

Correspondence.

Infusorial Earth and Rubber.

To the Editor of the Scientific American:

Under title of "Fossil Flour," you publish quite a lengthy article in your valuable paper. The use of the same, if the article is correct, is not new, as our Mr. A. B. Jenkins patented, under date of October 5, 1880, the use of diatomaceous silica or infusorial earth, mixed with rubber and gutta-percha, or either, and such other matter as is necessary to vulcanize it. It will not be necessary for us to go into details, as any one interested in the manufacture of rubber compounds can easily procure a copy of the patent wherein the use of silica or infusorial earth is clearly defined for use in different rubber compounds. The article speaks particularly of valve work. We wish to state that the different steam pump manufacturers have used our silica valves for years.

JENKINS BROS.

71 John Street, New York, September 10, 1891.

Dust Necessary to Produce Rain.

To the Editor of the Scientific American:

I have read your editorial in the SCIENTIFIC AMERICAN of September 5 on "The Artificial Production of Rain," also an editorial on the same subject reproduced from the SCIENTIFIC AMERICAN of December 20, 1890. The article of the latter date escaped my notice at the time it was published. You say that in a communication from Senator Farwell the following theories are advanced:

"My theory in regard to producing rain by explosives is based partly upon the fact that after all the great battles fought during the century heavy rainfalls have occurred. This is historical and undisputed."

Then follows the descriptions of rainfalls after various battles, extensive fires, and eruptions of volcanoes.

In quoting Siborne, you make him say that "At Waterloo, the weather during the morning of June 17, 1815, had been oppressively hot. It was now a dead calm; not a leaf was stirring, and the atmosphere was close to an intolerable degree, while a dark, heavy, dense cloud impended over the combatants. The 18th Hussars were fully prepared and awaited the command to charge, when brigade guns on the right commenced firing for the purpose of breaking the order of the enemy's advance. The concussion seemed instantly to rebound through the still atmosphere and communicate like an electric spark with the heavily charged mass above. A violent thunder clap burst forth, which was immediately followed by a rain which has never probably been exceeded even in the tropics. In a few moments the ground became perfectly saturated."

As a matter of history, I will state that this violent storm of rain occurred soon after the battles of Ligny and Quatre-Bras, which were fought in the afternoon of June 16. Waterloo was fought on the 18th under disadvantages, on account of previous rains.

"It rained incessantly," says Siborne, "during the night of the 17th, occasionally in torrents, while loud and frequent peals of thunder fell ominously on the ear of the toil-worn soldier." "As the morning (June 18) advanced," continues Siborne, "the dense, vapory masses which had so long rolled slowly and heavily over the plain gradually began, as if relieved by the constant discharge of their contents, to soar into a higher region, where, during the whole day, with little or but imperceptible motion, they hung spread out into a broad, expansive vault, through which the rays of the sun were unable fully to penetrate, until just at the moment of its sinking from the scene of strife, when it shed the full blaze of its setting splendor upon the victorious advance of the Anglo-allied army."

It appears to me that the cause of rainfalls after battles is not fully understood by the experimenters who are so deeply interested in producing rain by firing explosives. If our atmosphere were perfectly pure, free from minute particles of matter, it would be a question whether we would have any rain. When the molecules of water condense into fog or rain drops, they first require a nucleus, and that nucleus is the imperceptible dust in the air. The burning of gunpowder, eruptions of volcanoes, and extensive fires increase the particles in the atmosphere, and, therefore, make the conditions more favorable for rain.

Atmospheric dust plays an important role in the economy of nature. It not only produces rain, under favorable conditions, but diffuses light, gives us the red and golden sunset, and the more minute particles of dust or water, the blue sky.

H. C. STILLMAN.

Oswego, September 7, 1891.

Successful Trial of the Justin Dynamite Cartridge.

