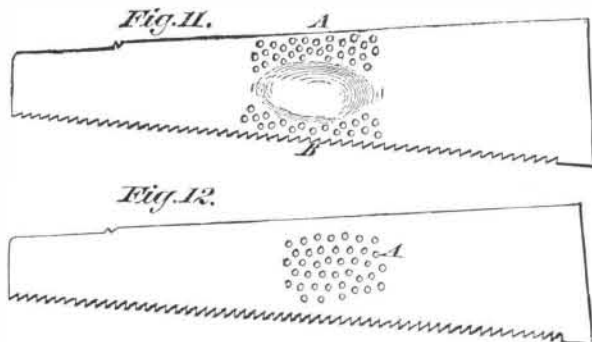


10, and he then bends the plate slightly backwards and forwards, the object of which is as follows: The defects in the

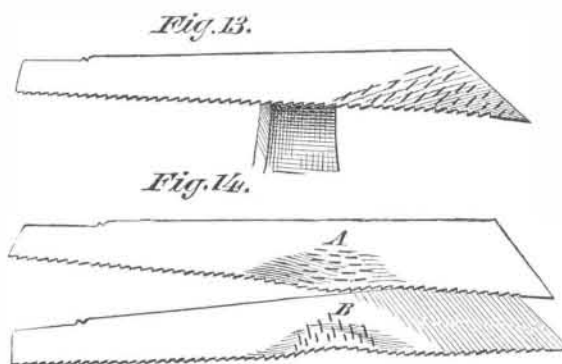


plate exist by reason of some part being either unduly expanded or contracted, thus creating undue local tension in one place, and removing the natural tension in another. The workman, when bending the plate backward and forward, finds that the loose place (or, in other words, the expanded part) moves easily, while the contracted part offers a resistance to the bending movement; so that, by noticing the amount of the movement during the bending, the workman discovers where the contracted part is, and he proceeds to remove it by stretching the blade in that spot. Thus while straightening the blade its tension is also equalized, giving to the plate a uniform resistance to its becoming bent or sprung. During the hammering process, the straight edge is frequently applied to the blade as a guide to test the work by. If, while attacking the necessary places, the saw blade does not lie solid upon the straightening block, the hammer will drum, as it is called; and the effect of the blow will be to stretch the outside skin of the saw blade, causing it to rise up because of its being elongated. Thus, were the blade to be hammered all over one face without bedding solid on the block, it would become bow-shaped, the face struck being the convex side.

In Fig. 11 is shown a saw blade having a loose place in the



middle, as denoted by the shade shown upon the face. The method of attack here would be to deliver the blows denoted by the marks shown at A and B, using the doghead hammer for the purpose. The parts so struck would be stretched, giving room for the loose place to flatten, and taking the undue tension from the outer surface and imparting it to the loose place, the saw becoming slightly elongated by the process. If, however, the bending process or test showed the contraction to be in the middle of the blade, the doghead would be used to deliver the blows shown in Fig. 12, at A, which would stretch the metal there, removing the contraction and equalizing the tension. Suppose, however, that the saw was atwist, as shown in Fig. 13: the method of attack



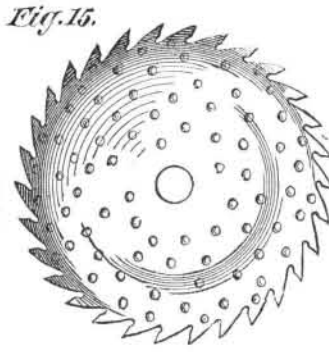
would be to take the blocking hammer, and deliver the blows denoted by the marks shown, using the hammer so that, while falling, it would travel laterally slightly from the workman. The blade would be placed upon the block with the drooping side downwards, because the effect of the blows of the blocking hammer is, as before noted, to lift the plate in front of them.

If one edge of the saw blade had a kink or wave in it, as shown in Fig. 14, the method of procedure would be as follows: The blade would be placed upon the block with the hollow side of the kink downwards, as shown in Fig. 14, and the blows shown at A would be delivered. The effect of these blows will be to stretch the metal of the plate, removing the tension behind the kink, and producing a tension tending to lift the part kinked. The plate is then turned

upside down, and the blows denoted by the marks shown in Fig. 14, at B, are delivered, which will remove the kink.

