wasp's flight started from a crotch in a limb, it is possible that the locust was left in the crotch. The whole incident showed a perfect understanding, on the part of the wasp, of what he proposed to do, and the carrying-out of a preconceived plan of procedure without any stopping to think what he would do next. The only pauses were in going up the trunk of the tree.

C. G. ROCKWOOD, JR.

New York, Aug. 11.

### A Good Word.

I SEE by your last issue that the Teachers' National Association indorsed the Blair bill. I am sorry to learn of this, as I think that bill is an imposition upon the intelligence of the people of this country.

In the first place, any State that cannot support schools in which to educate its children must be poor indeed; and, in the second place, any State that would accept national aid has not the spirit necessary to a sound government. We can plainly see where the most of that aid would go, and we do not feel like sending it into those States. I am aware that many will deem me unjust; but, be that as it may, I would never consent to the Blair bill, and I am sorry that my fellow-teachers ever gave their indorsement to such a bill, as by so doing it may have some weight in the future; but then teachers are only mortals, and many of them seem to have very poor judgment.

I am glad to see the position that *Science* takes in this matter, and you may rest assured that I shall be a life subscriber to that paper. I consider it the best paper published in this country for any advanced teacher or scientific man. I wish you the best of success.

JAMES LAWREY.

Fremont City, Io., Aug. 8.

### The Formation and Dissipation of Sea-Water Ice.

SEA-WATER possesses several characteristics that make the operation of freezing different from that in the case of fresh water.

The density of sea-water increasing till the freezing-point is reached, it follows that its conversion into ice will take place beneath, instead of at the surface as in the case of fresh water. The freezing-point in most cases, then, should be situated near the bottom of the column of water, if not actually at it.

In equal thicknesses of fresh and sea water ice, two inches of the first will support a greater weight, without fracture, than an equal thickness of the latter; although it is quite possible, that, where greater thicknesses are concerned, the advantage may be in the opposite direction.

Sea-water ice is much less 'brittle' than that of fresh water; rising and falling under the influence of a heavy sea, and adapting itself to its undulations, in cases where fresh-water ice would be fractured: this is particularly noticeable in the earlier stages of its formation.

An inch of newly formed sea-water ice will not support a man's weight, and, in giving way beneath him, does so abruptly, without any warning preliminary fissures, leaving a cleanly cut hole of the same extent as the surface over which direct pressure was administered, and thus differs from fresh-water ice, which, on being fractured in this way, carries down a large portion of the surface beyond the area directly under pressure. We may therefore conclude that the cohesion amongst the particles in fresh-water ice is greater than in the case of sea-water, and possibly that the arrangement of the ice-crystals is different in each. Those in the case of fresh water, forming horizontally at the surface, overlap and bind each other together, whilst those from sea-water would seem to arrange themselves vertically, as a comparison of the fractures in each case will show.

The formation of a film of ice over a sheet of sea-water takes place indifferently, as to position, during calm weather; but, with a light breeze blowing, the permanent formation commences at the windward shore; narrow and rapidly lengthening 'streamers' form from the points of this shore; continuing, and growing very slowly narrower as it does so, it may reach a length of from four hundred to five hundred yards; then parallel streamers combine, till at last the entire surface is covered. A great peculiarity of the proceeding is the extreme narrowness of these streamers in comparison to their great length, and the consequently great cohesion that is capable of overcoming the strain that must be caused by even a light wind blowing over so lengthy a surface, whilst it is rising and falling to the pronounced ripple on the water's surface.

Recently formed sea-water ice is not of uniform texture throughout its depth. A section of four inches would be represented by a thin layer of partially decomposed ice, looking very much like thoroughly saturated snow; then about two inches of 'sodden' ice, occupying a condition intermediate between that of the surface film and fully formed ice, both in consistency and appearance; and, finally, the fully formed ice, having every appearance of fresh-water ice. These differences in the several strata of the ice do not continue, once the temperature of the air becomes very much lower than that of the water's freezing-point.

When the ice is first formed in tidal waters, that portion of it which is left aground above low-water mark freezes to the bottom (the temperature of the air being supposed to be below the water's freezing-point); so that, on the water rising again, it is left there, submerged. Over this, at the surface of the water, another ice-film is formed, which, on reaching the level of the submerged ice, is frozen to and remains with it in this position. This operation is repeated, till the result is, that a perpendicular wall of ice forms, whose outer limit is the low-water mark, terminated by a horizontal surface shorewards at the limit of high-water mark. The outcome of this peculiarity is, that the shore outline in winter undergoes a complete transformation, of more or less extent in accordance with the difference existing between high and low water mark. In the case of a mud or sand bottom, the ice, though freezing to it, possesses sufficient buoyancy to raise a film of mud or sand with it each time, till it is of sufficient thickness to counteract this tendency.

