NATIONAL SCHOOL
SAILING ASSOCIATION

KNOTS ON A LOG-LINE

Curriculum Development Paper No 20

Cdr. B.W. Lucke (H.M.I.Rtd)

KNOTS ON A LOG-LINE

The speed of a vessel through the water can be found by simply throwing a scrap of flotsam over the bow and timing its passage to the stern, a method known as the "Dutchman's Log". More sophisticated techniques use a plug fitted with vanes to rotate on a line towing astern and connected to a clock-like mechanism to count the revolutions. Pitometers can measure changes in the pressure of water entering a forward pointing nozzle as the speed alters. The "Doppler" effect can measure changes in underwater sound waves travelling from forward aft and vice versa. All these systems are worth investigating as they provide opportunities for interesting and profitable experiments as well as exercises in ingenuity and craftsmanship. At their best, such studies can lead to the construction and calibration of practical instruments which can be used afloat; most are well within the capacity of school workshops and laboratories.

For the small boat sailor, however, there is much to be said for the old fashioned hand-log; it is quite easy to make, it is simple to use and has a degree of accuracy which surprises those accustomed to modern instruments; it also has the advantage that it can be used to calibrate other experimental equipment.

The drawing shows the whole outfit comprised of a log-line, chip, sand glass and the butt end of an old fishing rod and reel for stowage. This last is a convenience rather than a necessity and can be replaced with *a* simple frame to wind the line onto when not in use. The chip should be of good hard-wood about 1½ cms thick and needs to be accurately made with a radius of about 15 cms. The holes for the bridle must be drilled in exactly measured positions. The lead ballast should be hung from a hole drilled at the middle of the curved lower edge so that the weight can be experimented with until the chip floats upright with just a little of the top corner above water. The lead can then be

shaped and screwed to the centre of the lower edge. Better still it can be let into a space prepared for it. Whichever method is used however, it is important that the ballast be accurately centred as otherwise the chip will not tow evenly when being recovered but will dive and yaw all over the place. It will then be hard to pull in.

The peg and socket are important and can be contrived from the handle of an old tooth-brush or any other suitable piece of bone or plastic. The peg should be slightly tapered so that it fits firmly into the socket but must be smooth enough to pull out smartly with a sharp jerk on the line when the chip is afloat. It is as well to file a slot along the edge of the socket for the line to lie in when being seized on. A rather deeper crosswise notch will prevent the line slipping under the seizing.

The sand-glass can be made from a couple of plastic topped glass salt cellars glued together. It is as well, however, to file the tips down a little until the holes are about 4 or 5 mms in diameter so that the sand will flow fairly quickly. After the tops have been stuck together with water-proof glue ('Araldite' is suitable) the joint can be strengthened by bandaging round with gauze glued down turn by turn until a strong covering is made.

The sand for filling the glass should be first screened to remove any large particles. It should then be washed in fresh water to get rid of mud and salt and then thoroughly dried. There are incidentally some quite interesting experiments which can be carried out with a long wooden trough to simulate a gold-miner's cradle to sort the sand out into different sized particles. (The steeper the slope the faster the flow of water and the larger the particles in the silt.) Stirring sand and water together in a tall glass jar and resettling will produce layers of particles of different sizes. The more homogeneous the sand the more accurate the sand glass.

