

out the invention, Krupp's guns could not be successfully used. All of these objections are removed by the new law, which permits the patenting of improvements of all kinds except medicines and foods, as articles; but the processes of producing such articles can be patented.

The duration of the new patent is 15 years. It extends over the entire German Empire, comprising twenty-one States, and embracing an aggregate population of about fifty millions more or less.

Every patent is to be granted subject to the payment of an annual tax: subject also to a commencement of the working of the invention within the limits of the empire, within three years from the date of the patent.

These are some of the principal provisions of the new German patent law, concerning which we shall from time to time give our readers additional information.

In the meantime we would give notice to the many patrons of the Scientific American Patent Agency that Messrs. Munn & Co. have already completed their arrangements for taking patents in the German Empire under the new law, and are now ready to receive and give prompt attention to all applications. The proceedings are simple, and the costs light; the expenses, including the first year's taxes, amount only to one hundred dollars. Circulars of information, with particulars about the new German law and the patent laws of other foreign countries, England, France, Belgium, Austria, Italy, Spain, Russia, etc., may be had gratis at this office.

#### TAKING POWER OF THE LEGISLATURE.

In our issue of July 18, 1874 (page 32, volume XXXI), an article appeared quoting a portion of a then recent opinion of the court of last resort of the State of New Jersey, in the suit of "The Mayor, etc., of Newark vs. Agens et al.," which held in substance that the power of the legislature to tax or assess property, along the line of and for local street improvements, was limited to the special benefit which the property derived from such improvements. This position was contrasted with the nearly opposite view of the Court of Appeals of the State of New York, whose decisions have gone further perhaps than those of any other State in the Union, in holding that the power of the legislature was supreme in all matters of taxation, or, in other words, that "man was made for the State and not the State for man." The practical operation of this rule has been that, in many of our large cities, streets and boulevards have been built through pastures and swamps, under these legislative acts, without the wish or consent of a majority of owners; and the vast cost, with high prices and great frauds added thereto, has in many cases confiscated the property and ruined the owners; and the latter, under the decisions of our courts, have been without remedy.

That such a state of affairs should exist under a government not omnipotent, but where the people are supposed to rule, has led to much serious thought and discussion. It seems to have been considered by our courts quite fully, in the suit of Weisner vs. Village of Douglas—just reported in 64 N. Y. Reports, page 91—opinion by Judge Folger.

While this case turns upon the question of the constitutionality of the legislative act which authorized the village to issue bonds, to raise money, to pay for stock subscribed for, and collect by taxation to pay the bonds, yet the court, in its able opinion, holding the act unconstitutional, lays down a broad doctrine of equity, which, if applied, will relieve the people from many wrongs and much legalized robbery, even if it does not check reckless legislation. Honest taxpayers have long suffered from oppressive legislative acts; and whatever the future may disclose, they have seemed in the past to have no proper remedy in the courts.

#### ZINC-LINED WATER COOLERS.

Several correspondents have lately written to us concerning zinc-lined water coolers, complaining of the disagreeable flavor which the zinc imparts to water from melted ice. Several weeks ago, we had occasion to note the deleterious effects of water that had passed through zinc-coated or galvanized iron pipes. It is obvious that what was there said equally applies to zinc or galvanized iron-lined water reservoirs of any kind, although we admit that the corrosive action of any fluid is greatly diminished by a reduction in temperature. We think there can be no manner of doubt that the use of zinc or galvanized iron for such purposes is highly objectionable. The general action of zinc salts on the animal system is to cause persistent diarrhœa; and in conjunction with the enervating effects of hot weather and other causes tending in the same direction, this may result in very serious consequences—more especially with young children and persons suffering under the infirmities of age. During the next few months, these ice water fountains will receive marked attention, so also will cholera mixtures. If our readers would avoid headache and nausea, let them banish these "crystallized" coolers. The best lining for such vessels is, perhaps, porcelain enameled iron; but, unfortunately, there is always a doubt as to the amount of soluble lead the enamel may contain. We have seen some of these enamel-lined coolers in the market; but as they cost nearly twice as much as an ordinary cooler, their sale is very limited, while the handsome galvanized iron ones are round nearly everywhere. Tinned plate has been found unsuitable as a lining material, as the tin soon wears off and exposes the iron. Iron discolors and imparts a disagreeable styptic taste to the water. Glass, porcelain in general, and stone-ware or pottery, if free from lead glaze, may be used.

