# SHARPENING STONES

## HISTORY AND DEVELOPMENT

PIKE

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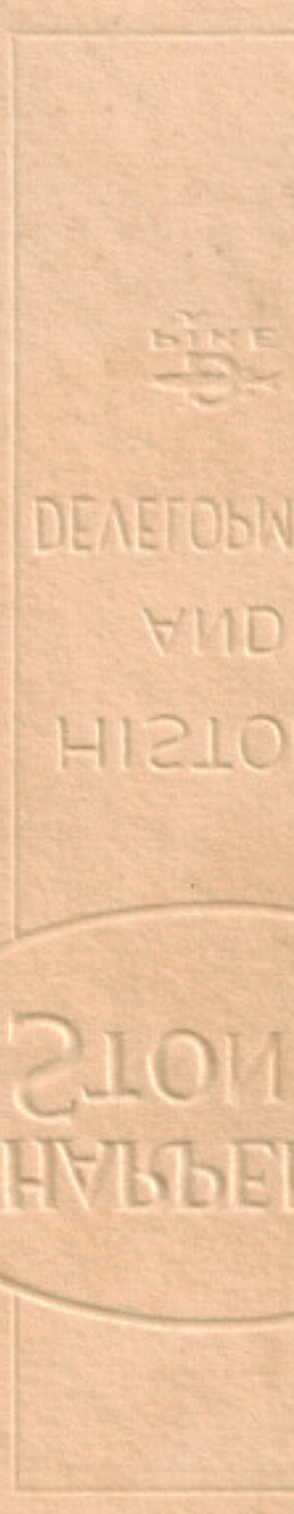

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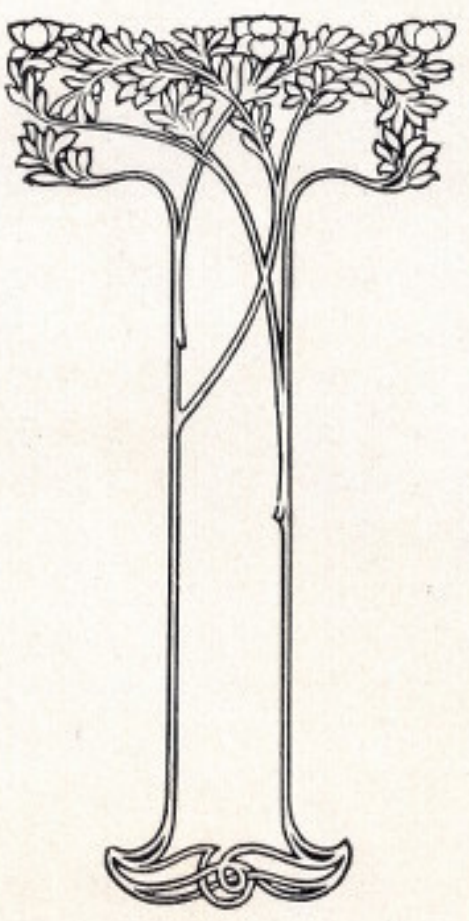



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# INTRODUCTION

THE sharpening stone has been known and used for untold centuries. The first cutting tools of primitive man were made by chipping flint or other hard stones into shape for immediate use, but no evidence can be discovered that any knowledge of abrading operations existed in the early epochs of the Stone Age. It is quite certain, however, that during the latter part of the Stone Age the art of grinding was developing slowly but was not being used so much for any technical advantage there might be as for the sake of beauty and symmetry of shape. In fact, in this period of man's development, grinding supplemented chipping rather than superseded it, for the obvious reason that the labor of grinding stone tools would have been wasted effort when it is remembered that such tools are so easily and rapidly chipped to form.

In spite of the antiquity of the sharpening or grinding stone, most authors who write about prehistoric times have little to say about it. It is a subject that seems to have been overlooked to a very considerable extent, and it is only within recent years that there has come a general realization of the important place the sharpening stone fills in the industrial as well as the home field. With this awakening has come a desire to know more about its history, the need for so many varieties, and something about the manufacturing processes employed. As a consequence the present monograph has been prepared. This work makes no pretensions of being a scientific discussion of the subject in hand, but rather a simple compilation of such facts as have been obtained in general reading, or have become known to us by reason of an experience gained in nearly a century of sharpening-stone manufacture. We have tried to make the text matter absolutely unbiased, though of necessity occasional references to some of our own institutions cannot be avoided.

The illustrations used in this book show only the chief features of several different manufacturing operations. Minor operations are not illustrated, but enough is shown to give a working knowledge of the subject. These pictures will be supplied in post card form, suitable for use in mirroscopes, to those who desire them for educational work. Privilege to use the text matter freely is also extended, if proper credit is given.

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# History and Development of Sharpening Stones

## Prehistoric Times

Among the relics coming from all parts of the world showing the life, manners and customs of prehistoric races, sharpening stones are often in evidence. The first stones were merely outcroppings of sandstone or other rock possessing abrading qualities. In those early days it was doubtless customary for primitive man to make frequent pilgrimages to the source of supply, for the sake of keeping his cutting tools in good condition. Then came the desire to have these stones near at hand, that they might be available for immediate use, and large pieces were broken off and carried or dragged away to considerable distances. One cannot help admiring the patience, skill and inventive genius shown by the early races of mankind in mastering problems like this.

As has been proved by the discovery of the stones themselves, these original sharpening stones were, when compared with present day standards, huge affairs measuring three or more feet in length, twelve to eighteen inches wide and of varying thicknesses. Their great weight held them stationary against the rubbing of axes, arrow and spear heads, swords, etc. In the Stone Age doubtless these stones were used more as polishers than as actual edge producers, but with the advent of the use of metals, and with the corresponding improvement in tools and implements of warfare, the sharpening stone gradually came into its own. As one century followed another increasing discrimination was shown in the selection of stones, until, at the beginning of the Christian era, we find a well defined supply and a well defined use.

## Sharpening Stones in Scripture

The first written record of the use of sharpening stones is found in the Bible in the 13th chapter of First Samuel, verses 20 and 21, where the following passage occurs:

> *"But all the Israelites went down to the Philistines to sharpen every man his share, and his coulter, and his axe, and his mattock. Yet they had a file for the mattocks, and for the coulters, and for the forks, and for the axes, and to sharpen the goads."*

SCYTHESTONE QUARRY AT PIKE, N. H.

*The quarries at Pike have been worked for nearly one hundred years and still yield large quantities of scythestone rock. The raw material is a mica schist, a finely grained, thinly laminated micaceous sandstone whose quartz grains occur in definite layers separated by thin layers of mica flakes. The rock is loosened along its natural line of cleavage by blasting.*

RAISING TIMBER FROM QUARRY

*After being loosened, the rock now known as "timber" is pried out in large, irregular shaped blocks, varying considerably in thickness and size; the largest, sometimes weighing several tons, are hoisted by steam derricks and hauled to the yard on cars.*

From this it is quite evident that the Israelites could not depend upon their files for sharpening, a fact, strange to say, many modern mechanics are just beginning to realize.

## Egyptian Carpenter's Stone

Some years ago a party of excavators in Egypt, working in the interests of the British Museum, unearthed a cabinetmaker's tool basket. Its date was about 1450 B. C. This ancient tool kit contained chisels with wooden handles, a saw, a drill bow and spindle, a rasp and plummet, and an oilstone as well as a horn in which to carry oil.

## First use of Oil and first Dry Stone

The historian Pliny writing early in the Christian era speaks of many kinds of stones used for sharpening iron instruments, and mentions in particular the use of oil on stones from Crete. Reference is also made to stones from Naxos used with water. Probably the latter were blocks of emery ore as Naxos later became famous for its emery products. Pliny also records that certain stones from Sicily were used without oil or water. Here, therefore, is the first written record of oilstones, water stones and dry sharpening. In the same account Pliny also speaks of a Spanish stone used in barber shops with the spittle of man, thus giving the first written record of the razor hone. The accuracy of this historian's statement is confirmed by the discovery of oilstones and razor hones among the ruins of Pompeii.

## The Original "Turkey" Stone

At the beginning of the 19th century, the "Turkey" oilstone quarried in Asia Minor had come into general use; hence, this stone is one of the oldest of our present day acquaintance. The German Water Hone, the Belgian Razor Hone, a stone from Finland and many others were in use, but the Turkey stone was the one by which the quality of all others was judged and thus it became the standard sharpening stone of the period.

## In the United States

The first mention of sharpening stones in the United States is made by one Thomas Merton who came to

BOLTING TIMBER

*When the timber reaches the yard, it is split into thin sheets and then into small rectangular slabs known as "bolts." Quarrying cannot be carried on during the winter, hence, sufficient timber has to be accumulated during warm weather to keep the mill at Pike supplied the year around.*

CUTTING STONES

*The bolted timber is cut into rough scythestone shape by cutters who work full time every month of the year. In the summer, protected from the sun and rain under canvas awnings, they work up the small pieces of rock as fast as they come from the quarry, while in the winter they work indoors, cutting the surplus timber accumulated during the summer months.*

Massachusetts with the first settlers and in letters back home dwells much upon the resources of the new country in whetstones. Inasmuch as the stones which were discovered by him near what is now Wollaston, Mass., were of very inferior quality, no commercial development was ever made of the product.

## The first Stones from Arkansas

About 1815 the first quarrying operations were performed in Arkansas, where about four hundred pounds of what is now known as Washita rock were taken out. The Arkansas Stone did not come into general use until several years afterward, being considered a barber's stone and too high priced for common use. The Washita stone took its name from the Ouachita River.

