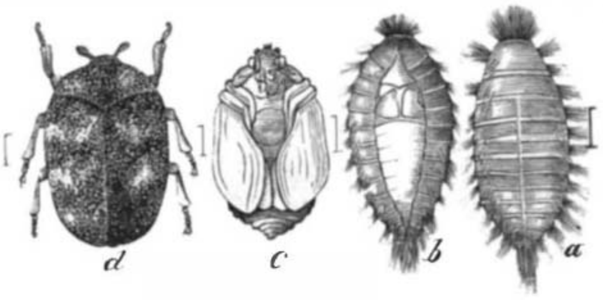
THE SPREAD OF THE CARPET BEETLE.

In the latter part of May, Master Fred. F. Richardson, of Tarrytown, N. Y., called our attention to the fact that the new household pest, the carpet beetle (*Anthrenus scrophulariæ*), had appeared on the blossoms of the field daisy. Further observation discovered the insects in considerable numbers on the flowers of the *Deutzia*.

A statement of the facts (with specimens of the beetles) was sent to Professor Comstock, U. S. Entomologist, at Washington, in a letter asking whether the beetles had before been discovered leading an outdoor life.

Professor Comstock's answer, dated June 7, ran as follows:

In reply to your letter of recent date I would state that the beetles sent were specimens of the imported carpet beetle (*Anthrenus scrophulariæ*), as you surmised. Since the beetles



NEW CARPET BEETLE (*Anthrenus scrophulariæ*).

of this group are known to generally feed upon the pollen of flowers in the adult stage, while their larvæ are miscellaneous feeders, there is nothing surprising in your observation; still it is of interest, as I am not aware that it has been recorded as yet in this country, except with regard to the California variety of the species, which Dr. Le Conte has called *A. lepidus*. Professor Lintner said, in 1878, "The insect has not yet become sufficiently abundant in New York to be found resorting to plants for its food," and I do not recall at the present moment that I have seen this statement corrected since.

Very respectfully yours,
J. HENRY COMSTOCK, Entomologist.

The inference to be drawn from this discovery is not encouraging to housekeepers. The beetles, in the larval condition, have already proved very destructive to carpets, and scarcely less so to woolen goods generally, wherever they have gained a footing; and now that they are multiplying out of doors there is little hope of their extermination.

It will be remembered that this latest and least welcome of immigrants from Europe was first discovered preying upon carpets by Professor J. A. Lintner, Entomologist of New York State, in 1874. In its native home it is said to have shown no such proclivity, whether from lack of carpets or an abundance of more attractive food it is impossible to say.

In the thirteenth annual report on the New York State Museum Professor Lintner gave a full description of the insect, with figures by Professor C. V. Riley. We copy the figures herewith for the information of housekeepers, who may not be aware that the pretty little beetles found crawling about the walls have anything to do with the hairy destroyers of their carpets, blankets, and woolen clothing. The tail-like tuft of black hair radiating from the last segment of the larva has been clipped in the picture; naturally it is nearly as long as the whole body. The indicated size of the beetle is for the female; the male is about half as large, and is whiter. A full description of the beetle in its several stages was given in the SCIENTIFIC AMERICAN of October 5, 1878. At this time the pest is only too well known, and the chief question with regard to it is how to stay its ravages.

There is a remote possibility that the attractions of outdoor life may withdraw the pest from the domestic field and cure it of its newly acquired taste for carpets. But it is far more probable that, after multiplying outside during the summer months, it may swarm into our houses in the fall with vastly increased numbers and capacity for mischief. Meantime householders will do well to watch closely to see whether the female beetles do not leave the flowers and betake themselves to the house to deposit their eggs upon carpets and clothing. In this case the ravages of the larvæ may be kept up the year round, and not, as heretofore supposed, during a few months of winter or early spring only.

The remedies proposed for the pest are numerous, but most of them are disappointing when put to practical test. In the report referred to above Professor Lintner says that Persian insect powder, camphor, pepper, tobacco, turpentine, carbolic acid, and the like are powerless. He recommends the use of benzine or kerosene on cotton stuffed into the joinings of the floors and the crevices beneath the baseboards. An efficient but somewhat hazardous remedy is said by others to be found in the liberal use of naphtha around the sides of the room, along the seams of the carpet, and wherever cracks in the floor provide a runway for the larvæ under the carpet. Obviously great care must be taken to give the rooms a protracted and thorough airing before lighting lamps or fires, as the naphtha takes fire readily and the vapor mixed with air is dangerously explosive.

