XI. Description of an improved machine for cutting chaff

Mr. Robert Salmon

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and the residuum properlyedulcorated with a fuitable quantity of alcohol. When all the fpirit of wine had evaporated * over a gentle fire, the quantity of the pure white fugar obtained was fuch that in general 8 pounds of pure fugar may be expected from 100 pounds of raw beet roots. According to this refult, an acre of land, which may produce 46,000 pounds of beet root, will yield 22 hundred weight of raw fugar. If we allow four pounds of beet root to one fquare foot, a German mile will produce 16,756 hundred weight 2 quarters and 14 pounds. This is all as yet known refpecting the difcovery. What M. Achard ftill keeps fecret is the refult of his fifteen years experience refpecting the cultivation of thefe beets. He has found that the quantity of fugar to be obtained will depend on the foil in which they are fown, and the method of culture employed. The king of Pruffia has not only beftowed a confiderable reward on M. Achard for this difcovery, but is purfuing every poffible means to render it beneficial to his dominions.

XI. *Description of an Improved Machine for Cutting Chaff†, invented by Mr. ROBERT SALMON, of Woburn, Bedfordfhire. From Tranfactions of the Society for the Encouragement of Arts, &c. Vol. XV.*

WITH this machine the chaff is cut by two knives, AA, (Plate VI.) fixed on the infide of the fellies of two wheels, BB, which are ftongly connected together; the edge of the knives being at an angle of about forty-five degrees from the plane of the wheel's motion. Thefe knives are fo fixed as to be forced forward by fprings, CC, on the wheel; which fprings are formed to adjust, and act more or

* Diffillation might be employed to fave the lofs of the alcohol. EDIT.

† Thirty guineas were voted to Mr. Salmon for this improved machine, of which a model is referved in the Society's repository for the infpection of the public.

less as occasion may require, so as to give the knife as much pressure against the box as may be requisite to cut the straw. The knives are prevented from coming too forward, and occasioning unnecessary friction, by the wedges under the staples *aa*; which wedges, as the knives wear, must be drawn out so as to admit the knives to come more forward. With the before-mentioned provisions it will be found very easy at any time to put on new knives, as the springs, &c. will always adjust them to their work.

On one side of the wheel is fixed a round block of wood, *D*, in which there are four holes and a moveable screw; to this block is screwed one end of the feeding-arm, *E*, running nearly horizontally to the cross bar *F*, at the end of the box *G*; to which cross bar *E* is attached by the pin *b*, moveable to five different holes in *F*, by means of which, and the four holes in the block before described, twenty changes in the length of the chaff may be obtained. The straw is brought forward by the rollers in the box *G*, the form of which is shewn at Fig. 2; which rollers are turned from the outside by the riggers or ratchet-wheels, *H*, one on each side the box, which move more or less, according to the stroke given to the cross bar by the feeding-arm and wheel: by this mode of feeding, the straw is perfectly at rest, and does not press forward at the time of the knife cutting; and, by means of the pin being taken out of the cross bar, the feeding is instantly thrown off, although the wheel and knives may continue their motion. Under the box is suspended the pressing weight *I*, which may be made more or less powerful by shifting the weight on the bearer *K*, to which it hangs, and also may be thrown on either side, more or less, as occasion may require; which will be found useful, in order to force the straw towards the knife, and to counterbalance the ratchet-wheel of the upper roller: near the fulcrum of this bearer is fixed a chain, shewn by the dotted line *c*; its upper end suspended from a roller; at each extremity of which is a small bar of iron joined to

the end of the upper spiked roller, by which means the straw is always equally pressed in passing the two-spiked rollers.

L. The winch by which the machine is turned.

M M. The frame of the machine.

In order to apply this machine to the best advantage, the inventor proposes a second box to be placed at the end of the first, which box may be of any length, and suspended by a line and counter-weight, whereby the end of it is brought down level whilst filling with straw, and then drawn up, so as to give the said box a declivity, to make the straw more easily come forward.

It is also presumed much advantage may be expected in this sort of machine, from its cutting various lengths—resting during the cut—the knives being adjusted to their work by regulating springs—the feeding being readily thrown off—and the pressure moveable to either side.

It is also well calculated to be applied to any power which may be occasionally fixed to the opposite side of that on which it is turned by hand; and, by the additional box, when used by hand, the workman will be enabled to cut for some continuance, without stopping to feed.

XII. *Agenda, or a Collection of Observations and Researches the Results of which may serve as the Foundation for a Theory of the Earth.* By M. DE SAUSSURE. From Journal des Mines. No. XX.

[Continued from page 156.]

CHAP. XII.

Observations to be made on the Valleys.

1. **T**O observe the direction of valleys. Those parallel to the chain of the mountains where they are situated are called longitudinal; those which intersect it at right angles, transversal;