

HULLING COTTON SEED.

Cotton seeds contain elements which are invaluable to the farmer as food for animals and as a fertilizer. The following table shows the relative value of different kinds of food, and, as will be seen, cotton seed stands highest on the list:

Kinds of Food.	Flesh Producing.	Fat Producing.
Turnips	1	5
Straw	3	16
Potatoes	3	17
Hay	8	50
Rye	11	72
Oats	12	63
Corn	12	68
Beans	22	60
Linseed cake	28	56
Bran and coarse mill stuff	31	51
Decorticated cotton seed meal	41	77

The importance of cotton seed as a food for animals is thoroughly recognized by Southern farmers, and its value as a fertilizer is unquestioned; but to utilize this article to the fullest extent it requires hulling, as the hulls are injurious to animals, and retard the decomposition of the seeds when used as a fertilizer. In view of these facts the importance of an efficient cotton-seed hulling machine will be at once recognized.

We give engravings of two forms of huller—a hand machine and a power machine—manufactured by Mr. David Kahnweiler, of 120 Center street, New York city. These machines have been largely introduced, and are favorably known all over the South. In addition to the sizes represented. Mr. Kahnweiler makes larger machines, having a capacity of 20 to 25 tons and upward per day. These machines are extensively used in oil mills. The smaller machines are used on plantations, the smallest ones being operated by hand, the larger by steam or horse power.

The judges at the Centennial Exhibition, in their report recommending the machine to the Commission for Awards, gave a very concise statement of the advantages of this huller, which we copy. It was recommended "for being well made and thoroughly efficient, supplying an increasing want on cotton plantations, namely, a means of preparing the cotton seed, by the removal of the shell and the cotton left by the gin, to be made into a highly valuable food. The mechanism is simple and the result satisfactory. The feed roller insures regular supply and prevents passage of nails, sticks, and other foreign matter which would injure the mill. The under roller or cutter head has a smooth surface, carrying eight knife sections; they are easily regulated to compensate for wear. The concave has three or four knives." The shell and kernel fall into a hexagonal revolving screen which permits the seeds to fall through, while the hulls are carried through the revolving screen and are delivered at the end. The hand machine has a capacity of 3 to 4 bushels per hour, and the power hullers for plantations will hull from 10 to 25 bushels per hour, according to the size. The steel knives on the cutter cylinder are made adjustable. The machine may be used to advantage in grinding and cracking corn, peas, etc.

It is believed that these machines will save the planter hundreds of dollars every year, enabling him to prepare his own feed and fertilizer. The old process of preparing cotton seeds as a fertilizer by exposing them in heaps to the action of the elements for months is wasteful of the most important fertilizing elements, and besides this many of the seeds are not killed, and will sprout. By employing a cotton-seed huller the seeds are at once deprived of power to germinate and are ready for immediate use as a fertilizer, and all of their nutritious elements are retained.

If desired, the meal and hulls may be permitted to mix as they are discharged from the machine by simply removing the hexagonal screen.

One of the recent improvements made in this machine is the adding of a countershaft, rendering the entire apparatus self-contained.

Progress in Japan.

Reviewing the industrial operations of the Japanese during the year 1880, the *Japan Mail* mentions the building of the Sapporo Railway; the two smelting furnaces at Kamaisi, delivering an output of some 700 or 800 tons of iron per mensem; the works of the harbor of Nobiru, almost completed; the weary tunnel at Kariyasu in Uzen, at last

carried through; the great aqueduct from the Inawashiro Lake achieved, and an immense area of country irrigated; the building of ships on western lines at the two dockyards of Kawasaki and Tokiyo carried on with increased industry; silk-reeling establishments erected in the three prefectures of Hiroshima, Aichi, and Shidzoka; the port of Mikuni opened to shipping; the works on the Tsuruga Railway progressing vigorously; the outcome of the coal mines in Kiushiu augmented; the docks of Nagasaki unceasingly occupied; and mining industries exceptionally active.

An Old Battlefield Uncovered.

During the spring rains in Georgia the Coosa River overflowed its banks, and in one place washed the soil from a

pairing what will undoubtedly prove to science one of the richest 'finds' ever made on the American continent. Among the countless number of Indian pipes found is one of great size and exceedingly fine workmanship, the bowl of which is carved with great skill into the form of a human head."

