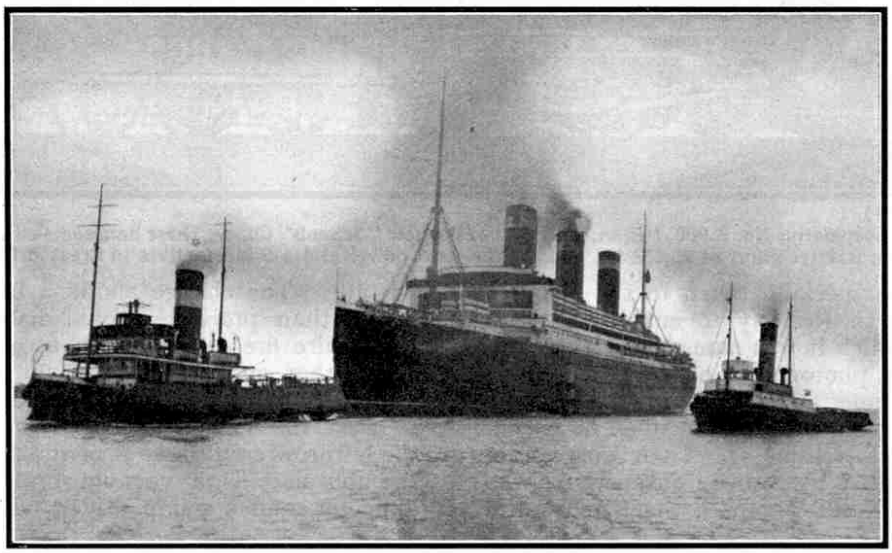
Steam Tugs and Their Work

Tiny Vessels That Handle Liners

By R. S. McNaught

THE steam tug, in spite of its comparatively small size, has a history longer than that of most other types of steamships. The first definitely recorded occasion on which a steam-propelled vessel was used for towing dates back to August, 1816, when a Thames vessel named the "*Majestic*" towed a sailing ship of considerable size from Deptford to Woolwich at a speed of three miles an hour against the wind. Up to comparatively recent years tugboats were mainly concerned with the handling of sailing ships which, as a general rule, required their services on entering harbour. At some ports, such as Liverpool, it was possible, when wind and tide were favourable, for a sailing vessel to be brought into port under sail without the assistance of a tug; but many ports, such as London, could not be entered by large sailing vessels without assistance.



Tugs towing the giant American liner "*Leviathan*" to her berth at Southampton.

The sailing ship has gone, and the majority of steamships are able to enter and leave port under their own power, and in some cases to enter docks without assistance. The tug is still required, however, to assist in the task of berthing and docking liners and other steamships that are too large to be manœuvred through dock entrances under their own steam. At every busy port is stationed a small fleet of sea-going tugs, which are always in readiness to steam at high speed, in fair weather or foul, to meet an incoming liner and tow her through intricate channels into harbour, and either bring her alongside a landing stage or guide her into dock. As a rule two tugs take charge of strong manilla hawsers at the bows, while one or more act as an additional rudder by hitching on astern with engines reversed to maintain a "grip" on the tow. With the liner's engines at "stand by" or "dead slow," the small craft are in full control of her movements.

The actual docking of a large steamship is a very delicate job especially when, in the case of liners, the maximum beam may be only 10 ft. less than the width of the entrance lock. Matters are further complicated if a strong wind is blowing, for a sudden side gust pressing against her towering hull just as she is passing into the entrance may cause her to swing round dangerously. The merest grazing of the granite walls of the quayside may result in strained and buckled plates, involving a visit to the graving dock for repairs. While engaged in this work the tugs have to be as responsive to the demands of the moment as a bicycle ridden through a crowded London street. Their movements are directed by an officer on the liner's lofty bridge in co-operation with the harbour-master's staff on the quayside, the manœuvring being controlled by means of a simple code of whistle signals.

