Correspondence.

A Correction.

To the Editor of the Scientific American:

In your recent notice of "Food Adulteration," by Dr. Battershall, you designate that gentleman as chemist in charge of the U. S. laboratory at this port. As I have held such position for the past seven years, and still hold it, and as the error, though inadvertent, may be misleading, I beg that you will correct it.

EDWARD SHERER, Chemist in Charge.

U. S. Laboratory, Port of New York, Appraiser's Office, 402 Washington Street, October 12, 1887.

Self-mending Insects and Snakes.

To the Editor of the Scientific American:

In the "Correspondence" department of September 24 was a communication from Oliver White, secretary of the Peoria, Illinois, Scientific Association, headed "Self-mending Snakes," in which he relates of breaking one of these reptiles into pieces from one to two inches long, from the anus to the tip of his tail—two-thirds of the whole length of the way—then placing a cage over him. On returning to the place twenty-four hours after, the snake was there, sound and whole, in full length.

A similar operation is performed by the insect known as the earwig. One resting on a board was cut in two with a knife, when the head half crawled away about a foot, and, after making a circuit, came back to the tail half, butted against it, and was again united with it, when the severed insect became whole—a perfect, living, moving object. Can you or any of your readers, Mr. Editor, give me a scientific reason for or an explanation of this most marvelous operation of the self-mending snake and the earwig? Are there any other insects, reptiles, or living objects that do the same?

CHARLES MARSEILLES.

Exeter, N. H.

In the "glass snake" and other low orders of life, repair is usually by *primary adhesion*, by *scabbing*, or more rarely *immediate union;* or it may, in a sense, be a medium between the two former. Creatures with three-chambered hearts and sluggish (cold) circulation retain vitality in severed tissue much longer than those possessed of a four-chambered heart and quick, warm circulation; and to even greater extent is this true of white-blooded insects, without complete circulatory apparatus. Here reparative material is poured out, undergoing changes similar to those in primary adhesion; and the wound cicatrizes rapidly beneath the scab formed by the highly plastic serum of the blood effused on the surface, and which coagulates with extreme rapidity and firmness in the lower orders of creatures. The scab affords support, the embryo cells with the plastic lymph being the medium of repair. The process is identical in all grades of life, and in all tissues, whether bone, muscle, integument, tendon, capillaries or nerves, and depends solely upon the blood supply and the capability of the nervous system to provide this nourishment. Severed fingers have successfully been reunited to the hand in the human subject; bits of muscle, integument, or scalp grafted; teeth transplanted; and even the spurs made to grow in the comb of the same barnyard cock. The processes are precisely the same as in the reunion of a severed portion in reptiles or insects when the latter are led by instinct to approximate the separated portions of their economies, and to await the exudation and "sealing" that will insure permanent union. The exudation about the wound gives support, exactly as the "provisional callous" forms a false splint holding the bone in place until reparative processes shall reunite the fractured surfaces. Had the *opheosaurus* of Mr. White been reunited *without* exhibiting traces of the injury, we might be justified in deeming it phenomenal, or in believing the gentleman had been unconsciously deceived; but under the circumstance, he narrates nothing but what is an every day physiological occurrence, curious only as the severed digit, when replaced and healed, is curious! But withal his observation is valuable, since it adds one more link to the chain that must eventually strangle superstition, and silence "doubting Thomases" possessed of narrow minds, and race egoism, that can conceive of nothing less than *man* as an object of nature's fostering care.

G. ARCHIE STOCKWELL, M.D., F.Z.S.

Port Huron, Michigan.

River and Harbor Improvement.

At a recent meeting of the Engineers' Club of Philadelphia, Prof. L. M. Haupt suggested a plan whereby he proposed to create a channel, sufficient to meet the demands of commerce, upon the following principles:

1. If the *bottom velocity* of a stream be increased to the limit required by the character of the material forming its bed, it will scour; if diminished, it will deposit.

2. If the *momentum* of a stream be suddenly arrested by an obstruction placed in its path, a reaction will be produced, its head will be increased, and the bottom will be scoured out.

3. If the *volume* of a stream be partially deflected by a trailing wall, from one side of a cross-over bar to the opposite side, the current over the bar will be quickened, and the crest lowered, above the line of the works.

4. If the *form* of the cross section of a stream be modified by cutting at one point and filling at another point of the same section, so that the area is not changed, other things being equal, the discharge will not be materially affected, and the part so deepened will remain open.

5. If a stream be compressed laterally into a smaller section, its velocity head near the banks will be increased, while that at the center will be diminished, and consequently the channel will be bifurcated and the deepest water be found near shore.

If, by the application of these laws of flowing water, a channel, sufficiently wide and deep for navigation, be cut across a bar, it will be self-sustaining, and cost much less than if the entire bar were disturbed by the usual lateral dikes or by dredging.

Automatic Car Couplers.

At the convention of the Master Car Builders at Minneapolis, last summer, the committee on automatic freight car couplers made their report, from which we take the following:

