

[For the Scientific American.]
WOOD-BORING BEETLES--THE "GIRDLEERS."

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The insect figured in the accompanying beautiful engraving (from Blanchard), in the three stages of its life history, is one of the family of *Longicornia*, or "long-horned" beetles; a family also known among entomologists as the *Cerambycidae*, from *Cerambyx*, one of the most typical of the genera it includes. As the former name denotes, the members of this, a most extensive group, are characterized by the length of their elegant antennæ. They are beetles, generally speaking, of neat form, with slender, often cylindrical, bodies, and moderately long legs. Many species attain to a considerable size, and many are brilliantly colored. They are, therefore, always acceptable additions to the cabinet of the coleopterist. On the other hand, the grubs of by no means a few of them are among the most mischievous of timber destroyers, and there is scarcely a tree that is not liable to suffer from the attacks of one species or another of this universally distributed family.

Sometimes these unsightly, whitish—often footless, maggot-like—larvæ, penetrate the tree while it still seems to be in the full vigor of its growth, boring through the trunk, or making their homes in the pith of such plants as the elder; others hasten the destruction of trees that are past their prime; while others, again, obtain an honest livelihood by removing decayed wood.

The latter, we suspect, was the original and normal occupation of the ancestors of the family, the less commendable practices of the others being probably the results of the necessities of the "long-horned" family, at times when its legitimate labor market was overstocked. For, as in these days of dense population, a man cannot always obtain his living in the trade of his forefathers, but must turn his hand to whatever pursuit offers the best chance, so, likewise, among insects, so great is the struggle for existence, so swiftly do foes multiply against every species, so constantly, though by imperceptible degrees, are all the conditions of existence changing around them, that, if the race is to continue, its habits and its instincts must be capable of corresponding modifications.

We thus find among insects, as among the inhabitants of large cities, instances of most singular and abnormal habits, habits induced by the exigencies in the former of natural, as in the latter of civilized, associations. Yet, however singular and out of the ordinary course may be the instincts which dictate such habits, many naturalists of the present day, nevertheless, consider them, not as original endowments by creation of the creature possessing them, but as gradual developments from simpler instincts, under the influence of a tendency to variation, directed by the necessities of the race in its struggle for existence, during very prolonged periods of time. No voluntary effort on the part of the individual is invoked, as having produced, or even tended to produce, such changes. Creative wisdom, which implies continued preservation, implanted in every race the capability of undergoing such slow and insensible modifications as should correspond to the change of condition to which, in the course of time, it would be subjected. Wherever such correspondence fails in portions of a race, such portions die out; they are no longer required in that form in the scheme of the universe. In this sense, the most extraordinary of instincts, developed from a simpler one, is no less the work of the Almighty Designer than if it had been implanted at the moment of a specific act of creation. The doctrine, in fact, while in no degree lessening our sense of Almighty Power, heightens vastly our recognition of an all-pervading Foresight.

The insect here figured presents us with a most remarkable instinctive habit. We give Professor Blanchard's history of the picture, in almost his own words: A M. Houliet, sojourning in the neighborhood of Rio Janeiro, heard every night the sound of branches falling from an acacia tree. These branches had been cut around, so that the centers alone were untouched, and they had broken off, consequently, by their own weight, or by a slight movement of the wind. "To whom was the mischief to be attributed? To the negroes of the house, undoubtedly, animated by a desire to cause their master a petty annoyance. But the traveller soon perceived that there was often a beetle (*Onciderus vomicosus*) upon the branch cut off; the coleopter, then, was the author of the mischief! A branch of the acacia was brought home; it contained living larvæ and pupæ of the *Onciderus*. It is the same branch, laid open and thus inhabited, that we here represent."

The reason of this extraordinary procedure appears to be, that, the eggs of the beetle being laid in a part of the tree in which vitality is very active, there is danger of the offspring, during its pupal or inactive condition, being built in too completely by the growing wood. Such may, or may not, be the true explanation; but, be it so or otherwise, it does certainly seem, at first sight, impossible to account, by any develop-

ment theory, for such an incomprehensible instinct. Writing of an allied species (*O. cingulatus*), found in our own region, Professor Huldeman recognizes this difficulty: "In our walks through the forest, our attention was frequently drawn to the branches and main shoots of young hickory trees (*Carya alba*), which were girdled with a deep notch, in such a manner as to induce an observer to believe that the object in view was to kill the branch beyond the notch; and, extraordinary as it may appear, this is actually the fact, and the operator is an insect, whose instinct was implanted by the Almighty Power who created it, and under such circumstances that it could never have been acquired as a habit. The effect of the girdling is unknown to the insect, whose life is too short to foresee the necessities of its progeny during the succeeding season."