In view of the fact that the larvæ of a related species of beetle abhors tallow it has been suggested that a remedy for the carpet beetle might be found in the liberal use of tallow in the cracks of the floor and around the edges of the wall where an invasion is feared. In Europe, however, the insect is said to infest dried meat, in which it is liable to come in contact with fat; and it is such an omnivorous creature in the larval state that it might possibly betake itself to tallow as a relish. Its taste for carpet-stuff, as already noted, is of recent origin, and there's no telling but it might learn to like even Professor Lintner's cotton soaked in kerosene.

A Massachusetts naturalist proposes the soaking of the edges and seams of carpets with an infusion of cayenne pepper and strychnia—one-quarter pound of pepper and two drachms of strychnia powder to the gallon of water. We do not know of any actual test of this remedy, which is objectionable because of its hurtfulness to man. Another (theoretical) remedy is an infusion of cayenne pepper and quassia chips—two ounces of pepper and half a pound of quassia to the gallon of water—which has the merit of not being poisonous. These infusions can be applied to new carpets by dipping the ends of the rolls in a shallow pan containing the liquid; to carpets already down the liquid might be applied with an atomizer until the edges and seams are saturated.

The interests involved in this insect invasion are coextensive with the carpet and woolen industries; and it is clear that the inventor who shall devise some sure and simple treatment of carpets and clothing to make such articles proof against the pest, will not only make himself a public benefactor, but reap a suitable reward in cash. Thus far the naphtha and benzine applications seem to promise the best results; but they are somewhat hazardous, to say nothing of the disagreeable odor they leave. A pleasanter, safer, and more permanent preventive is needed.

GAMGEE'S ZEROMOTOR.

The SCIENTIFIC AMERICAN of July 2, 1881, contains an article on Gamgee's zeromotor, signed Valentine G. Bell, M.I.C.E., etc.

This writer expresses the opinion that the zeromotor will be able "to go on continuously during a given duty;" but that "a colossal engine will be required to do a very small amount of work;" and he suggests the following method for making an estimate of the size of the engine required, viz.:

"In a condensing steam engine there is a difference of about 1,000° Fah. [units?] of heat between the steam issuing from the boiler and the water returning to it. On the other hand, in Professor Gamgee's engine, this difference will not exceed 60°. Without going into the question of the relative specific heats of water and ammonia, we may say roughly that, for the two engines to indicate the same power when working at the same number of revolutions, they must have cylinder capacities in inverse proportion to the above differences of heat respectively."

Let us apply this rule for making an estimate for a zeromotor, to be substituted for the steam engine of a certain vessel, having two cylinders, 33 inches by 2·75 feet, working with a steam pressure of 60 pounds per square inch. The two pistons sweep through a space of 64·914 cubic feet per revolution of engines. According to Mr. Bell's opinion the pistons of the zeromotor should sweep through a space of $\frac{64{\cdot}914 \times 1{,}000}{60} = 1{,}082$ cubic feet per revolution of engines; and sixteen rotary engines, having cylinders 50 inches diameter by 5 feet long on an 8 inch shaft would be required, which, making proper allowances for cylinder heads, stuffing boxes, and couplings, would occupy fully 150 feet in the length of the vessel.

Mr. Bell's estimate, however, is based on wrong premises. The size of an engine for a given power depends on the indicated mean pressure of the working fluid, which is not dependent on the difference in temperature of, or units of heat contained in, the working fluid at its initial and final pressures. The following example will make this clear: Let us take two condensing engines, one working *without expansion* with steam of 100 pounds pressure, the other working with the same initial steam pressure, but *expansively*, so that the mean pressure in the cylinder is 20 pounds. Assuming the back-pressure to be the same in both cases and so small that it may be neglected, then the initial and final temperatures will be the same in both cases, but, with the same piston speed, the expansive engine must be five times larger than the non-expansive engine.

Mr. Bell's estimate of the size of the ammonia boiler is also based on wrong data. The mean difference of temperatures of the water and hot gases in a steam boiler is much less than 2,000° Fah.; this difference exists probably between the temperatures of the furnace and of the water; but when the gases leave the boiler their temperature is generally not more than from 200° to 300° higher than that of the steam.

It is doubtful whether Mr. Gamgee will derive much comfort from Mr. Bell's indorsement of his invention. The public, however, cannot be warned too much against this delusion. The utter fallacy of the principle on which the zeromotor is based may be illustrated in the following manner:

The heat stored up in a body is capable of doing a certain amount of work in the same manner as a mass of water stored up in a reservoir. To make the power of the water *available* for work, it must fall down to and flow off at a lower level. In the same manner the heat must fall down to, and flow off at a lower temperature; this is effected by the condensing water, or other refrigerating medium, of a heat engine. But as the zeromotor is to work without a refrigerating medium which carries off the heat contained in the working fluid at a lower temperature, it resembles a water power machine where the water falls from a reservoir into a well without an outlet at a lower level. The well will fill up, and the machine will stop.