It has long been thought absolutely necessary that there should be a considerable amount of loose slack in the coupling of cars to enable the starting of trains; and while it has been tacitly admitted that there were some disadvantages incident to the presence of this slack, due to its tendency to break drawbars and draught rigging in starting and stopping trains and in pulling through sags and hollows in the track, it was never realized what an enormous evil the presence of this slack became on long trains until these trials were made. It was then found that the shocks were so terrific that it was absolutely necessary to block the links; without blocking it was impossible to live in the rear car. Stock could not stand on their feet in such a train, or freight be prevented from shifting except in the case where brakes were applied to each car by electricity. There was only one train brake present wherein the brakes were applied in this way, and even with this brake it was found necessary to block the links in making the break-away tests, as it was then impossible to use electricity on the rear portion of the train. At best this special train could not be considered as representing the usual conditions of service, because the cars were all of one standard and were all new and in perfect order. If the train had been made up miscellaneously of home and foreign and old and new cars, as is usual in service, it is fair to assume that the absence of shocks would not have been so apparent. The tests therefore conclusively show that power train brakes cannot be successfully introduced unless close couplings are used, except in the case where they are applied electrically to every car in the train, and no break-aways are expected. The presence of loose slack having been found to be so dangerous at Burlington (1887), the brake committee determined to dispense with it in so far as possible in making their tests. Before doing so they ascertained by actual experiment whether its substitution by spring slack would prevent the starting of an equal number of cars, as was generally believed. In this special test they demonstrated, both by observation and dynamometer car records, that the severest pull on the engine comes immediately after all the cars in the train have started, and that an engine will start more cars than it can pull; loose slack and spring slack were both shown to assist in moving the train for the first few feet, but the heavy pull on the engine comes after the slack is all out of the train. They found that there was very little difference between the ability of an engine to start a train with loose links or links blocked. Going up a grade of 53 feet to the mile, it was found that a train could be started with greater ease with the links blocked than with the links loose; this was due to the fact that with the loose coupled train the engine would have had to start up cautiously in order to prevent the train from breaking in two from the jerks that would follow before all of the slack was taken up. With a close coupled train this care was not necessary, there being no loose slack, and it was possible to start with a wide open throttle. It was also found that the riding of the train was very much improved by the close couplings, as might have been expected from our experience with passenger cars. It should be remarked here that no form of couplings, loose or closed, entirely abolish shocks of stopping in emergencies by train brakes, unless they are electrically applied, but that close couplings are vastly more advantageous than loose couplings; they cushion the shock and prevent the sharp and distinct blows found with loose couplings. A complete elimination of shocks is a question of brakes, not of couplers.

We have now, therefore, reached the point in the solution of this problem where we can say that the question which presented itself at this time last year with reference to the value of slack has been decided, and that consequently the choice for this association to make is again narrowed down by a great step from between the loose link and the hooks coupling vertically to the best sub-types of the hooks.

The adoption throughout the United States and Canada of any single individual coupler which would not interchange with any others we would consider most disadvantageous, for the reason previously set forth; neither could your committee recommend any coupler as the best, and we further think it would be impossible for the railroads to agree upon one coupler.

The Janney type of coupler, including the Janney, Dowling, Thurmond, and we think ultimately the Barnes and Hien, is the type to which the evolution of the subject has brought us; it affords a close coupling with spring slack; it makes it possible to use power train brakes; it already includes several couplers and opens the door to more, so that no railroad company is restricted to purchasing from one manufacturer; it incorporates more of the practical requirements of a perfect automatic train connection than any other type or form of coupling. It is not a new, unknown, and untried coupler, It has been used in the Janney form very extensively on some of our largest roads in the North and West, and in the Thurmond form in the South. Its most serious defect is in strength, and the question that now presents itself is, "Can this defect be remedied?" We consider that it can, and the further development of the problem must be in this direction, and what we say here on the subject of strength is applicable to all forms of couplers, no matter of what type. This development can be accomplished by following three paths: First, increase the dimensions; second, improve the character of the material; third, protect the coupler by dead woods or, better still, spring buffers. The development in the line of the first path must stop before interchangeability is destroyed. This limit, except possibly in some minor details, has practically been reached. In the second path, much remains to be done. Its advance has already been marked by transitions from cast to malleable and wrought iron, and in some cases from malleable iron to cast steel. Experiments are now being made on a large scale with manganese steel, and we are hopeful that the general attention being given to the improvement of material will result in valuable discoveries. The third path, protection, promises the most important benefits, although we believe all three paths should be followed. It is daily becoming more apparent that we cannot consistently expect the small, detail parts of a coupler to act as a buffer between such ponderous bodies as heavily loaded freight cars brought in sudden conjunction. Though these parts are designed to operate together in forming a coupling, they cannot successfully perform this function in a satisfactory manner and be the first to receive the whole force of the blows of service. These shocks should be received immediately upon that portion of the car strongest to resist them—the end sills, backed by all the floor framing in the car. Another line of development which should be mentioned here is the simplifying and standardizing of the levers, rods, and chains used for operating the various forms of couplers.

Your committee feels that the status of the problem at the present time, as here stated, warrants them in making the recommendation that this association recommend as a standard form of coupling the Janney type of coupler.

There is an urgent necessity that the association should act at this time, either in the line that your committee has recommended or in some other. Railroads have reached a point where there is an absolute need for an automatic train coupler; it is vividly apparent that a coupler must be introduced to save the life and limb of the employes; decrease the cost of operation by enabling the use of power train brakes; to do away with the shocks of stopping and starting, and to eliminate the damages of bunching trains in sags and hollows. The public demands it, the safety of the train men demands it, and the economical operation of railroads demands it.

In view of the facts already mentioned, that the best type of coupler is still undergoing development in matters of strength and simplicity, and that may railroads are not ready to adopt it until it is better perfected, your committee would further recommend the continuance or use of the Marks, Ames, and McKeen couplers as the best representatives of the loose couplers.

Walnuts as Food for Turkeys.

A writer in a London paper says under this head: I stated last week that in former days tame turkeys were fed with walnuts to give them the taste of wild turkeys. In Italy turkeys are always fattened with walnuts. Thirty days before a turkey is to be killed, one walnut is stuffed down his throat. Each day he is given an additional walnut, and on the twenty-ninth day he has twenty-nine walnuts. He is then immensely fat. I have often wondered, adds the writer, why our turkey breeders do not adopt this plan.