

NEW SYSTEM OF BRICK MAKING.

In brick making, as in all other industries where the demand is great and rapidly growing, machinery is replacing hand labor, and as a result it is not only possible to bring the rate of production up to the demands of the market, but the quality of the product is vastly superior to that of the best hand-made article, and with the system illustrated the quality of brick manufactured is far in advance of the product of

The following report of tests made by General Q. A. Gillmore shows the extraordinary strength of these bricks:

UNITED STATES ENGINEERS' OFFICE,

Wm. L. Gregg, Esq.:

DEAR SIR: I have the honor to state that some tests have been applied to the bricks received from you with very satisfactory results,

pounds, without cracking or disturbance of any kind. Surface pressed, equal to 32 square inches (4 x 8).

The pile was subjected to pressure between thin pine cushions, one below the lower brick and the other above the upper one.

SECOND TEST.

Three half bricks, making a pile 4 inches by 4 inches and 6 $\frac{3}{4}$ inches high, were then subjected to pressure between wooden cushions. Area of surface pressed, 16 square inches (4 x 4).

The pile crushed at 90,000 pounds, or 5,625 pounds to the square inch.

THIRD TEST.

Some two inch cubes were cut from the bricks, and crushed separately, with the following results:

No. 1 crushed at 40,000 pounds; equal to 10,000 pounds to square inch.

No. 2 crushed at 37,000 pounds; equal to 9,250 pounds to square inch.

The above were crushed between steel plates.

No. 3 crushed at 37,000 pounds; equal to 7,750 pounds to square inch.

No. 4 crushed at 30,000 pounds; equal to 7,500 pounds to square inch.

Nos. 3 and 4 were crushed between one-quarter inch pine cushions.

The crushing strength of these bricks is greater than that of any bricks ever tested by me.

Very respectfully, your obedient servant,

Q. A. GILLMORE,

Lt.-Col. Eng'rs, Bvt. Maj.-Gen.

Similar tests were applied by direction of the Supervising Architect of the United States, at the Treasury Department, Washington, with the same results, and the bricks were ordered to be used in the government work.

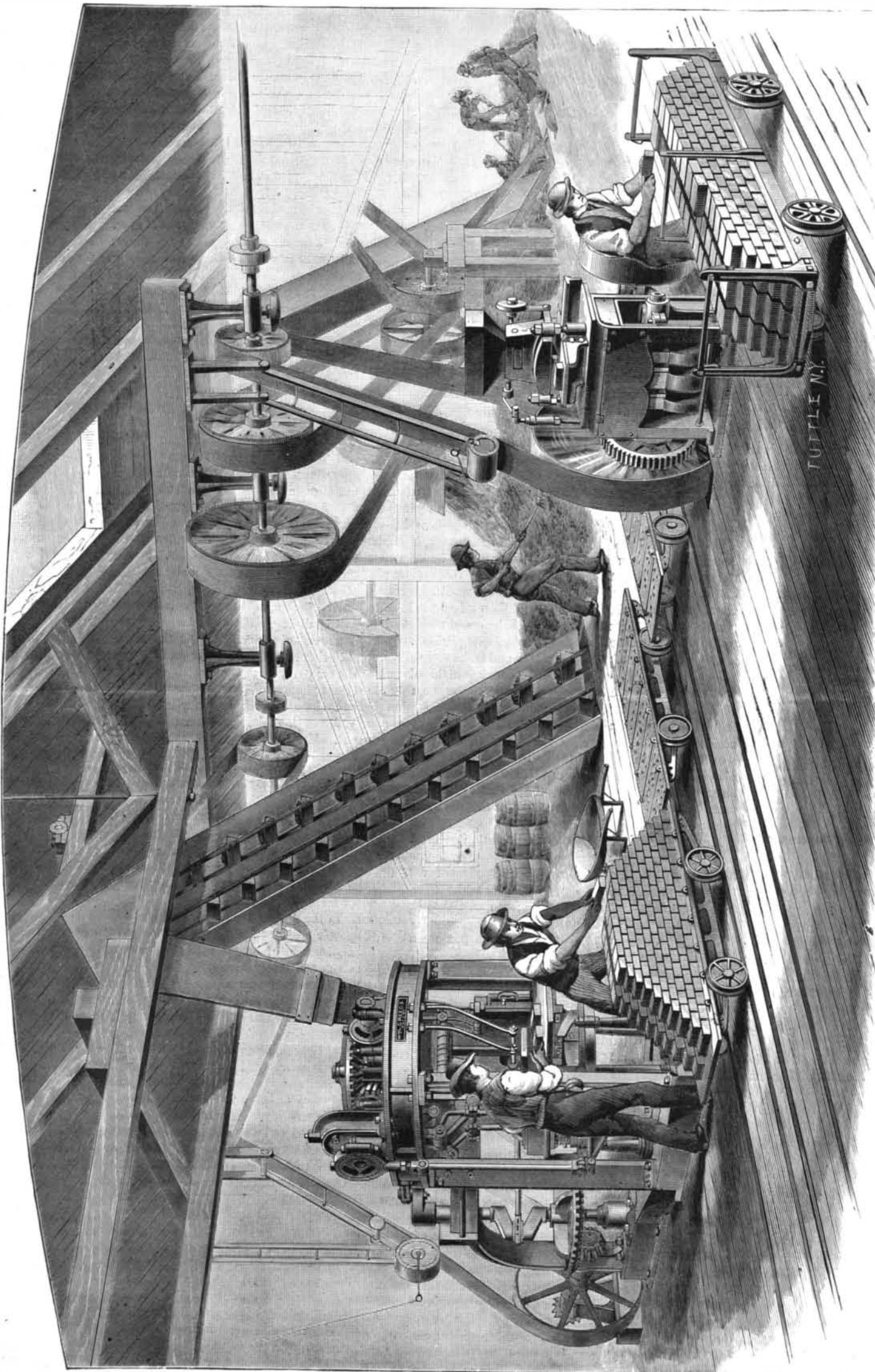
Heretofore in the construction of bricks by machinery, and especially face or front bricks, it has been found practically impossible to supply an equal amount of clay to each of the mould boxes. This results in unequal size and density in the bricks, and when but one pressure is imparted to the clay, as in ordinary machines, the bricks are often defective in strength, at the corners and edges especially, and hence unsuitable for use as first quality front or face bricks. These serious objections have been overcome by Gregg's brick machines.