The Arkansas stone was known for many years as the Mississippi Stone, obviously taking its name from the Mississippi River. It is, in fact, known by that name to many people in Europe even to-day, never having fully outlived the original designation given it by the traders in New Orleans.

## The First Indian Pond Stone

About 1821 Person Noyes, a farmer living in northern New Hampshire, while chopping in the woods picked up a piece of stone upon which he attempted to whet his axe. The stone gave such good results that he got out a few rough pieces from a nearby ledge and broke them into rough scythestone shape, but made no attempt to grind them smooth. This product was sold locally, but the industry did not develop further at that time on account of his death. Later his wife married Isaac Pike and through him the business of the Pike Manufacturing Company was established in the year 1823. The first quarry was located on the shores of Indian Pond and the product became known as Indian Pond Scythestones, a name which is familiar to-day in all parts of the world where agricultural pursuits are carried on.

## English Reject the Hindostan

In 1825 a fine sandstone formation was located in the vicinity of what is now known as French Lick, Ind. This product was first manufactured in the little town of Hindostan, from which the name of the

GRINDING SCYTHESTONES

*From the quarry, the cut stone is hauled to Pike. The grinding into shape is done on revolving wheels made of wood into which steel wedges are driven closely together, making practically a steel surface. Sand and water are constantly supplied, the grains of silica in the sand making the grinding operation much faster.*

ENDING SCYTHESTONES

*After the stones are ground on all sides, some fifty or more of them are clamped into a wooden frame, set on end on special wheels reserved for this purpose, and the ends finished automatically. The stones next go to the Assorting Room where they are graded, the ends painted red, a distinctive Pike mark, labeled and packed for shipment.*

product was derived. The first large consignment was shipped to England, but a second shipment was held up in London by the authorities, the stones confiscated and finally put over the side into the Thames River, on the ground that the Hindostan stone, so named, purported to come from Hindostan or India in the Far East. The little village of Hindostan a few years afterward passed through a fever epidemic and was utterly destroyed. The name of its sharpening product, however, was so firmly established that the stone stands to-day as a permanent monument to the ill-fated town which gave it its name.

## Modern Sharpening Stones

Having given briefly some of the principal historical facts pertaining to sharpening stones, we are now ready to consider in some detail those stones which are representative of the more important groups in general use at the present time. The reader is requested to bear in mind that the descriptions and illustrations of the manufacturing of Arkansas oilstones are fairly typical of the Washita stone as well as every other natural oilstone, while the quarrying and manufacturing methods as described at Pike, vary little wherever scythestones are manufactured, except in a few minor details.

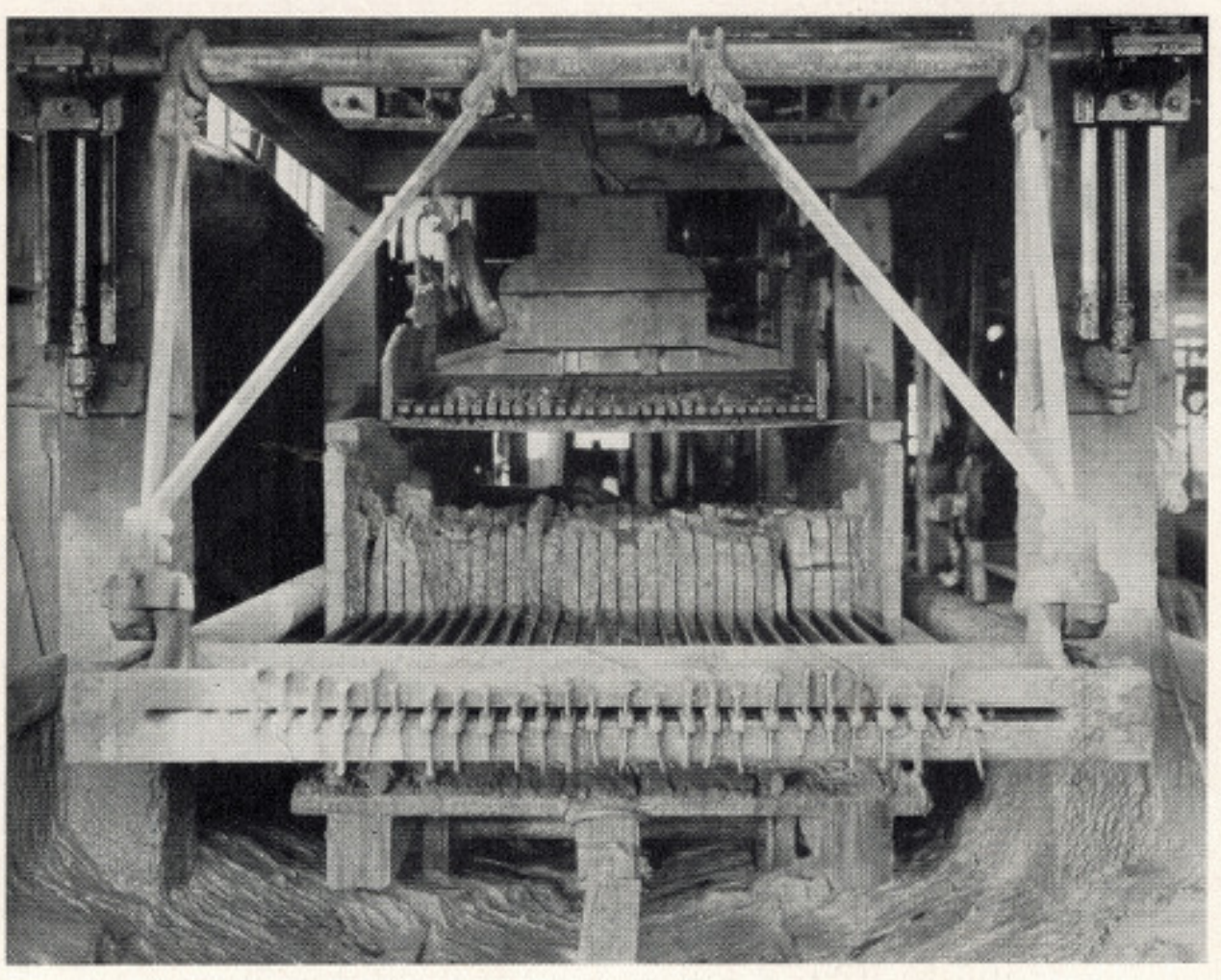
Sharpening stones to-day are divided into two distinct classes known as Natural and Artificial stones. Natural stones include those which are taken directly from the earth and which without undergoing any change of structure or crystallization, are manufactured into shapes convenient for mechanical purposes. Artificial stones, on the other hand, consist of certain basic materials which in the course of manufacture undergo some chemical change whereby an entirely new material is created; after which it is crushed, graded, molded into desired shapes and baked under intense heat in kilns or ovens.

## Sharpening Means Cutting

Every sharpening stone, whether Natural or Artificial, is a mass of crystals of varying size—infinitely sharp cutting points, each of which is harder than steel. These crystals are held or bound together by a substance termed the binding material, commonly spoken of as the "bond." After continued use the crystals on the surface of a stone become dull, and

ARKANSAS QUARRY

*The only deposit of Arkansas rock is found near Hot Springs, Arkansas. It occurs in pockets of varying depth and width and may be so badly shattered and full of flaws that it has no commercial value. Quarrying is carried on in the summer. All pieces weighing over five pounds are saved and shipped to the Pike Mfg. Co., Littleton, N. H., for manufacturing purposes.*



SAWING STONE AT LITTLETON FACTORY

*Blocks of stone are built up in a bed of plaster and the saws, plain bands of steel without teeth, are mechanically drawn back and forth, sand and water being constantly supplied. Sand grains being much coarser than the grains of the stone gradually scratch the stone away. The sawing process is very slow, the cutting rate being about one and a half inches in twenty-four hours.*