MISCELLANEOUS INVENTIONS.

Dr. Christian Heinzerling, of Biedenkopf, Germany, has patented an improved method of converting hides into leather, consisting in subjecting them to the action of a compound containing chromic acid and then treating the hides by a solution of stearine or similar fats.

Mr. Joseph H. Clyde, of Atlantic, Iowa, has patented an improvement in pantaloons, the object being to prevent the protrusion in front and wrinkling in rear in the knee portions of the legs of pantaloons, and also the uneven wearing of the seat portion.

In the manufacture of scrap-books and other books of a similar character it is necessary to provide guards or spacings between the sections of the book, and this is usually done by inserting the sections between folded strips of paper, and the sections and strips being afterward secured together, the strips form the guard between the sections. Mr. Frank Bowman, of Brooklyn, N. Y., has patented a device which obviates these difficulties of manufacture, and reduces the expense, and produces a stronger and better appearing scrap-book.

A cheap, simple, and effective trap, to be placed over mole or gopher "runs," for the purpose of destroying the animals, has been patented by Henry W. Hales, of Ridgewood, N. J.

An improved chalk holder for billiard tables has been patented by Mr. John Jefferson, of Columbus, O. The invention consists of cords, weights, and pulleys attached to and moving in suitable casing and tubes attached to the gas fixture, chandelier, or other object over the billiard table, the chalk being suspended above the table by the cord. It may be drawn down to a convenient position for use, and when released will be automatically returned to place.

An improvement in cryptography has been patented by Mr. Charles G. Burke, of New York city. The invention consists in the use of four characters, differing in form or color, which, when used in combination with a scale consisting of three horizontal parallel

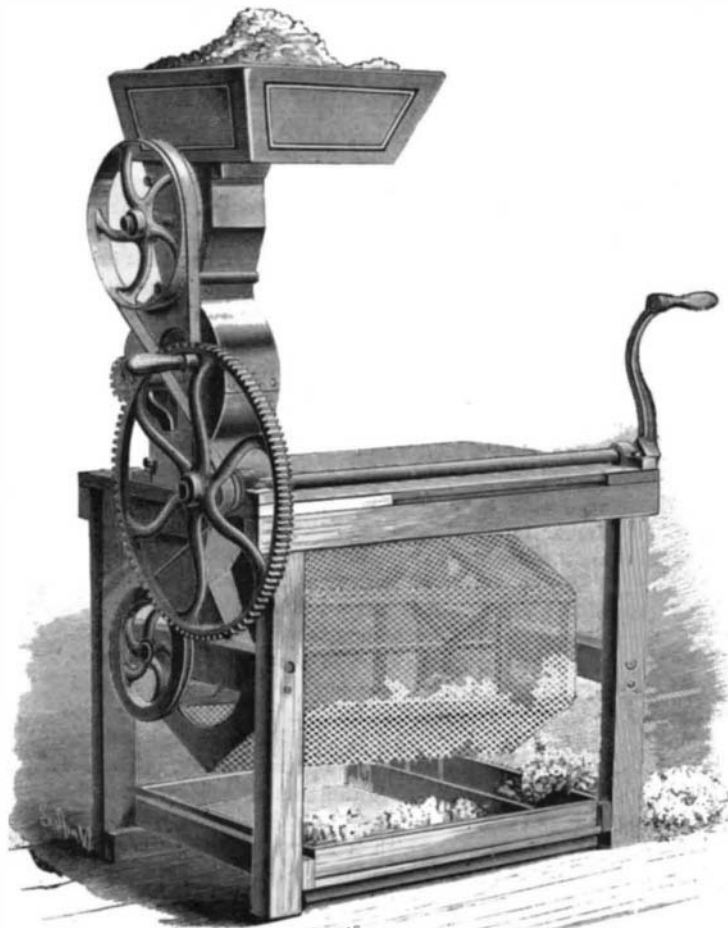
equidistant lines and spaces, represent intelligible sounds, which are convertible into words and sentences, and may be substituted for and made the equivalent of the English language.

Messrs. Green E. Hood and Charles W. Tift, of Albany, Ga., have patented a cotton-seed planter and guano distributor so constructed that it can be readily adjusted to plant more or less seed, or distribute more or less guano, and to cover the seed to a greater or less depth, as may be required.

