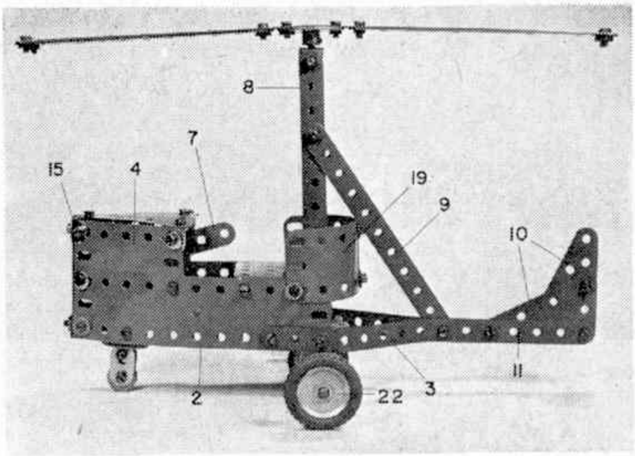
AUTOGYRO

by Spanner



Inspiration for this little autogyro model came from the Wallis Autogyro which appeared in the James Bond film, "You Only Live Twice". The model is of course only roughly based on the real thing, but the rotor revolves when the model is pushed along.

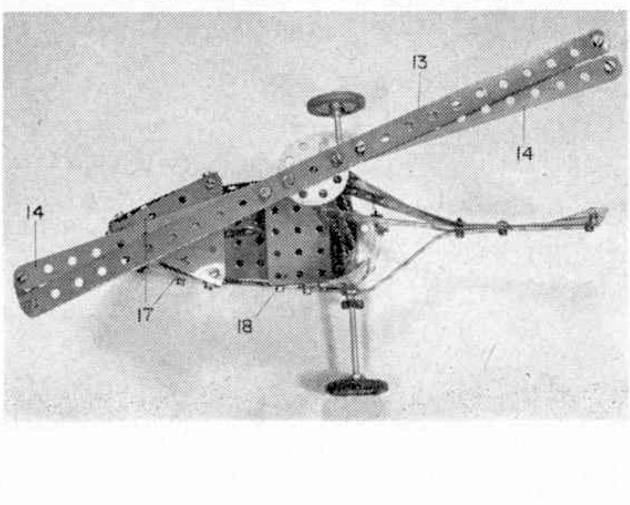
CROSS AN aeroplane with a helicopter and what do you get? Answer—an autogyro.

Most of us know something about both the aeroplane and the helicopter, but the autogyro is something of a mystery to many people, so what exactly is an autogyro? Well, to answer this one, we need to first look at the aeroplane and helicopter. In basic terms, the former, equipped with wings, is driven forward by an engine. As this happens, the passage of air over the aerofoil surfaces of the wing creates "lift" which enables the aircraft to leave the ground and fly. In the case of the helicopter, the wings are replaced by a large revolving rotor driven by the engine. As the rotor blades turn, the air passing over the blades again causes lift to raise the helicopter into the air.

The autogyro is similar to the helicopter in that it does not have any wings to speak of, and is equipped with a set of rotor blades. The rotor, however, is not driven by the engine but is free-running, the engine itself usually powering a separate propeller to drive the machine forward. As the machine moves forward, the action of the air over the rotor blades causes the rotor to revolve which in turn creates lift to get the machine airborne. All this happens very quickly once the craft begins to move, therefore an autogyro needs only a very short take-off run thus giving it a great advantage over a conventional aeroplane.

Autogyros have been brought well and truly into the limelight recently with the star role of the Wallis Autogyro in the James Bond film, "You Only Live Twice". This marvellous aircraft could be described as the mini version of the autogyro, yet it nonetheless overcame some pretty impressive odds in the film. Our model-builder was so taken with the aircraft that it formed the inspiration for the simple little Meccano model, described here. The model does not of course fly, but it is equipped with a revolving rotor that operates when the model is pushed along.

In this high top-view of the model the simple but effective construction of the rotor is quite obvious.



Construction is extremely easy, the whole model being built up round a Flanged Sector Plate 1, to each flange of which is bolted a $5\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate 2 extended eight holes by a shaped $5\frac{1}{2}$ in. Strip 3. A $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate 4 is fixed to Plate 2 in the position shown, then, before anything further is done to the body, the steerable nosewheel is added. The wheel itself consists of a $\frac{1}{2}$ in. Pulley without boss mounted loose between two Fishplates 5 lock-nutted on a $\frac{3}{8}$ in. Bolt. The free ends of the Fishplates are secured by Nuts on Bolts to the boss of a 1 in. Pulley 6 mounted on the lower end of a 2 in. Rod journalled in Flanged Sector Plate 1 and a $\frac{1}{2}$ in. Reversed Angle Bracket bolted to the underside of the Plate. A Spring Clip above the Plate holds the Rod in Position and, mounted above this Spring Clip, is another 1 in. Pulley to the boss of which a Fishplate is fixed. A $2\frac{1}{2}$ in. Strip 7 is bolted to this Fishplate to serve as the "joystick"-type steering handle.