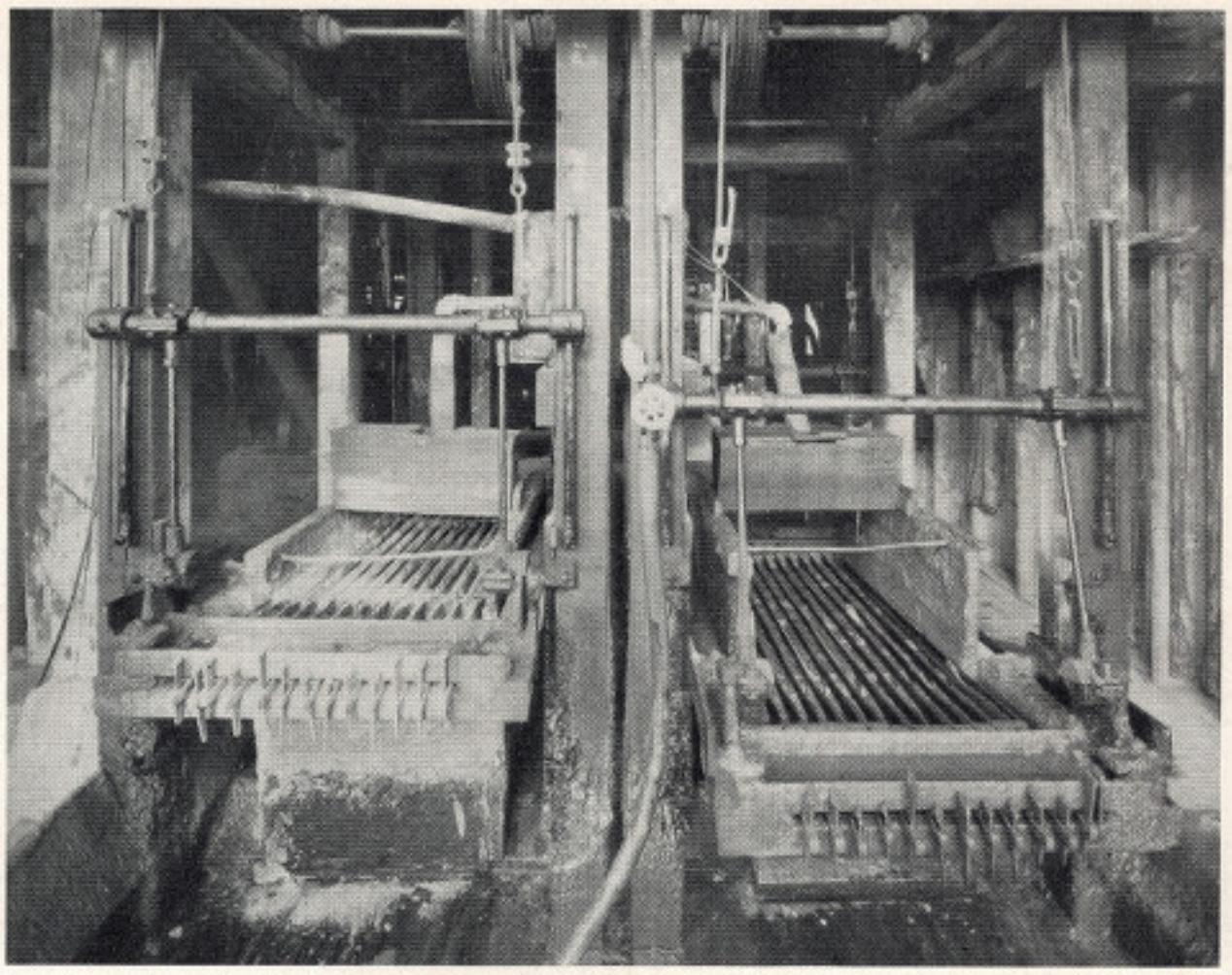
in order for the stone to give perfect service these crystals must fracture and break away from the bond, thus making way for new cutting points to do their work. The coarseness or fineness of these crystals, their hardness and their brittleness or toughness—these are the things which in various combinations make the differences between the several kinds of sharpening stones, making one kind better for its own purpose than another.

## Natural Stones

The most important stones of the Natural division in common use to-day are the Arkansas and Washita oilstones of Arkansas, the New Hampshire and Vermont scythestones, the Hindostan stone of Indiana, the Queer Creek stone of Ohio, the Turkey stone from Asia Minor, the Belgian Razor Hone from Belgium and the German Water Hone from Germany. Most of these will be dismissed with brief mention. The Hindostan and Queer Creek stones are of sandstone formation and are manufactured chiefly to meet the demand for an inexpensive stone. The Turkey stone, at one time used almost universally by carpenters and mechanics, is fast going out of the market, due to the fact that it is almost impossible to obtain good stones and also because it has been superseded by other products of much superior quality. The Belgian Hone, found in the Ardennes Mountains in Belgium, is very popular among barbers on account of the remarkably fine and soft texture of its grit. This hone, often called "petrified wood hone," "soap hone," or "oil hone," is what might well be termed a freak of nature. It consists of two distinct layers of entirely different material closely united into one solid piece, the upper layer possessing remarkable sharpening qualities, while the lower acts principally as a support to the softer top. Sometimes the two layers are quarried separately and glued together, not, however, to any detriment of quality. The cutting quality of the Belgian hone is due to the presence of microscopic garnet crystals.

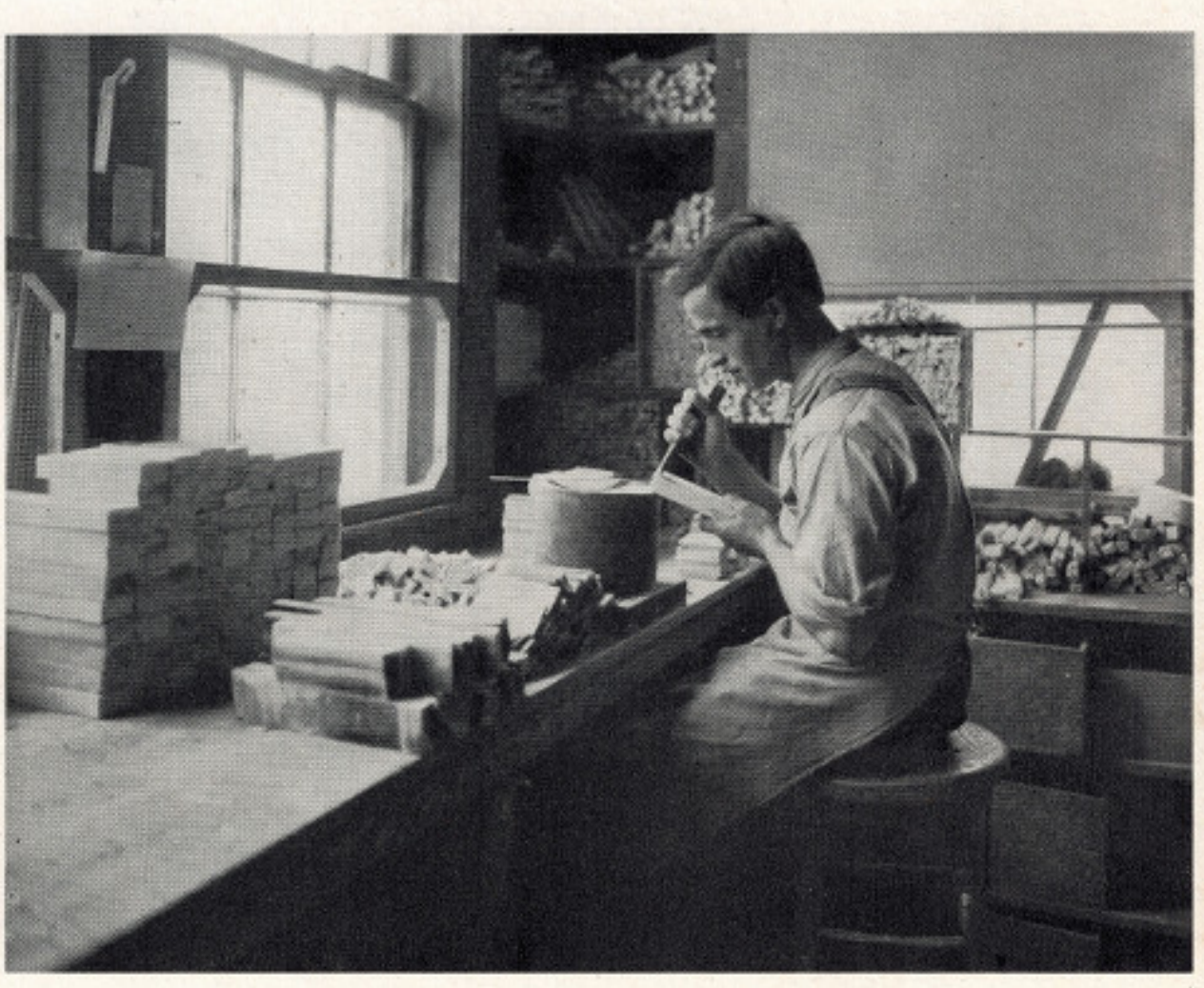
## Arkansas Oilstones

Arkansas stone is purely an American product found only in the Ozark Mountains of Arkansas. Originally used by the American Indian for his crude cutting implements, its fame has spread all over the world until it is now universally used for certain classes



SECOND CUTTING

*The cut slabs are now relaid in plaster beds and a second cutting, giving the width of the stone, takes place. After this operation the largest sizes go to the chipping room, while the irregular pieces are put to one side and again cut, to be used for making smaller stones like round edge slips, pen knife pieces, etc.*



CHIPPING ARKANSAS STONES

*The chipping process is a simple one. The operator marks the stone and with chisel and hammer breaks it at the desired point and chips the stone to somewhere near regular shape. The stones, now sawed and roughly chipped, are ready for the finishing process. At this point only about twenty-five per cent. of the original rock remains.*

of work. Genuine Arkansas stone is composed of millions of pure silica crystals, miscroscopic in size, of the greatest hardness and sharpness, silica being among the hardest of known minerals. So perfectly crystallized is this stone that it is nearly sixteen times harder to cut than marble,—a feature of great importance as it enables the hardest steel tools with fine points or blades to be sharpened without grooving the stone.

The extreme hardness of the Arkansas stone, coupled with the further fact that the supply of high grade rock is very limited, and that there is also an unavoidable waste of nearly 90% in manufacture, accounts for its comparatively high cost. It is, however, of inestimable value for removing the last bit of microscopic burr from the cutting edge or from delicate parts of fine machinery. No other oilstone approaches the Arkansas for this purpose.

