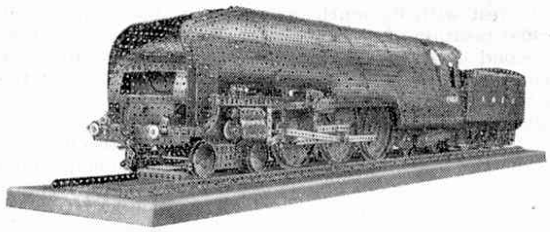
## 1 in. Scale Meccano Model of

# L.N.E.R. High-Pressure Locomotive "No. 10000"



LAST month we completed our description of the construction of the Meccano model of the L.N.E.R. locomotive "No. 10000." This month we describe the construction of the tender that accompanies the locomotive. This is a scale reproduction of a standard L.N.E.R. tender, and the parts required to build it were included in the list given at the foot of page 36 of the January "*M.M.*"

Each side of the main frames of the tender consists of an 18½" Angle Girder fitted with four 12½" Flat Girders by means of which the frame is made 1½" in depth. Each end of the frame is fitted with a 2½" Strip, the lower ends of which form wheel guards. The two side frames when completed are joined together by two girders 65 and 66, each of which consists of two 5½" Angle Girders overlapping five holes. Two 7½" Angle Girders 67 are also fitted, the right-hand ends of which are secured to an 18½" Angle Girder 68. It will be noticed that the Girders 65 and 66 overhang the side main girders for a distance of ½", and to these lugs are secured two 18½" Angle Girders 69. Each of these Girders carries one of the tender sides.

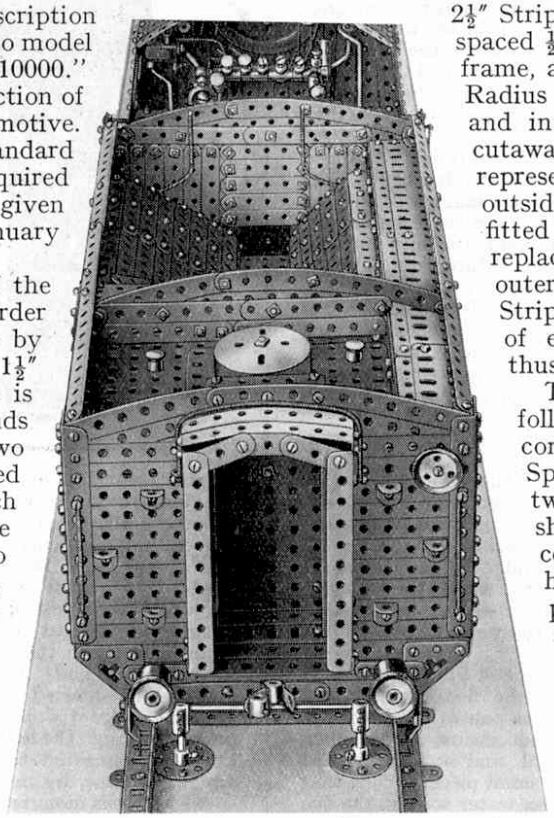


Fig. 1. The tender coal-bunker and corridor-entrance are shown in this illustration.

Each tender side is built up on two vertical Angle Girders, a 5½" at the rear end and a 4½" at the front end. Eight 18½" Strips, each composed of one 7½" and one 12½" Strip overlapping three holes, are now secured between the two Girders, and two 5½" Strips are then fixed in place in order to keep level the various strips forming the side. The two Strips are indicated at 70, Figs. 2 and 4, by the rows of bolt heads. A further strip, ½" shorter than those forming the tender side, is now fitted to the top of each wall of strips, and above this is secured the coal rail, built up from one 7½" Strip and one 9½" Strip. These two Strips overlap four holes, and the complete length is held in place by means of four Flat Brackets bent to the required shape.

Before proceeding further with the construction of the tender the axle-boxes and frames should be fitted. Eight 2½" Strips are first bolted in place, in pairs spaced ½" apart, on each side of the tender frame, as shown in Fig. 2. Next 2½" Small Radius Curved Strips are secured in place, and in this manner the typical curved cutaway portions of an actual tender are represented. It should be noted that the outside Strips of each end pair are not fitted with Curved Strips, these being replaced by 3" Strips bolted at their outer ends to the wheel guards. A 1½" Strip is now secured across the bottom of each pair of vertical 2½" Strips, thus completing the axle-box frames.

