

A Bibliography of Cordage and Cordage Making

“The Art of Ropemaking, by some strange fatality, has not attracted hitherto sufficiently the notice or attention of the mathematician, philosopher, or engineer, either in this country, or any part of the maritime world, with success”

Robert Chapman , 1868

The last substantial work on the history of cordage in English seems to be Tyson's "Rope - a history of the hard fibre cordage industry" (1966). Tyson's book is of the nature of a compilation of material. In particular, the first section is essentially an abridged version of a paper given by H. W. Dickinson to the Society of Patent Agents in 1943. It is typical of the literature of cordage that Tyson seems not to have known that this paper was published in its entirety in the Transactions of the Newcomen Society. It is also typical that he reproduces Dickinson's misprint in the number of Huddart's 1793 patent as 9512 rather than 1952. Tyson does attribute his source material though - much material, particularly illustrations, is reproduced in the literature without attribution. References where given are often terse, sometimes misleading.

The following represents an attempt to survey material relevant to the history of cordage, interpreted fairly broadly. Thus, I have included references to fibre production as well as rope making proper and to some secondary products such as bowstrings, which are of particular interest because of their requirement for high strength and low mass. Tim Baker's article in 'The Traditional Bowyer's Bible' on bowstrings has much interesting material, including a note on Japanese bowstrings which 'look to be a single large simple-ply. However the strings central core is twisted in the opposite direction from that of its surface.' It is inclusive rather than exclusive where there seems to me to be a doubt as to whether material is relevant.

The history of cordage from Egyptian times to about 1500 AD seems fairly speculative. An interesting article related to this is Mackay (1916) who published a photograph of Egyptian peasants making rope by a method closely related to the one shown in the wall painting in the tomb of Khaemweset. This seems to me to raise some interesting questions about craft survivals among conservative groups such as peasants and farmers in general, as well as the relation of Egyptian practice to the rest of the Mediterranean world such as Greece and Rome. It also leads me to speculate that the wimble (from C13 Middle Dutch wimmel - an auger) might be a survival of an older craft tradition of rope making. Allan Nillson's book would seem to provide much material.

The technology of rope making in England from 1790 can probably be followed adequately from Steel, Goodrich, Chapman, Carter and Lawrie plus the patents listed in Dickinson. Rural rope making which provided products like tapered plough-ropes seems to have survived unchanged from Steel's time in places until 1920.

The Swedish references, Wahlbeck and Nillson, provide a number of references to European material.

'China at Work' by R P Hommel shows photographs of a tackle board and sled, and spun-yarn winches taken in China in the 1920s.

SUMMARY OF EARLY MATERIAL

After the beginning of the 19th century, which is a sort of watershed marked by Huddart's patent and the introduction of machinery such as Maudslay's strand forming machine, the history of ropemaking is better documented. Before this time, until the encyclopaedists of the mid 18th century, what is known is very fragmentary.

Possibly by combining literary evidence with archaeology, etymology, the general history of technology (for example the substitution of rotary for oscillatory motion, the development of the crank, etc.), the history of textile technology, and the general historical context, enough might be deduced to allow intelligent speculation about this early period. The following is a summary of material that might be helpful in expanding Dickinson's essay to explore the early history of ropemaking more fully.

FIBRES

Many fibre sources have been of local importance in various parts of the world. The following seem to be of most significance.

Animal Sources

These comprise hair, hide, sinew and gut.

Wilkinson reproduces a picture of a hand whirl being used to make cord in Ancient Egypt. The raw materials appear to be hide, with the strand produced with a spiral cut.

Walrus hide was used for parrel ropes as late as the 14th century (see Tinniswood)

The Encyclopaedia of Rawhide and Leather Braiding has a photograph of South American gauchos making lariat rope from hide.

Ron Edwards discusses making hide rope.

Leather Manufacture by Alexander Watt gives a description of the manufacture of catgut.

Horsehair rope is mentioned by Ashley. There is an example of a Faeroes rope-making machine for horsehair rope in the Pitt Rivers museum, and of a horsehair net header at the Museum of Rural Life, Reading University.

Vegetable Sources.

The tomb of Khaemweset shows cordage making from papyrus.

Pliny mentions the use of flax for nets, and ship's rigging. Esparto he suggests was not used before the first invasion of Spain by the Carthaginians (237 BC), and that it was used in preference to hemp for sea-going purposes. He considers that the Greek for rope (Σχοινος which is the same as the word for rush) indicates that esparto was used, but that they afterwards used the leaves of palm trees and the inner bark of lime-trees. (Book XIX, Naturalis Historia, VII to IX).

Pliny Book XIX, LVI mentions hemp as exceedingly useful for ropes and hunting nets.

Prior to about 14th century lime bast seems to have been important

Ellen Schjøberg records the use of birch, juniper and willow twig cordage from the 12th and 13th centuries, together with cordage of shredded wood from the same period.

She also discusses heather cordage, apparently in use until recent times for roping thatch in the northern British Isles, and also for mooring boats on the Isle of Man.

Post 14th century, hemp dominated the rope trade in Western Europe until 19th century.

In 19th century, manila started to displace hemp. This seems to be due to uncertainty in supply (?), and reduced topside weight with manila. Also retting produces variable fibre quality whereas decortication for abaca leaves produces a more uniform result (Stevens, Robert White On the Stowage of Ships and their cargoes, Longman, Green and Co. 7th edition 1894 discusses some tests).

Robinson B B and Johnson F L Abaca - A cordage Fiber, USDA Agric Monograph No 21 (1953) is a good comprehensive reference.

FIBRE SEPARATION.

The Egyptians appear to have used papyrus whole or possibly split.

Pliny Book XIX mentions retting for flax and esparto but discusses only peeling for hemp.

Retting seems to have been standard for flax and hemp, although 'A Medieval Brewery; Cordage and Similar Products, Sound Tools and Music at Bryggen, The Bryggen Papers - Supplementary Series Vol. 3 notes the use of whole flax stems.

Diderot D and D'Alembert L'Encyclopedie - Arts des Textiles gives illustrations of hemp separation.

Kirby, R H Vegetable Fibres, Leonard Hall, London 1963 gives a good modern discussion of flax retting.

Mason, Bernard S Woodcraft and Camping, Dover 1974 discusses separation of lime bast. I haven't seen much material in English on lime bast – the Swedish literature may be more fruitful.

SPINNING

The most primitive method of spinning is hand twisting. Some Egyptian tomb paintings seem to show this. Kochanski, Mors L. Northern Bushcraft, Lone Pine Publishing Edmonton Alberta Canada 1987 amongst others discusses thigh rolling, where two strands are formed and laid simultaneously in a continuous process.

Wilkinson's book has a woodcut (p86) of net making juxtaposed with a man spinning, which presumably illustrates the production of flax twine.

In the 18th century, the conventional method of spinning a strand was by walking backwards from a spinning hook with dressed hemp wrapped around the waist.

Gaston Phœbus (15th C illustration) shows a wheel with hooked spindle driven by an assistant on the crank, while the spinner spins twine from a distaff. This looks like a development of the great wheel (eg Luttrell Psalter) but with the introduction of hooked spindle and crank. Possibly the spinner is walking backwards as was the later practice.

There is some crossover with textiles here. Presumably textiles required a higher quality product and adopted innovations before ropemakers.

Handspindles by Bette Hochberg mentions spinning camelhair rope with a stone and stick drop spindle.

Ellen Schjølberg in "Cordage and Similar Products from Bryggen in Bergen" discusses the use of the winch in spinning yarn.

There are a number of references to the use of the wimble for straw rope making in England and Ireland.

Nelson Annandale in The Faeroes and Iceland, Oxford University Press 1905, discusses spinning horsehair with drop spindle and spun-yarn winch.

D'Arcy Lever in Young Officers Sheet Anchor illustrates the spun-yarn winch.

W. E. Dexter, Rope-yarns, Marline-spikes and Tar describes the use of the spun-yarn winch on p52-56.

Bernd Wurlitzer in Historische Werkstätten, Verlag die Wirtschaft Berlin 1989 has a reproduction of an early woodcut which may illustrate a spun-yarn winch in use by a ropemaker from 'ende 16. Jahrhundert'.

'A Medieval Brewery; Cordage and Similar Products, Sound Tools and Music at Bryggen, The Bryggen Papers - Supplementary Series Vol. 3 ' describes similar methods.

Allan Nilsson in Studier I Svensket Replageri, Nord Museets Hendingar 55, 1961 has photographs of these methods in use in Scandinavia.

A video, 'The Ropemaker' from Historic American Productions, PO Box 763, Addison TX 75001, illustrates the use of the 'tarrabee' in Texas. This is basically the same device used by the ancient Egyptians.

Patricia Baines in 'Spinning Wheels, Spinners & Spinning' reproduces a number of early illustrations of spinning wheels for the production of textiles. Assuming that textile technology led ropemaking, some conclusions might be drawn about the date of introduction of, for example, the multi-spindle wheel for spinning hemp. Other general features such as the use of straw or leather bearings could be similar.

LAYING

E Mackay's Note on a new tomb (No 260) at Droh Aba'l Maga, Thebes, J Egypt Arch III (1916) p125-126 and plate XV illustrates and discusses the Egyptian hand whirl in laying rope.

J Gardener Wilkinson in 'The Ancient Egyptians, their life and customs' p93-95 describes and illustrates a similar implement for twisting leather thongs from a representation of a tomb of Thebes in the time of Thotmes III.

'The ends of four thongs were inserted and fastened into a hollow tube, from the side of which a bar projected, surmounted by a heavy metal ball; and the man, who twisted them, held the tube in his right hand, whirling it round, as he walked backwards, by means of the impetus given from the ball. A band, attached to a ring at the other end of the tube, went round his body, in order to support it and give a free action, and the ring turned upon a nut, to prevent the band itself from twisting.'

The details given I guess to be somewhat speculative. I am not aware of the survival of such a tool.

The methods shown in Mackay are plainly inadequate for laying large ropes. Wahlbeck's Rep och Repslageri under Olike Tidsaldrar, Sweden 1991 shows a rope being laid by hand-methods in East Africa using what appears to be a tackle board attached to a bipod with restraining rope. A similar arrangement appears in Description de l'Egypte from early 19th. Possibly this represents the continuation of ancient practice.

Description de l'Egypte illustrates (p701) an interesting piece of equipment. The rope-maker is laying four-strand rope. Four whorls are mounted on a board supported by a bipod. An endless rope passes around all four whorls, which are rotated by pulling on the rope. The layer appears to be using only his hands rather than a top.

David Steel, The Elements and Practice of Ropemaking gives a good description a 18th century practice in the ropemaking industry.

Diderot D and D'Alembert L'Encyclopedie - Arts des Textiles gives illustrations of rope laying.

Simon Goodrich, "Memoranda made at Chatham Ropery respecting Ropemaking between the 27 April and 6th May 1808 on the occasion of going down to examin about the introduction of a steam engine there for assisting in forming strands of cables and hawsers" gives a unique description and illustrations of early 19th century machinery and practice.

EQUIPMENT

The following is taken from Steel's Elements of Ropemaking.

AN ALPHABETICAL DESCRIPTION OF THE TOOLS AND EXPLANATION OF THE TERMS USED IN ROPE MAKING.

BACK-FRAME WHEEL for laying cordage, from a six-thread ratline to a two-inch rope, is about four or five feet in diameter, and is hung between two uprights, fixed by tenons on a truck, and supported by a knee of wood. Over its top is a semi-circular frame, called the head, to contain three whirls (that turn on the brasses) with iron spindles, secured by a hasp and pin. They are worked by means of a leather band encircling the whirls and wheel. Three of the whirls are turned when hardening the strands, and one only when closing the rope, the strands being hung together on it. The truck, on which the back-frame is fixed, runs on four wheels, and is made of three-inch oak plank, about nine feet long and thirteen inches broad, at one end, and eleven inches broad at the other.