Sawdust is often used in lining the walls of water coolers; but charcoal, in moderately fine powder, is much superior. Care should be taken, in filling the vessels with water, not to wet the lining, as when wet it becomes almost useless. Ice water—that is, water from melted ice—is not conducive to health; but it becomes more pernicious when its reservoir has been a zinc-lined vessel.

#### QUADRUPLIX TELEGRAPHY.

"We are not aware," says the editor of the London *Telegraphic Journal*, "that a quadruplex circuit exists in England at present, although we are assured that since 1874 quadruplex telegraphy has been an established fact in America, and that its employment there has been eminently successful. Statistics are nevertheless wanting to establish its practical value."

"\* \* \* We seem to be still as much in the dark as ever to the real advantages of quadruplex telegraphy. Without entering at all minutely into the system, it is sufficient to state that the difficulties inherent to the adoption of quadruplex telegraphy are greater than at first sight would be imagined." \* \* \* "Working a quadruplex system—that is, four circuits upon one wire—to meet the requirements of busy centers of commerce, looks very much like intrusting too many of the eggs to one basket, and in the event of interruptions could not fail to be attended with the most serious inconvenience."

For the information of our valued British cotemporary, we would state, by way of statistics, that the Western Union Telegraph Company is now regularly operating, daily, by the quadruplex system, about twenty thousand miles of its wires. The lines between New York and all the large cities, as Boston, Philadelphia, Pittsburgh, Chicago, St. Louis, Washington, New Orleans, are worked by the quadruplex plan.

For the illumination of our cotemporary, we would state that the real advantage of quadruplex telegraphy is that it permits the sending of four messages over one wire during the time heretofore required for sending one message by the old method. In other words, as much business may be done over one wire, by the quadruplex, as can be done over four wires by the common plan.

There are no inherent difficulties about the adoption of the new system in England. All that is needed is to send over to New York a postal money order and pay for as many instruments as are wanted, and then set them to work. They will work just as well in London as here.

To stand in the gallery of the great operating room of the Western Union Company, in this city, and gaze upon the multitude of operators there daily at work with the quadruplex instruments, does indeed seem like looking upon a good many eggs in one basket; but we hear of no inconvenience or interruptions therefrom resulting. On the contrary, so great is the regularity and necessity for the new system that the business of the Western Union could not now be transacted except for the quadruplex, the use of which is being rapidly extended. Finally, we suggest to our cotemporary that he make a summer excursion over here and learn something about modern telegraphy. The absence of the quadruplex in England shows conclusively that his countrymen are several telegraphic generations behind the age.

#### LOCUST PROSPECTS.

BY PROFESSOR C. V. RILEY.

Before spring opened, the most gloomy forebodings prevailed throughout the so-called Western States as to the prospective injury from the Rocky Mountain locust. Nor were those forebodings without foundation. Eggs were laid last fall over an immense stretch of country, from the 94th to the 98th meridian, and in some cases reaching into the mountains, and from near the British American line to the Gulf of Mexico. They remained for the most part sound throughout the winter; and notwithstanding that those which prematurely hatched, or were destroyed by the many different animals that feed upon them, more than sufficient remained as the ground thawed out to give birth to locusts enough to ruin most crops. The young insects began to hatch whenever the weather was favorable, often in such quantities as to daunt the most hopeful; they were graphically described as "boiling out of the ground," and they began to mow down the more succulent plants and to do great injury to young wheat. In some sections, the farmer was prepared and determined to make a fight; and wherever the war was waged with spirit, brains, and concerted action, the foe was vanquished. Yet in many, if not most, instances, he would have given up in despair, had not Dame Nature come to his aid with various most efficient allies. The insects soon began to disappear and to lose their voracious appetites, and at the present time there is, in most of the threatened country, no longer serious alarm, but, on the contrary, every prospect for more than average crops.

Having recently returned from an extended tour of investigation in Texas and Kansas, I take the liberty of quoting from a letter written on the 10th of May and addressed by me to the Governor of the latter State, that portion which bears more particularly on the disappearance of the young locusts:

"In every part of the State I have visited, and where I have examined carefully the condition of things, the young locusts have very largely—in some instances totally—disappeared; and I now have no doubt whatever that the reports of such disappearance that are so general throughout the entire portion of the State that was threatened have their foundation in fact. This disappearance is generally attributed to death and dissolution from the cold and wet weather that followed the principal hatching. That

this weather has been largely instrumental in causing death among the hopping pests I have no doubt, because there are always a certain portion just hatched or just molting, which are particularly tender and susceptible to the injurious effects of cold, drenching rains. But they have been yingd and are now dying fast during the present warm and sunny weather, and these dead insects are not parasited, but simply diseased—sick. In my last (9th) report made to the State of Missouri, in stating the causes that might diminish the prospective injury, I wrote:

"We may therefore expect that, as compared with 1875, a larger proportion of the young that will hatch in 1877 will be weakly and will soon perish. \* \* \* There is a bare possibility that, after the bulk of the young have hatched, and before they have commenced to do serious harm, we may have such unseasonably cold and wet weather as to kill them by myriads, and effectually weaken their power for injury."