The axle-boxes are built up in the following manner, the same method of construction being used for each. Each Spring consists of two 2½" Strips and two ½" Strips, bent to the required shape and secured together in the centre by a ⅜" Bolt. This Bolt also holds in place a Double Bracket, placed transversely across the spring, and also two 1"×½" Angle Brackets. These Angle Brackets are arranged in the form of a Single Bent Strip, and the two 1" lugs are arranged at 90 deg. to the two lugs of the Double Bracket already mentioned. A second Double Bracket is now bolted across the ends of the 1"×½"Angle Brackets, and the centre hole of this forms a bearing for one side of one of the axles carrying the travelling wheels. A Flat Bracket is now locknutted to the outside lug of the first-mentioned Double Bracket, forming an axle-box cover. It is removed by lifting the free end of the Flat Bracket until it is clear of the end of the axle, and then swinging it to one side. If it is thought necessary, Double Arm Cranks may be fitted in order to increase the bearing surfaces of the axles.

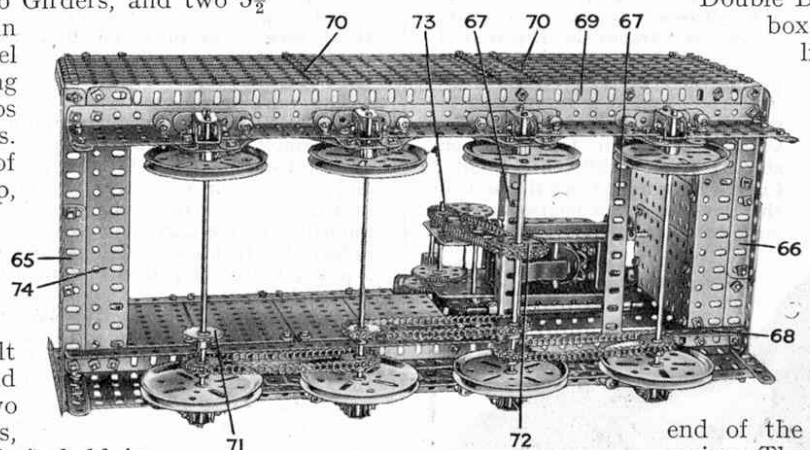



Fig. 2. An underneath view of the tender.

The complete axle-box is fitted to the tender frame by passing ½" Bolts through each end of the 2½" Strips forming the spring. They are then screwed into Handrail Supports, fixed securely to the frame, and locked in position by Grub-Screws passed into the threaded bore of the Handrail Supports from the opposite side to the ½" Bolts.

When all the axle-boxes are complete and in position the wheels and axles are fitted. Each axle consists of an 8″ Rod on which are carried two 3″ Pulley Wheels. Although these Pulleys are not technically correct, having grooves instead of flanges, they are almost the required size, and for this reason they have been used in preference to Wheel Flanges and Face Plates. The drive to the various wheels is arranged as shown in Fig. 2, the 1″ Sprocket Wheel 71 being used for connecting the tender to the engine when they are mounted together on a base-board. In addition to the 1″ Sprocket Wheels, one of the axles carries a 1½″ Sprocket Wheel 72, driven by Chain from the Electric Motor.

The motive unit consists of a No. E6 Electric Motor, to each flange of which is bolted a 3½″×½″ Double Angle Strip. These Double Angle Strips are held in place on the Girders 67 by passing 4½″ Rods through their ½″ lugs, and also through suitable holes in the Girders. This method of construction enables the motor to be taken out periodically for cleaning purposes without the manipulation of Nuts and Bolts in awkward positions. The drive is taken from a ½″ Pinion on the armature shaft to a 57-teeth Gear mounted on a 2″ Rod. This pair of gears is followed by three similar pairs, the total reduction being 81 : 1 between the armature shaft and the 3″ Rod 73. This Rod carries a ¾″ Sprocket Wheel that is connected by a length of Sprocket Chain to the Sprocket Wheel 72.