BACK-HOOKS. large strong iron hooks, to close ropes and cables, fixed on the breast-board of the sledge.

BANDS, to encircle the wheels and whirls, are of leather, large line, or catgut. The leather is for the spinning and back-frame wheels, the line for the table-wheel, and the catgut for line and twine wheels.

BLOCKS, single, double, or treble, are strapped with a hook and thimble, and reeved with a rope, called the tackle-fall, which is used to stretch the yarn to its full extent, (before the press is put on,) by a capstern, or crab, at the lower-end of the rope-walk. The fall is then belayed, until every yarn is hove through the strands and brought down, so that the rope may not exceed the circumference intended.

BOLTS for whirls are large iron pins with round heads driven in the board over the crank-wheel for the whirls to run on.

BRASSES, let into the heads of laying or spinning wheels, are about four inches long and two broad. In the middle of the upper-end is a hole for the spindle of the whirls to work in.

BRIDGE, an oak plank, thirty-two inches broad and three thick, fixed across the top of the kettle, with a mortise through the middle to admit the step, and a hole at the end for the yarn to pass through to the nipper.

CABLES, ropes made of nine strands, that are nine inches and upwards in circumference.

CABLETS, cable-laid ropes, under nine inches in circumference.

CAPSTERN. A round body of wood, about eight feet high and fourteen-inches in diameter. It turns on a spindle at top and bottom, has four holes near the middle for levers or bars, and is turned by men or horses. Its use is to draw the yarn, when tarring, out of the copper through the nipper to be coiled away in the yarn-house, and there properly hardened before used; if not, it will kink in closing.

A *CAPSTERN,* or *CRAB,* is fixed in the ground at the lower-end of the walk, and is used in stretching the yarn to its fullest extent, before it is worked into strands, by means of the tackle-fall led from the sledge to the capstern, they being about eighteen yards distant from each other.

CLEARER. A tool similar to the hatchell, but with finer teeth, as the hemp is always finished on it for lines and twines, for sail-makers, &c.

CLOSING of ropes, see *LAYING.*

COUCH. To couch well is to lay close and even.

COIL. A rope turned in form of a ring, one turn upon another, for easy stowage, and that it may run out free.

CRAB, a sort of small capstern, fixed in a frame of wood at the lower-end of the ground, used to stretch the yarn, by giving power to the tackle.

CRANK-WHEEL, for spinning of lines, box-cord, &c. is fixed on an iron spindle or axis with a handle to turn it by: It hangs between two posts; the after one is six feet high, one foot broad, and five inches thick; in its upper part, above the wheel, is let in a semi-circular board, two feet six inches long, two feet broad, and five inches thick, to receive three sets of whirl bolts, with whirls on them, for the spinners to hang their threads on: at the front side of the wheel is a short post supported by a knee of oak for the spindle to rest on.

DRAGS are formed like the after part of the sledge, to which they are fastened by ropes, and are lined with a board on the upper side. They contain weight, as a press, when the rope requires more than the sledge can carry to keep the strands of a proper stretch, and prevent their kinking, as they get hard, and as the rope is brought to its intended size.

FIDS, to make eyes, splices, &c. in large ropes, are round lignum-vitae pins, thick at one end, and tapering to a point. They are from eight to twenty inches long.

FOREGANGER, a short piece of rope, one quarter of an inch in circumference, (larger than a whale-line,) to fix on the harpoon when they strike a whale.

FORE-LOCK-HOOKS are made of iron, with a long neck and handle; they have an eye at the end of the neck for the fore-lock to go through, and are to hang the yarn on, to harden and close ropes, from two inches and a quarter upwards.

GROUND-TOW, the loose hemp that comes from the sides of hatchellers and spinners.

A *HATCHELL*, to clear the ends of the hemp, by drawing it through, has forty sharp-pointed iron teeth, one foot long, fixed in wood.

HAULED ABOUT is a term used in making a short cable-laid rope, when one strand is made long enough to make three; or, for a four strand rope, long enough to make two, and form an eye at the lower end for a stay.

A *HAUL OF YARN* is about four hundred threads, when warped off the winches, with a slight turn in it, to be tarred.

HAWSERS, ropes made of three or four single strands. When made of four strands it is called shroud-laid, and is used in merchant-ships.

HEART, a strand slack twisted, used in some four strand ropes: it is run down the middle, to fill the vacancy that would otherwise occur, and thereby forms a round. It is best hawser-laid.

IRON JACKS, sometimes used instead of the table-wheel or back-frame wheel, differ from the latter by having an iron wheel with cogs, which work in the whirls, they having iron cogs like-wise.

JUNK, old cables or hawser-ropes, cut into various lengths.

KINKING, the twisting or curling of a rope, by being twisted too hard.

KNITTING, the tying together certain quantities of yarn, when warping into hauls to be tarred.

LAYING, the closing of the strands together to compose the rope.

LAYING-HOOK, the hook on which the strands are all hung together for laying or closing.

LOPER, used to lay lines, has two iron swivel-hooks (that run round in a brass or iron box) at each end, for the line to hang on, and work, by the power of the fore-turn, from the wheel at the upper end.

MARKING-YARN, a white thread, untarred, laid in rope for the king's or East-India Company's mark. That for the king's is spun the contrary way.

MARLINE-SPIKES, to make eyes, splices, &c. in small ropes, are long iron pins, in shape of a fid, from eight to sixteen inches long.

MAIL, to rub off the loose hemp that remains on white cordage, is a kind of steel chain-work, flat, and fastened upon leather, about nine-inches long and seven-inches broad.

NIBBED-HOOKS are of iron, used to hang the yarn on to harden the strands, and lay ropes from two inches and a quarter to three inches and a quarter.

A *NIPPER* is formed of two steel plates, eight inches square and half an inch thick, with a semi-oval hole in each four inches wide, which, by the upper plate moving, enlarges or contracts as the tarring of the yarn requires. It is thus fixed. A post, twelve inches square, is placed between the kettle and capstern, with a mortise cut eighteen inches long from the kettle's surface and five inches wide. The under-plate is turned up on each side, to form two grooves, and is let into the front-side of the post from the lower part of the mortise: the upper-plate has a dove-tail on the back, that slides up and down in a groove into the grooves of the lower plate, and, by a staff, made fast to its front, it is highered or lowered, and regulated by a weight suspended at the other end, so that the yarn receives no more tar than is required, and what is squeezed out drops in a trough and returns onto the kettle.

PENDANTS, short pieces of rope, doubled, with a large eye spliced at each end, and a thimble seized in the bight, used to hook the tackles where wanted.

POSTS AND RAILS, along the whole length of the walk. The posts are eight feet high, exactly opposite to each other, and support, on the head, the rails that cross the ground, in which are iron hooks for the spinner to hang his yarn on as he spins it.

PRESS-BARRELS are old tar-barrels filled with clay, and laid on the sledge or drag to add weight when the rope is closing.

RAN, twenty cords of twine, wound on a reel, and every cord so parted by a knot as to be easily separated.

REACHING-POST, a post sixteen or eighteen inches diameter, and about four-feet high, fixed in the ground at the lower-end of the walk. It is used in stretching the yarn by means of a tackle, one of the blocks of which is hooked to a strap round the post, the other block to a pendant at the sledge, they being about eighteen yards distant from each other.

REELS to reel ropes on, from six-thread ratline to a two-inch rope, have four ribs fixed at each end in a flat circular piece of wood; round the edges, are blades, or handles, to turn them: one of the circular pieces is called the head, and is made to slide off for taking the coil away. They turn on an iron spindle with a round head, and are from ten to thirty-six inches long, and from twelve to eighteen inches diameter.

REELS, HAND, are used for reeling marline and other lines. They are narrow boards, with three or four holes at each end, in which pegs are fixed to reel the line on.

REELS, TWINE, have four oak bars, about eighteen inches long, one of which slides for the conveniency of taking off the twine.

ROPE-HOUSE GROUND, OR WALK, should be four-hundred yards long and about ten broad. At the upper-end are fixed the spinning wheels, over which is the hatchelling-loft, also the back-frame wheels, tackle-boards and posts, winches for winding the yarn on as it is spun, and reels for reeling the ropes on. On each side are stake-posts: in the middle is fixed the warping-post; and at the lower-end, the capstern and reaching-post. Back-frame wheels for small, and sledges and drags for large, ropes, are used towards the lower-end.

ROUNDING is giving the rope an additional turn after being closed.

SERVING-MALLET has a round head, about twelve inches long, to serve round the parcelling and spunyarn, which is woolded round the rope, to work the worming into the cuntline of the rope.

SERVING of ropes is binding them round with rope-yarn.

SHIVERS. The foul particles taken from the hemp when hatchelling.

SHORT-LAID, implies short-twisted.

SHORT-HAULS, hauls of yarn for rope short of the common length.

SHORTS. The toppings and tailings of the hemp, which are dressed for bolt-ropes and whalelines. *Shorts*, also, implies the distinction between the long hemp used in making staple-ropes, and inferior hemp.

SLACK-LAID means slack-twisted.

SLEDGES are frames made of strong oak, clamped with iron in different parts. They are from three feet wide and eight or twelve feet long to five feet wide and fifteen feet long, according to the size of rope. The two sides are the length of the sledge, made of oak, five by seven inches thick and tied in with oak bars at each end: near the front are two uprights, five feet high, let into the sides, and supported by two slanting pieces from the upper-end. A breast-board, nine inches wide and from two to three inches thick, is fastened with iron pins to the uprights, and contains holes for the hooks to go through on which the yarn is hung, which, being turned by men, is twisted into rope, and so closed or finished. These sledges are loaded to such a degree as the rope in making requires.

SPINNING-WHEEL, for twelve spinners, to spin yarn at the same time, is about five feet in diameter, and is hung between two posts fixed in the ground: over its top is fixed a semi-circular frame, called the head, which contains twelve whirls, that turn on iron spindles, with hooks to their front-ends to hang the hemp on, and are worked by means of a leather band encircling the wheel and the whirls.

STAFFS for tops are round, from six to eight feet long, and from two and a half to five inches diameter, which go through a hole in the top, or are confined under it by a bolt and tails: the run on a truck-wheel at the lower-end as the rope closes.

STAKE-POSTS are of oak, about four feet high and twelve inches diameter, with a mortice-hole in each end for the stake-heads to go in and out, to keep the rope from the ground. They are placed about ten yards distant from each other along the whole length of the walk.

STAKE-HEADS are about four feet long and four by three inches square, with four wooden pins to keep the strands asunder. For lines they are about two feet long and three by two inches square and have six pins.

STAPLE-ROPES, a term for ropes made of hemp not inferior to clean Petersburg.

STEP, OR TONGUE, for the tar-kettle, is made of three-inch oak plank, five feet long and thirteen inches broad, which tapers to nine inches at the bottom, and is put into the kettle through a mortice in the bridge. Within four inches of the lower-end of the step is a round hole five inches diameter, for the yarn to pass through. The step is suspended and regulated by a tackle.

STOVING is placing of white rope in an iron stove or oven, to which heat is communicated by means of a flue, which makes the rope more limber and pliant to receive the tar.

STRAND, one of the twists or divisions of which a rope is composed.

STRAP, a number of yarns platted together with an eye at one end, to put a stick through: it is bound around the end of the tails to twist them tight when the rope is to be laid hard. Some have a hook at the other end, to hook the strands in laying: others are made of the same sized rope as the pendants, with an eye spliced in each end.

STRAPS, pieces of rope spliced to surround blocks, or fasten large ropes, &c.