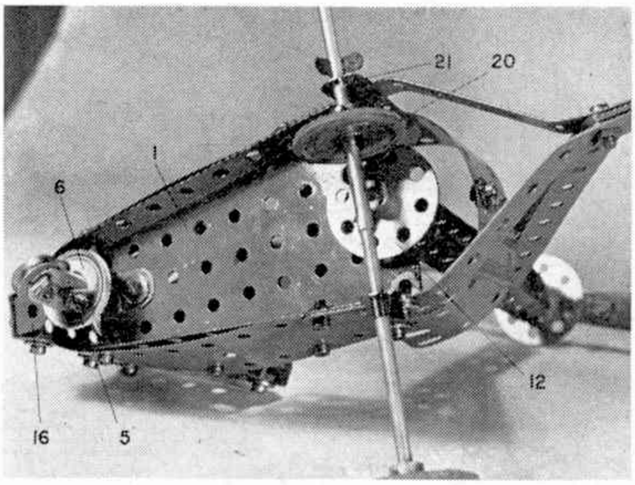
Now fixed to the wide end of Flanged Plate 1 are two Angle Brackets to each of which a $5\frac{1}{2}$ in. Strip 8 is bolted, each Strip 8 in turn being connected by another $5\frac{1}{2}$ in. Strip 9 to Strip 3, the lower securing Bolts helping to fix the fin in place. This fin consists of two $2\frac{1}{2} \times \frac{1}{2}$ in. Triangular Flexible Plates 10, arranged as shown and trapped between two $3\frac{1}{2}$ in. Strips 11. Strips 8 are joined at the top by a Double Bracket which, along with Flanged Plate 1, provides the bearing for a $6\frac{1}{2}$ in. Rod, on the lower end of which an 8-hole Bush Wheel 12 is mounted. Mounted on the upper end of the Rod is the rotor, built-up from an 8-hole Bush Wheel to which one $12\frac{1}{2}$ in. Strip 13 and two $5\frac{1}{2}$ in. Strips 14 are bolted, the ends of Strips 14 being connected to the ends of Strip 13 by Fishplates.

Returning to the body, Plates 2 and 4 at each side are joined, at the bottom, by a $\frac{1}{2} \times \frac{1}{2}$ in. Double Bracket with its lugs bent outwards slightly and, at the top, by two Obtuse Angle Brackets 15 formed into a compound double bracket. A $2\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip 16 is bolted to the Double Brackets, its lugs pointing rearwards, then two $2\frac{1}{2} \times 1\frac{1}{2}$ in. Triangular Flexible Plates 17 are bolted to the upper lug, also being attached to Plates 4 by Angle Brackets. A seat is provided by a $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flanged Plate 18 bolted between Flexible Plates 2, the securing Bolts also holding two curved 2½ × 1½ in. Plastic Plates 19 in place.

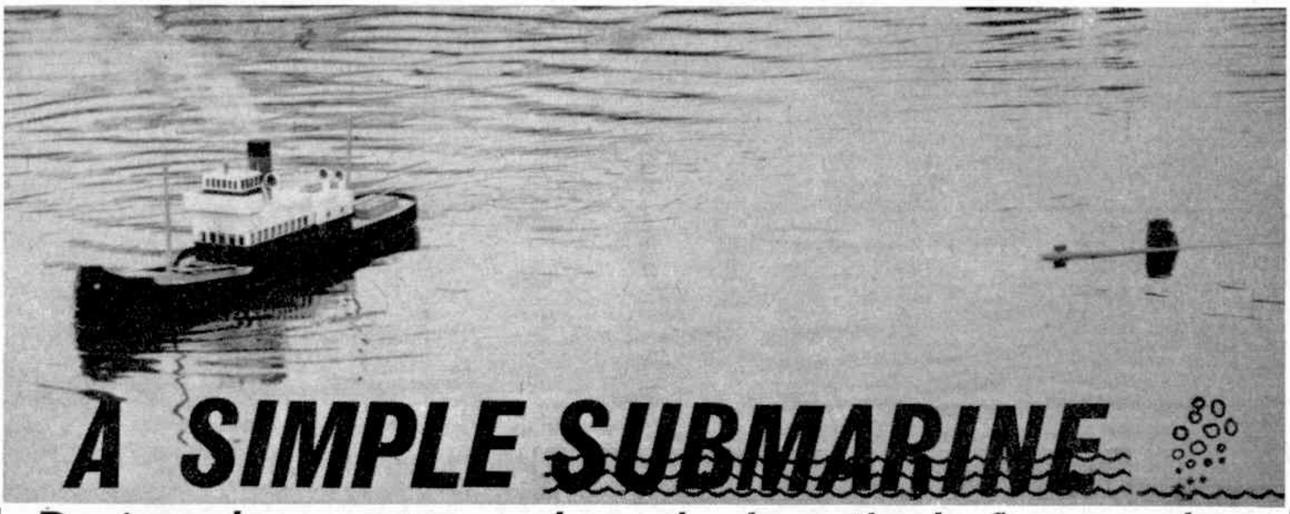
Last of all, the rear axle, supplied by two 3½ in. Rods joined by a Rod Connector, is fitted with a 1 in. fixed Pulley with Rubber Ring 20 and then journalled in Fishplates 21, bolted to Strips 3, where it is held in place by Spring Clips. Pulley with Rubber Ring 20 makes contact with Bush Wheels 12, thus providing a friction drive to the rotor when the model is pushed along on wheels provided by two 1 in. Pulleys 22, fitted with Motor Tyres and mounted on the ends of the rear axle.