An error in the above argument consists in overlooking the fact that the instinct belongs to, or subserves the pur-

looks upon any misconception and misstatement regarding the causation of the phenomena of Nature, as tending to lessen the high opinion we should form of the wisdom of its Author; and, while he does not conceitedly hope to be able to fathom every detail of a scheme that is universal, he does try to comprehend as much as he may of the invariable laws that control it. To such an one, these "girdlers" are not merely passing wonders, but elements in the study of the great problem of life.

Curious Sleepers.

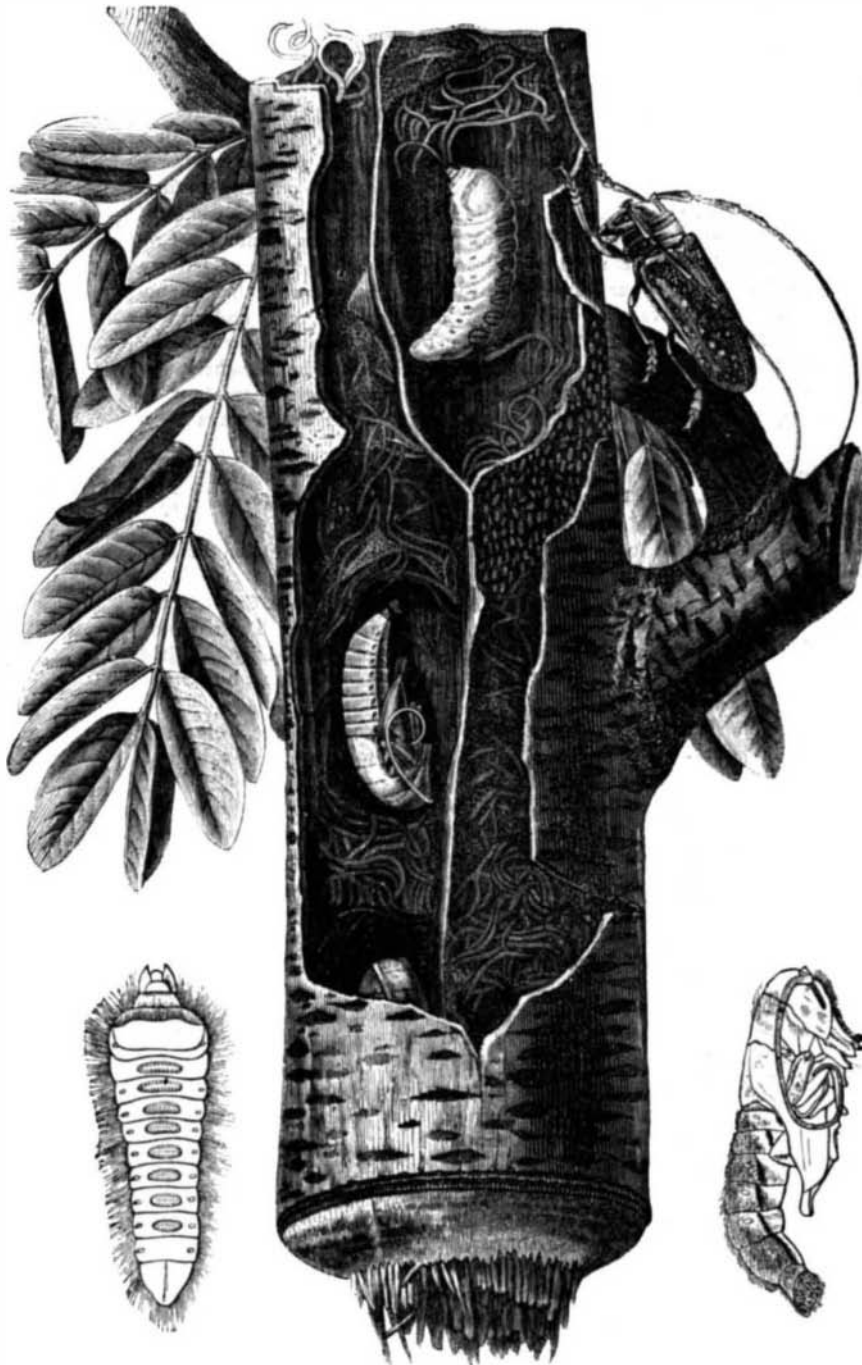
Sleep is nearly as great a puzzle as ever it was. Much has been discovered concerning the bodily peculiarities manifested during this portion of our existence; but all whose opinions are best worth listening to, admit that they are only on the threshold of the subject yet. Why, for instance, can some men maintain their bodily and mental vigor with so small an amount of sleep as falls to their share? Lord Brougham, and many other great statesmen and lawyers, are known to have been content with a marvelously small quantity of sleep. Frederick the Great is said to have allowed himself only five hours; John Hunter, five hours; General Elliot, the hero of Gibraltar, four hours; while Wellington, during the Peninsular War, had still less.