The mechanical construction of these machines is such that the heavy developing pressures take place while the mould table is at rest, thus requiring but a nominal amount of power to operate them, and avoiding strain, wear and tear, and breakage, as well as the great loss of power common to other machines.

Brick machines may properly be classified under three heads: dry clay machines, slush machines, and crude or moist clay machines.

From the peculiar construction of dry clay machines where "filler boxes" or graduating measures are used to fill the mould boxes, the clay must be dried and granulated

to fill with any degree of regularity into the "filler boxes," and thence into the moulds. And when moulds are grouped together it becomes a physical impossibility by the dry clay system to fill them alike, hence those deficient in clay will but partially develop the bricks; this, added to the fact of the cohesive quality of the clay being destroyed by extracting the moisture before moulding, complete vitrification cannot take place in the burning, and the result is that bricks made from the dry clay disintegrate with the action of the



GREGG'S NEW SYSTEM OF BRICK MAKING.

other machines. Bricks made by machinery have been commonly deficient in strength, unequal in size and density. The Gregg triple pressure and combination brick machine, shown in our engraving, possesses new and valuable features, which insure a yield of bricks superior to the best hand-made, and at a comparatively small cost. These bricks are superior in appearance, and in the matter of homogeneity and strength they are beyond all doubt far ahead of any other brick made.

The bricks possess remarkable density, hardness, and compressive strength.

The tests made and the results obtained are given below:

FIRST TEST.

Three bricks were placed together without mortar, one above the other, flatwise, making a pile 8 inches long, 4 inches wide, and 6 $\frac{3}{4}$ inches high, the upper and lower sides of each brick being rubbed to secure good contact.

The pile was then subjected to a pressure of 100,000

elements. In the manufacture of slush brick the other extreme is met. To facilitate moulding in the "hand way" a large portion of water is added, and the bricks being so soft must be spread upon floors to dry. The slow out-door process of drying, or evaporation, is one of the most favorable processes for the hand brick maker, but it requires the continuous insurance of favorable atmospheric influences, and a continuity of fair weather, which practically can never be relied on.

Clay, to be made into bricks by hand moulding, must of necessity be so wet that at least 25 per cent of water must be evaporated before it is safe to burn, so that in fact, in works producing 30,000 bricks per day, upwards of 23 tons of water have to be evaporated therefrom every twenty-four hours—the labor attending which being an expensive item, and the bricks being rendered porous by the operation.

Gregg's triple pressure and combination brick machines occupy a medium position between dry clay and slush machines; thus a first great saving is effected, as the machines accept the crude clay, and manufacture it to advantage in so stiff a state as not to contain more than one-eighth the above amount of water to be evaporated, and yet all of its cohesive qualities are retained. The fusion being complete, the bond between the particles is perfect and the bricks are less porous, consequently stronger, and absorb less moisture when burned.

After being pressed, the bricks are placed on iron cars and

turning out the finer grades of brick for fronts, mouldings, cornices, etc., ornamental and shape bricks.

Our engraving gives a good idea of the interior of the establishment, beside giving much of the detail of the machinery.

All inquiries should be addressed to the Gregg International Brick Machine Company, Equitable Building, Boston, Mass.

