.

Dr. King's theory would appear to be based upon information received in West Philadelphia while selecting a place of residence for his family in a locality adjacent to the Schuylkill River, where, notwithstanding the nearness of low lands, the residents claimed to enjoy immunity from malarial affections.

It is popularly believed that there are many places where the same profession is made by residents and land agents, and yet new-comers are apt to have their confidence in the value of interested testimony severely shaken out of them in the course of a year or two.

Perhaps a more extended observation of railway centers may lead Dr. King to modify his theory. The atmosphere of the lower levels of Jersey City, for example, is agitated by passing trains to a degree perhaps unrivaled in any corresponding area; yet, to speak within bounds, malarial diseases are not unknown on that side of the river; nor do our sanitary authorities report any signal diminution of malarial troubles among the residents of Harlem flats since steam roads were put upon the avenues and locomotives began to stir the air incessantly.

The circumstance that locomotive engineers and firemen are not exempt from ague and other malarial afflictions may not militate against Dr. King's theory, for trainmen do not spend quite all their time on the road; but how would he explain the fact that the extension of malarial diseases, their invasion of new districts, is so apt to be along the lines of railways? Is it because the trains on new roads do not run with sufficient frequency?

M. Poitevin.

Louis Alphonse Poitevin was born at Conflans, in the department of the Sarthe, in 1819. The earlier portion of his education was obtained at the neighboring town of St. Calais, whence he proceeded to the *Ecole Centrale* in Paris. During his course in this establishment he devoted himself almost entirely to chemistry and mechanical studies, and passed out of the school in 1843 with the diploma of civil engineer. His first official appointment was that of chemist to the *Salines National de l'Est*, in which capacity he introduced many improvements in the manufacture of salt, while his mechanical knowledge enabled him also to introduce new forms of apparatus and machinery, he also made improvements in the processes of manufacture of bleaching powder (hypochlorite of lime), salts of potash, magnesia, as well as sulphuric acid.

When photography came upon the world as a scientific curiosity Poitevin's *penchant* for chemistry led him to experiment in this new direction, and we find him in 1848 publishing the fact that it was possible to produce an electro deposit of copper upon the whites of the daguerreotype image. His experiments in this direction led to the discovery of a method of photo-chemical engraving upon metallic plates coated with silver or gold, for which he received the silver medal of the *Société d'Encouragement des Arts.*

Subsequent to this he turned his attention to the study of the action of light upon bichromated gelatine, in which principle he recognized the possibilities of great achievements. He first applied himself to the production of moulds in relief, and patented, in 1855, his helio-plastic process—a description of which is to be found in our volume for that year. This consisted simply in preparing a film of gelatine of greater or less thickness according to the depth of the relief required, which, after sensitizing by means of potassium bichromate, was exposed to light under a negative. It was subsequently treated with cold water, when the portions unacted on by light swelled up and so formed an image in relief, from which a mould in plaster or other suitable material could be taken.

His next achievement was the fatty ink process, of which he may be said to have been the father. This was based upon his discovery that the surface of the bichromated gelatine film after exposure to light became repellent of water, though it permitted a greasy ink to adhere; and in 1855 or 1856 he established an *atelier* for working this and the photolithographic processes. This venture did not, however, prove a great success, and he was compelled to relinquish it to M. Lemercier, who, with various modern improvements and extensions, still carries on the establishment.

In 1862, having for some time past devoted his attention to the so called carbon process, he published his new method of printing upon paper in pigmented gelatine, and this method no doubt forms the starting point of the now perfected process of carbon printing, or autotype. For this and his labors in connection with photolithography he was awarded the prize offered by the Duc de Luynes. He also published researches in connection with the action of light upon various salts of iron, and devised the first "dusting-on" process, which was based upon the hygroscopic properties of a mixture of tartaric acid and perchloride of iron.

At the Paris Exposition Internationale of 1878, M. Poitevin was named *Callaborateur Universal*, and was adjudged an honorarium of 7,000 francs and a gold medal in recognition of his services in the advancement of photography. This sum was, however, never paid.