TABLE-WHEEL, to lay ropes, from a six-thread ratline to a two-inch and half rope, is fixed in the wheel-house, at the upper-end of the rope-walk, in a frame fixed in the ground, with two sliding cheeks, and bands to work the whirls, which go separately over each whirl, and round the turning-wheel. (Some have six sets of whirls, of different sizes, with iron spindles, and nibbed or fore-lock hooks at the outer-end.) A tackle-board, twelve inches broad and three inches thick, with six holes for the hooks to go through, is fixed above the cheeks upon cleats.

TACKLE-FALL, the rope that connects the blocks together. The whole assemblage is called a tackle, and is used for stretching the yarn, &c.

TAR, a liquid gum of blackish hue, which distils from pines, or fir-trees: when prepared by boiling, it is used for tarring ropes. Stockholm tar is the best for the purpose, and no other is allowed in the royal navy.

TAR-KETTLE is made of copper, and holds from ten to twenty barrels of tar. It is set in strong brick-work, and over it is fastened, from side to side, in the direction of the nipper, a bridge made of three-inch oak plank, thirteen inches broad, through the middle of which is a mortice for the step to go through to keep the yarn down when drawing through the kettle. On that side of the kettle next to the capstern is an upright post, twelve inches square, in which is fixed nipper, to press the tar out of the yarn; and a staff, with a weight suspended at the end, is fixed in the side of the nipper, to keep it down, that the yarn may have no more tar than is necessary.

TOPS, to lay ropes, from a six-thread ratline to the largest cables, are conical pieces of wood, with three or four grooves or scores from the butt to the end, for the strands to lie in, and form a triangle. If too broad at the breech, the rope will not close well, nor the strands work so close as they should. A hole is made through the centre of the top, one third the length from the biggest end, for the staff or bolt to go through, round which are put pieces of old rope, called tails, for the layer to close the rope with, and lay it hard or slack, according to the use it is for. A hole is likewise made through the middle of the top length-ways, for laying ropes with a heart. A collar is put on to assist the layer when the work is too heavy, and to enable him to hold the tails and close the rope well.

TOPS, to lay ropes of three inches and upwards, have a staff under them, with a truck-wheel at the lower-end. An iron bolt goes through the centre of the top and is lashed down to the staff, on which the tails are put and rounded over the rope, being too heavy to be laid with a collar. A strap is put round the tails with a woolder for the layer to close the rope with.

TOPS, to lay cables, have a leg to support them with a truck-wheel at the end to run, besides the staff which the tails go over.

TOPS, for laying lines of all sizes, are of hard wood, tapered at the after part, that the line may close sharp. Those for sash-lines have four grooves, and for drum-lines eight grooves.

TOPPINGS, what comes from clearing hemp when hatchelling.

TOPPING AND TAILING is the clearing both ends of the hemp with the hatchell.

TRUCK-BARROWS are of different sizes, have three wheels, and are used to take hauls of yarn from the yarn-house, and the remnants of yarn, coils of rope, &c. from the ground to the rope-house.

TRUSSELS have four legs braced together with stout pins: they are used at the upper-end of the rope, or put under ropes of short length, when the strands cannot be put on the stake-heads.

WARPED INTO JUNKS is yarn warped into short lengths for spunyarn.

WARPING is running the yarn off the winches into hauls to be tarred.

WARPING-POST, a post, fourteen or sixteen inches diameter, fixed in the middle of the ground for

warping the yarn into hauls.

WARPING-BLOCKS are used to warp the yarn into hauls for tarring. The tops and bottoms are made separate, to let in the sheaves and screw down.

WARPING-Hook, for hanging the yarn on, when warping into hauls for tarring, is a large iron hook hung occasionally to the warping-posts.

WHIRLS are of beech or ash, five inches long, cylindrically formed, and fixed on an iron spindle in the head of the wheels, with a hook at on end for the spinner to hang his hemp on. They are likewise used to hang the yarn on for hardening, and laying ropes, from a six-thread ratline to a two and a half inch rope. Those for twines and lines are made of boxwood, with a hole through the middle, and two or more grooves round them, one to hold the catgut which encircles the wheel, and the other to hold a small cap, made of catgut, to which the thread is fastened in spinning or laying. The whirls for large work are four inches in diameter, with three or four grooves and an iron cap.

WINCH (a) is, to wind the yarn on as it is spun, and consists of eight spokes, to form the body, and eight blades, four at each end, to contain the spokes, and an iron bolt with a round head to turn it on.

WOOLDERS, single and double handed, are sticks about three feet long, and four inches in circumference, with strops of rope-yarn made fast, to fix on the rope and assist the men at the hooks in closing the rope.

WORMING is laying strands along the cuntlines of ropes, to make an even surface for serving.

YARN, called twenty-five, twenty, and eighteen thread yarn, differs only in the fineness; the twenty-five being finer than the twenty, &c. It is thus distinguished, because either twenty-five, twenty, or eighteen threads a hook, make a rope three inches in circumference, and so in proportion.

HEMP

Seed to be sown, should be of the preceding year, because it is an oily grain, and is apt to become rancid if kept too long; it is also advisable to choose the seed every second year from a different soil.

The time for sowing is from the beginning to the end of April; if sown earlier, the plants become tender, the frost will injure, if not totally destroy them. The plants should be left thick, as without this precaution, the plants grow large, the bark woody, and the fibres harsh.

The ripeness of the male plant is known by the leave turning yellow, and the stem of a whitish colour.

The ripeness of the female, by the opening of the pods so much, that the seed may be seen – they will have a brownish appearance.

The harvest for pulling the male is about August, the female not being fit until Michaelmas. When gathered, it is taken by the root end in large handfuls, and with a wooden sword the flowers and leaves are dressed off – twelve hands form a bundle, head, or layer. It is immersed in water as soon as possible; as by drying, the mucilage hardens, and it requires a more severe operation to develop the bark than when macerated directly, which is injurious to the fibre. If let lie in water too long, the fibres are too much divided, and by an undue dissolution of the gum, would not have the strength to stand the effort it should, in being dressed. But if not sufficiently steeped, it becomes harsh, coarse, non-elastic, and encumbered with woody shives, which is a great defect. The next operation is to separate the fibres from the stem; this is done by a process called scutching, formerly practised, but now by a machine, called a brake; the operation is only breaking the reed or woody part, for the fibre itself, of which is the filamentous substance; hemp only bends, and does not break. The strength of the longitudinal fibres is superior to the fibres by which they are joined; or, in other words, it requires more to break them than to separate them from one another, as by rubbing or beating, causes the longitudinal fibre to separate, and in proportion of a greater or less degree of that separation, it becomes more or less fine, elastic, and soft.

When intended for cordage or coarse yarn, it requires only to be drawn through a coarse heckle; but if for a fine yarn, through heckles of various of fineness. In this process the pins carry off a part of the gum in the form of dust, which is very pernicious, and by dividing the fibres, separate entirely the heterogeneous mass. To effect this, the heckle is fixed upon a frame, one side inclining from the workmen, who, grasping a handful of hemp in his hands, draws it through the heckle pins, which divides the fibres, cleanses and straightens them, and renders the hemp fit for spinning; if the fibres were spun longitudinally, the yarn would be stronger, more easily join, and require less twist.

SPINNING

When the spinner has placed the hemp around him, he commences by taking hold of the middle of the fibres, and attaching them to the rotatory motion that supplies twist, which, upon receiving, he steps backwards, doubling the fibres in the operation. When the yarn is spun, it is warped into hauls or junks, which contain a certain number of threads or yarns in proportion to the size and weight. The hauls are then tarred, if required. The tar should be good, and of a bright colour when rubbed by the fingers – Archangel being the best; mixing with it, at times, a portion of Stockholm, to ameliorate and soften that which has been boiled, as by repeated boiling it becomes of a pitchy substance, and makes the cordage stiff, difficult to coil, and liable to break. The tar should at first be heated to a temperature of 220 degrees Fahrenheit previous to commencing operations, so that the aqueous matter may be evaporated, and any dirt or other dense matter precipitated and taken out, thereby cleansing it from all impurities; as the yarn, passing through the tar, takes or draws in a quantity of moisture, and the atmospheric air pressing upon the surface, has a tendency of lowering the temperature; it never should descend while in operation below 212 degrees to evaporate that moisture. The yarn should not pass through the tar at a greater speed than fifteen feet per minute, to allow it to imbibe a sufficient quantity to prevent decay, and cause an amalgamation to take place, rendering the cordage more durable in exposed situations, weaker by its adhesion to the fibre which makes it more rigid, and destroys a small portion of its

strength and elasticity. After being tarred, the hauls are left for several hours to allow any moisture to evaporate; it is then coiled into the yarn-house, and left for several days to allow the tar to harden, and adhere more closely to the fibre; otherwise, should it be made into cordage directly after being tarred, the tar would press to the surface, decay takes place in the centre, and gives the cordage an unsightly appearance. When the hauls have lain a time in store, they are wound upon bobbins, the haul being stretched along the floor of a shed; and each end being formed in loops of bights, are placed upon hooks, and made taut by tackles; the workman takes the end of four yarns and separates them, passing each end through a gauge, attaches them to bobbins placed upon a machine to receive them, called a winding machine. When the bobbins are full, they each contain about 500 fathoms of yarn, or in proportion to the size of the yarn, and are taken from the machine and replaced by empty ones, and the operation proceeds.

The bobbins of yarn are then taken to a frame made to receive them, and the ends are passed through a metallic plate perforated with holes in concentric circles; each yarn is passed through a single hole to the number of yarns required to form a strand; the whole are then brought together, and drawn through a cylindrical metallic tube, having a bore equal to the number of yarns when compressed. It is then attached to a machine which is drawn down the rope-walk by steam or some other power; at the same time a rotatory motion is given to twist the yarns into a strand, making a uniform cylinder. These machines are called registers, because they register the length. Forming giving a proper formation, and equalising for the equality of twist given the strands over the old method.

There are other machines for making cordage upon more scientific principles, and which give a greater uniformity of twist or angle, such as Captain Huddart's, for these reasons: - the backward travelling movement of any register, forming, or equalising machine that is or may be used in a rope-walk, the retrograde movement of such a machine towards the bottom of the walk to which the strands are drawn, and where the most improved and best principle is or may be adopted, has hitherto been found defective. The machines being worked by ropes applied in different ways, causes non-uniformity in the twist or angle; as, in some cases, the rope is made to draw the machine by fastening one of its ends to the machine, and the other to a capstan at the bottom of the walk, the twist being given by the rotatory motion of the wheels on which it travels; in other cases, a rope, termed a ground-rope, made fast at each end of the walk, and having one or more turns about the barrel of the machine to give the required twist to the strands. Also an endless rope passing from one end of the walk to the other, the one end passing around a movable pulley, the other round a capstan, with the power to drive the machine; the rope is then passed round a gab-wheel upon the machine; the capstan being put in motion, the endless rope drives the gab-wheel, and causes the machine to retrograde or travel along the ground-rope which gives motion to the pinions, and twist the strands, The great object to be obtained is in the regulating the retrograding or travelling motion, and to preserve a certain speed in a given time, in order that the strands may receive a proper degree of twist in a certain length.

