Correspondence.

A Lead Boring Insect.

To the Editor of the Scientific American :

Eighteen months ago a tank was lined here with 4-pound sheet lead, and after being in use about six months the owner was troubled by its leaking. On examination two small holes were found, supposed to be made by nails; these were repaired, but after a short time it leaked again, and another hole was found. So I tore off a small piece of the lead, and found that the holes had been eaten through both the wood and *lead* by a small insect, of which I send you a specimen. As I have had twenty-five years' experience in plumbing, and never before heard or knew of anything of the kind, I thought it might be interesting and also instructive to your numerous readers if you could give some information on the subject. WM. F. ASHENHURST.

Little Falls, N. Y., May 16, 1884.

Ans.—The insect referred to in Mr. Ashenhurst's communication proves to be *Phymatodes dimidiatus*, Kirby (family Cerambycidæ or longicorn beetles), which in the larva state infests the oak. Several insects of various orders, but more especially coleoptera and their larvæ, are known to bore through lead or other soft metal if forced to do so, but the fact is not of common occurrence. In the case related by Mr. Ashenhurst, the larva of the *Phymatodes* lived in the wood of the tank before this last was made, and the beetle in order to make its way out had to eat through the lining sheet of lead. The duration of the larval state of many longicorn beetles exceeds two or even more years, and it is, therefore, not astonishing that the beetle issued from the tank after this had been in use for eighteen months.

E. A. SCHWARZ.

A Big Blast.

The Salt Lake *Tribune* gives the following account of a tremendous blast recently set off at Salt Lake City, Utah, on the 29th of April: About 100 persons assembled at the limestone quarry, north of Warm Springs, to witness the discharge of a big blast. Stone had been quarried out so as to leave a paling 100 feet wide and over 100 feet high. This face was nearly perpendicular, but had a bench or step extending up from the base forty feet. From this point a tunnel was run in on the dip of the ledge forty-three feet, and at the lower end a crosscut forty-three feet long was made. At each end of this crosscut a well was sunk nine feet deep, bringing the bottom about on a level with the floor of the quarry. In one of these wells 100 kegs of powder was placed, and in the other 125 kegs. This powder was placed in bulk, and wires so arranged as to enable the two masses to be fired at the same time by electricity. The powder and the wires once in position, the wells were filled up with tamping. The manner in which the tunnel crosscuts and wells were arranged made it easy to confine the explosive force of the powder so as to be more effective. Wires were stretched up the hill about 700 feet to a safe place, and a portable battery was carried to the spot. The crowd of spectators viewed the quarry and such features as were visible, and then retired to the valley below, 1,000 feet away, where they had a good chance to witness the explosion. Mrs. Frank Pascoe touched off the powder just at 4 o'clock by merely pressing a key of the machine, and at once the whole face of the quarry was raised and fell in an immense mass of broken rock, from the size of an egg up to that nearly of a house. Mr. Pascoe estimates that the blast brought down and loosened up between 30,000 and 40,000 tons of rock. The report of the explosion was not heavy—in fact, less than is often made by a stick of giant—but the tumbling of the rocks made the earth tremble for quite a distance. The amount of smoke which rose in an immense cloud gave some idea as to the amount of powder used, and for a time obscured the view.

Some Words to Inventors.

It is a saying attributed to the great chemist Liebig that the state of civilization of a country could be measured by the consumption of soap *per capita*. It would, we think, be a more correct generalization to infer the condition of a nation from the diversity of its industries, in which are included two important elements, namely, the extent to which it has developed its natural resources, and reduced the percentage of waste in its industries. In this last direction a rich field is open to the enterprising inventor, and we know of no more instructive book for the ambitious technologist and man of practice to read than Simmonds' "Waste Products and Undeveloped Substances," in which he will find a hundred suggestions, with latent possibilities of rich reward to inspire his zeal.

It is unnecessary to refer to books to teach the lesson we wish to convey. There is not a single industry, great or small, that is not susceptible of improvement, either in the cheapening of its processes or in the diminution of its losses by waste, and the opportunities at the disposal of the inventor who is observant enough to notice where improvement is needed, and intelligent and industrious enough to apply his time and energies to supply what is wanted, rarely fail of obtaining his reward.

We hear much about the trials and tribulations of inventors, and the fact is often paraded that not one invention in a dozen repays the cost of taking out a patent. But these things simply prove that there about the same proportion of successful inventors as there are of those engaged in other pursuits. Select a dozen men haphazard, engaged in as many different kinds of business, and it is doubtful if more than one out of the dozen is successful.