In performing any one of these operations new contractions or expansions of parts may be induced; and it not unfrequently happens that a kink and a twist, or a twist and a loose place, may be attacked at the same time. Numerous combinations of contracted or expanded places may of course exist in a blade, and the process for removing one may be modified or carried on in conjunction with that necessary to remove another; the principles employed, however, are in all cases those explained above, the application being varied to suit the circumstances.

In the edge view of Fig. 15 is shown a circular saw dish; and here it may be noted, that in this case as well as when the saw is out of straight, the first thing to do is to get the dish out, and afterwards proceed with the straightening. To remove the dish, the saw is placed upon the block with the concave side uppermost; and the blows are delivered with the doghead in the places denoted by the marks shown on the face view of the saw in Fig. 15. The testing of the saw is made by bending it, by sighting it, and by applying a straight edge to its surface. Some circular saws are too thick and strong to be easily bent, and in that case the bending test is omitted. If a circular saw is atwist or has a kink in it, the method of attack is the same as that already described for similar defects in hand or frame saws: except that, as before explained, a slight tension is left upon the outer diameter so as to allow for the expansion of the saw created by the centrifugal motion and force.



J. R.

## Communications.

### Our Washington Correspondence.

To the Editor of the Scientific American:

The letter of the Commissioner of Patents to the Secretary of the Interior on the general management of the Patent Office has been followed by a meeting of the different heads of bureaus of the Interior Department, for a general interchange and comparison of views and a discussion of the reports submitted by them upon the subject of civil service reform as applicable to the department. General Spear earnestly advocated the system of competitive examination, which prevailed in the Patent Office for several years before it was ignored by Secretary Chandler from the failure of Congress to provide means of paying the Civil Service Commission. It is to be hoped that competitive examination will again be the rule in making appointments, instead of the question as to a man's usefulness as a politician, as the examinations formerly made undoubtedly led to a great improvement in the examining corps during the time the system was in force. But in forming a new set of rules to govern the competitive examinations, should this system be adopted, those who will have the matter in charge should see that the questions asked the applicants have some connection with the duties they will be called on to perform. Under the old Civil Service Commission a large proportion of the queries asked would not have the least possible connection with Patent Office business, such, for instance, as geographical, historical, and astronomical questions, that would have been very proper if put to applicants for pedagogueships, but which could not, when answered correctly, give any indication as to the answerer's knowledge of mechanics or patent law. Such questions as these could be readily answered by young men just fresh from school; while old Patent Office examiners, who had learned these things in their youth, but in the course of acquiring the requisite knowledge of the classes of inventions under their charge had forgotten them, had, consequently, to take back seats, and see heedless youths who did not possess a tithe of their technical knowledge, and who in some cases actually knew nothing of the classes to which they were appointed, pass over their heads to higher positions.

Bids were to have been opened to-day at the Post Office department for supplying postal cards for four years from the first of May next. The advertisement required the bids to be for cards conformable to the sample furnished by the department, and this sample was one with different tints to the two faces—a buff and a pale green. A number of the leading paper manufacturers having represented to the Postmaster-General that this would virtually establish a monopoly in bidding, as but two or three manufacturers had the machinery necessary for this kind of paper, and that the result would be that the department would be compelled to pay a larger amount for the cards, the Postmaster-General decided to reject all bids, and to call for new proposals for a card such as can be made by any first class paper maker.

The Agricultural Department is continually troubled with applications for seed; but its distribution has ceased for the season, except to those districts of the West which were afflicted by grasshoppers in 1876, and for which a special appropriation was made by Congress a short time before the close of the session. Applications from other sections can-

not therefore be responded to, and parties outside of the grasshopper districts will save time and trouble by not making application.

