which our knowledge of these subjects is still fragmentary and imperfect, — points which are to be settled by direct experiment. Such experimental researches are of the highest value; and it is much to be regretted, that while the governments of England, France, and Germany, are employing their leading scientific men in such work, Congress has deliberately stopped a most promising series of investigation of this kind, and has resolved to confine its efforts to paying bills after an epidemic has made its appearance.

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

Use of the moxa in Japan.

As I rode behind the naked-backed jinriksha coolies, I noticed along each side of the spine, from the head to the hips, white, irregular scars, about the size of a dime, indicating, as I supposed, some skin-disease, to which they are very subject from their diet and exposure when young. These were the marks left by the *moxa*, a household remedy, probably invented in Japan, — a painful and powerful agent, well known in modern surgery. It is made of the pith of a reed (Artemisia), mixed with powdered charcoal, in a conical form. This is ignited, applied to the skin, and allowed to burn slowly until extinguished. The flesh is severely burned, with the resulting scar alluded to. As if this were not sufficient to expel the 'winds and vapors,' which they and the Chinese believe to be the cause of all diseases, this is combined with acupuncture, the needle passing through the moxa deeply into the tissues, and conveying the heat to the supposed seat of disease. As they employ this every spring as a preventive measure, it is rare to see a coolie without these scars. The accoucheur calls it to his aid, and is directed to burn three cones on the little toe of the right foot to accelerate the operation of nature. Even infants are thus tortured. A child about three years old, suffering from a wasting diarrhoea, who had thus been uselessly tormented, was brought to me; the many wraps having been removed, a simple water dressing and mild opiate brought the little creature round all right in two days. SAMUEL KNEELAND.

The least bittern in Newfoundland.

While on a recent visit to Newfoundland, I examined a mounted specimen of the least bittern (Ardetta exilis) that had been killed in a fresh-water marsh about a mile from St. John's, in the early part of October, 1882. The latitude of St. John's is 47° 33′ N., and it is hardly necessary to add that this species has not previously been recorded from so far north. C. HART MERRIAM, M.D.

Locust Grove, New York.

Science for workingmen.

Your article in the number of SCIENCE for April 20, upon this topic, was timely and suggestive. The example offered by the Baltimore and Ohio railroad is indeed worthy of imitation. But such work, however novel it may be in the east, has been done to a greater or less extent in this state for several years. It may interest your eastern readers, who sometimes think that we westerners must always wait for them in such matters, to know of a few attempts here to do similar work for the working-classes. Three years ago the officers of the St. Louis and San Francisco railroad maintained, with the hearty co-operation of its friends, a course of lectures in at least one important town on its line of road, for the special benefit of the railroad employees.

Two winters ago the Crystal plate-glass company, whose works, situated about thirty miles from this city, bring about them a population of nearly fifteen hundred, arranged a similar course of instruction lectures, which were attended by audiences of six and eight hundred persons.

The president of the St. Joe lead-mines at Bonne Terre, about seventy-five miles south-west of St. Louis, has just begun a like work, and intends to provide a good course of practical lectures, or talks upon science, literature, and travel, for the coming winter.

At Bonne Terre and at Crystal City, reading-rooms and libraries have been opened for all who choose to avail themselves of such opportunities; and at the former place a public reading from some standard author is given every Friday evening. The results attending such efforts to help working men and women have been sufficient to encourage these and other corporations to go on to still better things. The knowledge conveyed, and impulse given to thought and study, are only a part of the good done. A better relation between employers and employed is sure to come from the good feeling which prompts such action, and the grateful appreciation with which it is received.

Washington university is in this matter willing to take the position assumed by Johns Hopkins university in Baltimore, and has some half a dozen or so among its busy professors who are always ready to respond heartily to such calls for help. This institution has, in fact, been the main dependence of the corporations above mentioned in their efforts to do something to entertain and instruct their people.

We have accomplished but little here yet, but it may not be amiss to put ourselves on record as having begun. It helps us, always, to know what others are trying to do. M. S. SNOW.

Washington university, St. Louis, May 2.

Robins, sparrows, and earth-worms.

An amusing bit of impertinence on the part of the immigrant house-sparrow is seen in his habit of stealing earth-worms from our great lumbering, native American robin. As everybody knows, the robin is not a little skilful in extracting earth-worms from their burrows in land covered with short grass, as in pastures, lawns, and yards. The bird quickly detects the worm's head, as the creature lies resting near the mouth of its burrow, and seizes it instantly by a sudden blow with the beak. The head of the worm once firmly grasped, the robin straddles his legs apart, braces himself firmly, and gradually lifts his head to the uttermost, and thus slowly, by what is manifestly a powerful and a fatiguing effort, drags out the resisting worm. Having succeeded in an important enterprise, the bird very naturally pauses for a moment to take breath; and at this critical instant of time a sparrow steps forward, out of a squad of these birds which have been watching the robin's proceedings, quietly takes the worm from the robin's mouth, and incontinently flies away with it, leaving the original possessor in blank amazement. The transaction is well worth seeing for its own sake, and needs but to be looked for, in order to be seen frequently in and about our cities; and it suggests a question which may, perhaps, be profitably studied by the coming generation of naturalists. Indeed, the fact itself is worth putting upon record as a sort of bench-mark to serve as a point of comparison for observers in future years.