The failures heretofore attendant upon the attempt to fire a shell containing dynamite from the ordinary cannon have not discouraged Dr. Justin, the inventor of a special form of dynamite cartridge, and he made three apparently successful shots on September 10. Two of these shots were fired from a 5-inch Parrott rifle and one from an 8-inch Blakely gun, the range being about half a mile, and the shells striking against

a wall of limestone rock. The two 5-inch shells carried forty-one ounces each of nitro-gelatine, seven pounds of powder being used for each charge. Neither of these shells was exploded, and one of them, strange to say, rebounded many feet in the air. The 8-inch shell is said to have contained 150 pounds of nitro-gelatine, and to have been fired from the gun with a powder charge of thirty pounds. It exploded on striking, bringing down great quantities of rock and bowlders.

The Locust or Grasshopper Outlook.

BY C. V. RILEY.

During the past summer, and especially during the last six weeks, the papers have contained numerous reports concerning serious grasshopper ravages in various parts of the country, in some cases the reports being quite sensational and well calculated to create apprehension as to the safety of our crops and as to the possibility of serious locust devastation this fall or next year. I have felt that perhaps a few words indicating the exact state of the case and summarizing the investigations made, whether by agents of the department or others, will be of service in giving our farmers the true condition of things. While, from the investigations made a year ago and the reports of locust injury, it did not seem probable that there could be very much foundation for the reports of the present year, I deemed it quite desirable to endeavor to ascertain the facts as closely as possible. Accordingly Professor Lawrence Bruner was instructed to examine fully the regions in the North western States where the injuries were reported, and he has been over Eastern Colorado, Eastern and North Dakota, Western Minnesota and portions of Montana and Wyoming. Professor Herbert Osborn was instructed to visit the western parts of Kansas and investigate the southwestern portion of the State, examining all localities from which any reports of injury could be obtained. Professors F. W. Snow and E. A. Popenoe, on behalf of the State authorities in Kansas, thoroughly examined the section of country in southeast Colorado, passing over the country embraced in Northern Kansas, and thus connecting the territory covered by Professors Bruner and Osborn, so that it may be stated that the plains region from Northern Minnesota west to Montana and south to the Arkansas River has been pretty thoroughly examined. Mr. Nathan Banks was instructed to visit South Texas and New Mexico to inquire into the reports of injury in those sections.

It may be stated in brief that the depredations in Eastern and Southeastern Colorado have been due to the exceptional multiplication of the long-winged locust (*Disosteira longipennis*). This species always occurs in that section, and some of the first insects which I collected in Colorado on my first visit in 1867 were of this species, and are now in the national collection. It has never yet been reported in such immense and injurious numbers, and its work the present year furnishes another illustration of the fact that we never know when a species that has hitherto been looked upon as harmless may become seriously injurious to agriculture. During the latter part of July millions of pupæ and full grown larvæ of this species were found ranging over large areas of Eastern and Southeastern Colorado, moving in vast bodies all the way from Akron to the Arkansas River to the south. The insects moved in a body in various directions, choosing, as Professor Bruner reports, the roads for their line of march rather than the prairies. Normally this species frequents partially bare hill slopes and plains where the grasses are scant, and Professor Bruner's view of the matter is that the past few years have been favorable to its excessive multiplication, but that during the present year the exceptionally heavy rains which have occurred in that region have caused an unusually abundant growth of grasses and other vegetation, and the locusts have been compelled to move in search of more open country, and have frequented the roads, upon which they congregated and which they followed in vast bodies. He found, in going some distance away from the roadways, where the vegetation was at all rank, that but few insects were found. This species, in size and length of wing, much more closely resembles the migratory and destructive species of Europe and some other countries than does the Rocky Mountain locust (*Caloptenus spretus*), and there seems to be no particular reason why, at times, it should not become destructive and fly in vast swarms from one locality to another. So far as past experience justifies calculation, however, it will not do so, and I think there is little reason to fear any continued and widespread injury from this species. It is worthy of note also that its concentration in injurious swarms is due to conditions the very opposite of those which favor the undue increase of our most-to-be-dreaded species (*Caloptenus spretus*).