An improvement in wool carding machines has been patented by Messrs. William E. Bosworth and H. Wallace

Bosworth, of Lexington, Ky. The object of this invention is to obviate the trouble experienced in carding machines from the wool getting under the creel spools and thereby becoming tangled, stretched, and broken; also, to prevent accumulation of wool on the guides of the carding machine where the rolls enter, so that free passage of the rolls shall not be hindered.

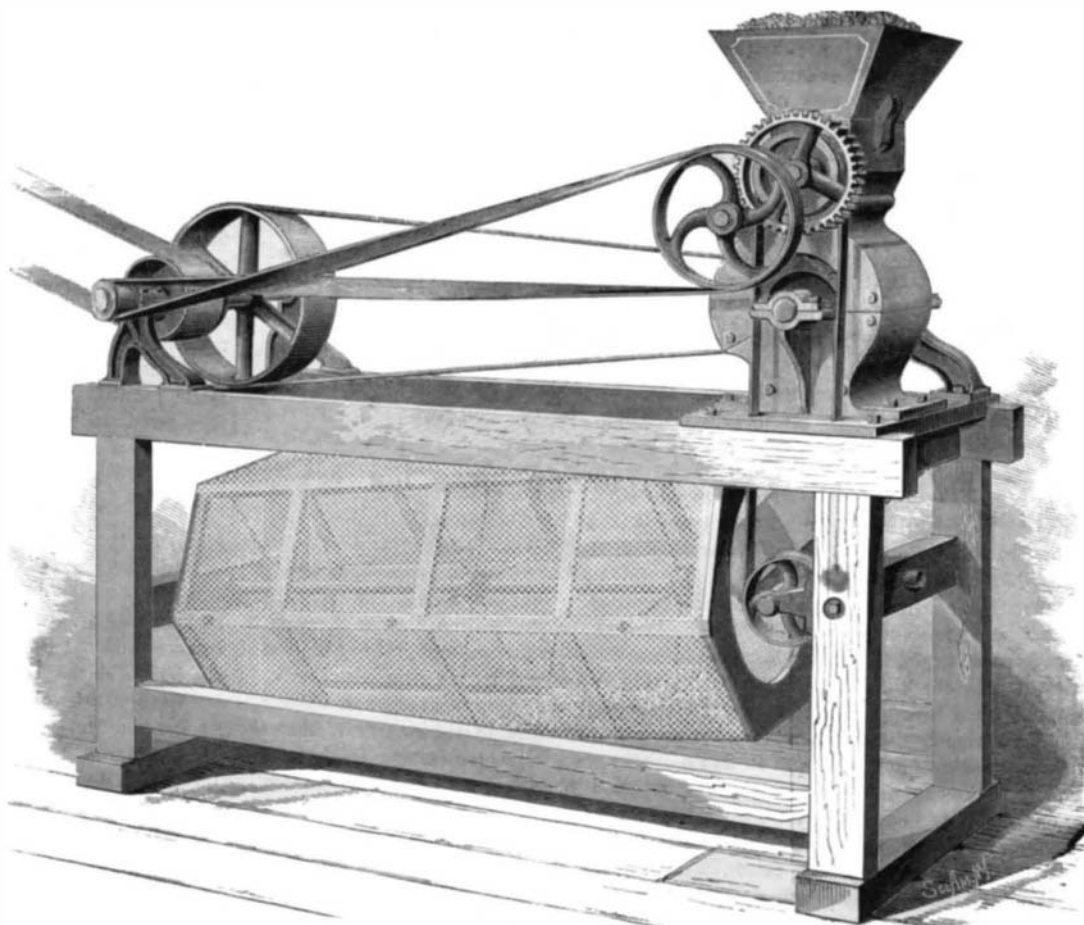
An improved watch-case spring has been patented by Mr. Joseph Canne, of Newport, Ky. The object of this invention is to provide a more durable watch-case spring, the spring part of which can be replaced, when broken, without renewing the body. This invention consists in forming the spring of sheet steel, having the thinner part toward the head instead of toward or near the body, as in other watch-case springs, so as to have the head on the most elastic part of the spring, and in lapping over the head instead of forging it, and in cutting away the lower edge of the spring portion for the purpose of increasing the elasticity of the spring and diminishing its stiffness. By using sheet steel for the spring no forging is required, and the strength of the spring is not

**HAND COTTON-SEED HULLER.**

considerable area. After the water subsided the washed land was found to be an ancient battlefield and burying ground. Part of the territory consisted of mounds, evidently fortifications. These were strewn with implements of aboriginal warfare, beads, and earthen vessels.

