of Tacitus breaks off at the moment when Thrasea was about to address Demetrius, the Cynic philosopher, with whom he had previously on the fatal day held a conversation on the nature of the soul. Thrasea was the subject of a panegyric by Arulenus Rusticus, one of the tribunes, who had offered to put his veto on the decree of the senate, but Thrasea refused to allow him to throw his life away uselessly. Thrasea's own model of life and conduct was Cato of Utica, on whom he had written a panegyric, one of Plutarch’s chief authorities in his biography of Cato.

See Tacitus, *Annals* (ed. Furneaux), xiii. 49, xiv. 12, 48, xv. 20-22, xvi. 21-35, containing a full account of his trial and condemnation, *Hist.* ii. 91, iv. 5; Dio Cassius lxi. 15, lxii. 26; Juvenal v. 36; W. A. Schmidt, *Geschichte der Denk- und Glaubensfreiheit* (Berlin, 1847); Merivale, *Hist. of the Romans under the Empire,* ch. 53; F. Hersche, *Zwei Characterbilder,* on Diogenes of Sinope and Paetus (Lucerne, 1865); monographs by A. S. Hoitsema (Groningen, 1852); and G. Joachim (Lahr, 1858); see also Pauly-Wissowa’s *Realencyclopädie der classischen Altertumswissenschaft* (1900), iv. pt. 1.

**THRASHING,** or Threshing (from “ to thrash,” O. Eng. h*erscan, cf.* Ger. *dreschen,* Du. *dorschen,* &c.), the process by which the grain or seed of cultivated plants is separated from the husk or pod which contains it.

*Historical.—*It is probable that in the earliest times the little grain that was raised was shelled by hand, but as the quantity increased doubtless the grain was beaten out with a stick or the sheaf beaten upon the ground. An improvement on this, as the quantity further increased, was the practice of the ancient Egyptians and Israelites of spreading out the loosened sheaves on a circular enclosure of hard ground 50 to 100 ft. in diameter, and driving oxen, sheep or other animals round and round over it so as to tread out the grain. This enclosure was placed on an elevated piece of ground so that when the straw was removed the wind blew away the chaff and left the corn. This method, however, damaged part of the grain, and as civilization advanced it was partially superseded by the thrashing sledge— the *charatz of* Egypt and the *morag* of the Hebrews—a heavy frame mounted with three or more rollers, sometimes spiked, which revolved as it was drawn over the spread out corn by two oxen. A common sledge with a ridged or grooved bottom was also used. Similar methods to these were used by the Greeks and are still employed in backward countries. In Italy a tapering roller fastened to an upright shaft in the centre of the thrashing floor and pulled round from the outer end by oxen is still in vogue and would seem to be a descendant of the Roman *tribulum* or roller sledge.

Doubtless the flail was evolved from the early method of using the stick. It seems to have been the thrashing implement in general use in all Northern European countries, and was the chief means of thrashing grain as late as i860. It was known to the Japanese from the earliest times, and was probably used in conjunction with the stripper, an implement fashioned very much like a large comb, with the teeth made of hard wood and pointing upwards. The straw after being reaped was brought to this and combed through by hand, the heads being drawn off and afterwards thrashed on the thrashing floor by the flail. At the present day just such an implement, known as a “ heckle,” is used for combing the bolls or heads off flax or for straightening the fibre in the after treatment.

The flail consisted of two pieces of wood, the handstaff or helve and the beater, fastened together loosely at one end by a thong of raw hide or eelskin, which made a very durable join. The handstaff is a light rod of ash about 5 ft. long, slightly increasing in girth at the farther end to allow for the hole for the thong to bind it to the beater. The length of the handstaff enabled the operator to stand in an upright position while working. The beater is a wooden rod about 30 in. long, made of ash, though a more compact wood such as thorn is less likely to split. This also has a hole at one end for the thong to bind it to the handstaff. The shape of the beater was cylindrical, of about 1¼ in. diameter and constructed so that the edge of the grain of the wood received the force of the blow; 30 to 40 blows or strokes per minute was the average speed.