The next operation, the strands are made into a rope by being attached to the machines at each end of the walk, and brought to a certain degree of tension by means of tackles; a wood frame, called a drag, is made fast to the machine, and some heavy material placed upon it to retain that tension when released from the tackles. The machines are then put in motion, and as the strands receive torsion they shorten in their length - this is called hardening; but from various causes, during this process, and inequality of tension takes place, one strand becoming slack and the others tight, therefore of unequal lengths, although originally of equal lengths, and receives the same number of twist or turns by machines of the most approved principle. The method practised to remedy this, is to twist up the slack strand, making it harder and smaller, and consequently it cannot lay evenly in the rope, and will be the first to break. It is also obvious that an after-twist must be given the rope to cause the strands to unite, as for every twist given the rope the same is taken from the strands; hence the same number of twists the rope receives, the same number must be given to the strands, and any increase given the rope in making or rounding cannot be retained, but must come out when the rope is put upon a strain, When the strands have received a sufficient hardness of twist, they are placed upon one hook upon one of the machines; a cone of wood, called a top, with grooves cut in the surface sufficiently large to receive the strands are then put between them; the machines are then put in motion, the strands made to bear equally the tails wrapped around the rope, and all is ready for closing. The machine that twists the rope being set so as to make two revolutions, while the machine that twists the strands makes but one revolution; this extra revolution given the rope being requisite to overcome the friction which is caused by the top, tails, and the stake heads which are placed at every five fathoms to support the strands and rope, and which extra revolutions cannot be retained in the rope.

1. A. B. Wahlbecks Fabriker Linkoping Sweden 1949
Fran Fiber till Tagvirke
All about ropemaking, ropes & knots
2. A Day at a Rope and Sailcloth Factory

Penny Magazine Nov 26 1842 p465-472

Interesting description of Huddart & Co. Limehouse and the apparent source of illustrations in many subsequent publications
3. Admiralty Manual of Seamanship 1908

p 106-107

Admiralty Manual of Seamanship 1937
London HMSO

p 98-99 Foxes and the rope jack
4. American Canvass, cables and Cordage
A Report from the Secretary of the Navy 1825
Report on possibilities for improvement of American hemp by adopting European practices
5. American Mechanical Dictionary
Edward H Knight New York 1874
p1358, 1980, 2272
Not Seen - Chronicle of Early American Industries Association refers
6. Bernh Hagedorn & Co.
Catalogue of ropemaking machinery
Glandorf bei Osnabruck, 1865
7. Bioresource Hemp - Proceedings of the Symposium. Frankfurt am Main, Germany.
March 2-5 1995 2nd edition
Hemptech, California 626 pp

Includes material on plant cultivation and fibre preparation
8. The Book of Trades (Standebuch)
Amman, Jost and Hans Sachs
1568
Dover reprint 1973 p183
There seem to be various woodcuts illustrating the ropemaker

Book of Trades or Library of Useful Arts 1811
Vol. 2 Beryl Hurley (ed.)
Wiltshire Family History Society
Orig. W Flint
Old Bailey, London for R. Phillips No 7 Great Bridge St
p 33-34

Book of Trades 1839

NOT SEEN

9. Book of English Trades
C J Rivington London 1827 p274
Not Seen

10. The Chronicle of the Early American Industries Association

Vol 1 #17,#18
Flax Dressing by Hand

Vol 2 #12 Dec 1939
Tow Rope George M Summers
Rope making from flax. Describes ropemaking machine with pine cog and 38 hickory teeth driving birdcage cogs. Top called a “rope or strand shuttle”.

Vol 2 #13 The Ropemaker William B Sprague

Vol 2 #14 June 1940
More About Rope Making Frank K Swain p116
Discusses visit to Peak Cavern at Castleton in 1925 – detail about breaking and rejoining yarn at weak points by snapping, fanning and twisting ends together.

Vol 2 # 19 December 1941
Ancient Craftsmen L. L. Thwing p163
Reproduces figures from the manuscript record book of the Mendel foundation in Nuremberg. Illustrations probably 15th or 16th century. First printed in Mummenhof’s Die Handwerker (Vol III in Nachbildung der Kupfer and Holzschmitte aus Deutsches Leben (13 Volumes). Also in Feldhaus’ Technik der Vorzeit and in his Technische der Antike. Previous American publication Technology Review Cambridge Mass 1941.

Vol 8 #3 July 1953
Real Primitive Robert G Hill p27 Note on John Good

Vol 9 #4 December 1956
Some Notes on Rope Making
Precis of Knight’s Cyclopedia of the Industry of All Nations, London 1851

Vol 14 #2 June 1961
Cordage of Native Materials Per Ernst Guldbek p 19
Notes on rope from bark, grass and roots

Vol. 25 #4 Dec 1972 Pennsylvania
Mack H Beechel Article on Hand Ropemaking
text and photos of ropemaking at Maunder & Sons (The Farmer’s Store) in Launceston, England

Vol. 26 #1 March 1973
J Rewell Carr The Rope Machines of Mystic
(taken there from Plymouth Rope Makers)

11. Ciba (Schaefer): #49 FLAX AND HEMP..History..Cultivation & Preparation.. ; 1945

12. Ciba (Schwarz): #59 The Reel ; 1947
Includes ‘From the Ropemaker’s Reel to the Ropemakers Wheel’

13. Ciba (Schaefer): #99 Hard Fibres; 1953

Good discussion of the history of hard fibres

14. Ciba (Bally+): #123 RAMIE..as an Economic Fibre Plant..History of..The Ramie Plant and Its Fibre..Ramie Culture.. 1957
15. Ciba (Castellini): '62/5 HEMP..Hemp Plant..Cultivation..Retting..Mechanized Preparation, and Uses of Hemp..Prespects fo; 1962 CIBA REVIEWS
16. Ciba (Plonka et al): '65/2 FLAX..Domesticated Flax..Cultivation..Modernization of Retting & Scutching Processes..Linen In; 1965 CIBA REVIEWS
17.
CIBA-GEIGY Review 1971/1
Ropemaking, then & now
Very interesting pamphlet 50p
Published CIBA-GEIGY Ltd
Basle, Switzerland
18. Colonial Crafts of Victoria Early Settlement to 1921
Catalogue of an Exhibition at the National Gallery of Victoria
4 Nov 1978 to 14 Jan 1979 Murray Walker
P97 shows a ropemaking machine 1890-1910
19.
Cordage World (1943) Jul p24, Aug p24, Sep p24, Oct p24
Around the ropewalks of the South and West

(1943) Liverpool's place in the world of ropes and cordage

Armorial Bearings of The Ropemakers
"May Hemp Bind Those That Honour Wont"
Argent, three rope-makers tools, sable between a chevron gules.
The illustration bears the date 1648.

A Surviving Village Ropemaker and Halter Weaver (1943?)
20. Cyclopedia of Useful Arts
Charles Tomlinson London 1852 p563 Vol II
Not Seen
21.

Description de l'Egypte Publiée par des ordres de Napoleon Bonaparte
Reprint 1994 Benedikt Taschen Verlag GmbH,
Hohenzollernring 53, D-50672 Koln

ISBN 3-8228-8964-4 P701
22. Dictionary of Arts, Manufactures and Mines
Andrew Ure, N.Y. 1850 p1075
Not Seen

23.
 - DIY Rope-making Machine Instructions
 - Education in the Dockyard n.d. (1995?)
 - The Historic Dockyard, Chatham
24.
 - Dizionario delle Arti e de Mestieri
 - Francesco Grisellini Vol IV Venice 1769
25.
 - Encyclopaedia Britannica
 - Eighth edition, 1856
 - 11th edition, 1910
 - Article on Hemp
 - 9th Edition Article on Rope – Mentions direct drive ropemakers wheel
26.
 - Encyclopédie Methodique 1787
 - This contains a cut of rope making which is often seen, but usually without attribution.
27.
 - The Faithful Fibre
 - The Story of the Development of the Linen Thread Co. Ltd
 - Glasgow 1956
28.
 - Friedrich Ehrhardt
 - Catalogue of ropemaking machinery
 - Ober-Ramstadt bei Darmstadt circa 1900
29.
 - Frost Brothers Ltd Rope makers and Yarn spinners
 - (1906) 64pp
 - NOT SEEN
30.
 - Frost Brothers Ltd
 - The Old Industry of Ropemaking with Modern Plant
 - London, 1907?
31.
 - Grande Encyclopédie Illustrée d'Economie Domestique
 - sous la direction de Jules Troussset
 - Paris, Antheme Fayard
 - c. 1900. Columns 1001-1006
 - Preparation of hemp
32.
 - The Great Industries of the United States
 - J B Burr and Hyde, Hartford 1873 p285
 - Not Seen
33.
 - Hailsham in Old Picture Postcards
 - Hailsham Historical & Natural History Society
 - European Library Zaltbommec/Netherlands
 - 3rd ed. 1984
 - Some photos of old ropewalks
34.
 - Hemp 1943 USDA bulletin #1935
 - Brittain R Robinson

Accompanies 'Hemp for Victory'
Reproduced in Herer

35. Hemp Production Experiments – Cultural Practices and Soil Requirements
Wilsie, C P and C A Black and A R Aandahl
USDA bulletin pp63 June 1944
36. Hemp, Ropes, Cords and Twines
A Compendium with Notes on Manufacture, Specifications and Tables
Dixon Corbits Limited, Teams Rope Works, Gateshead on Tyne England
Andrew Reed and Co Newcastle upon Tyne 1933
Catalogue with notes and photographs
37. Hemslojden 1995/3 P18-26 On ropemaking including excellent photographs of lime bast preparation.
38. The Historic Dockyard Chatham Kent
Jarrold Publishing 1994
Contains some material on the rope-walk
39. ICI Fibres Magazine 1966
Bridport net work
40. Illustrated Catalogue of Rope Machinery
Manufactured by the Watson Machine Co.
Paterson, New Jersey U.S.A c 1920?
41. Illustrations of Useful Arts and Manufactures
Charles Tomlinson London 1858 p 54
Not Seen
42. Kentucky Agricultural Experimental Station Bulletin #221 June 27, 1919
p 21-43 'Marketing Hemp' by John R Humphrey
NOT SEEN
43. The Library of Entertaining Knowledge. Vegetable Substances: Materials
of Manufactures.; London: Charles Knight, 1833.. Book 43 of the Library
of Entertaining Knowledge.
44. Mare di Corda Maria Nazzerena Croci
Excellent photos of local ropemaking at San Benedetto del Tronto
45. Model Shipwright

1 Rope making machine (Hahn's) 19/213
2 Rope making Robert M Rose MD 17/10
Includes a note on tops at Chatham Ropery, detailing the path of the core strand
through the top
3 Ropemaking, Variations on a theme of by E Freeston 11/275
A Meccano rope making machine
4 Ropes and how to make them by L. Cdr. J.H. Craine, R.N.R.(Retd.) 2/147
5 Ropes, A gauge for sizing 16/321
Sizing scale rope for models

6 Ropewalk, The poor man's by R Dybas 46/52
An easily made rope spinner

46. One Hundred Years of Ropemaking: A Story of Pioneering Achievement 1852-1952
M Donaghy & Sons Geelong West Victoria 1952
47. Panorama of Professions and Trades
Edward Hazen Philadelphia 1837 p56
Not Seen
48. Pioneering. Boy Scouts of America Merit Badge Series
p45-51 on ropemaking. Includes 'Indian Rope Spinner' 'used around about AD 1200 by
American Indians
49. Plymouth Cordage Company: Plymouth Cordage Company: one hundred years of service ;
Plymouth, MA: Plymouth Cordage Co., 1924.