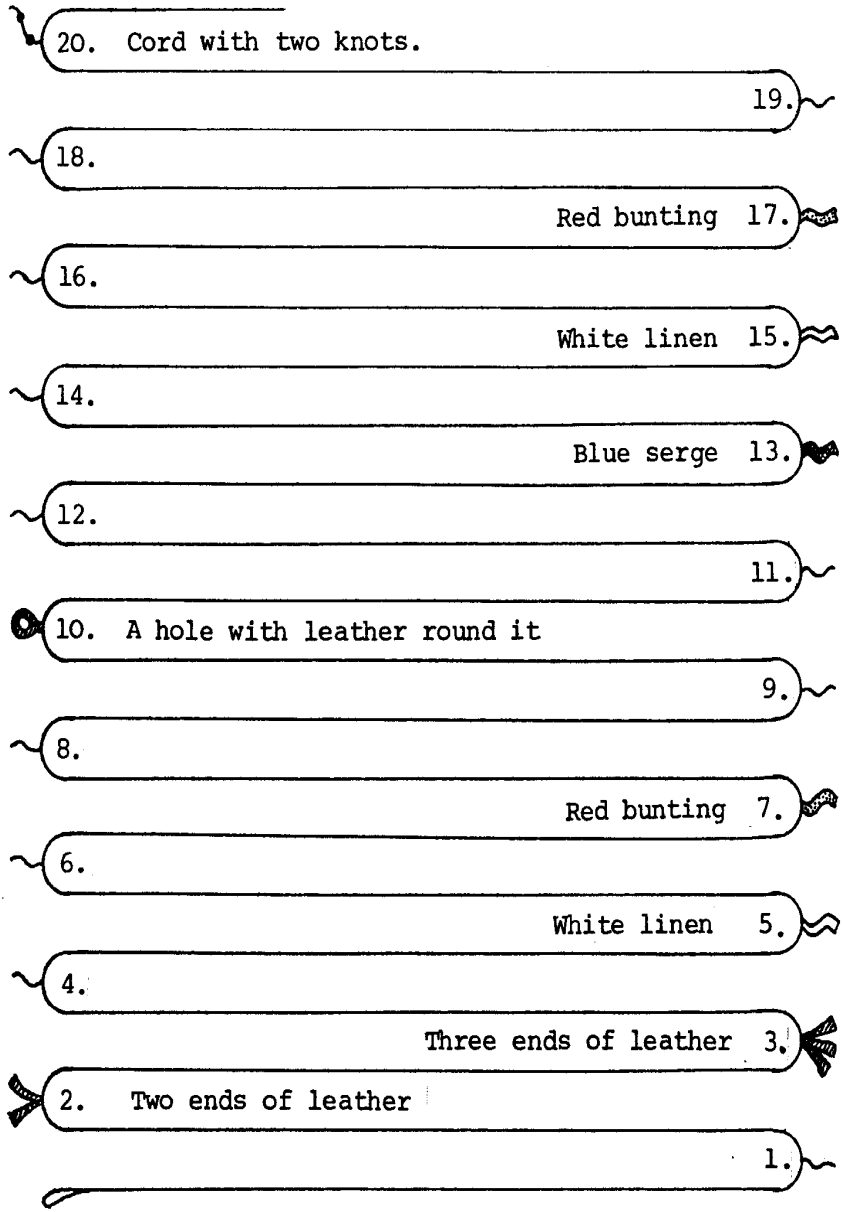
Timing the glass is easy; simply add sand until it takes exactly 6 seconds to run out. When finally screwed up tight, perfectionists may care to make a protective cage of the traditional shape to house the whole thing.

The log-line itself should be of strong (but not too thick) fishing line. It should be wound round a couple of fence-posts on a rainy day and left to soak and stretch for a hour or two. Marking should be done while the line is still wet. A length of 4 or 5 fathoms (8 or 10 metres) from the chip is called the "stray line" and is marked with a piece of red bunting. This is called the "Turn mark" and it makes sure that the chip has streamed well clear of the turbulent part of the wake before timing starts. After the turn mark, the knots are marked out at 10 foot intervals (3.048 metres) with *a* twist of twine in which the appropriate number of knots has been tied.