TAPIR AND YOUNG.

The first tapir known to have been bred in Europe was born in the London Zoological Gardens, February 12. It is a cross between the two principal American species, the mother (*Tapirus americanus*), from Brazil, being a brown animal, and the father (*T. roulini*), from Colombia, having black hair. The young one, like all young tapirs, is curiously lined and spotted with white on a ground of bright fawn color. The time of gestation was fourteen months. The young one is a lively little fellow, about the size of a roasting pig, and appears to enjoy life amazingly. When but a day old it readily entered the water, and when not following its mother about it frequently indulges in a swim. The white markings will probably disappear when it is about a year old.

The tapir is a pachyderm, one of the links which unite the elephant with the wild boar and rhinoceros.

The snout of the animal forms a small proboscis not

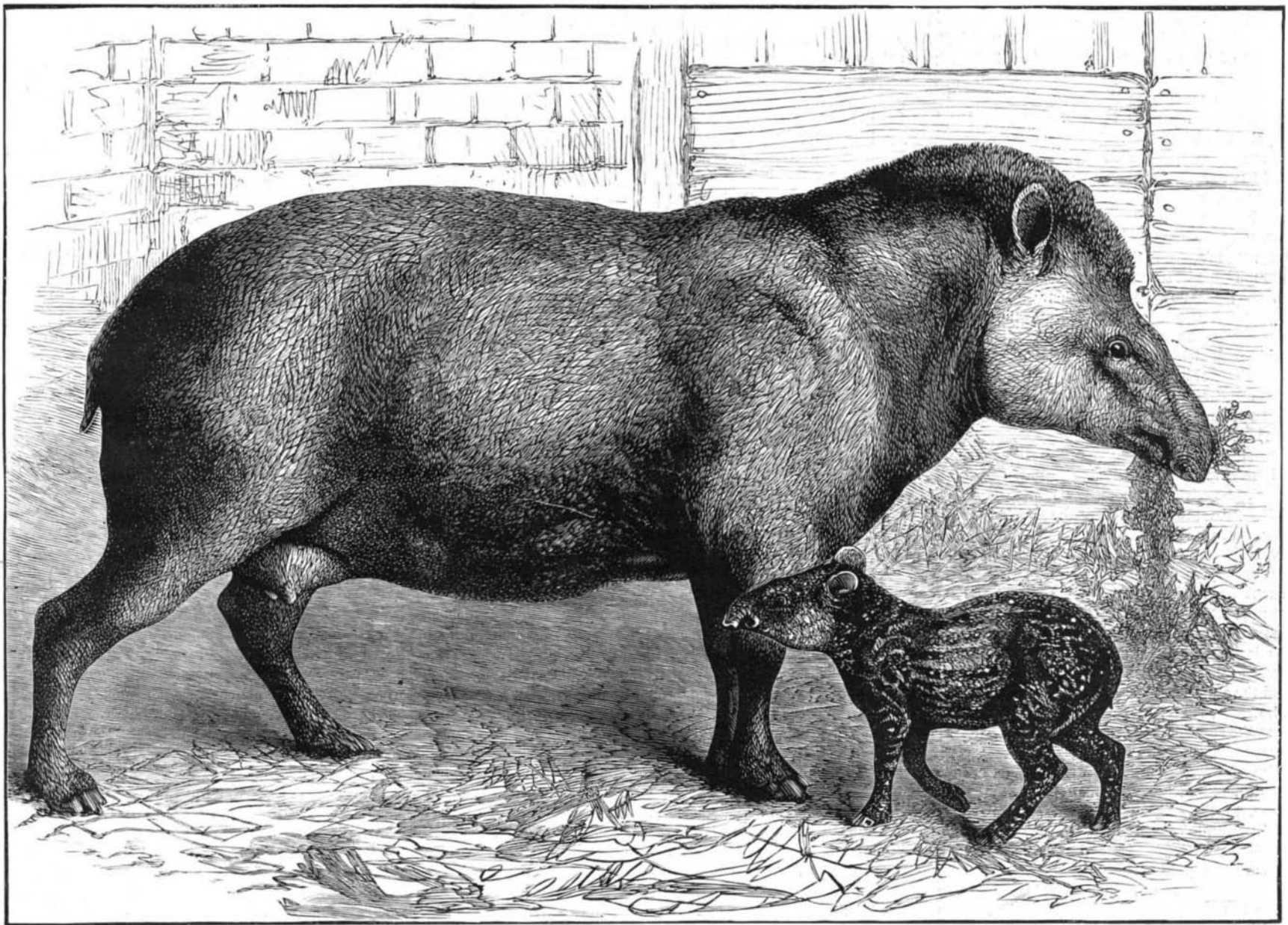
the Brazilian and Colombian tapirs have a stiff bristly mane; the Malayan has none. The *T. bairdi* is found, it is said, only on the Atlantic side of the Isthmus of Panama.