PARTS REQUIRED

1—1	2—16	56—37a	2—142c
8—2	1—14	51—37b	1—155
2—3	1—17	14—38	2—188
1—5	4—22	1—48a	2—189
5—10	1—22a	1—51	2—194
2—11	1—23	1—54	1—213
5—12	2—24	3—111c	4—221
3—12a	6—35	1—125	



An underside view of the model showing the nosewheel and friction drive to the rotor. The nosewheel is controlled by a "joystick"-type steering handle.



A SIMPLE SUBMARINE

Designed, constructed and described for readers by Lieut. Comdr. A. Greenhalgh R.N., C.Eng., M.I.Mech.E., A.F.R.Ae.S.

THIS LITTLE model is ideal and exciting for the younger members of the Model Shipbuilding Fraternity; the cost to build it is small and the time required is short.

Make the hull from a piece of spruce or similar soft-wood to the dimensions and shape shown on the drawing. The conning tower and dome are made from the same sort of wood as the hull. Balsa wood is not really suitable because it soaks up water very easily, particularly if not properly proofed. Any absorption of water, no matter what wood is used, will seriously affect the trim, and eventually, as the weight increases, the boat will fail to surface.

After carving each component to shape, sandpaper it smooth. The conning tower and dome are now glued and nailed to the hull. It is advisable to drill holes through these items to accommodate the nails and so avoid splitting the wood. Make the conning tower plane from tinplate and cement in place.

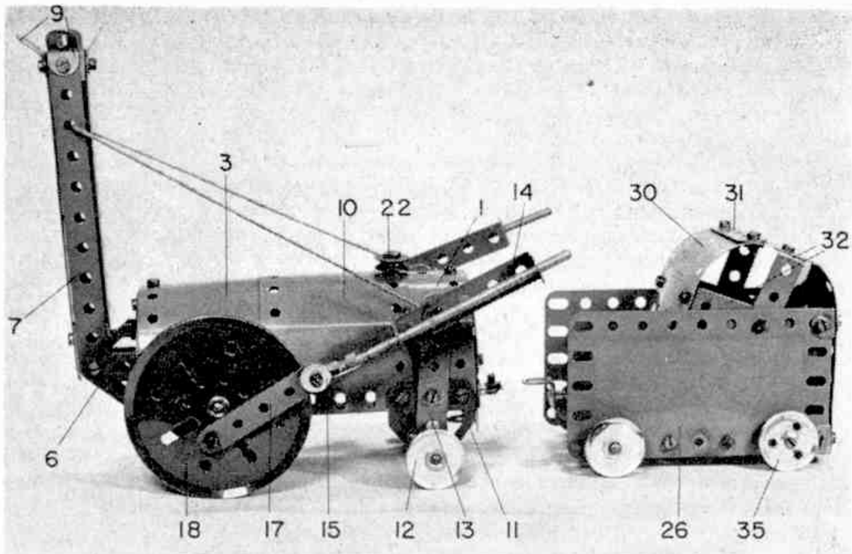
The next operation is to drill the hole for the spindle which carries the forward hydroplanes. This is drilled in from each side of the hull using a piece of 20 swg piano wire filed to a sharp point. The holes, of course, should meet at the centre.

The vessel can now be prepared for painting. Punch all nails to below the surface of the wood and fill the holes and any cracks with plastic wood or other suitable filler. When dry, remove the excess filler and rub the vessel down with fine sandpaper. A thin coat of under-coat paint should now be evenly applied. When thoroughly dry, apply a second coat and rub down again. Finish the model with a good quality enamel. The usual colour for a submarine is grey, but there are those who prefer them yellow!!

Let us now turn to the metalwork. The propeller and its bracket, hydroplanes and rudder, are made from the metal of a tin can. Cut a can up and flatten the metal obtained. Mark out the components using templates