The explanation of this phenomenon seems to me to be as follows: in the first place, it is essential that the temperature of the air should be below the freezing-point of the water; and, in the next place, it is evident that the temperature of the earth forming the bottom must be above the freezing-point, else ice would form there; still, it need not be much above it, as the water, being very nearly at the temperature of its freezing-point, would reduce the surface of the bottom to that point, less the increase in temperature consequent on the convection of the earth's heat to that surface. The freezing-point of sea-water being 26°.7, the melting-point of sea-water ice 28°.8 (*Science*, ix. No. 228, x. No. 232), then, if the temperature of the bottom lies between these values, we can understand, that, when the formed ice is placed in contact with it by the falling tide, the temperature of the air reduces that of the water which is running off the ice as the tide leaves it, so that it freezes and cements the ice to the bottom. To free it again requires that the temperature of either the air or the water should rise above 28°.8, which, with the water at 26°.7 and the atmosphere below this point, is not possible: therefore our ice remains fast to the bottom.

Fresh water freezing, and its ice melting, at the same temperature, it cannot possibly freeze to the bottom; for, granting that the temperature of the water may be 32°, that of the bottom must be above, both on account of the water in contact with it being at a higher temperature than this, and because, even if we assume the temperature at 32° throughout, that of the bottom must be above this, owing to convection, as before stated. Anchor-ice does form in fresh water, but not on the bottom proper, as it attaches itself to bowlders or pebbles which are not themselves in perfectly continuous connection with the bottom proper, and are therefore largely surrounded by the water, and correspondingly affected by its temperature, whilst insensibly affected by convection; so that, if we can assume conditions under which the water's temperature would be below the freezing-point, we have those cases in which anchor-ice will form.

On account of the position of the freezing-point in a column of sea-water, it is possible, under certain conditions, for two films of ice to form, one below the other. This was actually observed to have taken place under the following conditions: the temperature

of the water at its surface had been 29° for some days, when a very rapid and extensive fall in the temperature of the air took place; the following morning a film of ice half an inch thick had formed beneath the surface, and had become fixed in position at the under surface of the harbor-ice, whilst another film a quarter of an inch thick had formed at the surface of the water, leaving a space between them of about four and one-half feet.

The dissipation of sea-water ice by the approach of spring takes place at first much more rapidly from the upper than the under surface, the atmosphere reaching the required temperature so much sooner than the water. No sensible effect had been produced by the water till its temperature exceeded 29°, when a loss of transparency and vertical stratification of the ice became visible as the first signs of its dissipation from beneath. In the mean time, of a total thickness of four and one-half feet, eight inches of the upper surface had been dissipated. W. A. ASHE.

The Observatory, Quebec, July 29.

### The Florida Heron.

MR. SHUFELDT'S article on the wanton destruction of our heronries I found decidedly depressing reading. As an eye-witness, he was able to give graphic pictures of both life and death. There is perhaps no bird more beautiful, and at the same time more harmless to mankind. Indeed, it is its wonderful beauty that brings its cruel death; and the lack of fear and cunning, being never engaged in mean work, makes it all too easy for the barbarous murderer to approach. The heron is unfortunate. Nature has given it what human vanity makes valuable; and as only death can bring this beauty within reach of the hard-hearted wretches, whom money will induce to do many revolting things, the poor bird must die. If this were the only instance of the kind, it would be yet more painful to our better natures, and those who are guilty of the outrage would seem to us more blameworthy. In truth, it is the trivial use to which the heron's plumes are put that makes the act of getting them so detestable. The taste which calls for them is that of creatures not yet developed to the highest form. Would a bird's feather of any kind add to Venus de Medici? Yet feathers, even those of a buzzard's tail, would adorn an Indian female. When we contemplate any young lady of our age and generation, whose head is so covered with feathers that the only part of the impression the memory retains is that of the curiously combined mass of bird-plunder, we are apt to be led to reflections which it would be cruelty to the good-intentioned girl to make known to her. If the gentle creature is really beautiful, that beauty cannot be adorned, except from within. Any attempt to add to it externally by bright-colored ribbons, flashing jewelry, or plumage, is always shocking to refined minds. If beauty is lacking, the use of accessories to make up what nature has denied is quite certain to excite contempt or compassion.