Gideon Francis Holmes. Golden Anniversary Celebration 1859-1909
University Press Cambridge Massachusetts
50. Professione Corder - Marco Polo April 1988
A Corder by Trade – Article on Renzo Inio, last ropemaker in Venice
Corde e Filacanapi – Provincia di Venezia No1-2 January-April 1989: not on Tana ropery
51. Robert Graves and Co., Liverpool Patent Cordage Manufacturers
Advertisement for Manilla flat rope
1832
52. The Ropery Visitors Handbook 1991

The Historic Dockyard, Chatham
53. The Spinning Way, Bridport News
February 1861
Description of twine spinning in the town
54. THE STORY OF ROPE. The History And The Modern Development Of Rope-Making; North
Plymouth, Mass.: Plymouth Cordage Company, 1931.
55. The Story of the Hall Mark
History of Halls Barton Ropemakers
1st edition 1924
2nd edition 1975
56. The Story of Hawkins and Tipson, Ropemakers
Hawkins and Tipson Limited
ND c 1952
Company History
57. The Useful Arts and Manufactures of Great Britain

The Manufacture of Ropes and Cordage

There is a photocopy of this at Bridport museum but the full reference is unclear
Possibly C. Tomlinson (ed.) 1864 SPCK but no interlibrary loan copy of this book available

58. Thomas Barraclough & Co. Ltd
Price list of hemp rope machinery
Manchester circa 1900
59. Walter Glover & Co.
Catalogue (in Spanish & French) of ropemaking machinery
Manchester 1891
60. William Kenyon & Sons A Century's Work 1866-1966
Dukinfield Cheshire 1966
61. Workshop Receipts for Manufacturers and Scientific Amateurs
Vol. IV p18-24
E & F N Spon Ltd, London. 1932
- 62.- Yearbook of the United States Department of Agriculture 1913
Washington, Government Printing Office 1914
"Hemp" by Lyster H Dewey p283-346
63. Annandale Nelson The Faroes and Iceland

Oxford University Press 1905 234pp
Annandale contributed Faroes rope-making machine in Pitt Rivers Museum
Discusses spinning yarn for horsehair rope making by drop spindle and spunyarn winch, as
illustrated by Allan Nillson.
64. Annison, Ruth & Lesley Chapman
The Hawes Ropemakers
Hawes, Yorkshire 1983
65. Ashley Clifford W The Ashley Book of Knots

Doubleday and Company Inc. New York 1944

Not primarily a rope-making source but see p30, p549-550, p451 and chapters37, 38 &
39 on sinnets
66. Atton, Mavis Flax Culture from flower to fabric
The Ginger Press, Owen Sound, Ontario, Canada. 1989
A modern practical reference to flax cultivation and cultivation
67. Baines, Patricia Spinning Wheels, Spinners and Spinning
B T Batsford London 1977

p63-65
68. Baines, Patricia Flax & Linen
Shire Album #133

- Aylesbury 1985
69. Baker, Tim Strings in The Traditional Bowyer's Bible Vol. 2
Bois d'Arc Press 1993(?)
Distributed by Lyons & Burford, New York, N.Y.
A long (p157-258) and interesting discussion of bow-string making, including spinning the yarn by spindle and spinning wheel.
70. Bauer, Ernst
Denk dran;Aufs Seil Kommts An! Technisches Handbuch der Seiler, Segel und Netzmacher
Aegis-Verlag Ulm
Germany 1961
71. Beckles, Gordon
The Bridport Story 1253-1953
Bridport (?) 1953
72. BELL, F. Dillon & YOUNG, Frederick Jnr -: REASONS FOR PROMOTING THE CULTIVATION OF THE NEW ZEALAND FLAX_- ; London, 1842, Smith Elder & Co., 31pp
73. Bevan , G. Phillips. (ed.) British Manufacturing Industries
One of a series of volumes. This volume Tobacco, Hides and Leather, Gutta-percha
India rubber & Fibres and cordage
C. Simmonds
Edward Stanford, London 1877
74. Billingsley, John
General View of the Agriculture of the County of Somerset

Bath 1798
A couple of pages on cultivation of flax and hemp
75. Blake, George The Gourock. History of the Gourock Ropework Co.
Port Glasgow, Scotland 1963
76. Blandford, Percy W
Country Craft Tools
1974
David and Charles
p 194 and fig. 37 for some ropemaking tools
77. Bockstoce J R Eskimos of Northwest Alaska in the Early Nineteenth Century
Pitt Rivers Museum Oxford 1977

Photos and description of cordage made from sinew, baleen and sealskin
78. Bradbury, Fred: Flax Culture and Preparation; London Sir Isaac Pitman & Sons, Ltd., Amen Corner, E.C.4 no date 154pp.

Not seen
79. Bradshaw, R H W et al "New fossil evidence for the past cultivation and processing of hemp (Cannabis Sativa L.) in eastern England"

New Phytologist, Vol. 80 pp 503-510 (1981)

80. Brewer Douglas J and Renie F Friedman
Fish and Fishing in Ancient Egypt
Aris and Phillips. Warminster
81. Brewster, Ellis W 125 Years of Rope-making in Plymouth 1824-1949
Paper presented to the Newcomen Society of England in North America
New York, San Francisco, Montreal 1949
82. Brown N E Sanseveria
Kew Bull Misc. Inf. 5 p185-261 (1915)
Little material on fibre but *S. Ehrenbergii* noted as used for rope making in Egypt and *S. bracteata* as used by Bushmen
83. Brulles () Abbe
The mode of cultivating and dressing hemp
1790 pp15
NOT SEEN. The British Library has a no lending policy for items before 1801
84. Brunnschweiler, D. Braids and Braiding
paper printed in Journal of Textile Institute 1953
85. Burnett, David A Wiltshire Camera
Compton Russell, Salisbury 1975

Plate 48 shows C. W. Maggs Melksham ropewalk about 1900
86. Buchanan, Rita A Weaver's Garden Interweave Press Colorado 1987
Primarily weaving but good references
87. Caldwell, S A G The preparation and spinning of flax fibre
Emmott & Co. London 1931 364 pp
88. Campbell, F.: A Treatise on the culture of Flax and Hemp,
Sydney: Statham and Forster, 1845. (94pp.).
Not seen
89. Carter, Herbert Cordage Fibres: Their Cultivation, Extraction and preparation for Market
John Bale, Sons & Danielsson, London 1909
NOT SEEN
90. Carter, Herbert Rope, twine and Thread Making: A Practical Handbook for the use of]
Rope, Twine and Threadmakers
John Bale, Sons & Danielsson Ltd. London. 1909,1924 (?)
91. Carter, Herbert Modern Flax, Hemp and Jute Spinning & Twisting
Scott Greenwood & Son London 1907, 1925
- 92.

Carter, Herbert R The decortication of fibrous plants 1913

93.

Carter, Herbert The Spinning and Twisting of Long Vegetable Fibres
Charles Griffin & Co Ltd 1904, 1917

94.

Cartwright, Edmund A Memoir of Edmund Cartwright
London 1843
reprinted Adams and Dart 1971
Appendix D p333 and facing diagram of cordelier

95.

Chapman Robert - A treatise on rope-making with ... rules, tables of weights etc.

London 1857 (second edition 1868)

An extremely interesting reference by a practical ropemaker but hard to follow in places

96.

Charlton, Warwick The Voyage of Mayflower II
Cassell, London 1957
p76-77 of my proof copy mention making tapered rigging ropes

97.

Clarke, Robert Connell Marijuana Botany
Ronu Publishing Berkeley CA 1981
Extensive Bibliography

98.

Coad J.G. - Chatham Ropeyard
Post Medieval Archaeology Vol. 3, p143-165 (1969)

Interesting material on the Ropeyard plus material on ropemaking from Steel, Rees and Goodrich

99.

Colayco, Maria Theresa. : ROPEMAKERS: The Story of Manila Cordage Company ; 120 pgs.. Philippines: Privately Printed, (1975).

100.

Collins David An Account of The English Colony in New South Wales
Originally published 1798, this edition ed. Brian Fletcher and published in association with
The Royal Australian Historical Society
Published by A. H. & A. W. Reed, Sydney.
P426-429 discuss the early use of New Zealand flax in Australia, including mode of preparation.

101.

Cook J Gordon
Handbook of Textile fibres
Vol. 1 Natural Fibres
Vol. 2 Man-Made fibres
4th edition 1968
Merrow Publishing Co Ltd

102.

Cotton W Brief Memoir of the late Cap. Joseph Huddart FRS
1855
NOT SEEN

103.

Cripps, Ann (ed) The Countryman Rescuing the Past

- Readers Union 1974
p64-65 the wimble for making straw rope
104. Critchfield H J Phormium Tenax - New Zealand's native Hard Fibre
Econ Bot 5 p172-184 (1951)
105. Crommelin L An Essay towards the Improving of the Hempen and Flaxen Manufactures in
the Kingdom of Ireland
Dublin 1705
106. NOT SEEN
- Crowfoot E "The Textiles" 1975
in Platt C and Coleman-Smith R
Excavations in medieval Southampton 1953-1969
Leicester University Press. 1975.
Vol. 2 p333-338
Excavations include palm fibre rope
107. Crowfoot, Grace M Methods of Hand Spinning in Egypt and the Sudan
Bankfield Museum Notes Second Series No 12
Halifax: 1931
Reprinted by Ruth Bean, Carlton, Bedford 1974 (includes Hand Woolcombing by H. Ling
Roth)
Hand spinning of flax and wool, both ancient and modern in Egypt, including some remarks
on netting twine. Includes preparation of flax. On p32 'Flax is considerably grown..making twine and
rope, a purpose for which the thread is sometimes spun on a primitive type of hand-spinning machine'.
108. Davies, Norman de Garis The Mastaba of Ptahhetep & Akhethetep
Part 1
London, Egypt Exploration Fund 1900
Original publication of tomb art
109. Davies, Norman de Garis The tomb of Rekh-in-Rec at Thebes
1943 New York, Metropolitan Museum of Art
NOT SEEN
110. de Camp, L. Sprague Ancient Engineers Doubleday & Co, Inc.; Souvenir Press Ltd 1963
Tandem Publishing London 1977
p.291 refers to Chinese manufacture of ropes from partially rotted bamboo and p.367
mentions a rope-making machine design by Leonardo da Vinci.
- 111.

- de Meijer, Etienne Diversity in Cannabis 1994
Wageningen, the Netherlands pp 144
A serious study of hemp varieties
112. Denhofer, W Das illustrierte Seilerbuch
Verlag von Spamer, Leipzig 1869 pp172
NOT SEEN
113. Dewar, H S L Flax, Hemp and their growers in West Dorset

J Dorset Natural History and Archaeological Society, Vol. 91 p216-219
114. Dewey, Lyster H 1901 USDA Yearbook
Summary of Hemp cultivation and preparation
115. Dexter, W. E. Rope-yarns, Marline-spikes and Tar
William Hodge & Co London 1938
p 52-56 describe use of spunyarn winch
116. Dickinson H.W. A Condensed History of Ropemaking

Transactions of the Newcomen Society XXIII 1942-43 pp71-91

Very interesting, both fibre and wire rope, good references including patents
- 117.- Dickson, James Hill The Fibre Plants of India, Africa and Our Colonies...
London W Macintosh, Dublin G Herbert 1865
NOT SEEN
118. 'Dicky Sam' Liverpool's Place in the World of Ropes and Cordage
Cordage, Canvas and Jute World November 1943
119. Diderot D and D'Alembert L'Encyclopedie - Arts des Textiles

Interlivres reprint from
Encyclopédie ou Dictionnaire Raisonné des Science, des Arts et des Metiers
22 vols of text 1751-1777, 12 vols plates 1762-1772. Paris, Baissons.
120. Dimpleby, Geoffrey
Plants and Archaeology
John Baker London
2nd ed 1978
p46-47
121. Dixon K A Systematic Cordage Structure Analysis
American Anthropologist 59, 1957 Washington
NOT SEEN
122. Dodd British Manufacturers 1846

I have seen an illustration previously published in the Penny Magazine 1842
attributed to this source. There are six volumes and I have not been able to identify
which volume carried the illustration.
NOT SEEN
123. Dodd, James and James Moore Building the Wooden Fighting Ship

Hutchinson & Co. London 1984

P32 –33 reproduce illustrations from Steel. This is the only secondary source I know of, for these cuts. There is also a reproduction of a plate from Encyclopédie Méthodique, 1787
ISBN 0871969793

124.

Dodge, Charles R. A Descriptive Catalogue of Useful Fiber plants of the World
Fiber Investigations Report No 9 Washington USDA 1897

125.