The fact being as stated, the question is, What is the tribe of robins going to do about it? It is idle to suppose that the whole race of robins will continue for long to 'get left' in this way, or that they will accept the sparrow's system of pillage as a finality, to be submitted to as a part of the fundamental plan of life in this best possible of worlds; and it will be of interest for future observers to notice in just what manner the conflicting interests of the two birds shall, in the fulness of time, have been composed. At least four lines of conduct would seem to be open to the robin: he might thwack the offending sparrow at the moment of his wrong-doing, or, indeed, all sparrows, both as a preliminary to the hunting of worms and on all convenient occasions, though these operations would doubtless be somewhat laborious; possibly he might learn to swallow the worm *instanter*, or perhaps even to fly away with it quickly enough to elude pursuit; or he may, in despair, wholly give up the pulling of worms. So far as my own observation goes, though it must be said that it has been confined to no great number of individual robins, it would seem as if no inkling of either of these plans has yet occurred to the suffering bird. In so far as I have myself seen, each particular robin, when thus defrauded, looks and behaves as if he did not clearly comprehend what had become of his worm; and he speedily goes in search of another, as if, on reflection, he had concluded that he must have himself swallowed the first. Meanwhile, a number of the sparrows who had flown off in chase of the first robber with intent to share his booty have returned, and are hanging around the robin in readiness for his second stroke. The probabilities that the robins will eventually find out some way of circumventing the thieving sparrows seem stronger when we reflect that it is probably only a very short time, comparatively speaking, since the robins began to pull earth-worms, anyway, and consider how thoroughly well they now do this work. To all appearances, a parcel of scattered robins hopping about in a pasture are attending to any thing but business. It is hard to believe, at first sight, that the birds are seriously searching for food; for each one of them is continually stopping and standing still in an apparently aimless way, as if distracted. In point of fact, the bird, when quiet, is intently watching for earth-worms in their burrows; and it is more than probable that he is not helped at this stage of proceedings by a group of sparrows hanging expectant about him. When the worm, or the place where the worm is, is perceived, the movements of the robin are sufficiently direct and forcible, as has just been stated. Inasmuch as there is good reason to believe that earth-worms were not to be found at all in this New-England country before its settlement, and that, even if they did exist, they were rare, it would seem that the robins must have learned the trick of capturing them within the last two hundred or two hundred and fifty years. Even if it be supposed that the earlier robins may have practised somewhat analogous movements with regard to certain kinds of insects or their larvae, it will still be reasonable to suppose that the first lesson, how to detect and pull the worm, must have been intrinsically harder than the one now before the robins of the period; viz., how to keep and hold the worm in spite of the pygmy sparrow. F. H. STORER.

Intelligence of the crow.

In SCIENCE, No. 13, is a letter with this title, which I read with much interest, for the story is a very pretty one, and it is too bad to disturb it; yet I can but think the writer mistaken in the bird, for he says, 'It seems that we had been strolling too near their nests in the walls.' Now, it is well known that crows do not build in walls or cliffs; and none of the crows which I have ever kept in confinement ever used their claws with which to carry either food or other materials. I kept a raven for several years, which had its liberty, but always came for food when called. I never saw it carry food or any thing else in its claws. I have known it to carry off its own rations, rob both dog and cat of theirs, making at *least* three pieces, all of which it carried away in its beak at once, never in its claws. During the summer of 1882 I was living near high wooded cliffs, on one of which this raven built a perfect nest. It seems to me your correspondent must be mistaken.

Dorchester, Mass. JOS. M. WADE.

Sun's radiation and geologic climate.

In saying that the hypothesis of a diminution of solar radiation through the dissipation of solar energy would be admitted by 'most students,' I did not intend to include myself, for I am really a dissenter. In my judgment, the weight of the cumulative geologic evidence for the great age of the earth is not counterpoised by the arguments thus far adduced from the physical side of the question. I therefore welcome Mr. Warring's note (SCIENCE, No. 14) in that it helps to show that the physical conditions involved in the discussion are not so simple as some have assumed them to be. Perhaps we may go a step farther, and say, that even if it is demonstrated that solar energy is being dissipated, and if it is demonstrated that in consequence of this dissipation the temperature of the sun is either falling or rising, the relative intensity of solar radiation still remains an unsolved problem. The rate of radiation is a function of other conditions besides temperature, and notably of the nature of the outer envelope of the sun. It is quite conceivable that changes in the envelope, belonging to the chemical history of the sun, might materially modify any law of variation based upon a theory of progressive dissipation of energy. This suggestion is, of course, without experimental basis; but in this respect it does not stand alone. Our laboratories fall so far short of realizing solar conditions, that solar physics and solar chemistry cannot be conceived without the aid of the imagination.

G. K. GILBERT.

Marking geodetic stations.

Of the many hundred Coast-survey stations that have been marked at different dates within the limits of the state of New York, only a very small percentage have now, or ever have had, surface-marks of any description, and but few of the underground marks can be recovered without re-measuring angles of the triangulation.

The manner of marking stations is apparently left to the judgment of the Coast-survey assistants. The writer of the manual 'On the field-work of triangulation,' issued by the Coast-survey, neglected to place surface-marks at several of the primary triangulation points occupied by himself in the vicinity of Albany.

A substantial surface-mark has been placed at every geodetic station of the New York state survey; and although some have been mutilated, so far as is known, none have been removed. The number of granite surface-marks that have been placed by the survey is at present three hundred and twenty-nine.

HORACE ANDREWS, Jun.,

Albany, May 12, 1883. *Assistant N. Y. state survey.*