OILSTONES, HOW TO SELECT AND USE THEM

If the iron be blunt and he do not what the edge, then must he put to more strength.—Ecclesiastes x., 10.

No article in a mechanic's kit of tools is of greater importance than the oilstone, for no matter how good the quality of his edge tools, they cannot do good work unless properly sharpened. If it were possible to show in figures the total loss in damaged tools and wasted time resulting every year from the use of poor and unsuitable oilstones, the sum would be amazing—far exceeding, doubtless, the total amount of oilstones sold. Notwithstanding this fact, very few mechanics and still fewer tool dealers understand the particular merits of the different oilstones on the market, or how to select them for different purposes. The object of this article is to give a few practical suggestions on the selection, use and care of oilstones, in such terms that the amateur as well as the experienced mechanic may obtain a clear understanding of the subject, and benefit thereby.

Far in the past, while man was fighting his way up from his barbaric condition to civilization, the sharpening stone was one of his most important tools. Old stone implements and weapons discovered in caves, mounds and excavations in various parts of the world give evidence of this; for among those ancient relics have been found stone arrowheads and crude axes with sharp or ground edges. At first, it is probable that these were ground down by rubbing on large rocks. Later on in man's progress, when it was discovered that metal made better edge tools than stone, the sharpening stone became a still more important factor; more care was taken in selecting the kind of stone for grinding these tools, and instead of rubbing the tools on large boulders, he evidently broke off small pieces of rock and faced them by rubbing together.

Many pieces of hones and whetstones of various kinds have been found in the excavations of Pompeii and other ancient cities. Coming down to the time when the art of transmitting written records had been learned, we find whetstones referred to irequently by the carliest historians. The word "whet," as referring to the sharpening of swords and iron tools and weapons, occurs several times in the Bible, and the historian Pliny, writing over 1800 years ago, tells us that there were many different kinds of stone used in those days for sharpening iron instruments. He states that the best ones came from Crete, and gave better results when used with oil. As the wellknown Turkey oilstone is still found in Crete, although quarried principally in Asia Minor, it is probable that this is the stone Pliny refers to, which would indicate that the Turkey stone has been in use for nearly two thousand years. It was the principal oilstone of the civilized world until the discovery of Arkansas and Washita stones in the early part of the present century. These two kinds of stone, which are the same geological formation, but vary in hardness and fineness, were discovered in the Ozark Mountains of the state of Arkansas, U.S., somewhere about the year 1815, when it was quickly perceived that they were superior to anything ever found for sharpening edge tools. In those days of slow and costly transportation it was very expensive getting the stone into eastern markets, the rough rock bringing as high sometimes as \$2 per pound. In spite of this, the remarkable sharpening qualities of these stones rapidly increased the demand for them, until to-day they are the two leading oilstones of the world.

The first point to be considered in selecting an oilstone is the purpose for which it is required; many mechanics make the common mistake of expecting one oilstone to answer all purposes. It would be just as reasonable for a carpenter to use a coarse-tooth crosscut saw on fine cabinet work, as to expect a coarse-grained fast-cutting oilstone to impart a fine razor edge. The sharpening qualities of a stone depend upon the size of its grains of grit, or crystals. In a coarse-grit stone, these grains are large, and cut deep, far-apart furrows in the tool, leaving a coarse, rough edge. Such stones cut away steel faster than a fine-grained stone (as a coarse-tooth saw cuts faster than a finetooth). The coarse edge left by such a stone is all right for working pine or soft woods in which the cells are large, but for working hardwood or any kind of fine work, the tool should be finished on a finer-grained stone. It is therefore safe to lay down the rule that a good mechanic should have at least two oilstones, one for grinding down dull tools, or imparting a coarse edge, and another for finishing. There are some stones of

medium grit which answer well for many purposes, but they cannot cut as rapidly as the coarse stone, nor impart so smooth an edge as the fine. A carefully selected Washita stone is stated to be the best general purpose oilstone. The hardness of an oilstone is also an important factor in determining its cutting qualities. For sharpening ordinary tools with broad blades or edges, a medium-soft, fast-wearing stone should be chosen. For sharpening narrow chisels, engravers' tools or pointed instruments, however, it is necessary to use a very hard stone, as otherwise the stone will soon be cut full of grooves or furrows. The difference between a hard and soft Washita stone can be told in several ways; first, by the sight, as in a soft stone the minute pores are usually apparent to the eye, and the surface of the stone will have an open, granulated appearance; second, by scratching with a knifeblade, as a soft stone can be quite readily scratched on the edges, whereas a hard sione will show very little impression; third, by the sound, holding the stone loosely by one end between the thumb and fore-finger and tapping it with a knife, light hammer or any metal substance; the soft stone will sound dead like wood, whereas a hard stone gives forth a metallic ring. Having decided for what purpose the stone is to be used, the next thing is to find a stone that has the desired qualities. This leads to the consideration of the principal oilstones on the market.

The oilstones most widely in use at the present time are: The Washita, Arkansas, Turkey and Hindostan. Although these stones are well known to most mechanics, a brief description of them may not be out of place. The Washita and Arkansas stones are quarried in the state of Arkansas, near the celebrated Hot Springs. They are found in parallel veins, or mineral leads," and are quite similar in general appearance, both being white or nearly so, but the Arkansas is very much harder, more compact and finer grained than the Washita. There are various qualities of Arkansas and Washita rock, from a perfect, fast-cutting grit to the vitreous, flinty rock that is practically worthless. To the ordinary observer, the appearance of the good stone and the worthless is so nearly the same that it is always advisable to buy the known brand of a reliable manufacturer. At frequent periods, since these stones first came on the market, inferior qualities have been put out by presponsible or inexperienced manufacturers, which has done serious injury to their reputation in some localities. For the past few years, however, the output of the best quarries has, it is stated, been controlled by one firm.* As this firm has taken great care to select and manufacture only the best rock, noth reputation and demand have rapidly increased.

The Arkansas stone is found in two grades, known as hard and soft. Hard Arkansas is composed of nearly 991/2% pure silica (one of the hardest, sharpest cutting minerals), and is about 16 times harder than ordinary marble. Steel will not scratch it, but it. in turn, will cut the hardest steel very rapidly. It is white or bluish white in color, and by reason of its very fine, hard grit, is particularly adapted to sharpening fine tools requiring very keen, smooth edges, such as are used by engravers, watchmakers, diesinkers, wood and ivory carvers, surgeons, etc. Owing to the very limited supply of good Arkansas rock, and to the great difficulty in quarrying and manufacturing it (about 85 per cent. being waste), it is necessarily very high-priced, a first-quality stone being worth \$2.50 per pound at retail. A stone of extra large size or special shape is worth even more than this. Soft Arkansas is of the same composition as the hard, but is more porous, hence does not impart quite so fine an edge. It is used very largely by machinists, workers in hard wood, cutlers and mechanics in general as a finishing stone. It is carried in stock by most tool dealers, and generally sells at about one-third less price than hard Arkansas.

The Washita oilstone is the most widely used by carpenters and joiners. It has crowded the Turkey stone almost entirely out of America, and is fast superseding it in Europe and oiher countries. It is composed of nearly pure silica, but is much more porous than the Arkansas stone. It is stated by geologists that a cubic inch of perfectly crystalized Washita stone contains over eight million (8,000,000) cavities, or pores. It is the presence of this vast quantity of evenly distributed pores which enables the grit grains, or crystals (the teeth of the stone) to work freely and thus make it the fastest cutting fine-grained stone.

*The Pike Manufacturing Co., of Pike Station, N.H.