Doherty, Alexander The Long Ropemaking History of Belfast Cordage, Canvas and Jute
World, June 1943

126.

Duhamel du Monceau, Henri Louis Traite de la fabrique de manoeuvres pour les vaisseaux
ou l'art de la corderie perfectionne
2nd edition 1769

Reprint Connaissance et Memoires Europeennes, 65 av. De la gare – Luxembourg. 1996. ISBN 2 959
990 315

An early and extremely important work. The chapter headings are as follows (paraphrased in English).

Chapter 1 Description of Hemp

Chapter 2 Cultivation of Hemp

Chapter 3 Reception of Hemp at the Ports

Chapter 4 The Scutchers Workshop

Chapter 5 The Hacklers Workshop

Chapter 6 The Spinners Workshop

Chapter 7 to Chapter 11 The Ropemakers Workshop

Chapter 12 Objections and Replies

Chapter 13 The Precautions we have taken to make our experiments exact

Second Part

Chapter 1 Of the various ways of tarring cordage

Chapter 2 On the nature of tar...

127.

Dunham A "palimpsest" on an Egyptian mastaba wall

American Journal of Archaeology 39 p300-309 1935

128.

Edwards, H.T The Introduction of Abaca (Manila Hemp) into the Western Hemisphere
From the Smithsonian Report for 1945, p327-350 (10 plates)
United States Government Printing Office, Washington 1946
Smithsonian Institute Publication 3831

129.

Edwards, Ron Bushcraft 1 and Bushcraft 6
The Rams Skull Press, Australia

Material on bush ropemaking, including hide using conventional craft technique but
using substitutes for a top

130.

Evans, Nesta The East Anglian Linen Industry
Aspects of Hemp for ropemaking
Gower/The Pasold Research Fund 1985

131.

- Eyre J Journal of Royal Agricultural Society 1913
Some minor farm crops I Flax p127-140
II Hemp p140-148
132. Fenton A Ropes and Ropemaking in Scotland, Gwerin, 3. Oxford 1961
Ellen Schjølborg refers to this reference as containing material on heather cordage.
NOT SEEN
133. Findley, Gerald L Ropeworks
Hermon, New York 1996
p72-92 on Ropemaking including machine with wooden gears
134. Fitzrandolph H.E and M.D Hay
The Rural Industries of England and Wales. A Survey made on behalf of the
Agricultural Research Institute, Oxford
Vol. 1 Timber and Underwood Industries and some village workshops
(1926)
Very good material on the survival of traditional techniques among rural ropemakers
Based on a survey 1919 to 1923, carried out in part by K S Woods
135. Fournier, G. M R Paris & R R Paris
Compte Rendus Academie Agriculture de France
Apercu de la production de chanvre en France
Vol. 62, 1976
p1262-1270
136. Gautsch, Wolfgang Antike Seileri
Antike Welt 2 1985
NOT SEEN
137. Gay, Jacques La Fabrication des Cordages au XVIII siecle
L'Universite Francophone d'Ete
Cloitre des Carmes
7500 Jonzac
Saintonge France
ISBN 2-905735-08-2
138. Gilbert K R Ropemaking
in A History of TECHNOLOGY Vol. 1
Charles Singer (ed)
Oxford
p451-455
139. Gibbs-Smith Charles The Inventions of Leonardo da Vinci
Charles Scribner's Sons, New York, 1978
p50 shows ropmaking machine and notes two designs in Codex Atlanticus
140. Gilbert K R Henry Maudslay Machine Builder

London Science Museum (1971)

Maudslay built the 1811 strand forming machine at Chatham
This pamphlet gives a biography but has no mention of these machines

141.

Godwin, H. The Ancient Cultivation of Hemp
Antiquity Vol. 161 1967
Cambridge
Publication split between March and June due to printing error

142.

Goodrich, Simon Memoranda made at Chatham Ropery respecting Ropemaking between the
27 April and 6th May 1808 on the occasion of going down to examin about the introduction of a steam
engine there for assisting in forming strands of cables and hawsers.
Item 242 in the Goodrich Archive MS at Science Museum

Of the first importance

143.

Goulding, Ernest and Wyndham R Dunstan
Cotton and other vegetable fibres. Their production and Utilisation

John Murray London 1917

Includes Chapter V Flax, Hemp and Ramie
Chapter VI Jute and similar fibres
Chapter VII Cordage fibres

144.

Granlund, J. Lindbast och tråbast, Folkliv 7, 1943-44 Stockholm
NOT SEEN

145.

Grant, Bruce Encyclopedia of Rawhide and Leather Braiding Cornell Maritime Press
Centreville, Maryland 1972
p.30-33 show rawhide ropemaking

146.

Grant, I.F. Highland Folk Ways
Routledge Kegan Paul
London 1961 p205-206

147.

Graves, Richard The 10 Bushcraft Books
Dymock's Book Arcade Sydney n.d.

Revised edition 'Australian Bushcraft' National Book Distributors 1984

Book 1 covers setting up a rope walk. The second edition lacks some interesting photographs
of Australia soldiers making rope on a bush ropewalk but has additional photographs of the
author spinning strands

148.

Gregory, G DD A Dictionary of Arts and Sciences
First American from second London edition, Isaac Pierce, Philadelphia 1816
Vol III Article on Ropemaking and Plate CXXXVI
A good description which clarifies Steel's 'Elements of Ropemaking'

149.

Green A. W. and J. E. Hawkins Spinning Yarns
Green Brothers Hailsham c 1930

150. Greenhill, W.L. and Couchman, Jean F.: : THE WATER RETTING OF FLAX. Resume of Investigations from 1940 to 1945; Melbourne, C.S.I.R., 1947., pp. 57. BULLETIN NO. 211.
151. Grimshaw and Webster. The ship-owners guide in fitting out of ships with cordage... 1806 Sunderland
152. Grimshaw, John, of Bishopwearmouth Specification of a patent granted to J. Grimshaw... for an improved method of making flat ropes by machinery, worked by steam engine
Bishopwearmouth 1822
153. Haarer A E Ropes and Ropemaking

London, Oxford University Press 1950

Slightly odd because this is a text designed to give practice in English reading. Good on hard fibres Manila, Sisal and New Zealand hemp. Some material on wire.
154. Haarer A E (Alec Ernest) Jute Substitute Fibres
Wheatland Journals Ltd (Dorchester)
1952

Bimli-Jute, the Roselle and Aramina Fibre
155. Haarer A E Hemp (Cannabis Sativa)
World Crops 5 p445-448 (1953)
156. Hadingham, Evan Secrets of the Ice Age
Heinemann London 1979

p 187 "burnt rope made of plaited fibres less than a centimetre thick, which left a clear impression in the cave and is still the only evidence of Palaeolithic ropemaking"
[Caves at Lascaux]
157. Hanssen O Tog laga av furu (Pinus Silvestris), Tidskrift for skogbruk, 42, Oslo. 1934
Split wood cordage.
NOT SEEN
158. Harris, George. Observations on Harris's Patent Rope manufactured as Messrs Enderby's Brothers
Greenwich 1832
On the development of Phormium tenax
159. Hart, Thomas Rope driving
many editions
Thomas Hart, Blackburn circa 1930s
160. Hart R Edward The Transmission of Power by Cotton Ropes
Blackburn circa 1930s
161. Hemar, Nahal A Cave in the Desert
The Israel Museum, Jerusalem 1985

Photographs of some 9000 year old cordage finds

162. Hector, Sir James (ed) Phormium Tenax as a Fibrous Plant 2nd ed 1889
Colonial Museum and geological Survey Department, New Zealand
163. Hennell, Thomas The Countryman at work 1947
164. Herer, Jack The Emperor wears no clothes
Green Planet Books
Newcastle upon Tyne 1993
Seminal work in hemp revival
165. Hill Jack The complete Practical Book of Country crafts

David and Charles 1979
Illustrations redrawn from Woods?
166. Himmelfarb, David The Technology of Cordage Fibres and Rope
Leonard Hill London 1957
167. Hipkins W E The Wire Rope and its applications
Interesting few pages historical sketch
Birmingham 1896
168. Hochberg Bette Handspindles Bette and Bernard Hochberg, 333 Wilkes Circle, Santa Cruz
Ca 95060 USA 1980
Describes a number of variants of the spindle, including the rock spindle (p21) which she
records as being used to spin camel hair rope in central Asia
169. Hodges H Artifacts (1964) London
NOT SEEN
170. Holmes , Gideon F.: Golden Anniversary Celebration ; University Press, MA: 1909., History
of the Plymouth Cordage Company. Celebration honoring Gideon F. Holmes
171. Hommel Rudolf P China at Work: and illustrated record of the primitive industries of
China's mass, whose life is toil, and thus an account of Chinese civilization
New York Printed for the Bucks County Historical Society Doyleston Pa by the John Day
Company c1937
I believe there is a 1974 reprint by MIT Press

P5-10 cover rope making with tackle board and sled. P167-171 discuss spinning of hemp yarn
with spindle or spunyarn winch.
172. Hoogendoorn, Harman Commercial Hemp cultivation in the Netherlands in the 17th and 18th
Centuries
Wageningen Agricultural University
To be published
NOT SEEN
- 173.

- Hopkins, James F A History of the Hemp Industry in Kentucky
University of Kentucky, Lexington 1951
Reprinted 1998 ISBN 0-8131-0930-2 Material on ropemaking and competition with Russian
hemp.
174. Horne Jonathon A Collection of Early English Pottery part X
nd Catalogue. Item 256 shows a bowl with rope making scene c 1767
175. Horsley, John Tools of the Maritime Trades
International Marine Publishing Company, Camden, Maine 1978 ISBN 0-87742-101-3
P192-218 discuss ropemaking with local material from Brixham. Interesting but
flawed. Includes unattributed illustration from W.H. Pyne's 'Rustic Vignettes' and Egyptian
ropemaking, possibly from Wilkinson. He mentions the luper, quoting from Steel's Elements,
but doesn't understand its use.
176. Huddart, J Memoirs of the late Captain Joseph Huddart FRS
W. Phillips, London: 1821
NOT SEEN
177. Huddart, William Unpathed Waters – The Life and Times of Captain Joseph Huddart FRS
1741-181?
Discusses Huddart's ropemaking inventions and the challenge to his patent
178. Hughes G.B. Living Crafts 1953

Mentions the Luttrell Psalter? Probably based on Dickinson. Illustrated from Diderot
Baines (1977) reproduces a miniature from the Luttrell Psalter (1338) on p55 on makes a
convincing claim that it depicts wool spinning
179. Hurley William M Prehistoric Cordage – Identification of Impressions on Pottery
Aldine Manual of Archaeology 3, Taraxacum Inc. Washington 1979
180. Iago, Thomas Dalby Rope-making made easy, for the abatement of Shipwrecks and ... the
better protection of the live of mariners... a compendium of the Cordage Act
London 1852
181. Jaeger, Ellsworth
Wildwood Wisdom
Macmillan New York 1945 Reprinted 1972

p 299-303 Hand-twisted and platted American Indian cordage
182. James T.G.H Egyptian Painting and Drawing

British Museum 1985

Reproduction of copy of painting in tomb of Khaemweset p14-15
183. Jenkins, J. Geraint - Traditional Country Craftsmen