## Grades of Arkansas Stone

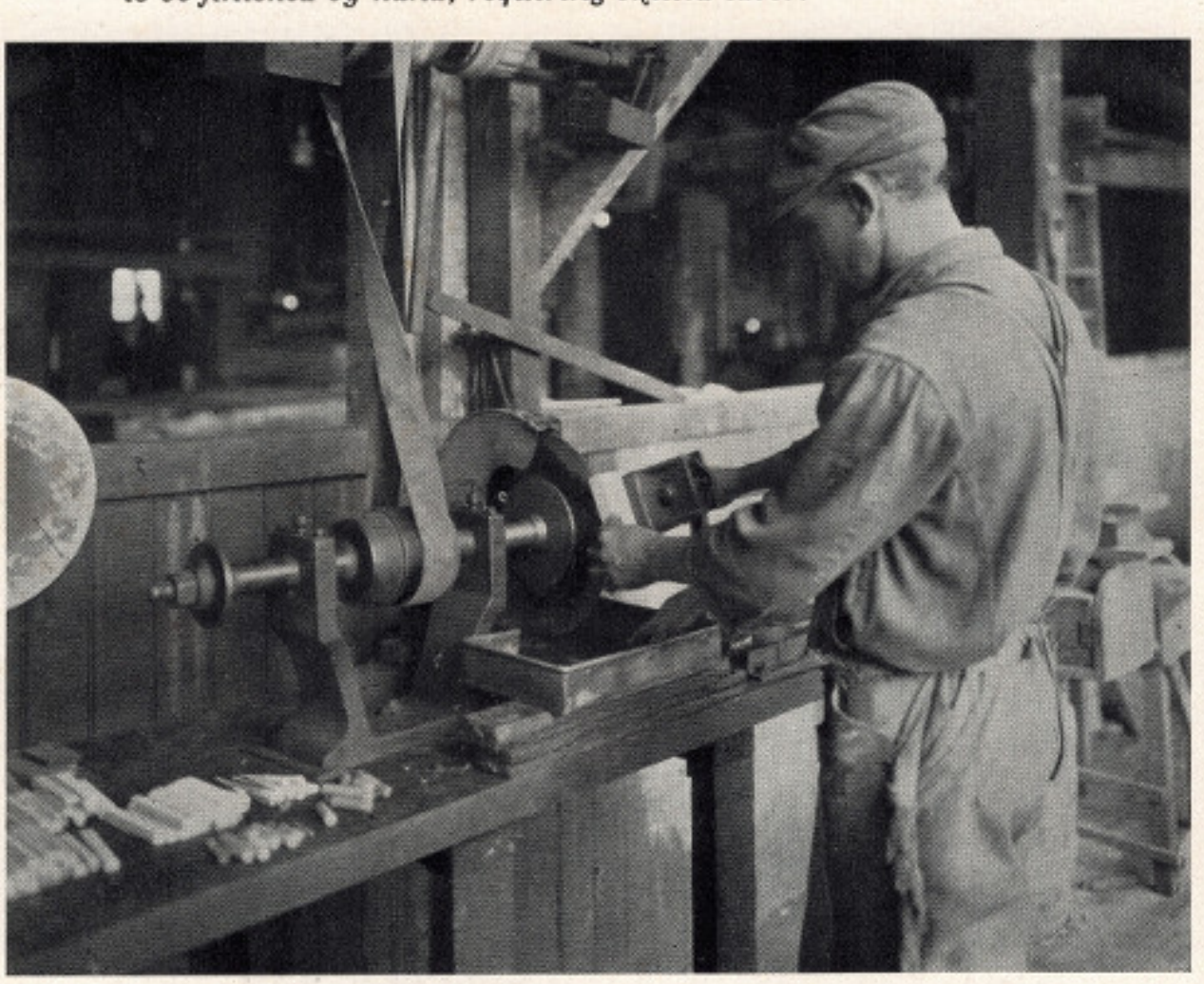
Arkansas stones are prepared for commercial purposes in two grades, Hard and Soft. Hard Arkansas is composed of 99½% pure silica and its sharpening qualities are due to small, sharp pointed grains or crystals, hexagonal in shape, which are much harder than steel and will therefore cut away and sharpen steel tools. It is used universally by surgeons, histologists, jewelers, dentists, watchmakers, cutlers, engravers and in all other similar professions or trades. Soft Arkansas is not quite so fine grained and hard but it cuts faster and is better adapted for sharpening the tools of wood carvers, file makers, pattern makers and all workers in hard wood. It is also used extensively by sheep shearers on the great ranches in western United States, Australia, South America and other sheep raising countries.

## Washita Oilstones

Washita stone is another product of the Ozark Mountains and is quite similar to the Arkansas stone, being composed of nearly pure silica but is much more porous. It is found in various grades from perfectly crystallized and porous grit to vitreous flint and hard sandstone. The best selections are made from very porous crystals. The brand known as Lily White Washita is acknowledged by experts as the best *Natural* stone for sharpening carpenters' and general

FINISHING ARKANSAS STONES

*The rubbing wheels, large discs of steel about eight feet in diameter, are run horizontally and constantly supplied with sand and water. Bench stones are laid face down and held by weights until finished. Smaller stones and those of special shape are bound in plaster on iron plates and ground to size. Much of this work has to be finished by hand, requiring skilled labor.*



CUTTING ARKANSAS FILES ON DIAMOND SAW

*The diamond saw is a thin disc of steel, the edges of which are serrated every quarter of an inch. Into each serration is carefully pounded a paste of crushed diamonds and covered with solder to hold the charge in place. This saw will cut Arkansas rock like so much chalk. The cost, however, is prohibitive except for small and special stones.*

wood-workers' tools. It is preferred by many mechanics for efficient tool sharpening and when properly selected gives extreme satisfaction although it does not cut as rapidly as some of the Artificial stones.

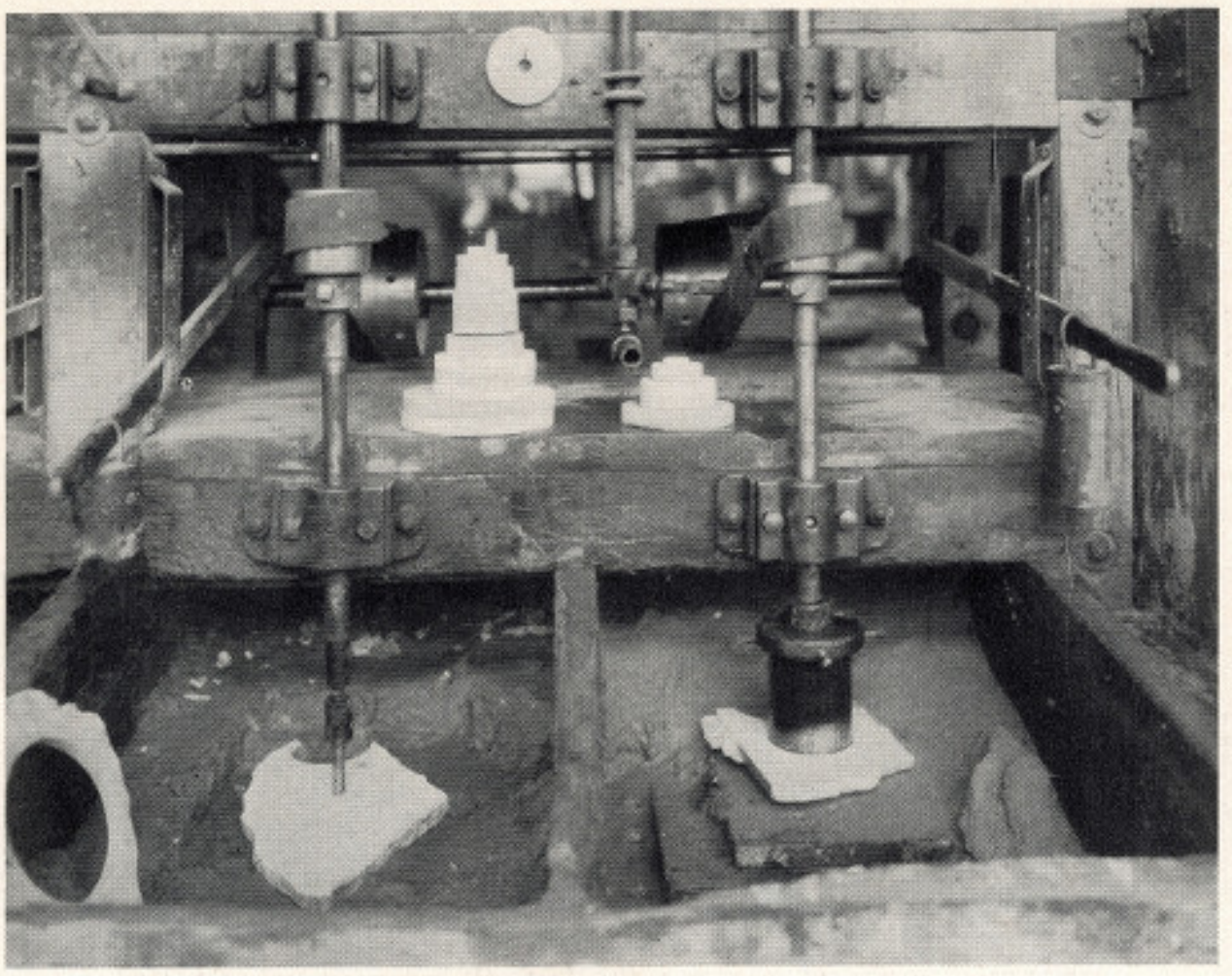
## Artificial Sharpening Stones

With the introduction of modern tool steels came the demand for faster cutting sharpening stones. As far back as 1830 attempts had been made to produce artificial oilstones. Various composition stones of emery, garnet or silica had been placed upon the market, but these, owing to their tendency to glaze and stop cutting, or to wear unevenly and even to crumble when wet, did not prove very satisfactory. When, therefore, a new oilstone under the name "India" was introduced in the early 90s, and concerning which several startling claims were made, mechanics were inclined to be skeptical. It was claimed for the India Oilstone that it would cut the hardest known steel, the kind on which an ordinary file slips; that it would stand up to its work under the most adverse conditions without losing its shape; that it could be graded to suit the particular work it was called upon to perform; and, most important of all, that it could be produced month after month, year after year, with no variation in quality. The years have verified these claims and to-day the India Oilstone is used almost universally in machine-shops, and all other places where a stone is required which must be not only fast cutting, but which must stand up under constant daily wear and tear practically indefinitely without losing its shape.