The truly hideous practice, in vogue a few years ago, of wearing the bodies of birds on the head, seems to have been too much, even for the calloused sensibilities of people of fashion. To be attacked by hungry cats, or to see the famous myth of a spring chicken on Biddy's proudly erect head, was too unpleasant. That there was any sentiment about it is not easily conceivable. The silent woods and meadows did not trouble the dissipated young female of the city. She must be in the fashion, or she must die; and, if she reasoned at all, it was to the effect that it were better that birds should die than that she should give up her slavish ghost.

The fate of the heron is plain. After the slaughter has continued until only here and there a shy one can be found, they will probably assemble in convention, and migrate, to be seen by us no more.

It would be idle to legislate, for only hunters know the way to their resorts, and the former would hardly do for constables. The very habits of a hunter would make it impossible to catch him at it; and, as he likes the sport too well, it would not be practicable to try bribery. The horrible evil will have to be put up with until fashion shall dictate something to take the place of the matchlessly beautiful plumage, or until the frightfully persecuted bird takes itself to remote regions impossible of access to man.

This topic has occupied my mind at times for many years, and I have mourned over the fate of the harmless denizens of our glades; but I have never been able to form a plan of hinderance that did not soon prove impracticable. I have submitted with a sigh which sometimes became almost a groan. My experience will, I fear, have to be that of all who become interested in the subject. The few words which I have brought together here may be of use in checking the abominable fashion: otherwise they are useless.

L. R. PEET.

Yalaha, Fla., Aug. 11.

### Answers.

12. MOSQUITOES. — In *Science* for Aug. 5, 'T. J. H.' queries concerning the re-appearance of mosquitoes on Staten Island seven days after a storm. Though I have made some notes in reference to *Culex* from time to time, this fact has never been observed. Storms are always disastrous to insect-life, and will kill or blow away moths and butterflies, as well as mosquitoes; but that these latter insects should re-appear in numbers seven days after a storm, will depend entirely upon whether the majority of the pupæ have reached maturity or not at that time. Mosquitoes are present in numbers all summer on the salt meadows, — indeed, I have scooped with my two hands together hundreds of their larvæ from the little pools, — but it is only at intervals of about a month that they swarm on the upland. During the latter week in May or first week in June, and the first days of July and August, I have noted swarms of mosquitoes in past years. The worst visitation of all is likely to be the July one, or at least it has been generally so. On low ground and near the meadows I have seen horses in July dressed in garments made for the occasion, and others decked with a profusion of wild indigo, that shook violently as they trotted along. The older residents remember well the mosquito visitation of July 3, 1862, when the vegetables were left unpicked in the garden for a week, and people wore mosquito-net over their hats.

WM. T. DAVIS.

Tompkinsville, Staten Island, Aug. 9.

13. ELECTRICITY AND THE EARTH. — In your issue of Aug. 5, Mr. M. A. Veeder points out some passages in Deschanel's text-book of physics, which he takes to imply that moist air is a good conductor of electricity, and that the earth is a reservoir of electricity; and then he asks, "Has Deschanel been superseded?" I do not happen to have the book referred to at hand, but it does not matter. It is true enough that one may complete an electric circuit through the earth, or through any part of it, when there is proper conducting-material at the wire terminals, not otherwise. The earth, in such case, acts solely like a return wire to complete the electric circuit, and its sole function is conductivity between points that differ in electric potential. As most of the earth's surface is made of conducting-materials, one may make connections for conduction almost anywhere, and it is a great convenience to be able to do so; but it does not follow that the earth stores up any electricity at all, so that it might be called a 'reservoir.' Electricity is but a transient phenomenon, and, when it does work in no other way, is changed at once into heat, in the earth as well as anywhere else. It is therefore improper and misleading to speak of the earth as a reservoir of electricity. As to the effect of a damp atmosphere upon electrical machines, it is well enough known that if means be provided for preventing the deposition of moisture upon the surface of such machines, by heating or otherwise, the machines may be kept electrified for an indefinite time. The electricity generated creeps over the damp surfaces of wood or wax or varnish to the earth, not through the air, whether moist or not. If moist air were a good conductor of electricity, or if it were one of the best conductors, as was stated by Mr. Garriott, it is highly probable that telegraph companies would have found it out long ago, and have had to insulate the wire from the air, instead of which they find it only necessary to insulate from the posts upon which the wires are hung. There is nothing new or strange about these things, except it be, that, having been patent to all for so long a time, they should be unknown to any who are pretentious enough to criticise the labors of those who work according to knowledge, and at the same time evolve out of their consciousness a theory unsupported by a single experiment, and directly contradicted by all we do know.

A. E. DOLBEAR.

New York, Aug. 12.