There are many who labor under the impression that luck or accident has much to do with the production of useful inventions. Nothing could be farther from the truth. There is probably no direction in which human activities are engaged where the element of chance plays a more subordinate role, or in which intelligently directed industry is more generally called into play. The history of successful inventors will testify to the fact that they have commenced by intelligently using their faculties of observation to ascertain in what direction an improvement was demanded; and that having ascertained this, they have gone to work intelligently and industriously to supply what was wanted. The unfortunate inventors are made up largely of the class that lack that most useful of commodities—common sense. They comprise the numerous visionaries who fancy themselves wiser than their fellows, and toil over such impossible problems as prepetual motion; and the more numerous class we devote their energies to the production of inventions that nobody wants. They comprise those whose ideas are disjointed, and who find, after they have wasted time, energy, and money, that some simple but insuperable obstacle interferes with their success, and which intelligent observations beforehand would have revealed. They comprise the self-opinionated persons who, though mere dabblers in mechanics, essay to make mechanical inventions that were discarded long before they were born; and who, though destitute of chemical or metallurgical knowledge, do not hesitate to attack problems that have vexed the brains of savants. Let no thoughtful, plodding student, no mechanic, master of his art, be deterred from entering the lists because of the failure of such as these, whose destiny it would appear to be to fail at everything they undertake, but rather let him profit by the lesson their failure teaches.—*Manufacturer and Builder.*

The Present Limit of Visibility.

Although there is perhaps much to be desired in the improvement of microscopic objectives, we may still consider our present state quite an advanced one. Although the present theoretical limit of visibility is fixed at 146,528 lines to the inch, we need not be deterred from *attempting* to pass this point. The limit which was accepted some years ago as the true one, although considerably lower, was quietly ignored as the angular aperture in objectives increased. It is only a few years ago that the majority of microscopists refused to believe that *A. pellucida*, which has about 100,000 lines to the inch, could be resolved, and now it is the work of beginners to do so.

But supposing 146,528 lines to be the limit, it is evident that a one-eighth or one-tenth objective with a one-half inch eyepiece is of amply sufficient magnifying power to make the lines visible to the eye, and there is therefore no need of using more. It is a good rule to follow, under all circumstances, not to use a greater power than is necessary to comfortably do the required work.—*E. Bausch.*

Corrosion of Cast Iron Pipes.

In the course of a paper read by Mr. McElroy before the Western Society of Engineers, on the causes of corrosion of cast iron pipes, the author observed that a prominent cause of corrosion is the class of materials used, and also the method of manufacture of pipes in ordinary foundries. In the first place, a cheap and easily melted pig is selected—specifications and the inspection of quality and mixture not being strict—and the castings (for convenience of handling) are generally made in greensand moulds laid at a slope of about 10 degrees from the horizontal. Impure metal is therefore run in a way that aggravates its defects. The core bars are coated with straw ropes, which may be more or less soft and loose, coated with loam more or less soft and wet, and sprinkled with sand.

If not very carefully wedged, these bars will rise; and they are seldom stiff enough to resist the upward pressure of the molten metal. The usual spring at the center for the core of an 8 inch pipe is $\frac{1}{8}$ or $\frac{1}{4}$ inch; or as much as $\frac{3}{16}$ inch with a 6 inch pipe. The metal, poured in from the upper end, first fills the lower section of the mould; and as it rises round the core to fill the upper section, its weight springs the bar upward to the extent indicated, making the casting thicker at the lower, and thinner at the upper side. The denser, hotter, and purer metal fills the lower portion; the impurities naturally floating upward to settle in the thinner metal as it cools. Here gather portions of the sand coating of the mould; while the bubbles of the metal, caused by the development of gas from the vegetable matter of the loam, and from its dampness, tend to perpetuate themselves in blisters and air cells.

The usual defects in these cheap castings are, therefore, inequality in thickness, air cells and blisters, sand holes, cold chutes from chilled metal, and mixtures of sand and iron. Such pipes are also frequently out of line, from the effect of unequal contraction. Pipes of this description are peculiarly liable to corrosion; containing as they do mixtures of metal of different densities, together with much graphite. The duration of such pipes in the ground is largely affected by the amount of disturbance they receive. If well laid at a good depth, and thoroughly backed, they may continue serviceable for many years; but their defects are likely to become suddenly prominent upon comparatively slight external interference. In favorable circumstances they may last more than 30 years; but the majority if tested after less use will show flaws that would have insured their rejection if detected when new.