## India Oilstones—Where and how Made

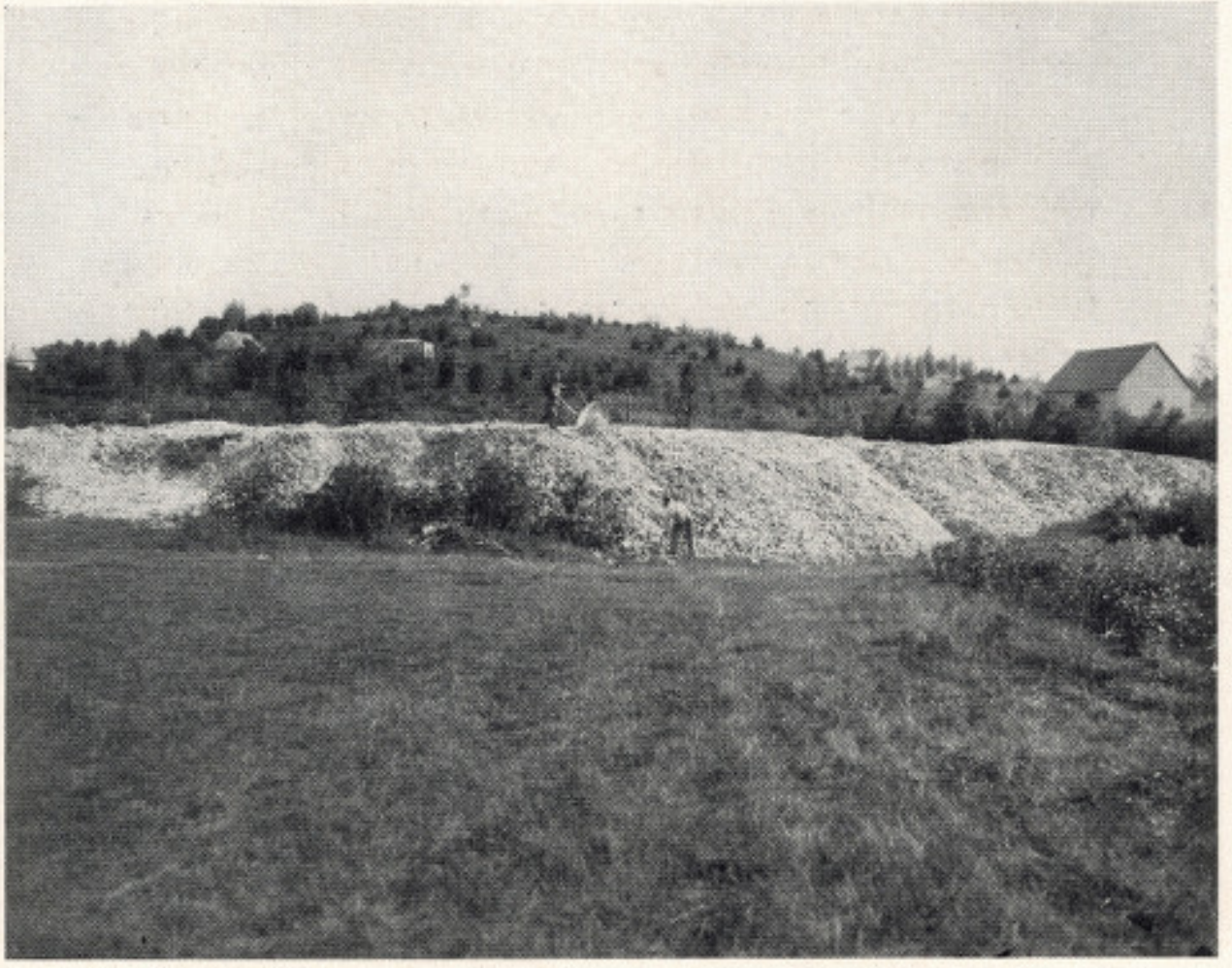
The India Oilstone is manufactured by the Norton Company of Worcester, Massachusetts, the world's largest manufacturer of grinding wheels. The sale of the India Oilstone, however, since it first came onto the market has been handled by the Pike Manufacturing Company, and it is known and advertised all over the world as Pike India. It might be well to state here that purchasers desiring to obtain a genuine India Oilstone should always look for the Pike name or trade mark on the face of the stone or on the box in which it was contained.

The first India Oilstones were made from corundum imported from India and from this it is easy to see



CUTTING ARKANSAS WHEELS

*The above illustration shows this operation perfectly. On the right is shown one of the steel dies ready to cut its way through a slab of Arkansas, while on the left is shown the method of making the hole in the wheel. Like most Arkansas operations, sand and water are being constantly supplied.*



WASTE PILE AT LITTLETON

*The story of the Arkansas stone from the time it is taken from the earth until it leaves the factory as a finished product is a story of waste. The above picture shows several years' accumulation of waste. Were it not for the fact that the stone itself is indispensable in its particular field, doubtless it would not be quarried or manufactured at all.*

how this remarkable oilstone derived its name. The difficulty in obtaining India corundum in sufficient quantity and of uniform quality caused the manufacturer to begin chemical experiments in an effort to find a substance possessing its many virtues and lacking some of its faults. The result of this study was the discovery of an artificial aluminum oxide, commercially known as Alundum.

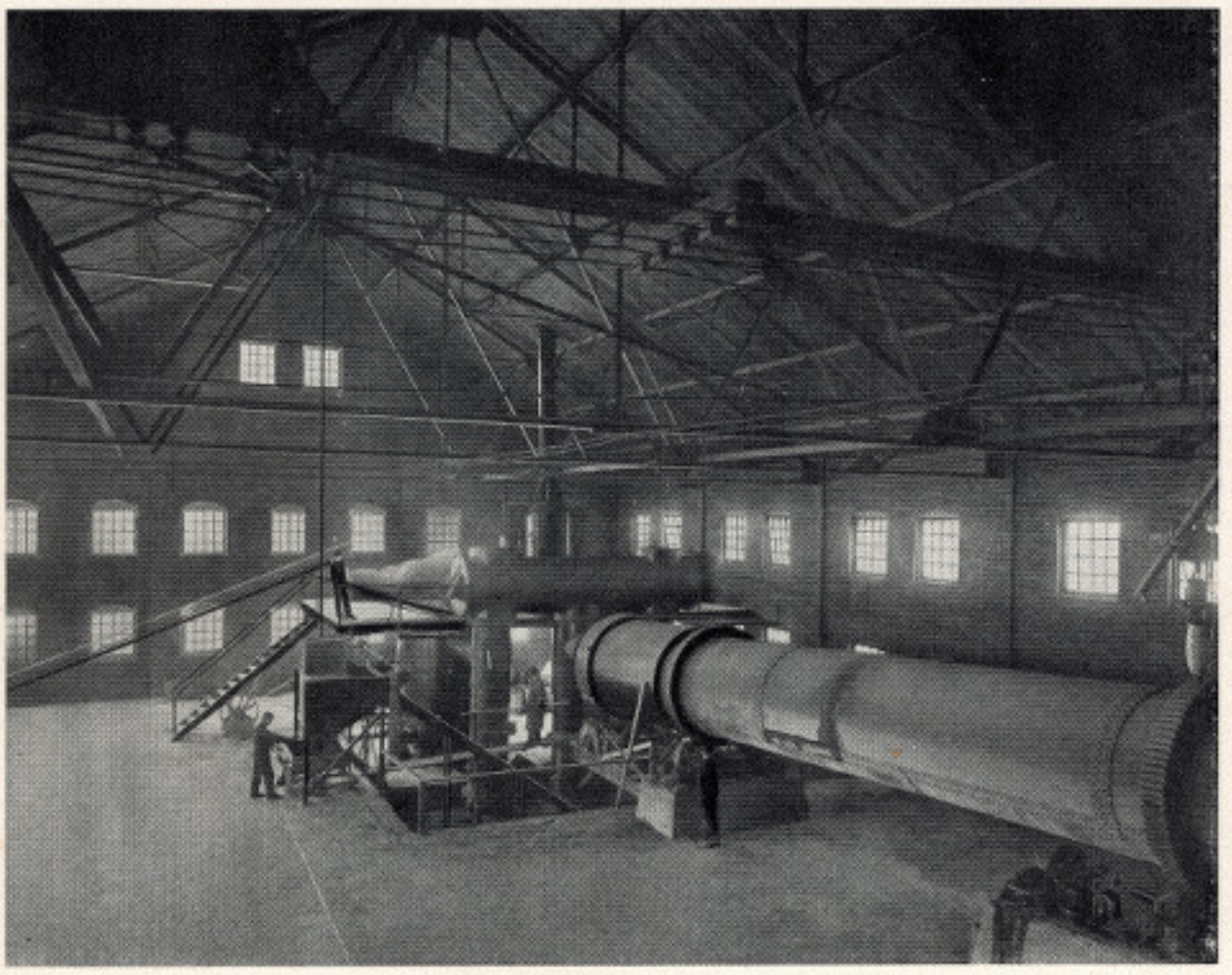
## What Alundum Is

Alundum is a remarkable reproduction of the natural mineral corundum. It is made by fusing bauxite in the intense heat of the electric furnace. Bauxite is a soft earth resembling light yellow clay and chemically is the purest form of aluminum oxide found in nature. The fact that the ruby and sapphire are of the same chemical composition as the soft yellow clay-like bauxite suggested the line of experiments which resulted in the production of Alundum, a hard, sharp abrasive material. The advantages of Alundum over every other known abrasive lie in its peculiar combination of hardness, sharpness and temper. By temper is meant strength of grain and ability to wear under pressure. Alundum has this desirable combination and it is maintained through purity of raw material and perfectly controlled electric furnace processes. India Oilstones are made from Alundum after it has been crushed and graded into the size of grain most suitable for oilstones. These Alundum grains are all uniform: coarse, medium or fine as desired. They are mixed with bonding material, molded into various oilstone shapes and then vitrified into solid stone under great heat. Every process being under perfect control, all India stones are absolutely uniform in hardness and texture, a most important quality, as every skilled mechanic knows.