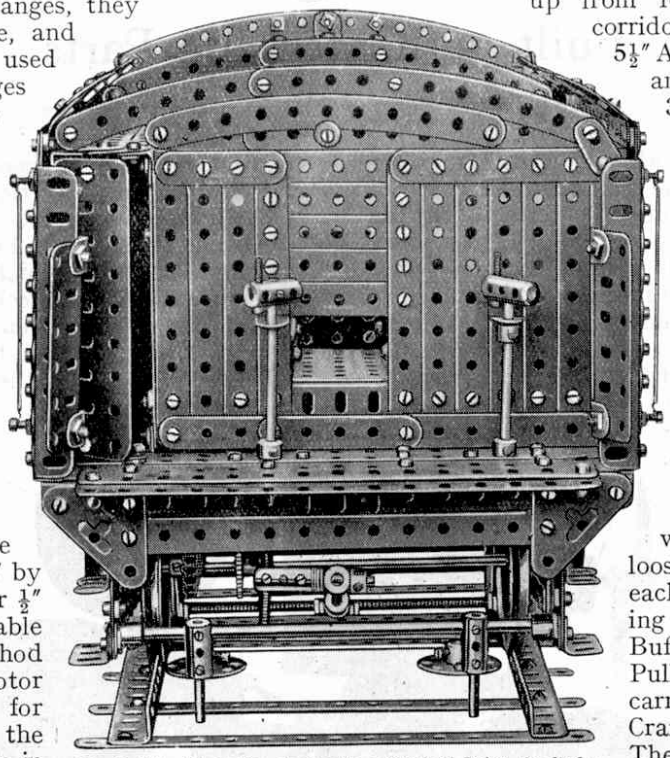


Fig. 3. This illustration shows the method of fitting the brake mechanism.

The rear door and corridor are now built. A 5½″ Flat Girder 74 is first bolted in place, as shown in Fig. 2, one end of which is held down by one end of a 9½″ Angle Girder carrying the 4½″×2½″ Flat Plates forming the inner wall of the corridor. There is no need to make a complete inner wall for the corridor as the space will be covered in later when the top of the tender is fitted. The tops of the 4½″×2½″ Flat Plates are all joined together by a 12½″ Angle Girder, which is extended by a 3½″ Angle Girder to a length of 16″. An Angle Girder 75 forms the necessary connection between the two girders.

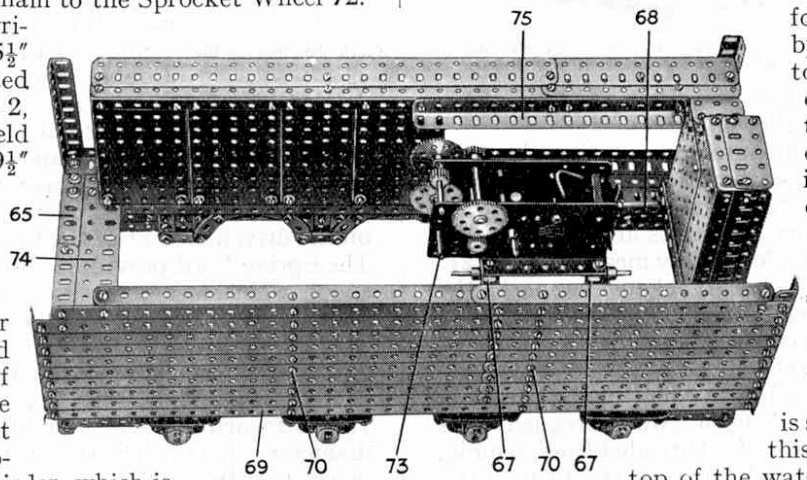



Fig. 4. The driving unit fitted inside the tender.

The top of the corridor is built up from two 12½″ and two 5½″ Flat Girders as shown in the illustration. The back of the corridor leading to the door is built up from a 4½″×2½″ and a 5½″×2½″ Flat Plate, which are bolted at their lower ends to a 5½″ Angle Girder attached in turn to a 5½″ Flat Girder. This Flat Girder is attached by a similar part, to the girder 65 of the tender frame. The side and top of this part of the corridor are built up from 5½″, 2½″ and 1½″ Flat Girders as shown in the illustration.

The rear of the tender, which is shown in Fig. 1, is formed at each side of the doorway from 3″ Strips, and the curved top is represented by two long curved strips built up from four 5½″ Curved Strips. The corridor connection sides consist of 5½″ Angle Girders and Flat Girders, and for the top and bottom 3½″×½″ Double Angle Strips are used. The curve at the top of the corridor connection is represented by three 1½″ Strips bolted together as shown. Three handrails are fitted to this part of the tender, one at each side and one over the corridor connection. These consist of Spring Cord with copper wire passed down the centre, the ends being secured to ⅜″ Bolts each attached by two Nuts to the model.