After the grain had been beaten out by the flail or ground out by other means the straw was carefully raked away and the corn and chaff collected to be separated by winnowing when there was a wind blowing. This consisted of tossing the mixture of corn and chaff into the air so that the wind carried away the chaff while the grain fell back on the thrashing floor. The best grain fell nearest while the lightest grain was carried some distance before falling, thus a very rough-and-ready grading of the grain was obtained. It was also performed when there was no wind by fanning while pouring the mixture from a vessel. Later on a fanning or winnowing mill was invented. All ancient barns were constructed with large doors giving on to the thrashing floor and opening in the direction of the prevailing winds so that the wind could blow right through the barn and across the thrashing floor for the purpose of winnowing the corn. The flail is still in use for special purposes such as flower seeds and also where the quantity grown is so small as to render it not worth while to use a thrashing mill.

With regard to the amount of grain thrashed in a day by the flail, a fair average quantity was 8 bushels of wheat, 30 bushels of oats, 16 bushels of barley, 20 bushels of beans, 8 bushels of rye and 20 bushels of buckwheat.

There seem to have been many attempts to devise some form of power-driven machinery for thrashing. In 1732 Michael Menzies, a Scotsman, obtained a patent for a power-driven machine. This was a contrivance arranged to drive a large number of flails operated by water power, but though worked for a time it was not particularly successful. The first practical effort leading in the right direction was made by a Scottish farmer named Leckie about 1758. He invented what was described as a “ rotary machine consisting of a set of cross arms attached to a horizontal shaft and enclosed in a cylindrical case.” This machine did not work very well, but it demonstrated the superiority of the rotary motion and pointed out the lines on which thrashing machines should be constructed.

The first really successful thrashing machine—the type which is embodied in modern thrashers—was invented by another Scotsman named Andrew Meikle in 1786 In this the loosened sheaves were fed, ears first, from a feeding board between two fluted revolving rollers to the beating cylinder. This cylinder or "drum ” was armed with four iron-shod beaters or spars of wood parallel to its axle, and these striking the ears of corn as they protruded from the rollers knocked out the grain. The drum revolved at 200 to 250 revolutions per minute and carried the loose grain and straw on to a concave sieve beneath another revolving drum or rake with pegs which rubbed the straw on to the concave and caused the grain and chaff to fall through. Another revolving rake tossed the straw out of the machine. The straw thus passing under one peg drum and over the next was subjected to a thorough rubbing and tossing which separated the grain and chaff from it. These fell on to the floor beneath, ready for winnowing.

A later development of the beater-drum was to fix iron pegs on the framework, and thus was evolved the Scottish “ peg-mill," which remained the standard type for nearly a hundred years and is found at nearly every farmstead in Scotland as a fixed machine in the barn to the present day, though in many cases unused since the advent of the portable thrasher. Further, it is the type adopted in America, and all "separators" in use on the great wheat lands of “ the West ” are simply modifications of the peg­mill principle. In Great Britain, however, a reversion has been made to the beating or rubbing principle, where the arms of the “ drum ” rub the straw against an encircling concave framework and thus shell the grain out, and the portable thrashing machines now taken from farm to farm are all constructed on this principle. It was not till about 1800 that a machine for winnowing was invented to work as part of Meikle’s peg-drum thrasher, and this made a complete separator or thrasher which thrashed, cleaned and delivered the grain at one operation. Still, these machines were stationary, being generally built up in homesteads and operated by water power, and the unthrashed corn had to be brought to them. Port­able thrashing machines operated by horse power were used to a small extent, but the work was very hard on the horses and took them away when their services were otherwise required on the farm. When steam was developed as a motive power the portable thrashing machine became more general.

When Meikle had brought together the peg-drum and concave he had solved the difficulty of mechanical thrashing. The develop­ment of the machine to the efficiency of the modern thrasher was very gradual, and was in the direction of greater speed to the drum and more beaters on it, and improved arrangements to ensure a clean sample of grain. It is generally supposed that each part was invented and perfected singly, but in reality the early experi­menters had tried to make a complete separating machine. In fact they covered the whole ground in theory before any main features were made practical.

*The Modern Thrashing Machine.—*The present-day thrashing machine embodies the main features of Meikle’s machine and will thrash up to 16 quarters of oats per hour, depending on the size of the same. There are no fluted rollers at the feed, the sheaves are fed straight to the drum; but as the working of these high-speed drums was attended with considerable risk, the Threshing Machine Act 1878 now provides for some sort of guard or safety feed.

In the most modem thrashing machine the ordinary routine is as follows: The loosened sheaf is fed in at the feed mouth under the drum guard and passes between the drum beaters