India Oilstones are filled with oil in the course of manufacture which gives them remarkable freedom from glazing. It is due to this economical feature that it is unnecessary to soak a new India stone in oil for days as is usually the case with other sharpening stones.

## Proved to be Fastest Cutting

Pike India Oilstones have been known for years as the longest wearing oilstones in the world. Recent laboratory tests conducted on a special machine



ROTARY CALCINER

*India Oilstones are made from Alundum, which in turn is made from the natural mineral bauxite. Bauxite is found in pockets and mined in open cuts. From the mine it goes to the calcining plant where it is heated to a red heat in a large rotary furnace to drive off the water which is chemically combined in it.*

ALUNDUM FURNACE AND COOLING FLOOR

*The bauxite is next delivered to the furnace building, which is equipped with electric furnaces of special design (arc type) connected with large transformers with a combined capacity of five thousand horse power. The bauxite is fed directly into the arc, fusing and gradually filling the furnace. Each ingot of Alundum thus formed weighs about two and a half tons and must stand several days before cool enough to handle and crush.*

designed for the purpose of testing abrasives, have proved beyond a doubt that they are also the fastest cutting. Fastest cutting means a saving of time; longest lasting means a saving of money, consequently Pike India Oilstones are the most satisfactory and the most economical oilstones now being manufactured.

## Carbide of Silicon Stones

Carbide of Silicon was created by a manufacturing chemist while experimenting with various substances in the hope of producing artificial diamonds. His attempts at making diamonds did not prove successful, but a product very hard and brittle and which has proved of considerable commercial value for use as an abrasive, was developed. Carbide of Silicon, when made into sharpening stones, is sold under several brand names, that of the Pike Manufacturing Company being known to the trade as Pike Crystolon.

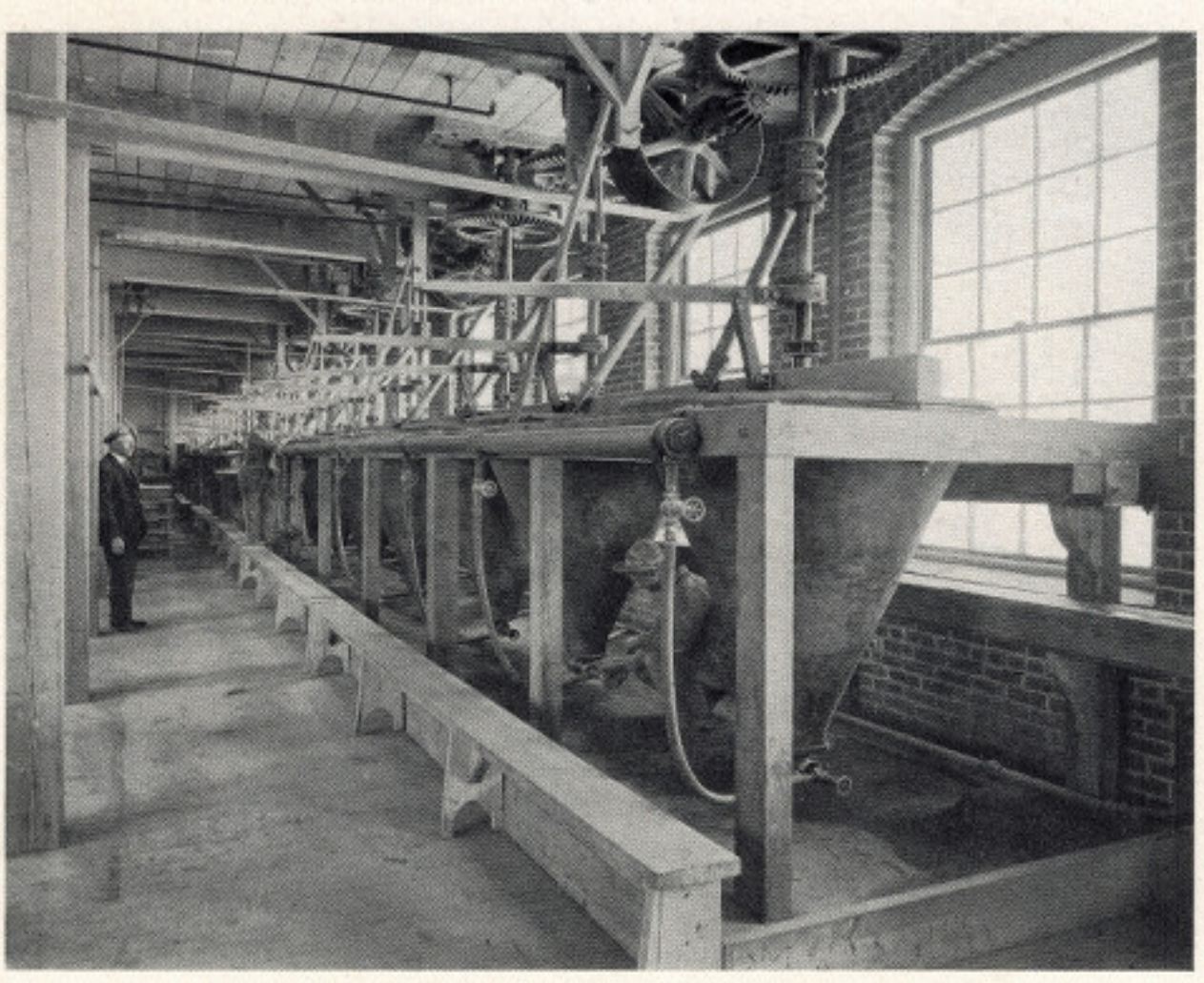
Crystolon, like Alundum, is an electric furnace product made from coke, sand, salt and sawdust which are carefully and accurately mixed and heated to a temperature of between 3300 and 4000 degrees Fahrenheit. The resulting crystals, sparkling like diamonds and radiating all the colors of the rainbow, are manufactured into oilstones by practically the same methods that are used in making the India Oilstone. There is, however, a marked difference between India and Crystolon. The peculiarity of carbide of silicon crystals, from which Pike Crystolon is made, is that they cut extremely fast but are extremely brittle; hence, while they are ideal for soft steel and for other uses where it is desirable to have a rapid breaking down of the crystals so as to constantly present new cutting points, these stones are not so valuable as the India for regular shop use, since they wear down too rapidly to satisfactorily hold their shape. Alundum crystals, on the other hand, from which Pike India is made, are so extremely tough that while they do not lose any of the fast cutting quality, they stand up under even the hardest service and hence, hold their shape almost indefinitely.

## Conclusion

Few people realize the important place the sharpening stone fills in the advancement of human endeavor,

CRUSHING FLOOR AT NIAGARA PLANT

*Reducing these immense pigs of Alundum to size for shipping requires powerful crushing machines on which the wear and tear is greater than in the crushing of any other material. This rapid wearing of high grade, special steels is an evidence of the remarkable cutting quality of Alundum from which it must be remembered that Pike India Oilstones are made.*