Other fittings include a window, represented by a 1″ loose Pulley, and three steps on each side of the doorway, consisting of ½″×½″ Angle Brackets. Buffers are built up from 1″ fast Pulleys mounted on 1½″ Rods carried in the bosses of Double Arm Cranks secured to the main frame. The body of each buffer is represented by a Chimney Adaptor. The automatic coupling will be seen from Fig. 1.

The front of the tender is shown in Fig. 3, and no description is necessary for its construction. The corridor door consists of a 4½″ Flat Girder mounted on two Hinges, and the side doors for the foot-plate are represented by 3″ Flat Girders made to swing on Hinges. Two dummy handles are fitted on the foot-plate both of which are shown in the illustration. If so desired one of these handles may be made to work brakes operating on the eight wheels of the tender, and a simple method of accomplishing this is shown in Fig. 3.

The top of the tender is shown in Fig. 1, and from this it will be seen that the top of the water tank is built up from 4½″×2½″ Flat Plates at its rear end, and from two 3½″×5½″ Flat Plates at its fore end. These latter Plates are bent at their centres to an angle of about 45 deg., and when they are fitted in place their lower edges are extended to the bottom of the tender by further 5½″×3½″ Flat Plates. The bottom of the tender is filled in by 5½″×3½″ and 5½″×2½″ Flat Plates, secured to the tender sides by ½″×½″ Angle Brackets. The sides of the coal compartment are built up from various sized Strips, ½″×½″ Angle Brackets being used for securing them in place.

(Continued on page 186)

## Modern Aeroplane—(*Continued from page 149*)

Petrol is pumped by duplicated engine-driven pumps from the main tanks to the engine. It is interesting to note that special Meccano Bevel Wheels, Nos. 30A and 30C, and the Meccano Pointer, are incorporated in the fuel gauge.

After the installation of the power plant, the controls are installed. A normal control column, fitted with a hand grip that from its shape is known as a "spade" operates the elevators and ailerons by means of straight lengths of cable and chain passing over ball-bearing sprockets. Hanging rudder pedals, the tail trimmer and the wheel-raising mechanism are the other controls that are fitted.

The connections from the engine to the engine speed indicator, oil pressure gauge, and oil thermometer on the pilot's dashboard are now made, and the cowlings and fairings are then placed in position. The metal airscrew is mounted, together with the spinner, and the fuselage is completed. The wings are then attached to the fuselage by wing root forgings on each side, and give the "Courier" a span of 47 ft.

The upholstery of the cabin, which is 8 ft. long by 3 ft. 8 in. wide, remains to be completed in a scheme to suit the purchaser of the machine.

Just before the test flight the machine is weighed and the empty weight should be in the neighbourhood of 2,100 lb.; and on completion of this formality the pilot tests the aeroplane's performance. With the "Lynx" engine, it should have a top speed of 165 m.p.h., a cruising speed of 145 m.p.h., and a landing speed of 50 m.p.h.; and higher speeds are attained with more powerful engines.

It will be noticed in the illustration of the cockpit that wireless equipment is fitted between the front seats. When wireless is to be installed the whole machine requires to be "bonded"; that is every metal part on the machine has to be joined by wire and connected to the set to form an "earth." The bonding of the machine is done immediately before any covering is commenced.

A wind-driven electrical generator to provide power for the set is mounted in the front of the centre section on the starboard side, and a trailing aerial is so fitted that it can be let down through the floor of the cockpit when required, and drawn in again by turning a hand-wheel when the wireless is not being used, or when a landing is to be made. The set itself is slung in shock absorbers at the rear of the cabin beneath the luggage locker.

The "blind-flying" instruments are also well shown in the illustration of the cockpit. These consist of a turn and bank indicator and a fore-and-aft level. The compass can be seen immediately below these two instruments. Before delivery to the owner, the machine is taxied out to a special concrete circle on the aerodrome showing the points of the compass and there the instrument is carefully "swung"; that is the machine is turned towards each point of the compass and the compass needle is adjusted by means of small magnets. When the errors have been reduced to a minimum a table of deviations is prepared for use with the compass. This table is pinned up in the machine, and is an essential factor in accurate cross-country flying.