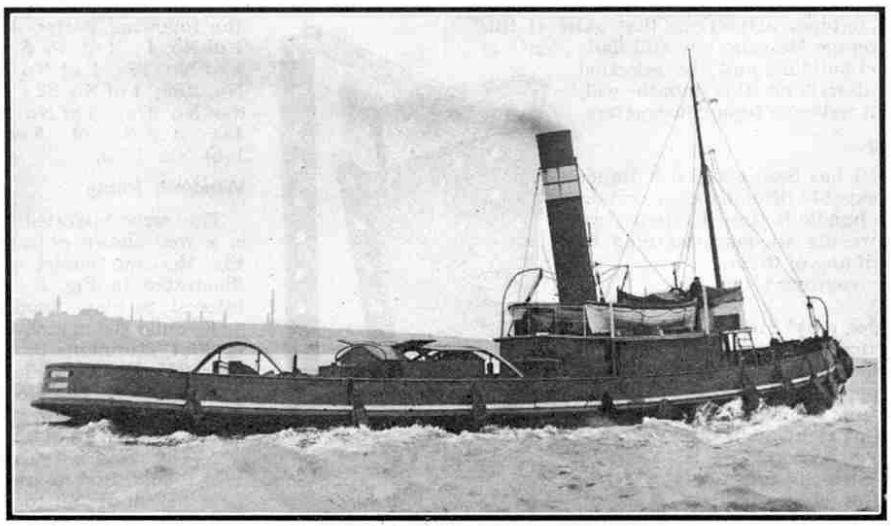
Larger than the ordinary sea-going tugs are the ocean-going tugs that specialise in salvage work and in long-distance towage. It is by no means a rare thing for these vessels to undertake a voyage half-way round the world. For some reason or other the Dutch have specialised in ocean towing, and they have evolved some remarkably efficient vessels specially designed for such work. Among their many notable achievements is that of towing a floating dock, 400 ft. in length and 95 ft. in breadth, from the builders' yard on the Tyne to a port on the coast of Peru, a distance of over 10,000 miles. During this voyage the dangerous and intricate Straits of Magellan were safely negotiated. Such a tow cannot proceed at a speed of more than six or seven knots in calm weather, and therefore the tugs had to carry huge supplies of coal and provisions, in addition to large quantities stowed on the floating dock.

Most of the Dutch ocean-going tugs may be recognised by their two tall funnels and two masts. The British ocean-going tugs are smaller than the Dutch vessels, but are in no way inferior. In proof of this may be mentioned the famous Liverpool "Cock" fleet, so called because they are named "*Storm Cock*," "*Black Cock*," and so on. They are always ready to undertake difficult tasks in any part of the world, and they have many notable exploits to their credit.

There are other classes of steam tugs which, while designed primarily for towage work, undertake additional duties for which they are provided with special equipment. Some are used for salvage work and have tremendously powerful pumps for assisting a stranded or sinking vessel. Others again are fire-fighters, ready at a moment's notice to pump enormous quantities

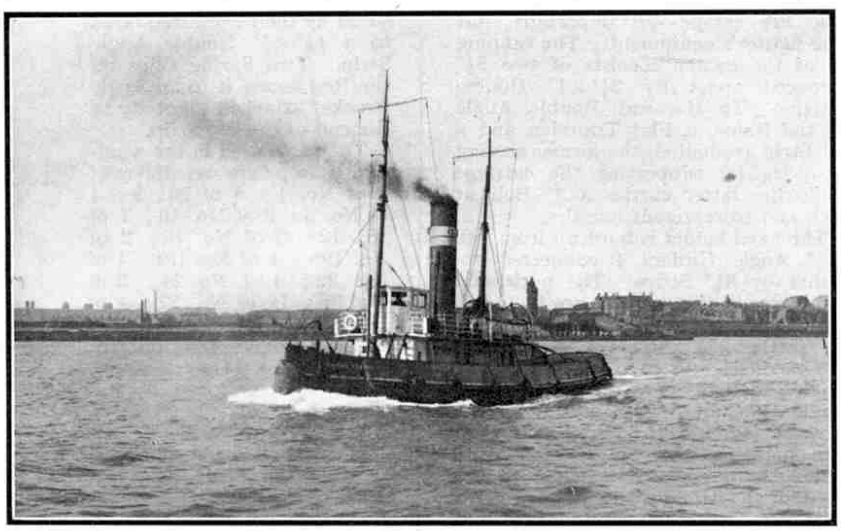
of water on to blazing ships, or on to burning warehouses along the waterside.

All steam tugs are very stoutly built as they have to withstand a tremendous amount of buffeting from stormy seas and also in the rough-and-tumble of their everyday work. They are exceptionally broad of beam and are designed so as to have a low centre of gravity to enable them to heel over to an acute angle with safety, as they often do when straining at a taut hawser. Their freeboard is low, and in bad weather few dry corners are to be found on board; while their trawler-shaped hull and shallow draught makes these little steamers as lively as corks when the sea is rough. Of necessity they are powerfully engined. A tug of, say, 500 tons gross may have engines of from 1,000 h.p. to as much as 1,300 h.p. The speed at which quite small tugs can move when running free is surprising, and it gives a good indication of their engine power. As a rule the propelling machinery consists of reciprocating engines driving twin screws, but recently a considerable number of tugs have been fitted with internal combustion engines.



A typical sea-going tug, showing the wooden arch over which the tow-rope is passed.

