unless the sirup be put into the cans in a very watery condition, the formation of a thick layer of crystals at the bottom invariably follows; and I have often seen great difficulty experienced in removing it without breaking the cans. J. EDWARD CHAPPEL.

Warsaw, N.Y., Dec. 14.

### International geological congress at Berlin.

On referring to the original notes which I took during the sessions of the International geological congress, I find that Mr. Archibald Geikie moved to strike out all the words after 'Coudroz' except 'l'Old Red,' in the paragraph (l. c., p. 15) of the report of the committee on uniformity of nomenclature, my account of which Dr. Dewalque criticises in *Science*, Dec. 11. Upon this, M. Renevier asked, 'on principle,' that the whole paragraph be struck out, on the ground that the congress ought not to go into such details. There is no mention in my rough notes that this was done; but in the fair copy, which I submitted to some of the leading members of the congress for their approval or correction, I find a pencil note to the effect that M. Renevier's motion was carried. I cannot recall the authority for this note, which was embodied in the short summary which, with the assistance of Professor Williams, I prepared for *Science*. I should like to state here, that in spite of the employment of the greatest possible care, and the assurances of the accuracy of the account of the meeting, which is about to appear in the *American journal of science and arts*, from some of the most active participants in the discussions, some errors, though I trust none of importance, will probably be found. To those who are aware of the exceedingly inferior acoustic qualities of the hall, and the involved nature of some of the discussions and votes, these will be thought pardonable. PERSIFOR FRAZER.

Philadelphia, Dec. 12.

### Earthquake-shocks more violent on the surface than in mines.

It has been sometimes observed that earthquake-shocks are felt more severely in mines than at the surface. This may be accounted for partly by the rapid decrease of the shock-motion (wave-height) which is supposed to vary inversely as the square of the distance from the focus or radius of the agitated sphere, partly by the quenching of the earth-wave by repeated reflections in passing through media of different elasticities, and by the fracturing of the imperfectly coherent media through which it passes. But the converse phenomenon, viz., the greater severity of shocks on the surface than in mines, is, I believe, far more common. This was very conspicuous in the Inyo earthquake of 1872; for buildings were shattered and the earth was broken in many places, and yet persons working in the mines were scarcely aware of any movement. The same has often been observed in Peru.

There are two ways in which I imagine this may be explained. The more obvious is as follows: As long as the earth-wave is within the earth, the back-and-forth movement (shock-movement) is largely restrained by the work of elastic compression of the earth in front necessary for the progress of the wave. But as soon as it reaches the surface the motion is free or unresisted, and therefore much more rapid, — so rapid as often to break up the surface, and throw loose lying bodies high into the air. But there is another explanation which is perhaps more doubtful, and which, therefore, I offer with some hesitation as a mere suggestion, in the hope that some one may be able either to follow it up or else to disprove it.

In the *Philosophical magazine* of June, 1849, p. 404, the royal astronomer, Professor Airy, drew attention to the peculiar phenomena of what he calls broken waves, or broken-headed waves. These are retarded, discontinuous waves; in other words, breakers. If a normal wave strike against a sea-wall, it will of course be reflected; but if a breaker, a broken or broken-headed wave, thus strike, the swell or unbroken part is reflected as usual, but the broken part is not. If it strike perpendicularly, the broken part is thrown up and destroyed. If it strike at small angle, then the broken part runs along as a strong wave clinging to the surface of the wall. I have myself observed this behavior of broken waves.

Professor Airy then applies this principle to the explanation of certain phenomena of whispering-galleries. The voice produces normal waves; but a hiss, a buzz, and therefore a whisper, produce broken, discontinuous waves. Now, in these galleries the voice is reflected in the ordinary way; but a whisper runs along, clinging to the surface of the wall and dome, and may be heard, if the ear be applied to the wall, at much greater distance than the much louder voice.

Now, may not this principle be applied also to earthquake-waves? 1°. The surface of the earth must be regarded as a very perfect reflection for waves emerging from below; as much so, in fact, as for sound-waves entering the earth from the air. Therefore normal waves emerging on the surface must be largely reflected back into the earth again. 2°. But earthquakes are pre-eminently broken, retarded, discontinuous waves. Passing, as they do, through an imperfectly elastic and slightly coherent medium, which is fissured and crushed at every step of its progress, the normal continuity of the waves is destroyed, and the waves retarded and their energy dissipated, by change into other forms of force, especially heat. For this reason the velocity of heavy earthquake-waves is always much less than that of normal elastic waves in the same medium. For this reason, too, they are rapidly quenched, and therefore extend much less distance than they otherwise would. 3°. If, then, we assume that earthquake-waves are broken and retarded waves, they ought to follow the law pointed out by Professor Airy. When they strike full on the surface, as at the epicentrum, they simply destroy themselves by the work of breaking the surface, and are not reflected. When they strike at small angle, as at a distance from epicentrum, they must run along as a strong wave clinging to the surface. JOSEPH LE CONTE.

Berkeley, Cal., Dec. 5.