The new Airspeed "Courier" is then ready to leave the factory after passing through the hands of woodworkers, sheet metal workers, fabric workers, fitters, and dopers, each man a skilled worker and a specialist.

## New Machine at Swindon—(*Cont. from page 161*)

depends on the mode of drive to be used. Machines of the past have, almost universally, relied upon a main shafting driven by a power plant, with the power transmitted by belts to countershafting and thence to machines; but the modern practice is to dispense with main shafting and operate the drive from a separate electric motor.

If it be the first case, then the fitter must be busy again, fitting the necessary pulleys to main shafting and countershafting; but if it be the other, then the electrician generally performs the final rites, although it does not always follow that a separate unit machine is without countershafts; and with such, the "strappy" or belt man would be called in to administer the *coup de grace*.

Thus, in the works at Swindon the march of progress goes on; and, it may be added, not without interest on the part of the men does a new machine commence its career. They are human enough to want to know "all about it," and, after all, when one fresh wonder succeeds another, each outstripping beyond comparison the performances of old machines, such interest is feasible.

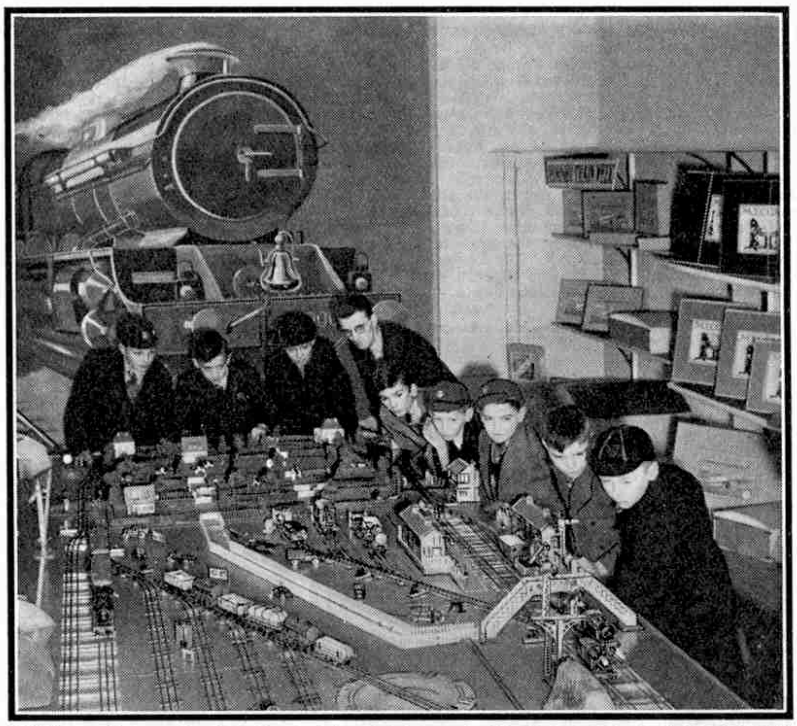
And yet, I believe that "Charles," that incorrigible veteran fitter with the famous rakish cap, gazes with a disapproving eye at them all, and pines in his heart for the unwieldy monstrosities he laid down reverently in his youth.

We are indebted to the courtesy of the Editor of the "*Great Western Railway Magazine*" for permission to reprint this interesting article.

## Special Trains—(*Continued from page 155*)

train speed, and usually signalmen are under orders to give the specials precedence of all other traffic except express passenger trains, breakdown van trains going to clear the line, light engines going to assist disabled trains, or fire brigade trains.

Most readers are by now familiar with the wonderful wagons that British railways possess for dealing with exceptionally heavy or out-of-gauge loads. For loads of very exceptional dimensions special trains are required. With them travel expert staffs, who "nurse" the loads throughout their journeys; instructions to the staff concerning one of these trains may easily occupy as much as eight closely printed pages of type. Most of the movements of exceptional loads take place through the night or on a Sunday, when traffic is at a minimum. Such consignments as ships' rudders and electrical rotors are at times so wide that they block the parallel line for a whole journey. It has been known to be necessary to slew a section of main line railway into a new position, and to remove bodily such obstacles as signal posts, gate posts and even fog signalmen's huts, to allow one of these special trains to pass.