How, on the other hand, to account for the cormorant sleepers? De Moivre, the mathematician, could (though it is to be hoped he did not) sleep twenty hours out of the twenty-four. Quin, the actor, sometimes slept for twenty-four hours at a stretch. Doctor Reid, the metaphysician, could so manage, that one potent meal, followed by one long and sound sleep, would last him for two days. Old Parr slept away his later days almost entirely. In the middle of the last century a young Frenchwoman, at Toulouse, had, for half a year, fits of lengthened sleep, varying from three to thirteen days each. About the same time, a girl, at Newcastle-on-Tyne, slept fourteen weeks without waking; and the waking process occupied three days to complete. Doctor Blanchet, of Paris, mentions the case of a lady who slept for twenty days together when she was about eighteen years of age, fifty when she was about twenty, and had nearly a whole year's sleep from Easter Sunday, 1862, till March, 1863; during this long sleep (which physicians call hysteric coma) she was fed with milk and soup, one of her front teeth being extracted to obtain an opening into her mouth. Stow, in his "Chronicle," tells us that "The 27th of April, 1546, being Tuesday in Easter week, W. Foxley, potmaker for the Mint in the Tower of London, fell asleep, and so continued sleeping, and could not be waked with pricking, cramping, or otherwise, till the first day of the next term, which was full fourteen days and fifteen nights. The causes of his thus sleeping could not be knowne, tho' the same were diligentlie searched for by the king's physicians and other learned men; yea, the king himself examined y^e said W. Foxley, who was in all points found at his waking to be as if he had slept but one night."

Another very notable instance was that of Samuel Chilton, of Tisbury, recorded in one of the volumes of the "Philosophical Transactions of the Royal Society." In the year 1694 he slept for a month, and no one could wake him. Later in the same year he had a four month's sleep, from April the 9th to August the 7th; he woke, dressed, went out into the fields (where he worked as a laborer), and found his companions reaping the corn which he had helped to sow the day before his long nap; it was not till that moment that he knew of his sleep having exceeded the usual duration of a few hours. He went to sleep again on the 17th of August, and did not wake till the 19th of November, notwithstanding the pungent applications of hellebore and sal ammoniac to his nostrils, and bleeding to the extent of fourteen ounces. He woke, asked for bread and cheese, but went off to sleep again before it could be brought to him, taking another spell of sleep, which lasted till the end of January. After this it is not recorded that he had any more of these strange relapses.

There are instances of sleep so intensely deep as to deprive the sleeper of all sense of pain. The records of the Bristol Infirmary present an extraordinary illustration of this. One cold night a tramp lay down near the warmth of a limekiln, and went to sleep. One foot must have been close to the fire hole of the kiln; for during the night the foot and ankle were so completely burned away, as to leave nothing but black cinder and calcined ash. He did not wake till the kiln man roused him next morning, nor did he know what had occurred until he looked down at his charred stump. He died in the infirmary a fortnight afterwards.

If we have an undue increase of noxious insects, it is not because new ones spring into being, but because of the increase of food on which they can feed. That the Colorado potato beetle is to some extent poisonous is inferred from the fact that the exposed parts of persons become very much swollen after standing in the smoke of fires into which these insects are thrown.



METAMORPHOSES OF THE WOOD-GIRDLING BEETLE.

poses of, the race, and not merely of the individual. The growth of such a peculiar habit must be the result of an accumulation of small changes of instinct, tending in one direction through a vast number of generations. But, if so, do we find instances of instincts less abnormal tending in the same direction? We believe we can indicate one, at least, among these same *Longicorns*. "The larva of the *Stenocorus putator*," says Packard, "nearly amputates the branches of black and white oaks. After becoming mature in the trunk, and just before undergoing its transformations, it gnaws off the branch which contains it, and which consequently falls to the ground." Here we have the very same instinct displayed by the grub, instead of by the perfect insect, and, though it is only a transference of the difficulty—for we are as puzzled as ever to demonstrate its origin in the grub—yet it, at least, shows that the habit of the *Onciderus* is not an isolated case; and we fully believe that, if due attention were given to all the variations of this instinct that are to be found among *Longicorns*, we might eventually trace many of the transitional steps from the habit of simply burrowing in the trunk to that of the grub severing the twig; and thence, to the still more abnormal one of the parent insect performing the operation.

But a worse part of the above argument is in the implied assumption, made too frequently elsewhere, that the Creator could not have developed an instinct; the only reason for this assumption being, that we do not easily see how He could have accomplished it! It is no consolation to the true naturalist to be told, "Well, after all, the view that the 'girdlers' were, from the first, created with this instinct is the simplest and most comprehensible one!" He is not in search of easily enunciated doctrines, but of the truth; he