

TWO INSECT SAMSONS.

BY JAMES WEIR, JR.

When Samson stood between the pillars of the temple of Dagon and "bowed himself," thereby occasioning the mighty pile to fall in ruins upon his head, as well as upon the heads of a multitude of his enemies, he evinced extraordinary and super-normal strength; yet it was my good fortune recently to witness exploits of great strength, by the side of which the captive Hebrew's avenging blow pales almost into utter insignificance. When I declare that the actors in these feats were two lowly "pinching bugs," I am afraid that some of my readers will declare that I am drawing on my imagination. And yet, that which I am about to relate can easily be verified by anyone who will take the trouble to investigate and to experiment.

Last summer I went to a "cake walk" which was given at night in the city park. I had secured a good viewpoint and was enjoying the amusing antics of a couple of cake walkers when I felt something alight on the collar of my outing shirt. The entertainment was in the open air, the walking course being one of the footpaths of the park, which was brilliantly illuminated. I had noticed many moths and beetles flying about the lights; so knew at once that my visitor was a "bug" of some kind. I put up my hand and seized it, when, suddenly, a spasm of pain darted from my finger tips to my shoulder. In my agony and surprise I emitted a yell which occasioned the two cake walkers to execute several steps not down in their repertory. On examination, I found that I had got the tip of my middle finger between the mandibles of the largest stag beetle (*Lucanus elephas*) that I had ever seen. His mandibles were carefully pried apart by a friend and my finger released. It can be seen in the photograph what formidable weapons they are, though the beetle is here considerably reduced, it being, in life, $2\frac{1}{4}$ inches long and $\frac{5}{8}$ of an inch broad. He is much more noticeable with his branching, staglike "horns" (which are not horns, but mandibles), broad, flattened, elephantlike head, and sturdy, polished legs and back, than the smaller female, whose mandibles are not branched and whose form is not so robust and formidable looking.

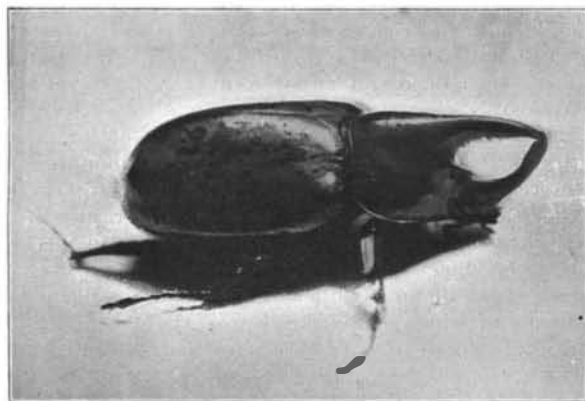
Unlike most of his congeners, the flight of *Lucanus* is almost without sound. I did not notice my visitor until I felt him on my collar. As soon as this beetle thinks that it is in danger of an attack from any source, it will hold its head erect and widely open its mandibles. Along the inner margins of the latter the horny skin is exceedingly sensitive. As soon as it feels anything between them, it closes them with considerable force and power, as I can testify from sad experience.

While holding this beetle in my hand, I was greatly struck with the extraordinary strength of his legs. When I closed my fingers upon him, taking care that none of them came between his sharp and ever ready "nippers," he seemed to plow his way through the hollow of my fist without the slightest difficulty. Procuring a little tin wagon which weighed exactly two ounces (960 grains apothecary's weight), I fastened him to it with a quick-drying glue and two pieces of thread. He weighed only 31 grains, yet he walked away, drawing the little wagon, as though he were free and untrammelled. I then placed half an ounce of bird shot in the wagon; he seemed to recognize this additional weight, yet pulled it along without difficulty. I added another half ounce. This seemed to be the limit of his load, for he could barely move the wagon, though move it he did for one inch. Just think of it! Here is a creature weighing only 31 grains which pulled 1,440 grains one inch, measured distance. Do you not think that his feat ranks with, if it does not surpass, that of the famous Samson? I do.