ROCKET FOR FOUR

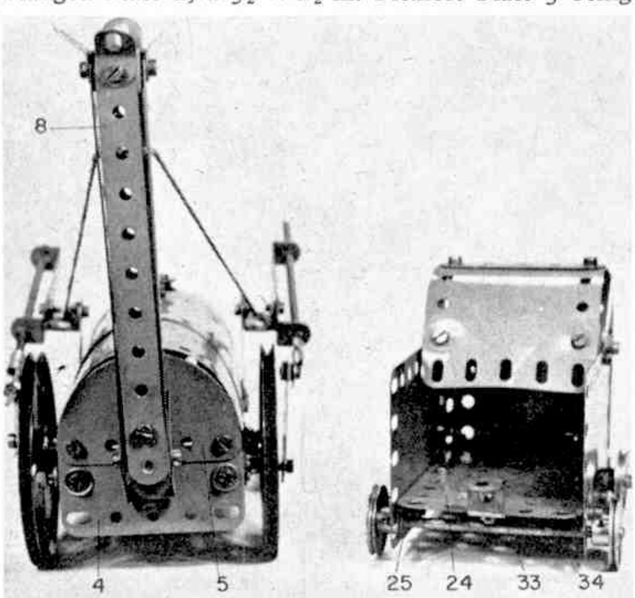
by Spanner



A simple, attractive model using a No. 4 Outfit

IN THESE days of manned space flight, I wouldn't mind betting that mention of the word " rocket " conjures up one picture only in the minds of most people—a long, sleek projectile standing ready on its launching pad, its tapered nose pointing skywards, eager to blast off to the stars. Mention the word " rocket " to a railway enthusiast, however, and his mind will conjure up an entirely different picture—a picture of the first Liverpool and Manchester railway locomotive, namely Stephenson's famous " Rocket."

Illustrated here is a simple Meccano model based on the " Rocket." Built with Outfit No. 4, it is produced in two sections, the main locomotive itself, and the tender, the front section of which also serves as the footplate for the loco. Dealing first with the loco, a $5\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate 1 is curved to shape and bolted to one end of the side flanges of a $5\frac{1}{2} \times 2\frac{1}{2}$ in. Flanged Plate 2, a $5\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate 3 being similarly positioned at the other end of the Flanged Plate. Two $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plates 4, each extended by a Semi-circular Plate 5, are bolted one to each end flange of Plate 2, the top of the Semi-circular Plate being attached to the respective Flexible Plate 1 or 3 by an Angle Bracket.



In this picture, the front of both the locomotive and tender are clearly shown. Note the use of the Semi-circular Plate at the front of the locomotive.

Now secured to front Semi-circular Plate 5 are two Trunnions 6, to the apex of each of which a $5\frac{1}{2}$ in. Strip 7 is bolted to form part of the chimney. The rest of the chimney is supplied by two further $5\frac{1}{2}$ in. Strips 8 attached at the top to Strips 7 by Angle Brackets, the securing Bolts also holding four Obtuse Angle Brackets 9 in place. The lower ends of Strips 8 are joined together by a $1 \times \frac{1}{2}$ in. Double Bracket.

The centre of the boiler can now be enclosed by a curved $5\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate 10 bolted to the side flanges of Plate 2, the rear securing Bolts helping to fix a Flat Trunnion 11 to each side flange. Held by 1 in. Pulleys with boss 12 in the apex holes of these Flat Trunnions is a $3\frac{1}{2}$ in. Rod acting as the rear axle.

Attached to the centre of each Flat Trunnion is a $2\frac{1}{2}$ in. Strip 13, projecting three holes upwards and angled backwards as far as the " play " in the holes will allow. Bolted to the top of this Strip in each case is a Double Bracket, also angled, and to the free lug of which a $2\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip 14 is fixed. Free to slide in the lugs of this Double Angle Strip is a 4 in. Rod, on the end of which, in one case, a Rod and Strip Connector 15 is mounted, while, in the other case, a right-angled Rod and Strip Connector 16 is used. Rod and Strip Connector 15 is lock-nutted to a $2\frac{1}{2}$ in. Strip 17, the other end of which is mounted loose on a $\frac{1}{2}$ in. Bolt held by Nuts in a 3 in. Pulley 18. A $\frac{1}{2}$ in. Bolt carrying another $2\frac{1}{2}$ in. Strip 19 is held in a similar 3 in. Pulley 20, both the 3 in. Pulleys being mounted on a $3\frac{1}{2}$ in. Rod, journalled in the side flanges of Plate 2 to serve as the front axle. The $2\frac{1}{2}$ in. Strip is lock-nutted to a Fishplate 21 bolted to right-angled Rod and Strip Connector 16.

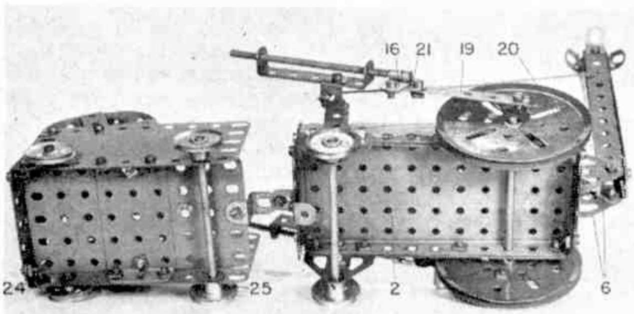
To complete the locomotive, a $\frac{1}{2}$ in. Pulley 22 is fixed on a $\frac{1}{2}$ in. Bolt secured as shown to the top of the boiler. A coupling point for the tender is supplied by an ordinary Bolt fixed, with its shank pointing upwards, to the horizontal lug of a Reversed Angle Bracket 23, bolted to the lower edge of rear Plate 4. Finally, a length of Cord is tied to the Double Bracket bolted to one Strip 13 and is threaded through the third holes from the top of the chimney to be tied to the Double Bracket bolted to remaining Strip 13.