Poisonous Plants and Some of their Antidotes.

It is important that all who ramble in the woods should be able to identify the poisonous plants, not only that they may avoid them, but that they may feel secure when such plants are near them. Some of the most dangerous plants which are used for medicinal purposes may be handled with perfect safety. I am not aware, on the other hand, says Wilson Flagg in the Boston *Transcript*, that any bad effects come from the internal use of the juices of either of the two poison sumacs, which cause a violent inflammation when handled by certain people. If I remember correctly, Kalm, the Swedish botanist, tried a variety of experiments with the poison dogwood. He rubbed its leaves on his face and hands, and drank a decoction of its leaves. All this was done with impunity. If I am incorrect in this statement, I would thank any reader who has a correct knowledge of the facts to set me right. I have no means, adds Mr. Flagg, of examining the source of my information. The inflammation caused by the poison ivy and the poison dogwood resembles erysipelas; but it is not dangerous. It yields gradually to a wash of a weak solution of sugar of lead. There is a popular belief that if one has suffered an attack from it he is rendered more liable to be affected by any future exposure to the baneful influence of the plant. I have reason to believe this to be an error.

Some persons are very susceptible to the poison, while others are not affected by it at all. But I have known persons who were badly poisoned in their early days who could, after becoming adults, handle the plant with impunity. An intelligent farmer, who had such experience in his own case, believed that any one who is subject to ivy or dogwood poison might counteract his susceptibility by frequently handling it. He cited his own experience as proof of his theory. Another theory is that the woods are full of antidotes to the effects of ivy and dogwood, and that the habit of many persons of occasionally chewing the ends of a pine twig is a preventive. The chewing of the tender sprouts of the common pear tree is also considered a safeguard. I mention these notions without professing any belief in them, but they may be correct. If they seem insignificant remedies, because these plants have no powerful medicinal qualities, we must consider that the two noxious sumacs do not manifest any properties of taste or smell that would lead us to suspect their poisonous nature. Dr. Rush remarks, in one of his medical essays, that it is not safe to declare that any plant is wanting in medicinal virtue on account of its deficiency in taste or smell, though he admits that the poisonous vegetables for the most part have a decidedly nauseous and disagreeable flavor. Opium is bitter, and tobacco is pungent and nauseous.

But as these properties of poisonous plants do not exist in all species which are poisonous, it is prudent for all persons who frequent the woods, either for labor or recreation, to learn how to determine upon their own safety. Now, with regard to the poison dogwood, I may say that it is not to be found in every wood, though not a rare plant. It is an elegant shrub, seldom a tree, but appearing in clumps like the common alder. The leaf is pinnate, resembling that of the American ash, but larger, and having a greater number of broad, ovate leaflets. As I have said in another essay, this tree is equaled by no other species in our woods for the splendor and variety of its autumn tints. There is more exposure to the poison ivy because it grows everywhere. There is hardly a wood or woody pasture in the lowlands that is not covered with it, and hardly an old stone wall that is not festooned with its elegant foliage. This climber resembles the Virginia creeper in its general aspect and climbing habits, and the two plants may be distinguished by their leaves. The leaf of each plant is compound, but the ivy bears only three leaflets, while the creeper has five in a whorl; hence, when one is at a loss to determine the identity of the plant, he must count its leaflets. Neither of the two poison sumacs bears a conspicuous flower or fruit. The flowers and fruit are greenish, small, and without any beauty. If one is doubtful, therefore, about the identity of a plant, he may be sure, if it bears a handsome flower or fruit, it is neither the poison ivy nor the dogwood. As there is no other plant in our woods, however poisonous as a drug, that may not be safely handled, the rule given above may insure any one's safety.

In conclusion, I would remark that I cannot regard the poison ivy as a very dangerous plant; if it were more so, we should hear of more frequent instances of its poisonous effects. As it grows almost everywhere, it is hardly possible for parties to spend half a day in the woods without frequently handling it. Some caution is, nevertheless, advisable. If I had an estate, with trees near my house which were covered with this beautiful climber, I should not remove it. I should consider how extremely small is the liability of any one to be affected by it, and that his exposure would be greater in crossing almost any rude pasture that contained any shrubbery than by visiting my grounds.

Treatment of Earache.

It is said that by the following simple method almost instant relief of earache is afforded: Put five drops of chloroform on a little cotton or wool in the bowl of a clay pipe, then blow the vapor through the stem into the aching ear.—*Med. Record.*