Mr. Gamgee tries to remedy this evil by his high-pressure boiler, which is intended to supply the motive power of an injector by means of which the ammonia vapor and liquid is to be forced back into the working boiler. The operation of this high-pressure boiler may be likened to that of a high-pressure reservoir, lying above the working reservoir, and operating a water-ram which shall not only lift all the water out of the well back into the working reservoir, but lift the water which operates the ram back to its original height! Faith in the zeromotor must be stronger than that faith which will move mountains!

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WOOD WEAVING.

We take the following details concerning a very peculiar industry from a recent number of *Cassell's Magazine:* One of the busiest towns of the manufacturing district of the Austrian empire is Ehrenberg, lying close to the Saxon frontier, and distinguished from other towns and villages for its curious industry of wood weaving—*sparterie* work, as it is called—which was introduced something more than a century ago by a carpenter named Anton Menzee. The threads used for weaving are no thicker than writing paper, and vary in width from the fifth to the twenty-fifth part of an inch. The aspen is the only tree whose wood is sufficiently tough and pliable to supply these threads in the required lengths. This tree was formerly indigenous to Bohemia, but has now almost entirely disappeared, so that the raw material for the *sparterie* work has to be brought from Russian Poland. The wood used for the purpose of weaving must be free from knots, as the smaller defects or irregularity, such as ordinary persons would hardly notice, make the fibers quite unfit for working. Arrived in Ehrenberg, the wood is planed and divided into pieces nearly 2½ inches wide. When these have been made perfectly smooth they are divided again by an instrument resembling a plane, but furnished with a number of fine knife blades, which mark the wood at regular distances, according to the width the strips are to be. This process requires the utmost dexterity and nicety, as it is absolutely essential that the divider shall exactly follow the direction of the fiber, and for this reason, among others, it must always be done by hand.

The divider makes incisions one-fifth of an inch deep; the wood is then carefully planed and comes off in thin paper-like strips, some of them not wider than a stout thread. They are gathered up by women as they fall, and are examined and the defective pieces rejected. There is a good deal of waste in the process. The threads or fibers being ready, must be tied in couples at one end before they can be woven. This work is done by little children of four years of age and upward, who earn eight cents a day. The weaving is done chiefly by women, and on looms which differ considerably from those in ordinary use, the fiber being not more than 39 to 50 inches in length. The longer fibers form the warp, the shorter the woof, which are passed in and out by means of a little instrument with an eye like a needle. Until within a few years this concluded the whole process—the "foundations," as they are called, were complete and nothing more was done except that a few hats and caps were made of them. These were of the simplest description, and anything but becoming; moreover, they were glued together, thus making them unpleasant to wear in hot or wet weather; accordingly they brought but 30 cents or 60 cents per dozen, and were worn by the very lowest classes.

Within the last few years, however, owing partly to the interest taken by the Government in the manufacture, a great change for the better has taken place. At present Ehrenberg sends out not only the raw material, but ready-made goods—fashionable hats of all kinds and a variety of fancy articles skillfully concocted out of the wood fabric; ladies' hats of every description and of the latest fashion, such as no one need be ashamed to wear, are made entirely of wood and sold at astonishingly low prices. Men's hats are to be had of all shapes, from the Panama hat—not a whit inferior to that bought in Paris—to the common hats exported in large quantities to China, and the linings or foundations of which give stiffness to the fez of the Turkish soldier. The export trade embraces all Europe, from Spain to Russia, extends beyond the Caucasus to India and China, and maintains active relations with North and South America as well as Australia. The manufacturers are in direct communication with the four quarters of the world, and their goods are being introduced into Africa by French and English traders.

Influence of Magnetism on Electrical Currents.

At a recent meeting of the Physical Society, London, Mr. Hall, of Johns Hopkins University, Baltimore, exhibited his experiment in which a current of electricity flowing longitudinally along a thin foil of metal is caused to yield a transverse or lateral current by inserting the foil between the foils between the poles of a magnet. The lateral current is observed on a sensitive galvanometer, and care is taken in the first place to find points of connection with the foil which yield no current before the magnet is applied. The results were that if iron is called + the series is iron +, silver —, gold —, platinum —, tin —, and, curiously, nickel, though a magnetic metal like iron, is —, but on inquiry of Professor Chandler Roberts it proved that the nickel employed was, perhaps, impure. Cobalt ranges between iron and silver, and is + like iron.