The actual towing gear consists of a heavy steel hook built into a specially reinforced bulkhead abaft the funnel, and placed as low down as possible. Occasionally a second towing hook is fixed astern or in rear of the engine-room casing, but this is suitable for light work only. In the United States the tugs make use of a special windlass for towing purposes instead of a hook. As a matter of fact these American tugs usually handle a liner, not by towing, but by placing their noses against her plates and pushing.



An ocean-going tug fitted with wireless.

When fastened to the usual type of towing hook the towing wire lies a little higher than the axis of a pivoting bolt round which the hook can turn. There is a slipping device on the hook controlled by a wire from the bridge, and between the hook and the stern is a strong wooden arch over which the tow-rope passes. This arch is one of the most noticeable features of a tug.

For open sea work a particularly long and heavy hawser is employed, designed to withstand the sudden jerks that are inevitable in rough weather. Many ocean-going tugs are fitted with an automatic towing device that counteracts the effects of these sudden strains by paying out or taking in the hawser according to the demands of the moment. A long tow-line, owing to its own weight, is submerged for part of its length, and a floating buoy is attached midway to indicate the presence and position of the line. After dusk an extra white light is carried at the masthead of a tug to denote that she has a vessel in tow. On such a river as the Mersey, where a tug often may have to tow a string of five or six barges from dock to dock, a corresponding number of lights must be displayed.

The living accommodation provided on steam tugs is similar to that on a steam trawler or drifter, which means that it is both limited and rough and ready. Ocean-going tugs usually have a forecastle, but this is not the case with the tugs that rarely lose sight of their own estuary or bay. A normal crew for a sea-going tug consists of skipper, mate, engineer, three or four deck hands and greasers, and a lad who looks after the cooking and cleaning. At low tide, or when for other reasons work is slack, much time is spent in painting and polishing the tug which, in rough weather, comes back from every job salt-encrusted and dingy. However small and weather-beaten a tug may be, her crew, from the skipper downward, are proud of her, and one never meets a tugman whose boat is even second best on her particular stretch of coast!

Much might be written of the adventures that tugs encounter in their intricate and often dangerous work. Risks of all kinds have to be faced, and the tug skipper takes them as they come without the slightest hesitation or fuss. On one occasion a tug went out to sea in the teeth of a howling gale to aid a large troopship that was on fire astern. The forward holds contained explosives, and the troops on board were crowded forward. Approaching as closely as was possible in the raging seas, the tug (Continued on page 380

material being made into "slurry" by mixing it with water, and then disposed of by pumping.

Various ventilation schemes might be adopted. In the San Francisco tunnel the cross section is a circle divided into three compartments by horizontal partitions. The upper one permits the removal of foul air, while the lower one supplies fresh air, admitted at numerous places along the length of the roadway. A similar scheme was adopted in the New York-New Jersey tunnel.

Construction being finished, the double track would be electrified. The catchment area of the Guadalquivir is capable of supplying 200,000 h.p., and could easily provide the necessary motive power. The passage of the tunnel would be made in half-an-hour, instead of the customary three hours by sea.

The estimated cost of a huge undertaking of this kind is naturally of paramount importance. If 1,000 men were employed on the work it is believed that this could be completed in from five to six years, and the author of the project estimates that the total cost would not exceed £12,375,000. Of this, £937,500 would go to preliminary works; £7,200,000 to the submarine tunnel; £3,037,500 for the portion of the works not under the sea, and £1,200,000 for contingencies. The amount of traffic that would be available cannot, of course, be estimated with certainty, but the author gives good reasons for his belief that the financial soundness of the scheme is beyond doubt.

Mechanical Fingers made from Meccano

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distance between the chucks is thus increased, the pulling out of the softened tube being accomplished in exactly the same manner as if the tubing were held in the operator's hands, the Angle Girders and chucks thus acting as efficient substitutes for fingers.

Occasionally the shape or size of the end that has been melted prevents it from fitting into the needle. This can be quite easily corrected by an experienced glass blower, either by carefully re-heating in one spot to alter the shape, or by fusing another piece of tubing on the end and repeating the entire operation. The framework carrying the gas burner is left with a little side play so that the flame may be moved sideways when necessary to re-heat the ends of the capillary tube before removal from the chucks.

This apparatus works very effectively, and its inventor is to be congratulated upon his ingenuity. At the same time, the mechanism affords another striking example of the remarkable adaptability of Meccano.

A New British Roll Film

An event of great interest to photographers is the appearance this month of a new British roll film. This film has been given the name "Selo," pronounced "Sea-lo"; and it is the united product of six well-known British manufacturers—Apem Ltd., Gem Dry Plate Co. Ltd., Ilford Ltd., Illingworth and Co. Ltd., Imperial Dry Plate Co. Ltd., and Wellington and Ward Ltd. The laboratories of these firms have been working together for some time with the object of producing jointly the best possible film, and it may be assumed that the "Selo" film combines the various points of excellence by which the films of the individual firms have been characterised in the past. It is claimed that "Selo" is the fastest roll film produced, and therefore it should be of value to the amateur who, in the course of our erratic summers, is often obliged to take snapshots in poor light unless he is to lose many interesting subjects. The film is also stated to be highly sensitive to colour values.