RKP 1965, 1975

- Interesting plate of Scottish crofter made rope being laid on similar equipment to that in Pitt Rivers Museum. The rope seems to have been laid with a sort of wooden fork similar to the steel rod spreader in Ron Edwards book
- 184.
- Jobson Allan - Household and Country Crafts 1952
- Description of ropewalk at Bewdley, Worcestershire
- 185.
- Jones, Colin R Birmingham's Ropes Go Around the World
1990
A compilation of various items, primarily the Birmingham Weekly Post Friday, January 25, 1952
- 186.
- Juet, Robert On The Third Voyage of Master Henry Hudson [1610]
In Narratives of New Netherland 1609-1664
F J Jameson ed p11-28
Barnes & Noble, New York 1967
- 187.
- Kenyon W A. Rope
Report of lecture (printed in Journal of Textile Institute) 1951 or Report of their conference 1951
- 188.
- Kenyon William & Sons Ropes and Rope Driving
Dukinfield, Manchester 1924 edition
- 189.
- Kilgour P Rope-maker's 12-in Calculating Slide Rule
The Textile Manufacturer
Jan 15, 1927
- 190.
- Kirby, R H Vegetable Fibres
Leonard Hall, London 1963
A good, comprehensive reference. A successor to Goulding (1917)
- 191.
- Klust, Gerhard
Fibre Ropes for fishing Gear
FAO fishing manual 1983
- 192.
- Klust, Gerhard
Netting Materials for fishing gear
2nd edition 1982 FAO Fishing Manuals
A technical guide to the properties of modern netting twines
- 193.
- Kochanski, Mors L. Northern Bushcraft
Lone Pine Publishing Edmonton Alberta Canada 1987

Covers cordage making by thigh rolling
- 194.
- Laing R M, L E W Blackwell Plants of New Zealand
7th Edition Whitcombe and Tombs Ltd n.d.
New Zealand flax p106-111
- 195.
- Landels J.G. Engineering in the Ancient World

University of California Press 1978

p109 “complete lack of knowledge of a craft industry” in Greek times

196. Lane, Frederic C The Rope Factory and Hemp Trade in the Fifteenth and Sixteenth Centuries, J Economic and Business History IV (1932) 830-847
Reprinted in Venice And History – The Collected papers of Frederic C Lane
The Johns Hopkins Press, Baltimore 1966
197. Lane-Poole, Richard ‘A Medieval Cordage Account’,
Mariners Mirror 42, p67-73 1956

Contains some material on Bridport
198. Lang, John Dunmore
An Historical and Statistical account of New South Wales
2nd ed 1837
Sydney ropemaking based on New Zealand flax, and export figures of New Zealand
flax to London, 1826-1835
199. Larson H L Slagning av Laderrep i Dalarna , Fataburen 1929 hafte 3
Leather rope making
200. Lawrie George - The Practical Ropemaker

H. R. Carter Belfast 1948

One of the very few books on rope-making. Very interesting
201. Leslie, R C Old Sea Wings, Ways and Words
1890
p178 plate shows ropemaking on deck
202. Lever D’Arcy Young Officers Sheet Anchor
Good description and drawings of spun-yarn winches
Reprint of the 2nd edition of 1819, Dover Publications, Mineola, NY. 1998
203. Lindsay, H.A. The Bushman’s Handbook
The Jacaranda Press
3rd ed 1963
p125-126 handmaking small cordage
204. Longridge, C Nepean The Anatomy of Nelson’s ships
Argus books 1994

p204-209 describe miniature ropewalk
205. Lock G.W Sisal
Longmans 1962
Includes material on preparation
- 206.

Lucas A and Harris J R - Ancient Egyptian Materials and Industries

4th ed rev 1962 London Edward Arnold

Dickinson refers to 2nd edition 1934 pp134-135

207. Lucas, Kathryn C A New Twist A Centennial History of Donaghys Industries Limited
Donaghys Industries Limited, 1979
Company History
208. Lund, Neils (ed) Two voyagers at the Court of King Alfred
William Sessions Ltd, York, England 1984. ISBN 0 900657 86 3
Parallel in Anglo-Saxon and English. Earliest mention of walrus-hide rope. P54-55 include
extra material and photograph of walrus-hide rope.
209. Mackay E Note on a new tomb (No 260) at Droh Aba'1 Maga, Thebes
J Egypt Arch III (1916) p125-126 and plate XV
210. Macmillan, David S One Hundred Years of Ropemaking 1865-1965
Archibald Forsyth & Co 1965 Sydney
Company history of Forsyth's
211. Manners J E Country Crafts Today David and Charles 1974
p191-194 on ropemaking
212. Manners J E Making Church Bell Ropes The Lady 14th November 1974
A detailed article on bell rope making
213. Manners J E Country Crafts in Pictures David and Charles 1974
P78 has an interesting photograph of a ropewalk, possibly Boyds of Castle Cary
214. Marcandier ()
Traite du Chauvre Paris 1758
NOT SEEN
A Treatise on Hemp translated from the French of M Marcandier etc.
London 1764
Reprinted 1996 by John Hanson/Cht. (Publishers) Malthouse, Lyme Regis, Dorset
ISBN 0.95294320.4 A facsimile of the copy from the library of Joseph Banks
- An Abstract of the most useful parts of a.. treatise on hemp, translated from the
French of M Marcandier to which is added, some account of the use of the Horse
Chestnut; and a plan of the Pennsylvania Hemp brake
Boston (Mass) 1765
An excerpt was reprinted in High Life Issue 10
- “ M Marcandier, Magistrate of Bourges...”
215. Mason, Bernard S Woodcraft and Camping
Dover 1974
Chapter XI Woodcraft Rope and Cordage
Good description of preparing lime bast
216. McCutcheon, W A The Industrial Archaeology of Northern Ireland
HMSO Belfast 1980

- Good chapter on flax and linen from textile perspective. Rope-making limited to photographs of Belfast rope-works
217. McGee, Eddie No Need To Die
Paul H Crompton Ltd London
1982
- p127 rope from Nettles
218. McGrail, Sean Ancient Boats in Northwest Europe
Longmans 1987
p35 mentions rope fibres
219. McPherson Jim Primitive Fire and Cordage
Prairie Wolf. Randolph, Kansas. 1987
6th edition 1995
220. Miers, John Professional Papers of the Corps of Royal Engineers Vol. V 1842 XII
Description of the Machinery employed at the Deptford Dockyard for the spinning of
hemp and manufacturing of ropes and cables
p233-265 and plates 26-42
NOT SEEN
221. Mills, John FRS
A Practical treatise of Husbandry translated and edited by J Mills
1762
NOT SEEN
222. Morison, Samuel Eliot
- The Rope Makers of Plymouth
A History of the Plymouth Cordage Company 1824-1949
- The Riverside Press, Cambridge
Houghton Mifflin Company 1950
223. Morton, John C A Cyclopedia of Agriculture
Blackie and Son London n.d. but about 1850
- Interesting article on hemp with some material on yarn spinning in Bridport
224. Modéer I Ölandskt tallrepslageri, Fataburen, Stockholm 1928
Ellen Schjølberg mentions this reference as discussing spinning of cordage.
225. Murphy, William S The Textile Industries
The Gresham Publishing Company, London n.d.
- Generally interesting, also Vol. IV, Chapter IX on threads, twines and ropes
226. Nilsson, Allan Studier I Svensket Repslageri
Nord Museets Hendingar 55, 1961
An important book on craft ropemaking
227. Oakley F.I. Long Vegetable Fibres
London 1928 176 pp
Not seen

228. Oesterle, Valentin Handbuch fur Seiler
Fran Huber;Offenburg/Baden 1930
229. Ohlsen, Birgit Ainu Material Culture from the notes of N. G. Munro
British Museum Occasional Paper 96
Department of Ethnography 1994

p21-23 has some notes on cordage
230. Olofsson, O. Rep av trä och näver. Norbotten, Årsbok, Ystad 1936
NOT SEEN
231. Olsen, Larry Dean Outdoor Survival Skills
Brigham Young University Press
Provo, Utah 1973
p120, p136-138
hand-twisting cordage
232. Orchard, William C Beads and Beadwork of the North American Indians
New York. Museum of the American Indian/Heye Foundation 1975
NOT SEEN
233. Over Luke - Bridport - The Evolution of a Town

Bridport Museum Publication No 1 1988

p26-29 "Ropes and Nets"
234. Pahl, Janice The Rope and Net Industry of Bridport
Some aspects of its history and geography

J Dorset Natural History and Archaeological Society Vol. 82 p143-154
235. Pawson, Des Rope Recycling "The Boatman" Issue 26 pp64-66
236. Pawson, Des 1998 Unpublished photographs of Portuguese ropemakers using the Egyptian
handwhirl.
237. Payne-Gallwey Sir Ralph
The Crossbow
The Holland Press 1958
p110-113 Crossbow strings
238. Perry, P J Bridport Harbour and the Hemp and Flax Trade, 18151914

J Dorset Natural History and Archaeological Society, Vole 86 p231-234
239. Petrie WMF - Deshasheh

1897 London, Egypt Exploration Fund
240. Phœbus, Gaston The Hunting Book
Regent Books Hightext Ltd, London n.d. (~1984)

Gaston Phœbus (1331-1391). This is a translation of the 14th century work (from Bibliotheque Nationale MS. francais 616, 15th century?) p43 shows the spinning of twine for net making

241. Pliny Natural History (Naturalis Historia)
My copy Loeb Classical Library, William Heinemann Ltd, London 1950
Flax, esparto and hemp for cordage, as well as mention of palm fibre, and lime bast.
242. Porter, Enid Cambridgeshire Customs and Folklore
Routledge and Kegan Paul 1969
Non rope folk uses of hemp
243. Preston R.D. and Mavis Middlebrook
The Fine Structure of Sisal Fibres
Paper printed in Journal of Textile Institute 1949
244. Purseglove J W Tropical Crops
Longman, London 1972
Two volumes, Monocotyledons and Dicotyledons
Excellent standard reference
245. Radcliffe-Brown, A.R
The Andaman Islanders
Free Press of Glencoe 1964
Appendix A - The technical culture of the Andaman Islanders
Includes material on bow-strings and cordage in general (two strand plus some oddities)
246. Rees, Abraham DD FRS The Cyclopaedia; or Universal Dictionary of Arts, Sciences & Literature
1st American ed, 43 vols. text, 4 vols. plates
Philadelphia. Samuel f Bradford & Murray, Fairman & Co c. 1807
1819-1820 London Longman, Hurst, Rees, Orme And Brown
247. Reichert, Gordon Government of Canada: Report on Hemp
Bi-weekly Bulletin Dec 16, 1994
Vol. 7, No 23
Summary of history, cultivation and prospects
248. Reisner George A - A History of the Giza Necropolis Vol1 1942
Cambridge, Harvard University Press
NOT SEEN
249. Renfrew Colin and Paul Bahn
Archaeology, theories, methods and practice
Thames and Hudson 1991
Includes some material on the Late Ice-Age rope from Lascaux including
“consisted of fibres spiralling to the right, and was therefore tressed by a right-
hander”
250. Rhind William - A History of the Vegetable Kingdom embracing a Comprehensive
description of the plants

London Blackie and Son 1872 (1868, 1870)

Chapter XLI covers fibre plants, mostly flax, cotton, and hemp but also New Zealand hemp. Interesting material on retting, and the Italian and Russian hemp industry.