PARTS REQUIRED

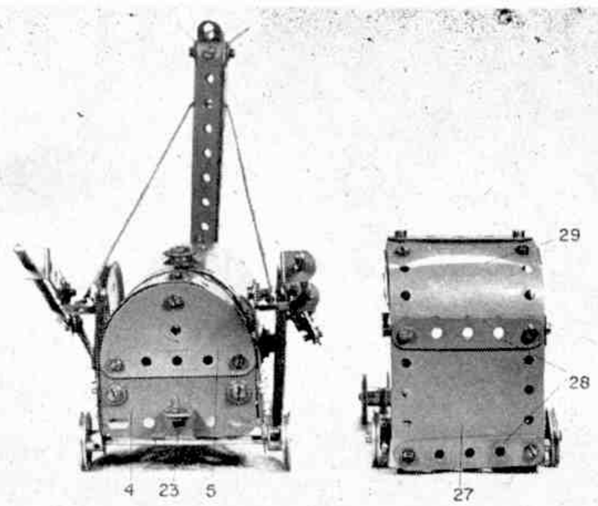
4—2	3—16	1—51	1—189
2—3	2—19b	1—52	1—190
7—5	4—22	1—53a	2—191
1—10	2—22a	5—111a	2—192
2—11	1—23	2—125	2—194a
1—11a	82—37a	2—126	1—212
10—12	66—37b	2—126a	1—212a
4—12c	13—38	2—188	2—214
2—15b	6—48a		

Tender

Coming to the tender, this is really very basic in design, a base being built up from a $4\frac{1}{2} \times 2\frac{1}{2}$ in. Flat Plate 24 bolted to a $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flanged Plate, each flange of which is extended by a $3\frac{1}{2}$ in. Strip 25, the securing Bolts also fixing a $4\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate 26 in place. Plates 26 at each side are connected at the rear by a $2\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate 27, secured by Angle Brackets and overlayed along the upper and lower edges by $2\frac{1}{2}$ in. Strips 28 at the same time extending the Plate upwards with a $2\frac{1}{2} \times 2\frac{1}{2}$ in. Plastic Plate 29. This Plate is, in turn, extended by another $2\frac{1}{2} \times 2\frac{1}{2}$ in. Plastic Plate 30, the join overlayed by a $2\frac{1}{2}$ in. Strip 31, then the Plastic Plates are curved over and fixed to Flexible Plates 26, as shown, by two crossed $2\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strips 32 in each case. A coupling is supplied by a $\frac{1}{2}$ in. Reversed Angle Bracket 33 bolted to Flat Plate 24, then, last of all, the wheels are added, those at the front consisting of two 1 in. Pulleys with boss mounted on a $3\frac{1}{2}$ in. Rod 34 journalled in the end holes of Strips 25. The rear wheels, on the other hand, are 1 in. Pulleys without boss 35, loose on $\frac{1}{2}$ in. Bolts held by Nuts in the other end holes of Strips 25.



An underside view of the model showing construction of the bases of the locomotive and tender. Couplings are supplied by Reversed Angle Brackets.



This picture shows the rear of both the locomotive and tender. You will see that a Semi-circular Plate is again used to effectively block off the back of the locomotive.

SEA CITY *continued from page 287*

boating enthusiasts, the foundations would exist for building up a good export trade, possibly concentrating on fibreglass construction to eliminate the need for large timber storage areas within the city.

The shallow water around the city would facilitate the dredging of sand and gravel, basic building materials for which a profitable market is assured.

It is envisaged that Sea City would have a College of Marine Research, the first stage of a Marine University. It would have ideal facilities with direct access to the sea, underwater laboratories, research vessels and trial grounds. Visitors to the city would be able to enjoy the observation of sea life by strolling along inside glass 'tubes' laid on the sea bed. Another attraction would be a Marine Zoo.

The city would be built mainly of glass and reinforced concrete. Much of the glass would have special heat and light transmission and insulation properties to reduce glare and overheating. In a multitude of colours and tints, the vast expanses of glass would greatly enhance the city's appearance and by night Sea City would become as a sparkling jewel.

The terraced wall provides the majority of the accommodation, housing 21,000 people in flats and maisonettes of one to seven rooms in size, almost all having private terrace gardens. Other residents would have individually designed houses on the pontoon islands. Incidentally, the width and angle of all windows is designed to ensure that every resident can enjoy at least $2\frac{1}{2}$ hours of winter sunshine a day.

Commuting between Sea City and the mainland would be by hovercraft, supplemented by a helicopter service.

The planers are confident that Sea City would very soon assume an added importance by becoming a popular holiday resort—not only during the summer months but also during the winter when the city's artificially mild climate and freedom from icy winds would be greatly appreciated by chilly mainlanders.