Both possibilities have become actualities.

It is a singular fact, however, that, notwithstanding the large numbers which hatched, no one has been able to discover the dead carcasses of these disappearing locusts in anything like the numbers necessary to account for the disappearance; and in most instances where dead insects have been reported to me, an examination at once showed that the parties had mistaken therefor the exuvie or empty skins of those which had molted; which skins are always abundant under straw or weeds, or at the base of a wheat stool, where the young insects congregate when undergoing their molts.

The young locusts possess remarkable tenacity of life; and the fact that the bulk of those remaining are in the third stage (that is, have molted twice) and must have hatched before the unfavorable weather set in, is in itself enough to show that other factors than those meteorological have entered largely into the problem of disappearance. The principal of these I will briefly enumerate, because, unlike meteorological or climatic influences, they may, most of them, be relied upon in future, are largely within man's control, and may even be rendered still more effective. They are, in short, elements of certainty in the problems of locust destruction:

First—The natural enemies of the locust. These consist in the present instance (the parasites not affecting it till it gets older) of the vertebrate animals which are known to feed upon it, such as snakes, gophers, field mice, etc., and birds. These last have been more efficient than most of us imagine, and I never saw blackbirds, plover, the Lapland longspur, etc., so numerous. The dung often whitens the fields where the locusts were once thick, and they have been the principal cause of the latter's disappearance. The prolonged cold and wet retarded the development of the insects, benefited the wheat, and gave our feathered friends an excellent opportunity to check them. We should employ all means to encourage the multiplication of the birds.

Second—The farmers. In most parts of the State I have traversed, the farmers had determined from the beginning to make war, and they did make war, and so successfully that the insects were pretty effectually destroyed before the cold and wet occurred. The means employed were mostly kerosene pans and burning—over 700 kerosene pans having been made at Salina alone.

Third—The weather. The continued cold, after the principal hatching, had the effect, as already stated, to kill many that were just hatching or molting. The heavy rains also washed many away into the streams; and in some instances, on soils which contain sand and lime, and which are liable to crack when dry, the rains doubtless covered up and killed such as were sheltering in such fissures.

Fourth—Climate. The fact that the insects, especially after the second and third moltings, are dying, is simply confirmatory of the views I have always held and advanced, that the species is out of its natural habitat, and can never permanently thrive here. These views I need not repeat at length here. While the number that have become sickly and died have not so far begun to compare with those which have perished in the other three ways mentioned, it will doubtless continue to increase as the insects get larger, for already they show a tendency to unnaturally group together during the heat of the day, and feed much less ravenously than when in perfect health."

It affords me pleasure to be able to state that the favorable condition of things reported in the above-quoted passage is not confined to Kansas, but is general. In parts of Minnesota, where the eggs were so thick that to dig the ground when at all moist was to make a paste, the little red mite (*trombidium sericeum*) has swarmed and destroyed them. In other places birds have pecked the ground full of holes in their search for eggs; and from Iowa, Nebraska, and Colorado, the reports are almost unanimous that the young insects that continue to hatch also continue to perish.

A survey of the field at this writing gives every assurance of good harvests throughout the threatened country. They are needed! With ruined crops this year, following so closely the injury of the past few years, many a farmer would have been bankrupt, and the whole country would have seriously suffered. The sickness of the locusts as compared with those of 1875 is a most encouraging sign. Comparatively few will live to get wings. Those that became fledged in Texas are passing northwest in scattering and insignificant flights. The Saskatchewan plains and the northwestern hatching grounds were pretty well depleted last year; and there is every reason to hope for freedom from any general and disastrous invasion for some years to come. St. Louis, Mo.

#### Sideraphthite.

Sideraphthite is the name given to a new alloy composed of 66 parts of iron, 23 of nickel, 4 of tungsten, 5 of aluminum, and 5 of copper. It is said to resist sulphuretted hydrogen and the vegetable acids, and to be but slightly attacked by mineral acids. It is really more useful than silver, and can be prepared at less cost than German silver.

In our notice of Mr. D. L. Holden's patent for an ice machine, published on page 330 of our issue dated May 26, we gave his address as "Carrington, Ky." It should be "Covington, Ky."