251. Riddlestone, Sue et al Bioregional Fibres
Bioregional Development Group
Sutton Ecology Centre, Honeywood Walk, Carshalton, Surrey
1994
252. Riddlestone, Sue et al Hemp for textiles
Bioregional Development Group
Sutton Ecology Centre, Honeywood Walk, Carshalton, Surrey
1994
Modern reference for hemp cultivation
253. Rivers, Stanley G. Around the Rope Walks of the South and West
Cordage, Canvas and Jute World July, August, September, October 1943
254. Roberts, Elizabeth (ed) A History of Linen in the North-West
Centre for North-West Regional Studies
University of Lancaster 1998
255. Robinson B B and Johnson F L Abaca - A cordage Fiber
USDA Agric Monograph No 21 (1953)
256. Roulac John (ed.) Industrial Hemp - Practical Products Paper to Fabric to Cosmetics
Hemptech Ojai, California USA (1995)
ISBN 1-886874-00-X
257. Rowlandson Thomas - Journal of Royal Agricultural Society Vol. 10

"On Hemp" 1849 pp172-183

Hemp cultivation and retting
258. Royle, J. Forbes.: THE FIBROUS PLANTS OF INDIA FITTED FOR CORDAGE,
CLOTHING, AND PAPER. With an Account of the Cultivation ; of Flax, Hemp, and Their
Substitutes. London: Smith, Elder & Co., 1855, xiv, 404, (16 ads) pp.
259. Russell, Richard The Rope-Makers Guide, or a complete key to the art of rope-making
London 1804
NOT SEEN
260. Ryan Donald P and Hansen David H - A Study of Ancient Egyptian Cordage in the
British Museum

British Museum 1987

Interesting, good source of references, corrects fibre identifications

261. Ryder, David Warren Men of Rope
Historical Publications, San Francisco
1954
- History of the Tubbs Cordage Company
262. Sanctuary A - The Development of the Bridport Rope, Twine and Net Industry
Read before the British Association for the Advancement of Science at
Exeter September 1969
MS at Bridport Museum
263. Sanctuary A MS on craft ropemaking 1977
Bridport Museum
264. Sanctuary A - Rope, Twine and Net Making
Shire Publications 1988
Good, easily accessible but brief
265. Schjøberg Ellen - "The Hair Products"
In The Bryggen Papers 1984 Supplementary Series No 1
Studies on the Earliest Farm Settlement, and other Studies
ISBN 82-00-07119-7 Herteig, Asbjorn E. (ed.)
Also
A Medieval Brewery; Cordage and Similar Products, Sound Tools and Music at
Bryggen, The Bryggen Papers - Supplementary Series Vol. 3
"Cordage and Similar Products from Bryggen in Bergen"
This contains a mass of interesting information not available in other sources.
266. Sayce, R W. The Wimble and its Relatives, Folkliv 3, Stockholm 1939
Ellen Schjøberg mentions that this reference refers to the winch as 'wink' from southwest
English dialect. This is the only reference I am aware of to the use of the winch in English tradition.
NOT SEEN
267. Scholtz, Sandra Clements: Prehistoric Plies: A Structural and Comparative Analysis of
Cordage, Netting, Basketry and Fabric, ; From Ozark Bluff Shelters, 1975, "North America",
Arkansas Archeological Survey Research Series No. 9, 193 pages
Not seen
268. Searle, Antony G and James W Tuck The King's Flax and the Queen's linen
The Larks Press, Dereham Norfolk
ISBN 0 948400 781
ND but 1999

269. Seymour, Fannie E.: Benjamin Seymour In Russia, England and America
1787-1817. ; Rogers Print, MA: 1940
Diary. Mentions early inventors including Belfour
270. Seymour, John The Forgotten Arts
Dorling Kindersley 1984
- p116-117 ropemaking - illustrations redrawn from Woods?
271. Sharkey Olive
Old Days, Old Ways
The O'Brien press, Dublin 1985
p135 - illustration of a wimble
Includes misleading diagram of closure of rope
272. SHARP, Peter: Flax, Tow, and Jute Spinning - A Handbook; 1907 Mathew, Dundee &
Simpkin Marshall, London. 4th Ed
273. Shaw-Smith David Ireland's Traditional Crafts
Thames and Hudson 1984
p141 shows use of a wimble, here called a croakeen or thraw-hook for making sugan
(straw rope)
274. Short Brian (ed.) The String Town Hailsham 1870-1914
Centre for Continuing Education
University of Sussex 1980
275. Slator L. Instructions for the Cultivating and Raising of Flax and Hemp
Dublin 1724
- NOT SEEN
276. Smedley, Norman East Anglian Crafts
Batsford. London 1977
Chapter on ropemaking at Haverhill, Suffolk
277. Smith, H Hamel
Sisal production and preparation
London John Bale, Sons and Daniellson Ltd 1929
278. Smith William S - A History of Egyptian Sculpture and Painting in the Old Kingdom
2nd edition 1949
- Oxford, Oxford University Press
Illustration of rope-making with 'fingers and toes' - might be papyrus splitting (?)
279. Speck, Frank G Penobscot Man: The Life History of a Forest Tribe in Maine
New York. Octagon Books 1976
NOT SEEN
280. Spencer, J E The Abaca Plant and its Fiber Manila Hemp
Econ Bot 7 p195-213 (1953)
281. Spindler, Konrad The Man in the Ice

- Weidenfeld and Nicolson 1994
Neolithic cordage, some mention of lime bast
282. Steel, David The Elements and Practice of Ropemaking
In The Elements and Practice of Rigging and Seamanship
2 Vols. 1794
283. Stevens, Robert White On the Stowage of Ships and their cargoes
Longman, Green and Co 7th edition 1894
London
Interesting articles on hemp and rope
284. Stewart, Hillary Cedar
Seattle and London University of Washington Press 1984
P 162-165
285. Stewart, Hillary Indian Fishing Early methods on the North West Coast
University of Washington Press, Seattle 1982 ISBN 0-295-95803-0
Douglas & McIntyre Ltd, Vancouver BC 1982 ISBN 0-88894-332-6
P 26-29 Cordage from knotted kelp stipes, cedar bark cordage
286. Summers, Catherine C Hawaiian Cordage
Pacific Anthropological Record Vol. 39
Bishop Museum press
Honolulu Hawaii 1990 129 pp
287. Sung Ying-Hsing Chinese Technology in the Seventeenth Century
Dover reprint (1996) of the first edition, Pennsylvania State University Press 1966
P176 mentions ropes of boiled bamboo bark, and 'hemp stalks twisted roughly together'
288. Tasman On the Cultivation of Flax, The use of Linseed and Method of Cultivating the
Hemp Plant
Hobart Town 1870
NOT SEEN
289. Teeter, Emily Techniques and Terminology of Ropemaking in Ancient Egypt
The Journal of Egyptian Archaeology Vol 73 p71-78
The Egyptian Exploration Society London 1987
290. Tinniswood, J T 'English Galleys 1272-1377'
Mariners Mirror 35 p276-315 1949
Mention of walrus hide parrel ropes p308
291. Turner A. J. CBE Bast and Leaf Fibres - Development and Prospects
Paper printed in Journal of Textile Institute 1951
292. Tunis E 1965
Colonial Craftsmen and the beginnings of American Industry

New York Crowell
Very brief on ropemaking
293. Tyson, William Rope - A History of the Hard Fibre Cordage Industry in the UK
1966

294. Undrum, Ingunn . Placement at the Ropery at Chatham Historic Dockyard September-December 1999
The Ropery at Chatham Historic Dockyard September-December 1999
Report to Leonardo da Vinci Foundation 1999
295. Van der Post, Laurens and Jane Taylor
Testament to the Bushmen
Viking
p85-86 and plates 76-78 show manufacture of sansieveria cordage by thigh rolling
296. Van der Werf, Hayo Crop Physiology of Fibre Hemp
Wageningen Agricultural University, the Netherlands pp152
Also a Hemptech edition
297. Vandier J Manuel d'archaeologie egyptienne Vol. V 1969

A et J Picard Paris

P447-483 and figures 214 & 230 summarise Egyptian material on papyrus harvesting and ropemaking
298. Verhoog Jeroen, Warmerdam Hans 450 Jaar in Touw 1995

History of the Dutch rope company G. van der Lee
299. Wahlbeck, Olle Rep och Repslageri under Olika Tidsaldrar
Sweden 1991 ISBN 91 630 0829-7 220pp
Detailed history of rope and ropemaking by late managing director of major Swedish ropemaker
300. Wallace, Frederick William The Romance of Rope
Published by the Plymouth Cordage Co 1932
301. Walton Penelope "Caulking, Cordage and Textiles"

in The Origins of the Newcastle Quayside O'Brien et al

The Society of Antiquaries of Newcastle upon Tyne 1988
302. Walton Penelope "Textiles from 16-22 Coppergate"

in The Archaeology of York
Mention of 13th Century cordage from whole flax stems and Common Hair Moss (Polytrichum commune)
303. Watt Alexander Leather Manufacture Crosby Lockwood and Son London 1919
Chapter XXXV describes Gut-Dressing including manufacture of lathe cords, cords for tennis racquets etc.
304. Weindling, Ludwig : LONG VEGETABLE FIBERS Manila Sisal Jute Flax and Related Fibers of Commerce ; NY: Columbia University Press, 1947.

Not seen

305. Wendrich, Willemina Who's Afraid of Basketry
A Guide to recording basketry & cordage for Archaeologists and Ethnographers
(in English)
Centre for Non-Western Studies, Leiden University
Netherlands 1994
306. Wiczeil, E. Ropes and Cordage
Paper printed in Journal of Textile Institute 1951?
307. Wilkinson, J. Gardner
The Ancient Egyptians their life and customs
Vol. 2 Senate reprint 1994 1st edition 1854

p 93 shows hand whirl being used for twisting leather cord
308. Williams, Roger A Key into the Language of America
J J Teunissen and E J Hinz eds.
Detroit. Wayne State University Press 1973
First printed 1643
NOT SEEN
309. Willmot S G Ramie Fibre, its cultivation and development
World Crops 6, p405-408 (1954)
310. Woodhouse Thomas and P Kilgour Cordage and Cordage Hemp and Fibres

London Pitman 1919
311. Woods K.S. Rural Crafts of England

George Harrap and Co Ltd

1949

Unusually good book on country crafts, probably an original source of much
material used elsewhere. The author took part in the survey of rural industry (see
Fitzrandolph)
312. Wright J.T "Ropemaking, hemp and twine" in S Timmins ed.

Birmingham and the Midland Hardware district - a series of reports

London Frank Cass 1967(?) p578-590
313. Wurlitzer, Bernd Historische Werkstätten

Verlag die Wirtschaft Berlin 1989
p199-201 Hand-held wooden register plate. The cut reproduced on p199 is an early
illustration of European rope making, and seems to show hemp spinning using a winch.
314. Young, Arthur General View of the Agriculture of the county of Suffolk

London 1813

Reprinted Augustus M Kelley, New York 1969

Fibre hemp cultivation in Suffolk - for textile use

315.

Zola, Nelly and Beth Gott

Koorie Plants Koorie People

The Koorie Heritage Trust 1992

p57-64 Australian fibre plants as used by the Aborigines

[BELFOUR, John Daniel].: **[Drop title] REPERTORY OF ARTS AND MANUFACTURES;** ; Specification of the Patent granted to Mr. John Daniel Belfour, of Elsinour, for his new-invented Machine for making and Manufacturing Ropes and Cordage, dated March 16, 1793. [n.p, n.d. but c.1795]. pp. 145-76 only [32pp, see note]. 8vo in 4s. Coarse brown recent wraps. Three full-page copper engravings, a little foxed. Though complete in itself, this is obviously a part of a much larger work, being only signatures U-Z of Vol.2. An interesting example of the transmission, and popularisation, of technical advances that made the Industrial Revolution possible. HPS ENG HIS 18C Offered for sale by [Grant's Bookshop](#) at [AUD30.00](#)

Abernethy, Jane Fulton and Tune, Suelyn Ching: **Made in Hawaii** ; Honolulu: University of Hawaii Press, 1983. V-Fine/no DJ, Oblong, 16mo, 128, Instructions for craft projects and activities which are traditionally Hawaiian. Includes how to use ti and coconut; how to make tools, cordage, toys, and leis; how to prepare foods and natural dyes; how to plant such crops as coconut, banana, and sugarcane; and how to play Hawaiian games., Julie Stewart Williams, Paperback, Handicraft - Hawaii Hawaii Social Life Hawaii Customs (UR#:BOOKS002327I) Offered for sale by [The Book Faire](#) at [US\\$6.50](#)