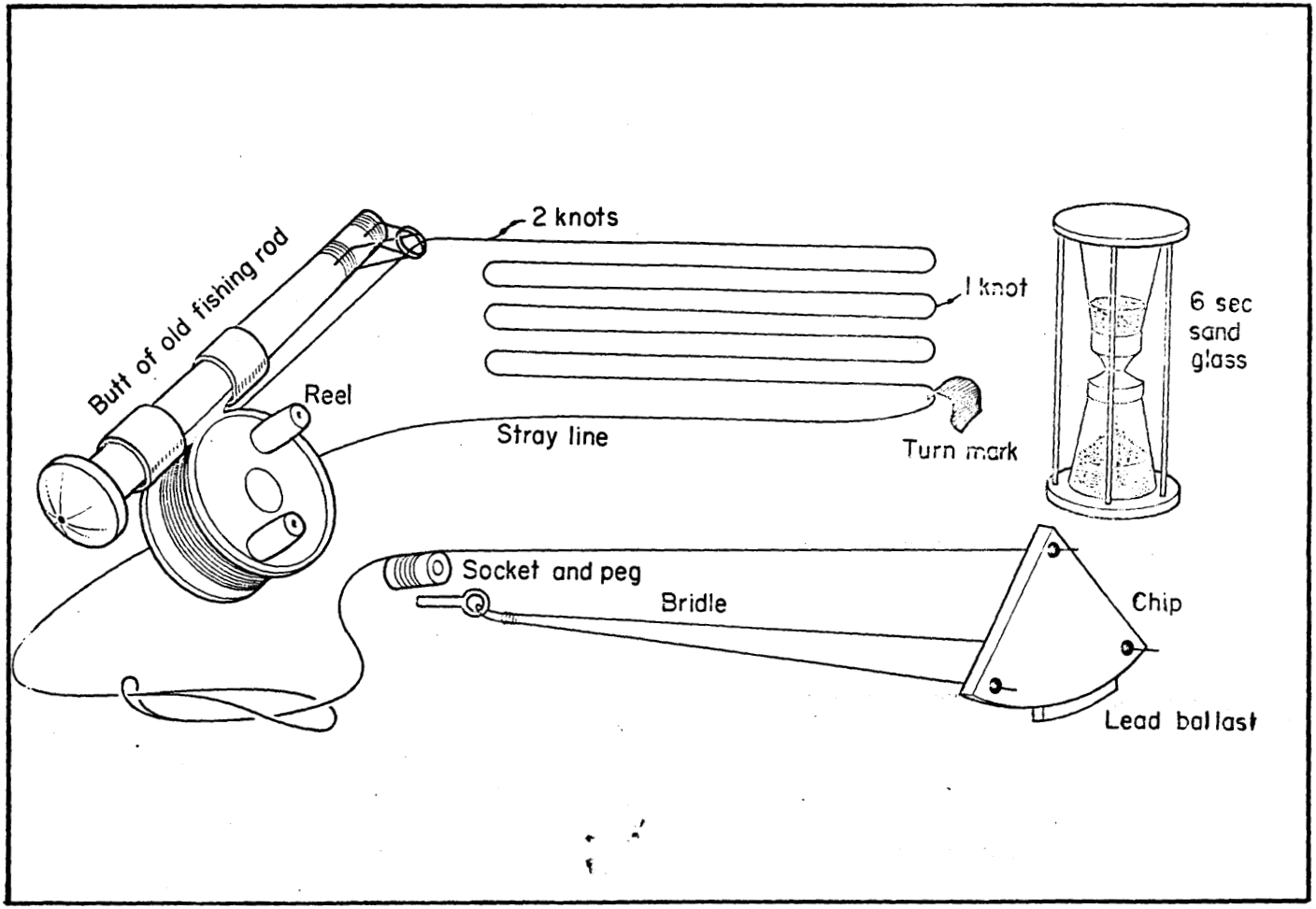
The reason for the 6 seconds and the 10 feet is that the length of a nautical mile is the length of one minute of latitude i.e. 6086 feet. For practical purposes this can be thought of as 6000 feet. A speed of 1 nautical mile per hour is therefore 6000 feet in 3600 seconds. Cancelling reduces this to 10 feet in 6 seconds or one knot. At the cost of greater bulk one can get greater accuracy; historically a 14 second glass was used with 23ft 7 ins knots.

Streaming the log needs two people; the bridle is pegged up and dropped over the stern while the line flows freely and smoothly after it. As the red bunting goes over the taffrail, the "Streamer" calls "Turn" and the "Time-keeper" turns the glass. As soon as the glass runs out the Time-keeper calls "Stop" and the streamer grips the line firmly. The number of knots and feet run over the stern is the speed in knots and tenths. The jerk when the line is gripped will almost certainly have pulled the peg from the socket and the chip will be towing and planing on the surface so that it is easily handed and restowed.

Fig. 7 The marks of a hand lead line



NB. Deeps have a twist of twine.


2 knots
1 knot
Butt of old fishing rod
Reel
Stray line
Turn mark
6 sec
sand
glass
Socket and peg
Bridle
Chip
Lead ballast