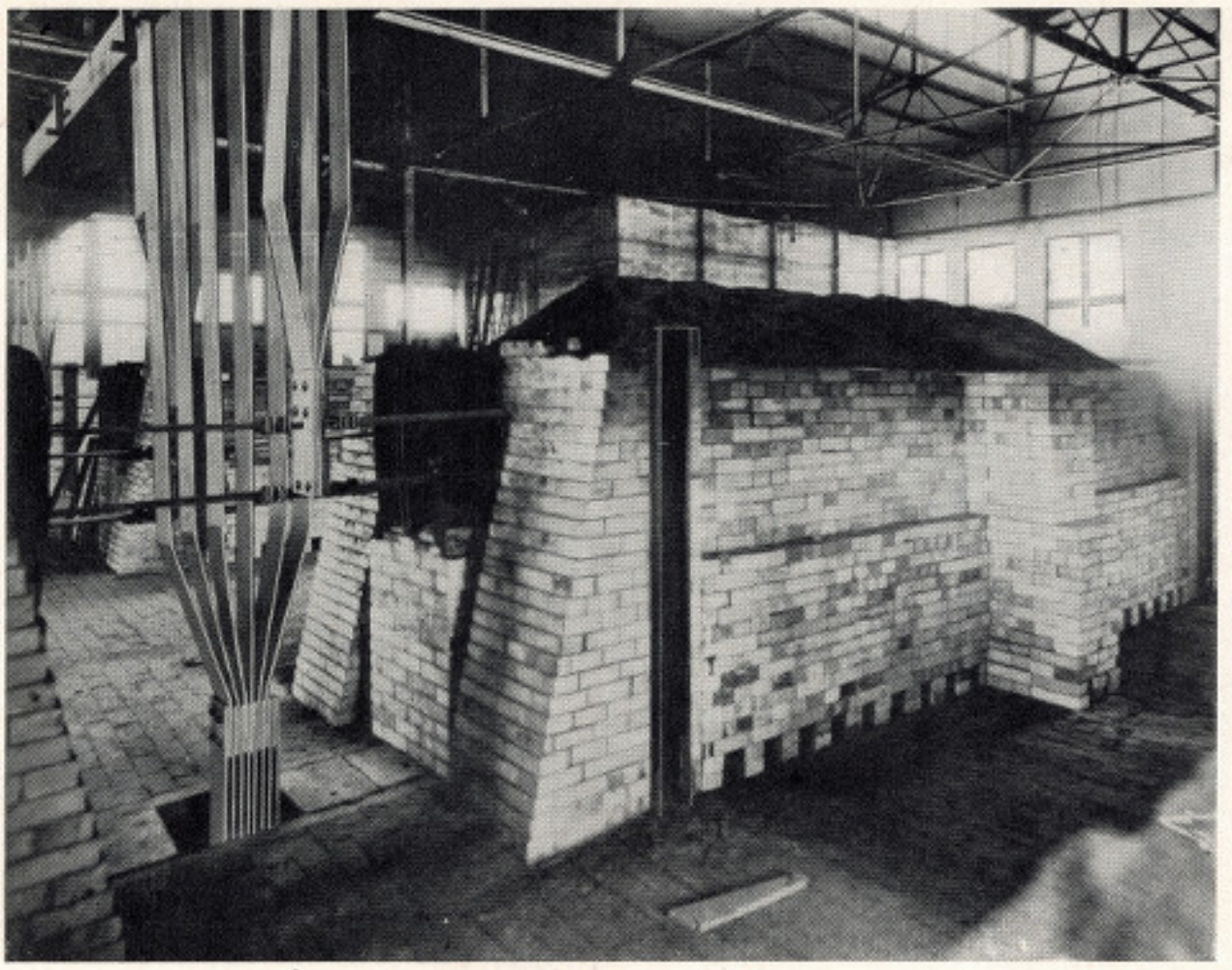
WASHERS

*After crushing to the size of egg coal, the Alundum is shipped to Worcester, Massachusetts, where a modern crushing and grading plant reduces it to the various sizes required in the manufacture of India Oilstones and other lines. The equipment consists of special crushing and grading machines—crushers, rolls and sieves for grading to all sizes from the coarsest grain to the finest flours.*

nor the many and various ways in which it is used. In a general way it is realized that the carpenter needs an oilstone, the farmer a scythestone, and the barber a razor hone. Beyond this, however, little consideration is ever given to the thousands of different manufacturing operations in which the sharpening stone is an actual necessity, nor to the thousands of articles in every-day use whose production in practically every stage of their development is dependent upon the selection of the right sharpening stone.

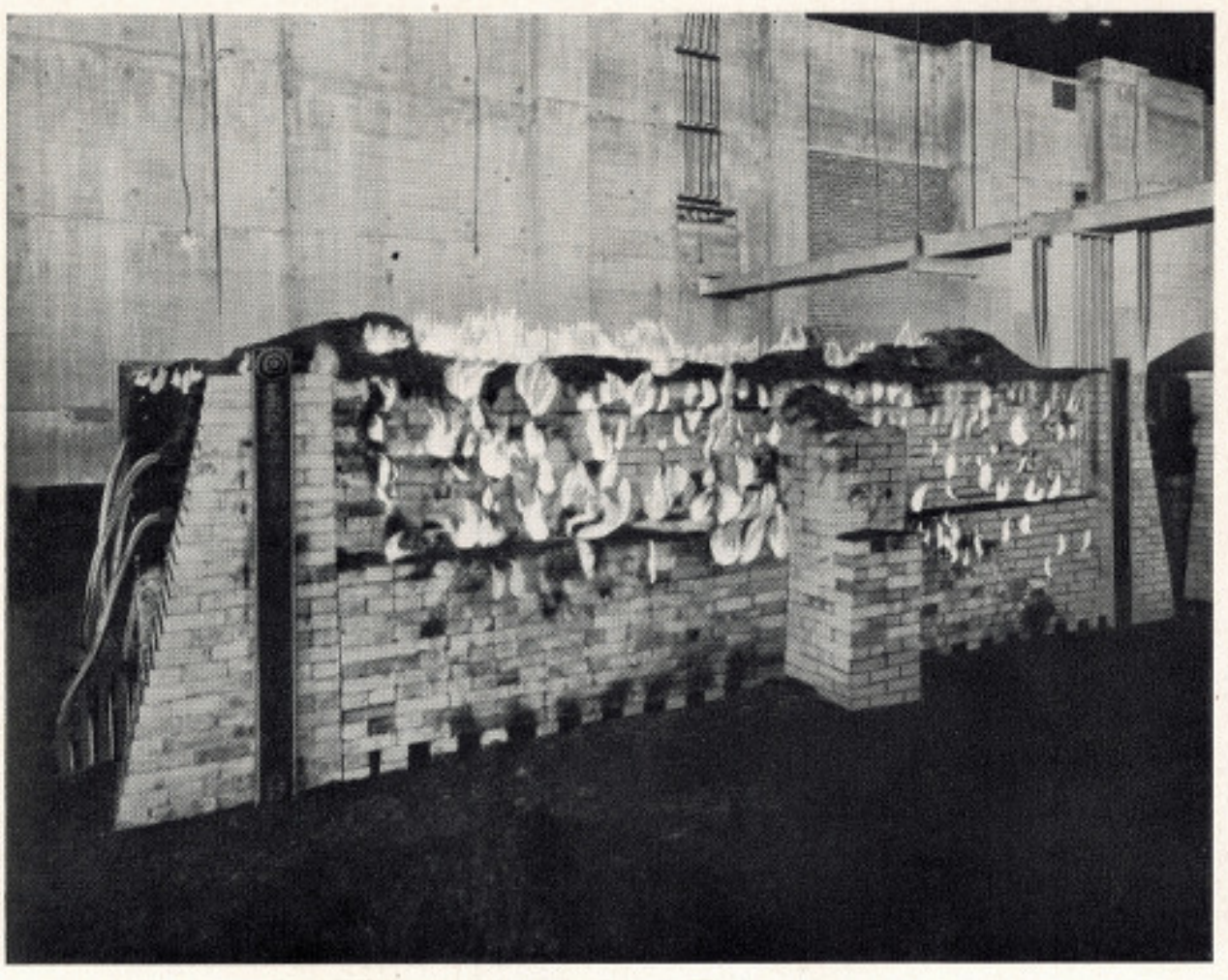
It is indeed a far cry from prehistoric man with his single unwieldy whetstone to the complex civilization of the present day with its requirements of hundreds of different sharpening stones. In the catalog of the Pike Manufacturing Company over eleven hundred different stones are listed regularly. There are shapes, sizes and grits for every conceivable purpose. The question is often asked as to why so many varieties are necessary. The reason is, because each one of these stones fills some particular sharpening requirement just a bit better than any other stone. The ordinary scythestone, limited as its field is, offers a very good example. Offhand, a single variety would seem sufficient, inasmuch as green grass appears very much the same the world over. There are, however, decided differences. Some grass is fine, tough and wiry like that common to New England, while at the other extreme, is the coarse, heavy prairie grass of the West. For the first, a fine, even edge is required; for the latter a coarse, rough edge is better, and for the variations in between, edges of various descriptions are found more efficient. Then also must be considered the personal likes and dislikes of the user, shape, weight and grit all having their individual champions.

The scythestone is typical of the whole range of sharpening stones. One variety will not answer for every sharpening purpose. A certain class of work might be very satisfactorily performed on a Natural stone, such as Arkansas, Washita or one of the Pike Scythestones; or, perhaps an artificial stone like the India or Crystolon would be better fitted for the work in hand. It would be impossible in a work of this kind to make even the slightest attempt to describe the thousands of different sharpening operations, or recommend the best stone and the right stone for them. Every reader is assured, however, that the



CRYSTOLON FURNACE

*Crystolon, the abrasive material used in the manufacture of Crystolon Sharpening Stones, is made from coke, sand, salt and sawdust. These materials are submitted to a high temperature in electric furnaces of special design, of which the above is an illustration and which shows the furnace ready to turn on the current.*



CRYSTOLON FURNACE BURNING

*The mixture is heated at a temperature of between 3300 and 4000° F., each charge consuming about one thousand horse power. After the material comes from the furnace it goes through several steps of crushing and grading just the same as Alundum.*

entire organization of the Pike Manufacturing Company is at his or her service. If you have sharpening problems of any kind or description, we want you to feel perfectly free to submit them to us, for we feel that we are equipped to advise you impartially and to your best interest.

Under the Pike trade-mark may be found a stone of the right substance for any and every kind of a cutting edge. Hence, we are not under the temptation of offering indiscriminately a single stone for nearly every sharpening purpose. Pike Sharpening Stones are offered without prejudice, the one desire being to make sure that the user gets just the stone best suited for his sharpening needs.