For our handsome illustration we are indebted to the London *Illustrated News*.

New Variety of Silk Moth.

BY W. MARTIN WOOD.

On behalf of both entomologists and sericulturists, it seems desirable to make some further mention of the fertile hybrid silk-moth—result of a cross between the *Yamma-mai* of Japan, and the *Tusser* moth of the Deccan—first produced at Bombay about seven or eight years ago. It is not mentioned by Mr. Wardle in his valuable "Handbook of the Collection Illustrative of the Wild Silks of India," though that bear's date so late as July last year. Besides, this new silkworm, though specially reared, comes under the definition given by Mr. Wardle in his opening sentence: "The term 'wild silks of India' must be regarded as applying to all species of silk other than that produced by the *Bombyx mori*, the worm which feeds on the mulberry leaf." The primary advantage of this new high-class silk spinner is in its being able to feed and thrive, not only on the blair tree (*Zizyphus jujuba*), as mentioned in my remarks the other day, but on almost every variety of the *ficus*—probably on all the trees mentioned by Mr. Wardle (p. 15) as furnishing food to the "Tusser" worm. Thus the



THE NEW-BORN TAPIR—LONDON ZOOLOGICAL GARDENS.

passed through a drying tunnel, where they are dried with regularity, not being subjected to rains and atmospheric changes as by the old out-door system: they are then passed directly to the burning kiln, and are there burned and made ready for the market.

The great benefit to be derived by operating this system is not only the economy and regularity of the manufacture, but the increased value of the product. By keeping a strict account of the cost of manufacturing 1,000,000 bricks by the old system and a similar account of a like number made by the Gregg system, it will readily be seen that they can be made by the latter process at one half the cost of the former, as well as at all seasons of the year, and be worth twice as much in the market as a kiln of ordinary brick.

The Gregg machines have obtained a world-wide reputation at the various expositions, both in this country and Europe, where they have invariably received the highest awards.

Mr. Wm. L. Gregg, the inventor of this system, has organized in New England the "New England Press Brick Manufacturing Company," having offices in the Equitable Building, Boston, Mass. The works of this company are capable of turning out 100,000 bricks per day, this being the largest production of fine bricks made in any of the Eastern States.

This establishment is specially fitted with machines for

unlike the elephant's, but much smaller, and minus the finger-like tip. It has the appearance of a trunk cut short.

The American tapir is a great swimmer and haunts wooded parts on the margins of streams; it is powerfully built, and has the merest apology for a tail.

The food of the tapir consists of leaves, young shoots of trees, native fruits, and probably submerged water plants and other vegetable matter. It often does much damage to the manioc plantations of the natives. The flesh is good to eat, though somewhat dry and tough. The tapir is much hunted by the Indians, who watch for their large but timid game from platforms built among the trees overlooking the animal's feeding places.

The tapir is of a very gentle disposition, and becomes quite affectionate in confinement, which may be observed with the specimens now in the Gardens; the attentive young keeper moves about among them as if they were sheep. The tapir is a different animal if hard pressed, and becomes a formidable opponent; he does not always come off second best. He goes in search of food by night, is very shy, and has wonderful powers of hearing and scent. The jaguar is its most formidable enemy.

There are now several known species of tapirs, such as the *Tapirus americanus*, *T. laurillardii*, *T. malayensis*, *T. roulini*, *T. sumatranus*, *T. indicus*, *T. bairdi*.

The Sumatran tapir has a white band encircling the body;

new worm might be diffused over the greater part of India without any planting preparations being required. The Japanese progenitor of the hybrid is known as the "oak-feeding" silkworm, so that may partly account for the omnivorous character of the creature, although experience may show that carefully selected diet will improve the quality of its silk. The new variety might be provisionally designated *Yamma-paphia mowisia*, thus preserving the name of the ingenious sericulturist, Mr. Paul Mowis, who developed the hybrid, and tested its value through several seasons. Having myself seen the creature during all its stages, from egg to moth, I can testify to its healthy appearance, its fertility, and productiveness. Some millions of its cocoons were, I understood, sent about 1878, to be reeled and worked up at Bradford. The silk is finer than that of the *Tusser*, and nearly as strong; so that if the worm can be reared and fed on the same plants, and with as little trouble as the coarser *Tusser* worm, then there should be a very distinct gain in the most valuable quality of silk produced. Mr. Mowis is, at present, carrying on his sericulture somewhere in the railway reserved forests of H. H. the Nizam's dominions; and, no doubt, information could be elicited from him on the subject. He had given much attention to the practical chemistry of sericulture in trying to hit on the best methods of removing the mucilaginous matter from the worms, and in preparing the fiber for dyeing.—*Journal of the Society of Arts*.