The locusts found further north have consisted of several species, most of which are known as sedentary, that is, not ordinarily migratory. But one of them, namely, the pellucid locust (*Camnula pellucida*), is the species that has already done much damage and is one of the Pacific migratory forms. Commencing in Idaho it has been gradually working eastward and is

now found in portions of Montana, North Dakota, Wyoming and Western Nebraska. The gradual eastward spread and increase of this species deserves attention, but so far as the reports go, it has nowhere been sufficiently numerous to justify alarm.

The true Rocky Mountain locust, the species which we most have to fear (*Caloptenus spretus*), was found in considerable numbers in North Dakota and Minnesota, in some counties proving quite destructive; but owing to vigorous measures which have been adopted, especially in Minnesota, by the State authorities, chiefly under the direction of Professor Otto Luger, of the Minnesota experiment station, they have been to a large extent destroyed, and there is little probability that they will spread extensively from the localities in which they now occur. The destructive species most commonly found in Southwest Kansas was the differential locust (*Caloptenus differentialis*). It has devastated the alfalfa fields in the irrigated territory along the Arkansas River for a distance of some fifty miles. This is a widespread species east of the Rocky Mountains, occurring all over the country, and it is one of the species which acquires the power of extended flight only in very dry seasons and under certain favorable conditions. Ordinarily the female is too heavy bodied and short winged to become migratory. There is no fear of widespread injury from this species. The accounts from Southwest Texas have been very greatly exaggerated, and little injury could be found by the agent sent there. The species were also those indigenous to the region, and not of migratory forms that had come from other parts. The reports from Ohio and from some of the other Eastern States, though not investigated particularly, need not concern us, because they are known to be based upon the undue multiplication of some of the indigenous Eastern species which never acquire the destructive powers of the Western migratory forms.

On the whole, therefore, it is safe to conclude that, while there are several localities where locusts have been more or less destructive and required attention, there is no cause for widespread alarm and no reason to believe that any general injury will result in 1892. It will, however, be desirable to gather all the data possible as to the regions where eggs will be thickly laid, and especially to get further data from Manitoba and British North America. These data it is hoped may yet be obtained through the Canadian authorities, or possibly by some mutual arrangement with them, so that if it should be necessary to urge any particular action on Congress, it may be done during the coming winter.

One of the difficulties in sudden outbreaks of locust injury is that they find the farmers ill prepared to meet the attack. These injuries are almost always greatest in newly and thinly settled portions of the West, and the farmers, as a rule, even where they know how to deal with the insects, have not the means to buy the necessary supplies. The department has been applied to the present year for material assistance in the way of coal oil and sheet iron, but has no way of furnishing such material aid, which must be had of the State authorities where the emergency requires.

Cleaning Panama Hats.

To renovate white straw hats the following method has been recommended. Prepare two solutions as given—

NO. 1.

Sodium hyposulphite.....	G.	10
Glycerine.....	"	5
Alcohol.....	"	10
Water.....	"	75

NO. 2.

Citric acid.....	G.	2
Alcohol.....	"	10
Water.....	"	90

First sponge the straw hat with solution No. 1, and lay aside in a moist room (cellar) for twenty-four hours; then apply solution No. 2 and treat similarly as before. Finally the hat should be gone over with a flatiron, not too hot. If very dirty, the hat must be cleaned with some detergent and dried before beginning the bleaching operation.—*Western Druggist*.

Disappearing Lampposts.

An ingenious suggestion has been made to the Brussels authorities with regard to the electric lighting of their principal streets, and particularly of the Grand Place, in which the Hotel de Ville is situated. It has hitherto been objected to the plans for the electrical illumination of this square that the poles on which the lights were hung, and all proposed improvements in the lamps, were out of harmony with the surrounding architecture, which is of an exceedingly interesting character (many of the buildings being in the old style), and were apt to be an eyesore in the daytime. It is now proposed that the light shall be shed upon the square from tall steel standards which will be sunk in deepheaths underground in daylight and elevated by hydraulic pressure at dusk. Prizes of \$200 and \$100 are offered for the best design of lamppost.