Our "Better Title" Contest

The Contest announced in the 1930 Meccano Catalogue attracted widespread interest. In it competitors were asked to suggest an alternative title for the picture on the cover, and in making choice of the best of the enormous number of entries submitted, the judges had a very arduous but pleasant task. Meccano boys in all parts of the world had scrutinised

Henry Turner, of Sheffield.

the illustration to good purpose, and it is quite clear that the majority of them also had studied very carefully the art of writing slogans, for a very large proportion of the titles were suitable for use in this manner.

After due deliberation the judges came to the conclusion that the best entry submitted was "AMATEURS TO-DAY—EXPERTS TO-MORROW." This was sent in by Master Henry Turner, Sheffield, whose portrait appears above, and to him has been forwarded a cheque for £5 together with congratulations on having thought out this neat and comprehensive title.

The judges felt that many of the efforts sent in were so good that some recognition was due to them, and accordingly a number of consolation prizes have been forwarded to their authors.

Steam Tugs

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managed to get a hawser on board, and she then drove full speed ahead, hour after hour, in order to keep the troopship's head to the wind and prevent the fire from spreading forward. The strength of the gale was such that practically no progress through the water was possible, but the tug succeeded in her desperate efforts, and stuck to the tow-rope until the gale blew itself out and the fire was got under control. Without the splendid assistance of the tug the troopship undoubtedly must have been lost, and probably with all on board, for no boats could have survived in such a sea. This episode affords a typical instance of what is perhaps the most notable characteristic of tugs and their skippers—bulldog tenacity.

One of the most extraordinary incidents in the history of tugs occurred in 1913 on the coast near Sunderland. A large German cargo steamer, the "*Orion*," had been driven hard ashore, and when the next high tides came round a determined effort was made by three powerful tugs to haul her off into deep water. After some unsuccessful attempts the tugs gathered their strength for a final desperate effort, and succeeded, not in dragging the German ship off, but in pulling her clean in two! Her hull parted amidships as cleanly as if it had been cut through.

Two large tugs of an unusual type are familiar to those crossing the Mersey by ferry or sailing from Liverpool to foreign ports. These are the tenders "*Magnetic*" of the White Star Line, and "*Skirmisher*" of the Cunard Line. These tugs are specially fitted with passenger accommodation to carry passengers to and from the liners, or to carry parties for inspection cruises; and in addition they use their power for towing the great liners of their respective companies to and from the docks and the landing stage. The "*Skirmisher*" is a particularly interesting craft. She is now quite a veteran, and must have had charge at different times of every liner in the Cunard fleet during the last 30 years. She looked tiny when towing the old "*Umbria*" or "*Lucania*"; but she seemed a midget indeed when in attendance on the "*Aquitania*" or the "*Mauretania.*" Since the departure of the latter giant liners to Southampton the "*Skirmisher*" devotes her attention to the graceful new single-funnelled Cunarders that enter and leave the Mersey with the regularity of express trains.

Safety Device for Electric Railways

The "dead man's handle" has long been a familiar term to those who are interested in the London Tubes and other electric railways. This startling name is used for a safety device consisting of a special switch that the driver of an electric vehicle must press continuously in order to maintain the supply of current for the motors. If he becomes incapable or falls from his proper driving position owing to sudden illness or any other reason, the release of the switch is followed by the automatic stopping of the train.

On certain electric railways in Central Europe an ingenious invention of a more comfortable type is being substituted for the customary "dead man's handle." The new device consists of a safety belt that is buckled by the driver round his waist. A cord connects the belt to a switch fixed on a cross bar above his head, the switch being designed to slide freely along the cross bar, and not to interfere with the movements of the driver. The length of the cord is so adjusted that if the man wearing the belt falls to his knees the switch is closed. Current is thereby supplied to a small electro-magnet that cuts out the main supply and applies the emergency brake.

The device has the great advantage that it is positive in action and not wasteful of current. Only if a driver falls is current switched on, whereas in the old system the current in the control circuit flows continuously, thus adding unnecessarily to the consumption.

The driver of an electric train on which the safety belt is fitted may bring it to a standstill in an emergency by jumping out, for this will immediately shut off current and put on the brakes. To act in this manner is the natural impulse of a driver who sees that a collision is unavoidable and it may be done with the knowledge that this is the very best means of minimising the effect of the collision.