For many years past M. Poitevin had retired from active participation in the advancement of photography, though he still retained his interest in that as well as other branches of chemistry and science. Having settled at his native place, Conflans, he preferred to spend his latter days in that leisure which his active life so justly entitled him to; and it was there he passed away, March 4, 1882, mourned by a large circle of affectionate relatives. His death removes from the ranks of photography one of the few remaining historic names.—*Brit. Jour. of Photography.*

FOODS FOR INFANTS AND INVALIDS.

It may be questioned whether there is any subject which comes more closely home to people of all classes than the character of the food supplies specially provided for infants and invalids. The increasing demand for this class of preparations (due partly to an actual need, but chiefly, we suspect, to the skillful advertising of manufacturers and the liberal margin of profit they offer to the retail trade), has led to a great number and variety of such competitors for public favor. Put up in ornamental boxes, they appear on the counters of every grocer and in the show cases of every apothecary shop; and not unfrequently their actual value is in inverse ratio to the pretentiousness of the package and the price.

As a rule, purchasers are obliged to take the virtue of such articles upon trust, few having the means or the knowledge requisite for an analysis, microscopic or chemical, of the preparations which they are advised to try, perhaps by the family physician, and yet a mistake in this connection may be fatal.

For all young infants, and for adults in many cases of sickness, starch food is injurious: sometimes in being a source of intestinal irritation; sometimes, as in the case of very young children, in furnishing a semblance of aliment without the reality, such children being as unable to digest and assimilate starch as sand. Hence the usual claim with respect to prepared foods of the cereal class is that they are free from or contain very little starch, while they are rich in gluten and other food elements capable of nourishing the sick and the young. To discover how far these claims are well founded, Dr. Ephraim Cutter, of Harvard College and the University of Pennsylvania, has lately made microscopic examinations of something like forty cereal foods, developing facts of the highest importance to physicians and their patients as well as to parents having young children. The results of his investigation appear, with numerous illustrations, in the SUPPLEMENT for this week. The article (which, by courtesy of Dr. E. S. Gaillard, we reprint from the *American Medical Weekly*) is worthy of study by all who are interested in microscopy or in the nourishment of invalids and children.

A Precocious Picklock.

On April 5 a twelve year old black boy, named Coleman, was brought before the United States Commissioner at Baltimore, Md., charged with robbing the private letter boxes in the city post office.

The locks on these boxes are of a kind supposed to be proof against picking, and the authorities could not believe the little rascal's admission of guilt. So the marshal of police and the assistant postmaster took the little fellow to the post office, where he gave them an exhibition of his skill in opening burglar-proof locks. He had a little strip of wrought iron which he had hammered very thin, and, putting this in the keyhole of a box and giving it one or two slight taps with his finger, open flew the box as if by magic. Box after box he opened in the same way.

Among locksmiths of Baltimore the case has excited, it is said, the widest interest, and the discovery that these locks can be picked may lead to an entire change in them. Government experts are already studying the case. The boy Coleman was sent to jail by the commissioner to await the action of the grand jury on his case.

Now would appear to be a good time for some inventor to bring out an unpickable lock suitable for post office use.

SIR CHARLES WYVILLE THOMSON died on the 12th of March, at the age of fifty-two. He was born at Bonsyde, Linlithgowshire, on the 5th of March, 1830. His exploring expeditions in the Lightning, Porcupine, and Challenger, in which the "depths of the sea" in the Atlantic and around the world were investigated with remarkable success and multitudes of new discoveries, have made his name familiar to the people of all civilized lands. The publications of his last expedition are still in progress. After graduating at the University of Edinburgh, he was appointed, in 1850, Lecturer on Botany in King's College, Aberdeen, and, in 1870, Regius Professor of Natural History in the University of Edinburgh. His so early departure is greatly to be deplored.

The Tobacco Plug Patent Declared Invalid.

The United States Circuit Court of Kentucky, Judge Baxter presiding, has declared invalid the reissued patent of Miller & Worley, 8,060, January 29, 1878. This patent was for the idea of stamping letters or other marks by pressure into the side of the plug of tobacco. Instead of the usual plain plug, the inventor produced a plug marked with the maker's stamp or other ornamentation. This patent was considered to be of great value; but the court declares it to be invalid on the ground that Miller was not the original and first inventor. The testimony showed that Edward F. Smith invented and worked the same thing in 1875.