The remainder of the ground was covered thickly with skeletons, all perfectly exposed, and all in good preservation.

A press dispatch from Rome, Ga., dated April 2, says: "The place is attracting crowds from all directions, and it is almost impossible to prevent vandalism from seriously im-

**POWER COTTON SEED HULLER.**

impaired, and by having the thinnest or most elastic part near the head the spring is not so liable to "stay back" after usage, as is commonly the case with springs of even thickness and with those that are thickest near the head.

THE STAG BEETLE AND CHAMPION BEETLE.

The common stag beetle (*Lucanus servus*) must have been known to the ancients, for Pliny says in one of his books on natural history: "Beetles (he calls them scarabei) have a hard covering over their feeble wings, but none of them have a sting. There is, however, a large family, which have horns, on whose points are two-pronged forks, which can be closed at will and are capable of pinching. They are hung on the necks of children as a charm." Rigidius calls them *Lucanus*. Mufet, who, in his "Insectorum sive Minimorum Animalium Theatrum," has collected with great industry all that was known about insects up to his time, describes the stag beetle, but believes that the same description will apply to the female; while Aristotle asserts that in insects the males are always smaller than the females. Now every boy who is acquainted with beetles and lives in a region abounding in oaks, where the stag beetles make their appearance, knows that those having horns are males, while the females have simply short curved mandibles in no way conspicuous. The most recent observations on other kinds of stag beetles have taught us that according to the scanty or abundant nourishment of the larvæ, the beetles turn out small or large, and this is especially true of the males. The horn-like mandibles of the smaller beetles through small development confers upon the whole beetle a changed appearance, in comparison with a fully developed one. We may, therefore, see in a single family medium and smaller forms, without bestowing on them special names, as in earlier times.

The stag beetle is the largest of the European beetles. The male has enormous horn-like jaws or mandibles, the tips being armed with antler-like projections, slender antennæ, the upper lip is bent downward, and the tongue is deeply slit. The color is a dull black, the wing covers and horns are a glistening chestnut brown.

In June these beetles are found in the oak forests, where on beautiful evenings the males fly with a loud humming noise about the tops of the trees, while the females keep themselves concealed. In the daytime they run among the dry leaves on the ground and betray their presence by their rustling, or they sit on the bleeding trunks of the oaks and lap up the sap. Chop gives an interesting account in his "Garten-laube" of their behavior at these feasts.

In June, 1863, while lying under the cooling shade of an old oak tree on a very warm afternoon, a peculiar rustling sound attracted his attention. A soft snapping or grating was heard at short intervals, as if small dry twigs were being broken. Shortly a blackish object fell from the tree to the ground; it proved to be a stag beetle, which he found after a long search in the act of creeping up the rough bark again. The rustling did not cease, and when the observer looked upward he saw, seven or eight feet up the trunk, a peculiar brown mass. In the course of half an hour eleven stag beetles, of both sexes, had fallen down one after another, and because the crackling sound was still heard Chop procured a ladder in order to examine this remarkable appearance. A curious sight met his view. Upon a small surface the sap was flowing down from the old bark. To this dainty meal a very mixed company of insects had invited themselves as guests.

Large ants climbed busily up and down, dainty flies of all kinds sat together in crowded heaps, and hornets swarmed fiercely humming around the trunk. But the most conspicuous guests were undoubtedly the stag beetles. There were twenty-four individuals of them counted, those already captured not being reckoned. They played apparently the most important character at this banquet, and in spite of the sweet food did not seem to be in very good humor. Even the bold hornets avoided coming too near the powerful nip-pers of their clumsy companions, and held themselves at a respectful distance. The beetles fought a furious battle with one another, and certainly two-thirds of them contended to-

gether. The females, with their short, strong teeth, angrily bit each other in their struggle for the food. The contest between the males was especially interesting. Their horns were interlocked and projected over the neck shields of their antagonists, and they fought furiously together until one of the combatants dropped to the ground from sheer exhaustion. Sometimes a skillful fighter would succeed in seizing his opponent about the body, and with his head erected let him struggle in the air for a little while, and finally drop him. The observer, although near, was unnoticed, the fighters struggling and the victors licking the sap greedily. They seemed disturbed when the breath touched them, and the slightest noise, as the breaking of a twig, immediately affected the whole company. They would all raise themselves quickly and appear to listen. A similar thing would happen if one of the beetles that had fallen to the ground ascended the tree again and approached the others. In this case the males would move toward them with wide open mandibles eager to engage in a combat with them. Toward evening the greater part of the beetles buzzed away, and the crack-