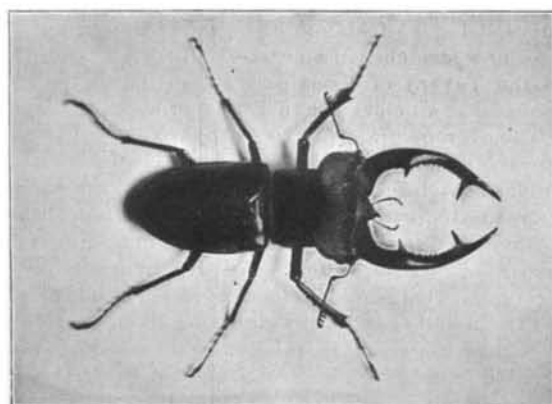
I confined all of his legs save one, which I attached to a very delicate dynamometer. This leg was fully extended and the animal was then irritated. It pulled down, as shown by the dynamometer, 249 grains. A man weighing 240 pounds would have to lift very near 2,000 pounds—one ton—with one hand or one leg in order to equal the performance of this beetle.

The rhinoceros beetle (*Dynastes tityrus*), the second insect Samson to which I invite attention, differs from the first in many respects. *Lucanus* is jet black, with wing cases and legs highly polished; it is slender, and sometimes very quick in its movements. *Dynastes*, on the contrary, is yellowish gray in color, with wing cases spotted with black; its body is heavy and solid looking, and its movements are always slow and sedate. Unlike those of the stag beetle, the horns on the head and prothorax of the rhinoceros beetle are true horns, and not mandibles. If the photograph of *Dynastes* be closely observed, it will be seen that the top horn springs from the back of the creature's neck, as it were, while the lower horn grows from the back

of its head. These horns are fixed and immovable and can only be made to approximate by movements of the beetle's head. Near the base of the upper horn are two short, thornlike spines, one on each side. The female *Dynastes* is without horns, and is otherwise very different from the individual in the picture. The photograph is life size, and, since it is a very good one indeed, an accurate idea of the appearance of this mammoth beetle can easily be obtained from a study of it.



AN INSECT SAMSON—*DYNASTES TITYRUS* (RHINOCEROS BEETLE).

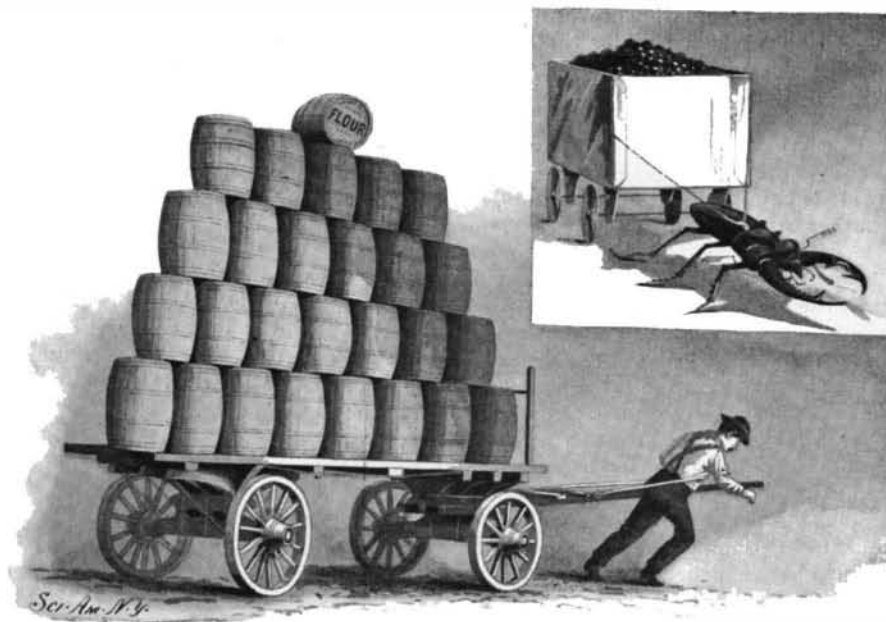


AN INSECT SAMSON—*LUCANUS ELEPHAS* (STAG BEETLE).

The set (or sets) of muscles governing the action of the mandibles of *L. elephas* is very highly developed and is exceedingly strong. Especially is this true of the tendinous attachments of the muscles themselves, which seem part and parcel of the mandibles, so closely and intimately are they welded to them.

The anatomical appearance of these structures indicates great strength. This appearance is reality, for relatively the elephant beetle has more power in its "jaws" than the most ferocious bulldog that ever gripped a bone. Furthermore, this insect has all the "staying" qualities of its canine prototype; for, once having seized an object between its powerful pincers, its head may almost be torn from its body before it will relax its grasp.