An interesting booklet entitled "How to Sharpen," which contains a great deal of specific information about general sharpening operations, will be sent free to any one who desires to learn the correct way to keep edge tools sharp.

We have also prepared a small but compact Educational Exhibit consisting of rough and finished specimens of various sharpening stones, firmly mounted in a plush lined cabinet, especially suitable for class demonstration work. A nominal charge is made for this exhibit sufficient to cover cost of assembling and transportation. Correspondence is invited from all who may be interested in adding this exhibit to their equipment.


PIKE EDUCATIONAL EXHIBIT

# Glossary of Abrasive Terms

**ABRADE.** The dictionary definition of this word is "to wear away by friction." As used in the sharpening stone industry, however, it means more than this. When an edge tool is rubbed over the surface of such a stone, the steel composing the tool is *cut away* or abraded rather than worn away; in this sense, therefore, abrading means cutting. From this comes the word "abrasive" as applied in a generic sense to every kind of sharpening or grinding substance.

**ALUNDUM.** An artificial abrasive used in the manufacture of Pike India Oilstones and Norton Grinding Wheels. Made by fusing the natural mineral bauxite in electric furnaces. Alundum is the same chemical composition as the natural mineral corundum.

**ARKANSAS.** A true novaculite (see novaculite) used as an oilstone for sharpening tools or instruments requiring extremely fine, long-lasting edges. A product of the Ozark Mountains of Arkansas.

**ARTIFICIAL STONES.** These include such varieties as have been created from certain basic natural materials which in the course of manufacture undergo remarkable chemical changes whereby an entirely new material is created. This new substance is then crushed, graded, molded into desired shapes and baked under intense heat in kilns or ovens.

**BAUXITE.** A natural mineral used in the manufacture of Alundum, also used as raw material in the production of metallic aluminum and in the manufacture of aluminum salts and refractory bricks. Chemically, it is the purest form of aluminum oxide found in nature. Mined in France, and in Arkansas and Georgia in the United States.

**BENCH STONE.** A rectangular stone measuring from four to eight or nine inches long by approximately two inches wide and of varying thicknesses. In use it generally rests on artisan's bench, whence its name. Some bench stones are made circular in shape for those who prefer the rotary motion in sharpening chisels and similar instruments.

**BOND.** The material which holds or binds together the crystals which make up a sharpening stone or grinding wheel, more commonly spoken of in connection with artificial abrasives.

**BUHR STONE.** See Mill Stone.

**CARBIDE OF SILICON.** An artificial abrasive made by fusing coke, sand, salt and sawdust in electric furnaces. Discovered in an attempt to make artificial diamonds.

**CARBORUNDUM.** A trade name for carbide of silicon.

**CHOCOLATE.** A very fine grained mica schist found in New Hampshire and used extensively in the manufacture of scythe stones, axe stones and knife stones.

**CORUNDUM.** Corundum is the hardest of all known minerals except the diamond. The gems, ruby, sapphire and oriental emerald are perfectly crystallized, highly colored varieties of corundum. It is used extensively in the manufacture of oilstones, razor hones and grinding wheels.

**CRYSTOLON.** A trade name for carbide of silicon.

**DRY SHARPENING STONE.** A stone so constituted that its crystals break away from its binding material so rapidly that the particles of steel have no chance to fill the pores of the stone. Sandstone and coarse gritted scythestones are good examples.

**DRY HONE.** An artificial razor hone in which the sharpening crystals or grains are so blended with the bond that good results can be obtained without the use of lubricants.

**EMERY.** An impure corundum. It might be properly called an iron mineral carrying a varying amount of corundum so thoroughly mixed that they cannot be commercially separated. Used in the cheaper grades of oilstones and grinding wheels. Found in many different localities all over the world.

**FILES.** A name applied to small oilstones having special shapes running from three to four inches long by one quarter to one half inches or more in diameter. The most common are triangular, square, round, oval, flat, bevel, diamond, point and knife blade, each variety taking its name from its shape.

**GARNET.** A granular crystalline rock used, when crushed, in making polishing paper. Little if any is used in making sharpening stones.

**GOUGE SLIP.** See Slip Stone.

**GRINDSTONE.** A large circular stone made from sandstone and used quite extensively for the sharpening of many different tools and instruments On account of grinding speed, compactness and cutting efficiency, it is being replaced in many instances by the small hand or foot power grinder, mounted with artificial abrasive wheels.

**GRIT OR GRAIN.** Artificial sharpening stones can be graded to suit the work they are intended to perform. Standard grades are coarse, medium and fine. Coarse stones cut very rapidly, but leave a rough edge. Medium stones do not cut as fast as coarse stones but leave a smoother edge. Fine stones are still slower cutting, but are useful where extremely fine edges are desired.

**HINDOSTAN.** A fine-grained sandstone used extensively in the manufacture of very cheap sharpening stones, especially axe stones. Found in Indiana.

**"HOW TO SHARPEN."** The title of a booklet containing much interesting information about different sharpening operations, which should be in the possession of every one who has to work with edged tools.

**INFUSORIAL EARTH.** A deposit formed from the silicious shells of microscopic aquatic plants. Used for abrasives in the form of polishing papers, scouring soaps, etc., but more extensively in the manufacture of dynamite and in packing for boilers, steam pipes, etc.

**INDIA.** A remarkably fast cutting, long wearing oilstone made from Alundum.

**MICA SCHIST.** A fine grained, thinly laminated micaceous sandstone whose quartz grains occur in definite layers separated by thin layers of mica flakes. Found in New Hampshire and Vermont and used extensively in the manufacture of scythestones.

**MILL STONE.** A large grindstone used for grinding cereals, mineral paint ores, fertilizers, etc.

**NATURAL STONES.** Natural stones include those which are taken directly from the earth and without undergoing any change of structure are manufactured into convenient shapes for mechanical purposes. Artificial stones, on the other hand, consist of certain basic natural materials which in the course of manufacture undergo some chemical change whereby an entirely new material is created, after which it is crushed, graded and molded into proper shapes and baked under intense heat in kilns or ovens.

**NOVACULITE.** An extremely fine grained sedimentary, silicious rock used for abrasive purposes, of which the Arkansas and Washita oilstones are the best examples.

**OILSTONE.** A stone used for sharpening edged tools or other similar metal surfaces. It may be of any shape or size but should always be used with oil which serves to float the small particles of steel cut away from the metal and which otherwise would fill the pores of the stone, causing it to glaze over and eventually become useless.

**PULP STONE.** A very large grindstone employed in pulp mills for crushing or grinding wood into fiber.

**PUMICE.** This name is applied to the loose, spongy, cellular or froth like parts of lava. Used for giving a smooth surface and polishing wood and other materials.

**QUARTZ.** The hardest of common minerals and used in the manufacture of sandpaper, scouring soaps, and as a wood finisher.

**QUEER CREEK.** A fine grained sandstone found in Ohio and used in the manufacture of inexpensive sharpening stones.

**RAZOR HONE.** A stone of sufficiently fine grain to give a smooth, velvety edge to a razor.

**ROUND EDGE SLIP.** See Slip Stone.

**RUBBING BRICK.** A heavy, coarse grained stone generally artificial, used principally for rubbing down rough castings, smoothing concrete work and for dressing marble and granite.

**SANDSTONE.** (Geology.) A sedimentary rock composed of cemented sand of various sized grains.

**SANDSTONE.** (Commercial.) A very coarse grained stone suitable for knives or tools requiring very coarse, rough edges. Quarried extensively in Ohio and India.

**SCYTHESTONE.** A stone used to sharpen the edges of scythes. Made in many different weights and grits to suit individual preferences. Scythestones are also used extensively for sharpening household knives.

**SILICA.** A white or colorless, extremely hard crystalline formation found pure as calcite or opal in many rocks or sands.

**SLIP STONE.** A term often applied erroneously to any oilstone of small size. The correct designation is "Round Edge Slip" and applies to a stone suitable for sharpening gouges and other curved edges. It measures from three to five or more inches in length and is of varying widths and thicknesses, with a thick rounded back tapering to a thin rounded edge.

**TAM-O-SHANTER.** A very fine grained, soft gritted natural stone found in Scotland. It is used in the United States as an axe stone and for sharpening pruning knives.

**TRIPOLI.** Very similar to Infusorial Earth.

**TURKEY STONE.** A very fine, close-grained stone containing about 75% silica intimately blending with about 25% calcite. Quarried in the interior of Asia Minor. Once very popular for sharpening mechanics' tools but now superseded largely by Arkansas and Washita oilstones.

**VITRIFIED PROCESS.** After the crystals or grains of artificial stones are mixed with their bond and molded into proper shape, they are placed in immense ovens or kilns and "burned" at a temperature of about 3000° F. This burning is termed the vitrifying process.

**WASHITA.** A rather coarse grained novaculite, especially suitable for sharpening carpenters' or general wood-workers' tools.

**WATER-OF-AYR.** See Tam-O-Shanter.

**WATER STONE.** A stone whose cutting crystals break away rapidly from its bond. The use of water forms a gritty paste which acts in much the same way as oil when used on an oilstone. The Queer Creek and Hindostan stones are good examples of water stone.

**WHETSTONE.** A term formerly applied to about every kind of stone used in sharpening edge tools, but now superseded to a very great extent by the phrase "sharpening stone."

*Commonwealth Press*
*·Printers·*
*Worcester, Mass.*