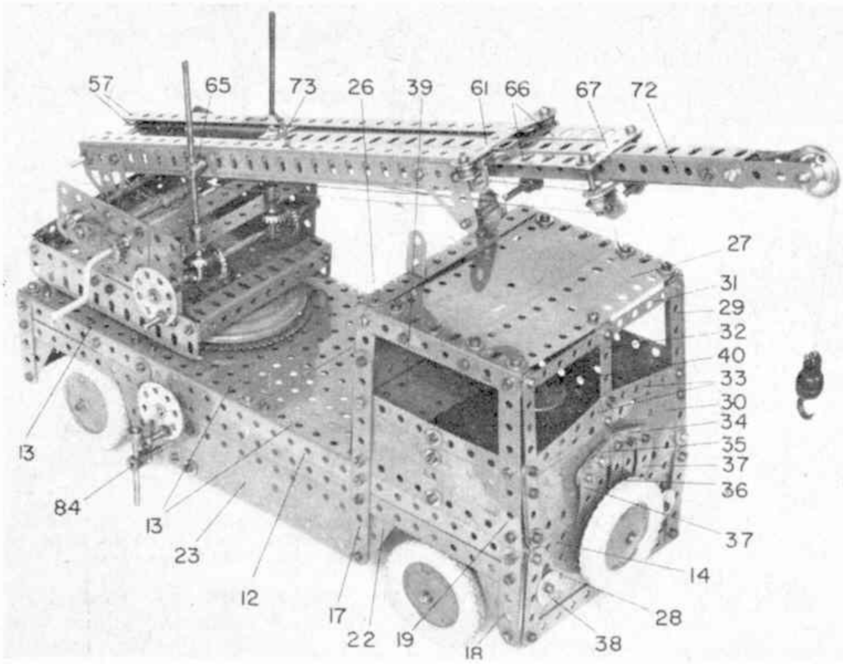
Although it has been hinted that it may be fifty years before sea cities become realistic, there is a possibility the first sea-based community will be established long before then. Indeed, at this moment, a far-sighted plan reminiscent of the Pilkington Sea City project, is being considered for the future development of Toronto.

Early industrial developments are hampering modern plans for the city's downtown area and a revolutionary scheme has been researched for extending the downtown area onto a massive pontoon and raft foundation and creating a floating city on the adjacent waters of Lake Ontario. Although not an open sea project, the basic idea is the same—conserve land by building on water.

People must be housed, but the world dare not sacrifice vast areas of vital agricultural land on which to house them. Sooner or later sea cities will offer the last and only solution to lack of living space.

A PLANT HIRE CRANE

described by Spanner



A mobile crane with a difference is this advanced model based on a Coles Hydra Telescopic Truck Crane as manufactured by Coles Cranes Ltd. of Sunderland.

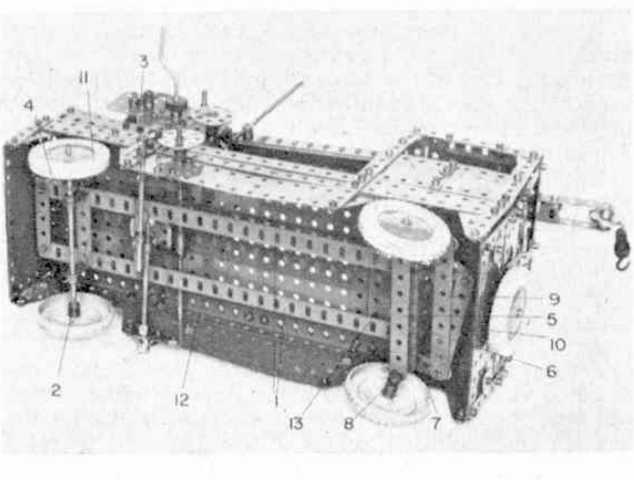
VARIOUS kinds of mobile cranes are in use today, but there is one particular type which is becoming increasingly popular with hire companies, namely the telescopic-jib variety. As the name suggests, these cranes have a jib split into several sections, one section fitting inside the next and designed to be extended or retracted just like a telescope. The Meccano model featured in this article is roughly based on just such a crane, the 12-ton Coles Hydra Telescopic Truck Crane manufactured by Coles Cranes Ltd. of Sunderland. On the model, the hydraulic actions of the original are reproduced by screw jacks and Cord.

Chassis

Beginning construction with the chassis, two 12½ in. Angle Girders 1 are connected at one end by a 2½ in. Strip, through their fourth holes by a 2½ × 1 in. Double Angle Strip 2 and through their eighth holes by another 2½ in. Strip 3. The Bolts securing the end 2½ in. Strip also hold two 1½ × ½ in. Double Angle Strips 4 in place. At their other ends, Girders 1 are joined by a 4½ in. "U"-section girder 5, built up from two 4½ in. Angle Girders, the open end of the "U" pointing forward. The upper arm of the "U" is overlayed by a 4½ in. Strip, while the Bolts securing the girder to Girders 1 again hold two 1½ × ½ in. Double Angle Strips 6 in place.

Journalled in the end holes of "U"-section girder 5 are two 1½ in. Rods, each held in place by a Crank 7 above the girder and by a Collar 8 beneath it, the Collar being spaced from the girder by two Washers. Lock-nutted between the arms of Cranks 7 is a 4½ in. Strip 9, a 3½ in. Strip 10 also being lock-nutted to the left-hand Crank. A Double Arm Crank which, in due course, will take the steering column, is lock-nutted to the end of Strip 10, then a ¾ in. Bolt, on which a free-running 2½ in. Road Wheel is mounted, is screwed tightly into one tapped bore of each Collar 8. Two similar Road Wheels 11 are mounted on the rear axle, supplied by a 6½ in. Rod held by Collars in the lugs of Double Angle Strip 2.