Congress last session appropriated \$18,000 for the purpose of sending a commission to investigate the grasshopper plague, and suggest remedies for the relief of the suffering farmers whose crops have been yearly devastated by this rapacious insect. The President has appointed Professor C. V. Riley, State Entomologist of Missouri; Professor Cyrus Thomas, Entomologist of Illinois; and Professor Packard, of Salem, Mass., as the Commission. This action is the result of a conference held in Nebraska by the Governors and prominent men of the States and Territories interested, in which Professors Riley and Thomas each took a prominent part. The commission is an excellent one, and will probably make a report of great value. They propose to go as far west as the breeding places of the insect, and study its habits, and from them deduce a plan for its destruction, if possible. The Southern farmers are reported as grumbling at the neglect of their section, and ask: If the grasshopper is to be investigated, why should not the habits of the tobacco or cotton worm be examined by a commission also? They think they have as much right to a commission as the Western agriculturists.

Washington, D. C.

OCASIONAL.

[For the Scientific American.]

### IMPORTANT OBSERVATIONS ON THE ROCKY MOUNTAIN LOCUST, OR "GRASSHOPPER" PEST OF THE WEST.

BY PROFESSOR C. V. RILEY.

In a few weeks the ravages of the Rocky Mountain locust (*Scotoplanes spretus*) will, in all probability, be creating more attention than ever, as the area threatened by the young insects is larger than ever before, beginning in Southeastern Dakota, including the Southwestern half of Minnesota, the Western half of Iowa, 4 counties in Northwest and 12 in Southwest Missouri, Benton County in Arkansas, Texas from that point to the mouth of the Sabine river, thence along the Gulf to Austin, and more or less all the country west of these points to the mountains. In view of this probability, the following observations, which are largely extracted from my ninth report, now going through the press, and which are here recorded for the first time, will doubtless prove of interest to your large circle of readers: I propose to follow them with the results of a series of experiments on the eggs and the young insects, with a view of most effectually destroying them, which experiments these observations will render more intelligible.

#### DOES THE FEMALE FORM MORE THAN ONE EGG MASS?

Whether the female of our Rocky Mountain locust lays her full supply of eggs at once, and in one and the same hole, or whether she forms several pods at different periods, are questions often asked, but which have never been fully and definitely answered in entomological works. It is the rule with insects, particularly with the large number of injurious species belonging to the *lepidoptera*, that the eggs in the ovaries develop almost simultaneously, and that when oviposition once commences it is continued uninterruptedly until the supply of eggs is exhausted. Yet there are many notable exceptions to the rule among injurious species, as in the cases of the common plum curculio and the Colorado potato beetle, which oviposit at stated or irregular intervals during several weeks or even months. The Rocky Mountain locust belongs to this last category; and the most casual examination of the ovaries in a female taken in the act of ovipositing will show that, besides the fully formed eggs being then and there laid, there are other sets, diminishing in size, which are to be laid at future periods. This, I repeat, can be determined by any one who will take the trouble to examine a few females when laying. But just how often, or how many eggs each one lays, is more difficult to determine. With *spretus*, I have been able to make comparatively few experiments, but on three different occasions I obtained two pods from single females, laid at intervals of 18, 21, and 26 days respectively. I have, however, made extended experiments with its close congeners, *femur rubrum* and *Atlanis*, and in two cases with the former have obtained four different pods from one female, the laying covering periods of 58 and 62 days, and the total number of eggs laid being in one case 96, and in the other 110. A number of both species laid three times, but most of them—owing perhaps to their being confined—laid but twice. They couple with the male between each period, and I have no doubt but that, as in most other species of animals, there is great difference in the degree of individual prolificacy.

I have frequently counted upward of a hundred ova in the ovaries of *spretus*, and as the largest and most perfect pods seldom contain more than thirty, we may feel confident that the Rocky Mountain locust will sometimes form as many as four pods, and perhaps even still more.

The time required for drilling the hole and completing the pod will vary according to the season and the temperature. During the latter part of October, or early in November last year, when there was frost at night and the insects did not rouse from their chilled inactivity till 9 o'clock A.M., the females scarce had time to complete the process during the four or five warmer hours of the day; but with higher temperature not more than two or three hours would be required.

#### HOW THE EGGS ARE LAID.

The question as to how best to treat the soil, or to manage the eggs so as to most easily destroy their vitality, is a most