### An unreliable treatise on disinfectants.

That 'unreliable treatise on disinfectants' criticised by you Dec. 4, deserves even less mercy than you have shown it. When the publisher declares that there is no indorsement of the essays as scientific, and the one selected as the best is chosen as a standard of the excellence of the work as a whole, all persons in the least familiar with the present position of sanitary science must wonder why the

volume ever saw the light. Mr. Benjamin's article was singled out by Messrs. Lattimore and Remington as worthy of the first prize, probably because of the following 'practical and otherwise valuable' information which it contains: "All that is required to immediately purify and sweeten a contaminated air-supply, however originated, is to dip a cloth in the liquid (a solution of nitrate of lead and common salt), and hang it up in the apartment." Or perhaps they thought sulphate of iron, charcoal, and table salt were of much greater value than chlorinated lime, mercuric chloride, or mercuric iodide. Their fathers thought so, and therefore the new-fangled notions of bacteriologists must be disregarded as unscientific and impractical. They believed that Dr. Baker's special training as a physician, and his experience as founder of the state board of health of Michigan, as well as member of the committee on disinfectants of the National board of health, unfitted him as a judge of such matters. In spite of his earnest protests, they insisted upon giving the first prize to a paper which he declared was unworthy any prize. Their special training as analytical and pharmaceutical chemists fitted them for just such work, because they knew nothing of Pasteur or Magnin, Koch or Miguel, Sternberg or Klein, other than they happened to see in the *Rochester post* or *Philadelphia ledger*.

G.

Brooklyn, Dec. 11.

## The English sparrow.

The despised sparrow is entitled to a good word if he can secure it. He has come to stay, and no amount of vituperation will displace him. 'He is too many,' and has spread over too large a portion of the union. The sparrows crossed the Mississippi River at Clinton, Io., about 1875, and have increased largely. They confine themselves principally to the railroad buildings and some of the business blocks, though they occasionally nest on private houses.

When this town was founded, twenty-five years ago, there were no trees or shrubbery near, and consequently few birds. Now the town looks like a forest in the distance. The consequence is that robins, thrushes, orioles, blackbirds, bluebirds, and many other birds, are very numerous, and seem to be increasing. Numbers of blue jays nest in the shade-trees, and stay with us during winter. The sparrows have never seemed to drive any away, as each year more nests of summer birds have been observed. They confine themselves to the open spaces and streets, and do not nest or frequent the trees or shrubbery. They have never been observed in the fields outside of town, and do no injury to fruit or seeds in gardens. They live largely on insects, as has been shown by examining their crops. In winter they are mainly dependent on the seeds and grains they can pick up. They fall victims to the jays and the butcher birds, but a crowd of them makes a good fight against the aggressors. There are millions of them in every large town, on the railroads of this state, and there is no way of exterminating them, and no wish to on the part of unprejudiced people. There is no law for their protection in this state, only a general friendliness toward them as toward all small birds.

P. J. FARNSWORTH.

Clinton, Io., Dec. 10.

It must be admitted that the English house-sparrow will eat seeds and fruit, but it should be remembered that the young sparrows are fed chiefly on insects and caterpillars; and a good English authority (Yarrell) observes that "so great is the number of these consumed by the parent birds and their successive broods of young, that it is a question whether the benefit thus performed is not an equivalent even for the grain and seeds eaten by the adult birds at other seasons of the year."

Dr. Elliott Coues, in his notes to Stearns' 'New England birds,' advocates the extermination of the English sparrow, and calls it 'the parasite.' This is not a translation of its scientific name, Passer domesticus, and does not accord with any known habit of the birds in question. Dr. Coues has no fault to find with a native tree-sparrow (Spizella monticola), which he says exists in large quantities, and feeds only on grain and seeds. All specimens shot by Dr. Coues had their crops full of seeds.

The sparrows which damage the crops and orchards in England are another species, called the field-sparrow. I have seen these in flocks of over a thousand rise at one time from a field of grain. This is, I presume, the bird described by Dr. Coues as Passer montanus. He states they are now found in New England, but I never heard of their having been imported.

I rather doubt the stories about the English sparrows molesting the bluebirds at breeding time. It is well known that most birds are very pugnacious at this period, and I am personally acquainted with the fact that bluebirds are particularly courageous at this season. On one occasion a bluebird made its nest in my garden, in the hollow of a tree, about six feet from the ground. One day, when busy inspecting the nest, I received a violent blow on the side of the head, and, on looking up, saw the parent bluebird flying away. I found that whenever I placed my hand in the nest, I was attacked in this manner. I apprehend, that, if a bluebird will attack a man in defence of its nest, it is not likely that a sparrow would do so with impunity.

I notice that Dr. Bechstein, in his standard work on birds, published as one of Bohn's library, states, that although the house-sparrow has no song, he can be educated to sing equal to the canary. I was also surprised to find in the same work (p. 249) that the house-sparrow could be taught to speak: it mentions a clergyman of Paris who had two of these birds which could repeat the fourth, fifth, sixth, and seventh commandments. It is gravely stated that when these birds quarrelled over their food, "one of them would admonish the other with the remark, 'Tu ne voleras pas.'"

Giving due credit to the house-sparrow for all his accomplishments, I fear he can speak the French language only in fable.

JOHN MICHELS.

New York, Dec. 10.

## The temperature of the moon.

Now that the temperature of the moon has become a subject of investigation with the aid of recent refinements in the methods of observing very small intensities of heat radiation, it may be well to also look at the matter from another stand-point.

The condition which determines the static mean temperature of the whole mass of the moon is, that its rate of losing heat by radiation from its surface shall be exactly equal to the rate with which it receives and absorbs the heat radiated from the sun,