An underside view of the model showing the layout of the chassis and steering gear.



Body and Cab

Coming now to the body, a framework is first built up from two 15 in. compound girders 12 connected by four 5½ × 3½ in. Flat Plates 13 and joined at each end by a 5½ in. Angle Girder 14. Girders 12 each consist of a 12½ in. Angle Girder extended five holes by a 5½ in. Angle Girder. Bolted to rear Angle Girder 14 to form the back of the body is a 5½ × 2½ in. Flexible Plate edged along the sides by 2½ in. Strips and along the bottom by a 5½ in. Strip. Attached to the back by Angle Brackets are two 2½ × 1½ in. Triangular Flexible Plates, one at each side, each overlayed by a 2½ in. Strip 15 bolted, along with the Triangular Plate, to compound girder 12.

Also bolted to compound girder 12 in the positions shown are another 2½ in. Strip 16, a 5½ in. Strip 17 and a further 2½ in. Strip 18, the last extended upwards by a 4½ in. Strip 19, angled rearwards. Secured to Strips 15, 16, 17 and 18 is a 15 in. compound strip 20, built up from a 12½ in. and a 4½ in. Strip, the Bolt securing it to Strip 18 also fixing another 2½ × 1½ in. Triangular Flexible Plate in position, while similar

Triangular Flexible Plates 21 and 22 are held by the Bolts fixing Strips 16 and 17 to the compound strip. The lower ends of Strips 16 and 17 are joined by a $7 \times 1\frac{1}{2}$ in. compound flexible plate 23, obtained from one $5\frac{1}{2} \times 1\frac{1}{2}$ in. and one $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate overlapped two holes.

Strip 17 is now extended two holes upwards by a $3\frac{1}{2}$ in. Angle Girder 24, the top of which is joined to the top of Strip 19 by two 3 in. Angle Girders 25, overlapped four holes. Girders 24 at each side are themselves joined by a $5\frac{1}{2}$ in. Angle Girder 26, the securing Bolts at the same time helping to fix the back of the cab in position, the back being supplied by two $5\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plates overlapped two holes. A $2\frac{1}{2} \times 1$ in. Double Angle Strip is bolted to the top flange of Girder 26, while the cab roof is represented by one $5\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate and one $5\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate 27 bolted between Angle Girders 25.

In the case of the cab front, a $5\frac{1}{2} \times 2\frac{1}{2}$ in. Flat Plate 28, overlayed along its side edges by $2\frac{1}{2}$ in. Strips and along its lower edge by a $5\frac{1}{2}$ in. Strip, is bolted to the back of the vertical flange of front Angle Girder 14. The $2\frac{1}{2}$ in. Strips are extended upwards by $4\frac{1}{2}$ in. Narrow Strips 29 which are in turn connected by a $5\frac{1}{2} \times 2$ in. compound flexible plate 30, obtained from two $5\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plates, and by a $5\frac{1}{2}$ in. Narrow Strip 31, the securing Bolts in the latter case also fixing the cab front to Strips 19 by means of Angle Brackets. The centre of plate 30 is connected to Narrow Strip 31 by a $2\frac{1}{2}$ in. Narrow Strip 32, the upper securing Bolt again holding in place an Angle Bracket which is also bolted to Plate 27. A further two $2\frac{1}{2}$ in. Narrow Strips 33 are bolted between Narrow Strips 29 and Narrow Strip 32.

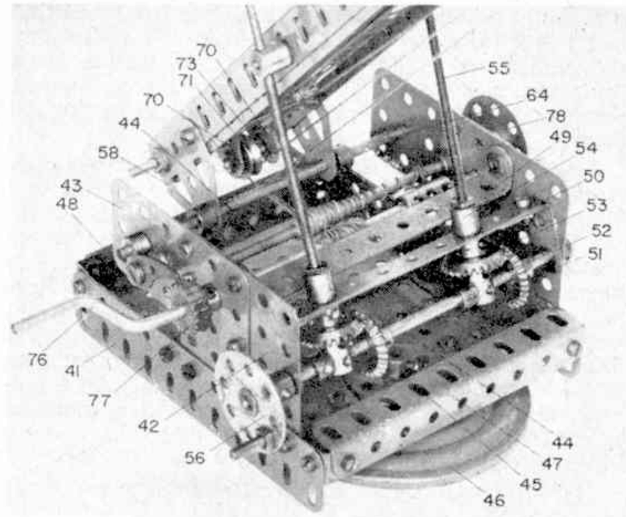
The radiator-grille is built up from three $1\frac{1}{2}$ in. Strips 34, one behind the other and interlocking with three similar Strips 35, all bolted to the front of the cab along with a $2\frac{1}{2}$ in. Narrow Strip 36. Another two $2\frac{1}{2}$ in. Narrow Strips are bolted one each to the centre of Strips 34 and 35 while two 2 in. Strips 37 are secured to the end of the Strips. A $2\frac{1}{2}$ in. Road Wheel, representing the spare wheel, is bolted to Flat Plate 28 immediately below the radiator grille, while two $\frac{3}{4}$ in. Washers 38 are added to the same Plate to serve as headlamps. Strips 18 are attached to the cab front by Angle Brackets.