I held this beetle between thumb and forefinger of my right hand, and then brought the tip of my left thumb between its mandibles. These closed at once



RELATIVE STRENGTH OF MAN AND BEETLE.

on the hard and calloused skin, the tips piercing through and through and meeting beneath the surface. By exerting no little force, during the exhibition of which the cervical attachments underwent considerable strain, the mandibles were dragged through the skin. Not till then did the creature separate them.

These members are powerful weapons of offense and defense, and one should carefully avoid them when examining this insect Samson.

The larva or grub of *Dynastes* is the largest of all the beetle grubs. The individual I have is very near two years old and will pupate during next winter. It will emerge a fully developed rhinoceros beetle about next May or June. When this grub is first hatched out, it is quite active, boring and eating its way through wood that is just beginning to decay. As it grows older, it becomes sluggish and seeks wood that is softer and more decayed; finally, just before it pupates, it seeks the rotten dust and broken up detritus of the cavity and there undergoes further metamorphosis. The grub was reared from the egg.

This giant among beetles is remarkably strong. After fastening it to the tin cart mentioned elsewhere in this paper, I placed in the little vehicle one ounce of bird shot. The beetle pulled this along without difficulty. I then placed a half ounce more of shot in the cart. This seemed to bring out the strength of the insect, for it bent to its work and clearly showed that it felt the additional weight very materially. Again I added a half ounce of shot. This seemed at first to bring the load to a weight beyond the creature's strength, but when I goaded it with an electric needle, it "bowed itself," even as Samson did between the pillars of Dagon, and pulled this, to it, enormous weight of one thousand nine hundred and twenty grains, a measured distance of two inches! The beetle weighed only one hundred and eight grains; consequently, it moved a weight eighteen times greater than its own. To equal this feat I would be compelled to drag a wagon and load which together weighed four thousand five hundred pounds! When we take into consideration that two thousand pounds is a heavy load for two strong draught horses, we can appreciate all the more what a wonderful exploit this was. This beetle showed a dynamometric strength of three hundred and ten grains for one of its fore legs.

In order to further test this insect's strength, I gently placed on its back a common paving brick weighing some four or five pounds. The beetle moved this brick perceptibly to and fro. If a man were to be subjected to a like experiment, the brick being as large in proportion to him as it was to the beetle, he would be crushed into a shapeless mass.

THE UNITED STATES ARMORED CRUISER "BROOKLYN"

Until the story of the naval engagement off Santiago has been written by some naval expert who was present at the fight, and written with a view to giving the facts which are of the greatest technical value, we shall be in ignorance as to which of the American ships bore the brunt of the fight. By one eyewitness the "Iowa" is reported to have been the chief object of attack, and another witness reports that on account of her superior speed the "Brooklyn" was singled out by the Spanish cruisers, and an attempt made to disable her. The fact (if fact it be) that she was hit forty times seems to substantiate the latter statement; moreover, it would be natural for the cruisers, whose sole effort seems to have been to escape, to aim at disabling the speediest ship of the enemy, and the only one that was capable of overhauling them provided she was not disabled.

The "Brooklyn" is the most modern of the large cruisers of our navy. She was modeled on the lines of the "New York," but exceeds her in size, speed, coal endurance and the power of her batteries. Both of the ships are of the armored cruiser type, and they constitute the sole representatives of this type in our navy.

The dimensions of these two vessels are given below.

Both ships have three funnels, and with their lofty freeboard present a commanding appearance. The "Brooklyn's" funnels are abnormally lofty, their extreme height being intended to serve the purpose of forced draught.

The forward pair of 8-inch guns in the "Brooklyn" are carried upon a raised forecastle deck, and the great height of the deck above the waterline gives the ship a peculiar contour from which she is easily recognized.

She was built by the William Cramp and Sons' Ship and Engine Building Company, of Philadelphia, Penn., from government designs, the contract price being \$2,986,000, of which it was estimated that the machinery would cost \$986,000, the remainder being for hull and fittings. Proposals for the construction of this cruiser were issued on September

	Length.		Beam.		Draught.		Dis- place- ment.	Horse Power.	Speed.
	Ft.	In.	Ft.	In.	Ft.	In.			Knots.
"Brooklyn"	400	6	64	8 $\frac{3}{4}$	24		9,215	18,769	21.91
"New York"	380	6 $\frac{1}{2}$	64	10	23	3 $\frac{1}{4}$	8,300	17,401	21