The larvæ grow very slowly, and are nourished by the decayed wood of the oak tree. It requires four or five years for them to attain their growth of about four and one quarter inches and the thickness of a finger.

Their appearance is similar to that of others of their family. They have four-jointed antennæ on the horn-like head; the last joint is very short. The anterior of the three rings around the body is imperfectly defined on account of the cross folds, and has six strong legs which are yellow like the body; the horny parts about the mouth are black.

These larvæ were without doubt known to the ancients, for Pliny says: "The large wood worms which are found in hollow oaks and called 'cossis' are regarded as a choice morsel, and are even fattened with meal." They must have long been in use as a means of nourishment, for Hieronymus says: "In Pontus and Phrygia large, fat, white worms with black heads, which are generated in decayed wood, afford a considerable source of revenue and are valued as very dainty food." The full grown larva prepares a firm case, as large as the fist, from the decayed splinters of wood, and smooths

it out well inside. Three months sometimes pass before the larva assumes a chrysalis state and afterward becomes a beetle. From the hatching of the egg to the development of the perfect beetle requires about five years, some say six, and they enjoy for scarcely four weeks their winged existence. They may be kept in confinement by nourishing them with sweetened water or sweet beer.

Bültner mentions a swarm of stag beetles which were drowned in the Baltic and washed ashore. Cornelius gives an account of the great number of beetles which appeared in a limited locality at Elberfeld, in 1867, and thinks that every five years they will return again, and that the supposed developing time must be five instead of six years. Haaber mentions this and thinks this supposition is confirmed, as he observed a large number of beetles in 1862 and again in 1867 in the region of Prague.

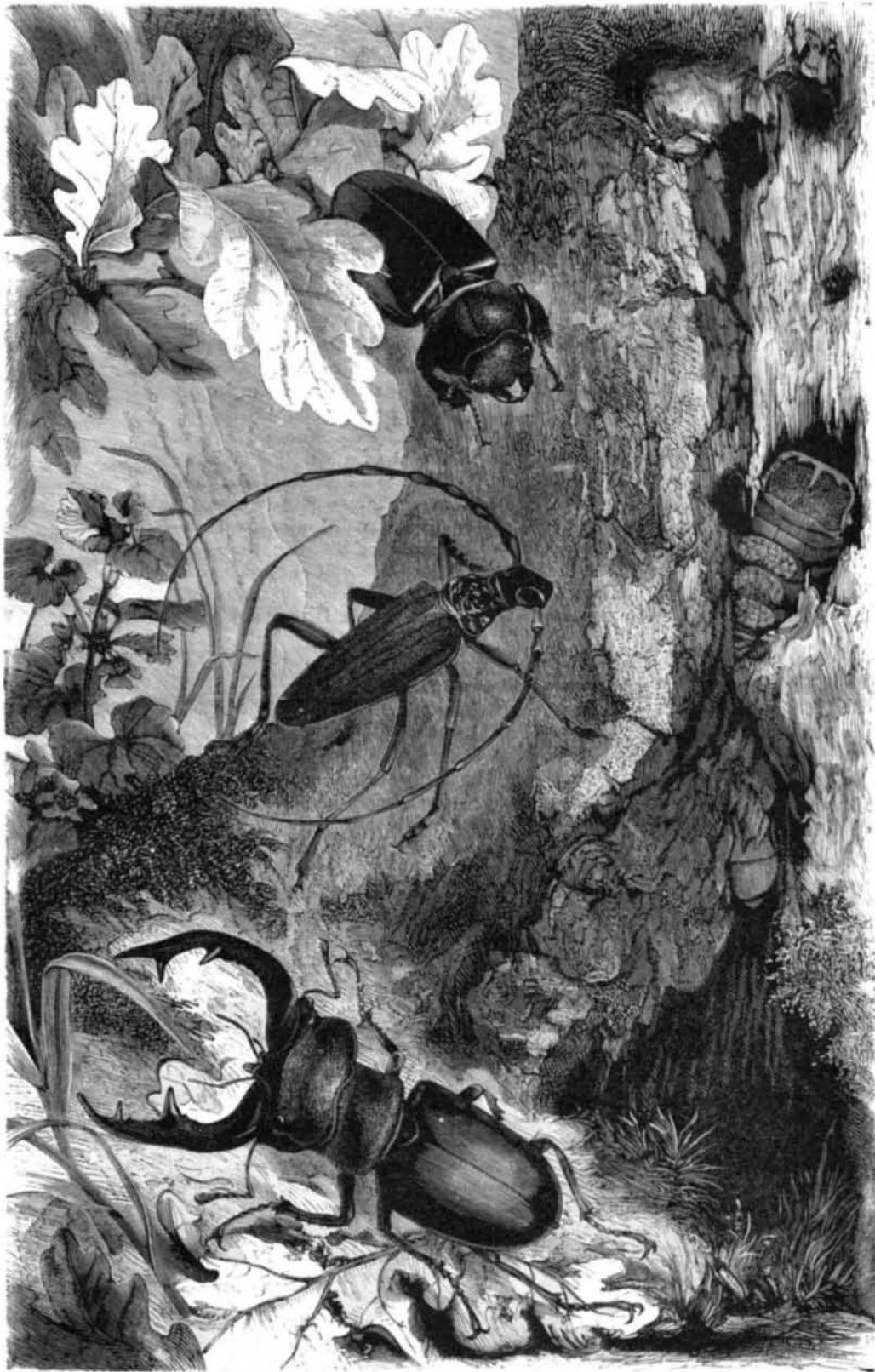
Here, as at Elberfeld, they flourished in old oak stumps, which appear especially favorable to their propagation. It would be of interest for other regions to note the flying year of the stag beetles. These beetles extend over the whole of middle and northern Europe, and are only wanting in regions where there are no oaks.