**Miniature railway enthusiasts keenly interested in an electrically operated Hornby train layout arranged by Rushworths Ltd., of Huddersfield. The railway system includes a complete main line with sections of double track and two separate systems of sidings for shunting purposes.**

## A New Cycle White Patch

To enable every cyclist to meet the provisions of the new Road Traffic Acts, Bluemel Brothers Ltd. have introduced a new lightweight combined white patch and reflector of exceptionally neat design. The fitting consists of a piece of white celluloid of the well-known Bluemel "Featherweight" section, fitted with two strong mudguard clips and a white celluloid covered "Prismatic" reflector of new design. Full details of this useful unit, which costs only 1/6, can be had from Bluemel Brothers Ltd., Wolston, Coventry, on mentioning the "*M.M.*"

## High Pressure Locomotive—(*Cont. from p. 175*)

Two vent pipes are fitted to these sloping sides, for in actual practice they are the tops of water tanks. The vents are built up in a similar manner to the handrails at the rear of the tender. The water-scoop top is represented in the model by a Boiler End, and the main tank vents by Buffer-shanks fitted with Collars.

For mounting the tender above the rails two horizontal Rods are fitted similar to those at the rear of the engine. The short vertical supports consist of 1½" Rods, the lower ends of which are carried in Bush Wheels secured to the baseboard.

The baseboard for this model should be at least 1" in thickness, and must measure about 6' 6" in length and 10" in width. The engine and tender are secured to this in the manner already described and in their correct positions, after which the track is screwed into position. Each rail consists of three 24½" Angle Girders overlapping each other two or more holes, the number depending upon the exact length of the baseboard. The sleepers, which consist of 7½" Strips, are then placed in position, one being used every 2½", and the whole track screwed down, preferably with black round headed screws. The model is now complete except for the piece of Sprocket Chain connecting the engine and tender, this being fitted last in order to get the exact length required.

If it is desired the characteristic letters L.N.E.R. and the number "10000" may be painted on the model, as shown in Fig. 1 of the first article of this series.

## Moving Picture Projector—(*Cont. from p. 177*)

construction of this ingenious mechanism is quite simple, as a study of Fig. 4 will show.

Two Rods act as guides and keep the film pressed against the Pawls when they advance to pull the film downward. After leaving the gate the film passes over the take-up sprocket 16 (Fig. 1), which is driven by Sprocket Chain from the main drive. A small spring-controlled roller is provided to keep the film in engagement with the teeth of the sprocket.

The built-up crank handle 32 (Fig. 5) is intended for driving the projector by hand when "threading" the film.

The Electric Motor for driving the model is mounted in front of the projector below the lens housing, and the drive is transmitted by belts and Sprocket Chain. We understand that when fitted with an ordinary electric lamp the machine is capable of projecting a really bright and steady picture.

## Meccano Exhibition in Wallasey

The Annual Conversazione of Wallasey Grammar School, held on 9th February, included a Hobbies Competition of which a Meccano Model-building Contest formed a popular section. The models shown were remarkable for their originality, and for the ingenuity displayed in overcoming difficulties. F. S. Miles won the First Prize with a model showing a section of the Mersey Tunnel, through which motor cars and lorries of the Dinky Toy series ran continuously. Above the tunnel itself was the Mersey, with ferry boats passing to and fro between the Liverpool and Wallasey landing stages. The Second Prize was won by F. Lawson, whose entry represented a pit shaft with winding gear, and an excellent model of an electric power station by L. Howson Jones was awarded honourable mention. Interest was added to the Conversazione by a display of working models, including a Workshop and a Ship Coaler, loaned by Meccano Ltd.

## Turog Essay Competition

Spillers Ltd., millers of the famous Turog Flour, announce this month an interesting Prize Essay Competition open to boys and girls of all ages. Prizes to a total value of £320 are offered for essays not exceeding 150 words in length. General details of the competition will be found on *page xvi* of this issue, and further details are given in a special competition folder that may be obtained from any Turog baker or direct from Spillers Ltd., 40, St. Mary Axe, London, E.C.3. This folder contains also details of a generous free gift scheme.

## The Rivercraft Canoe Club

Those of our readers who are fond of water sports—particularly those residing within easy reach of the Thames—will find the Rivercraft Canoe Club of interest. Among its objects are the improvement of canoeing technique and the provision of centres where canoeists may meet for canoeing and camping. The Secretary of the Club, Mr. Owen Jones, will be glad to give full details to any reader of the "*M.M.*" who writes to him at Walton Bridge, Surrey.

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