The champion beetle (*Cerambyx heros*) may be seen on an oak stem with the stag beetle in our engraving. It is a magnificent insect, of a glittering black. The head is long, the eleven-jointed antennæ swell out in the third to fifth joint into a club-shape, and end in a long slender joint, which appears to be separated, and in the male is considerably longer than the body. The neck shield is grooved or wrinkled, and has in the middle a thorny point at the broadest place. The wing covers have a blunt three-cornered shield in front. The under part of the body is covered with silky hairs, and is silvery white.

The larva has a granulated horny shield on the back of most of the joints, and lives three or four years in the inside of decayed oak trees. The broad flat passageways in the decayed wood which they bore out wind in various directions next to the bark. A trunk which is already perforated seems to possess a particular attraction for the female, and the work accomplished by these

colossal larva is enormous. The beetle emerges from the chrysalis in July, and is not seen by day; it only projects the points of its antennæ out of its retreat and speedily draws them back again if it is not approached very cautiously. The antennæ must project a long distance to enable one to bring the sly fellow to light. In most cases they will allow the points to be torn off before they can be drawn out of their retreat. After the sun has set they come out voluntarily and fly swiftly around, but not very high, in search of others of their family. The pairing ensues during the night, and the swarming time is, as with the stag beetle, a limited one.—*Brehm's Animal Life.*

EIGHTY-THREE thousand buffalo hides were sold at Miles City, Montana, alone, during the past fall and winter. At this rate the buffaloes will become extinct before long.



THE STAG BEETLE AND CHAMPION BEETLE.

ling sound was much diminished when the observer left the garden at eight o'clock. The struggles of a male over a female are of a more serious and determined nature, as the deep impressions and perforations in the wing covers show.

At the end of June or the first days of July the short swarming time is past. The pairing takes place in the night, the females lay their eggs in the decayed wood of an old oak tree, and the hard remains of the dead bodies of the males lie strewn around. It may even occur, and has frequently been observed, that after the pairing the feeble males, while still alive, are eaten by the rapacious ants, the hard front of the body being robbed of the soft back part, and they drag themselves painfully along on their long legs, a singular habitation for solitary ants. The bodies of the females are seldom found, because few of them come forth from their brooding places, and because the females are much more seldom met with than the males, who are about six times as numerous.