Inside the cab, a seat is provided by a $5\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate 39 attached to Girders 24 by $1 \times \frac{1}{2}$ in. Angle Brackets. Also, a Double Bent Strip is bolted to the top of front Flat Plate 13, this later acting as one of the bearings for the steering column.

Now tightly fixed to the tops of the third and fourth Flat Plates 13 (counting from the front) is a Ball Thrust Race Toothed Disc, after which the body can be secured to the chassis by bolting the free lugs of Double Angle Strips 4 and 6 to respective Flat Plates 13. A $3\frac{1}{2}$ in. Rod representing the steering column, is then journalled in the above-mentioned Double Bent Strip and the Flat Plate to which it is bolted, being fixed in the boss of the Double Arm Crank lock-nutted to Strip 10. Mounted on the upper end of the Rod is an 8-hole Bush Wheel 40, serving as the steering wheel.

Crane Section

Although not especially difficult, the most complicated part of the model is the actual crane section. This is built up on a swivelling base, each side of which consists of two $2\frac{1}{2}$ in. Angle Girders butt-jointed together by a $5\frac{1}{2}$ in. Flat Girder 41 projecting forward one hole, the Bolts fixing it to the front Angle Girder also holding a $2\frac{1}{2} \times 2\frac{1}{2}$ in. Flat Plate 42 in position. This Plate is, in turn, extended three holes rearward by a $3 \times 1\frac{1}{2}$ in.

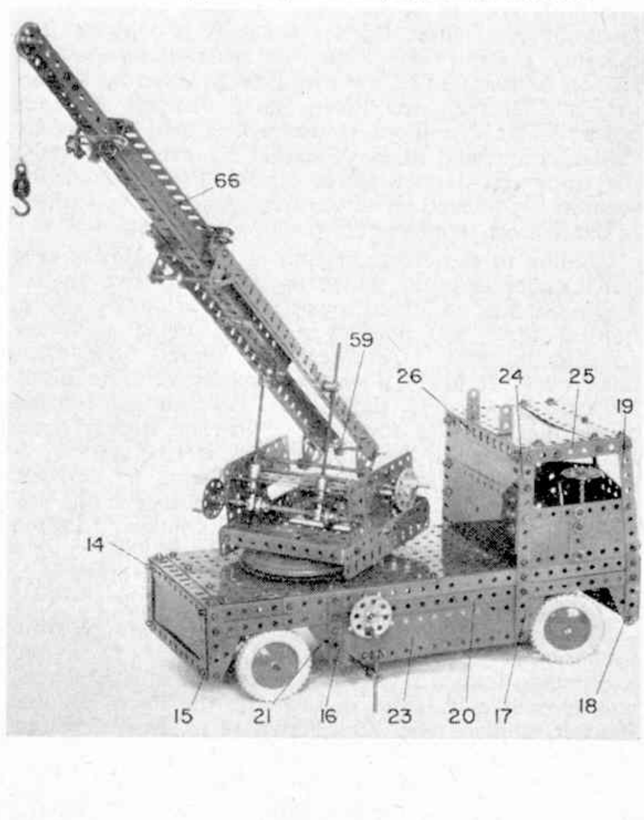


In this close-up view of the crane section base, removed from the model, the construction of the jib-raising gear is clearly shown. Note that the hydraulic rams of the original are replaced by screw jacks on the model.

Flat Plate 43, whereas the lower flanges of the Angle Girders at each side are connected by two $4\frac{1}{2} \times 2\frac{1}{2}$ in. Flat Plates 44. Bolted to the top of the foremost of these Flat Plates is an 8-hole Bush Wheel 45, the securing Bolts helping to fix a Ball Thrust Race Flanged Disc 46 to the underside of the Plate. The projecting ends of Flat Girders 41 are joined by a $4\frac{1}{2}$ in. Angle Girder 47, secured by Angle Brackets, while, at the rear, they are joined by a $4\frac{1}{2}$ in. Flat Girder 48, also secured by Angle Brackets.

Flat Plates 42 are now joined through their top centre holes by a $4\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip 49, spaced from each Plate by a Washer. A $4\frac{1}{2} \times 1$ in.

A general view of the model showing the crane section out of the travelling position, with the jib partially extended.



compound double angle strip 50 is then produced from two 1 × 1 in. Angle Brackets bolted to a 4½ in. Strip and is mounted on a 5½ in. Rod held by Collars in the front centre holes of Flat Plates 42. Note that the compound double angle strip is *not* bolted to the Flat Plates.

Also mounted on the 5½ in. Rod are two similar arrangements, each consisting of a ⅞ in. Bevel Gear 51, a Short Coupling 52 and a Collar. The Bevel and Collar are fixed on the Rod, but the Short Coupling must be perfectly free. In mesh with the Bevel is another ⅞ in. Bevel Gear 53, fixed on an Adaptor for Screwed Rods 54, journalled in double angle strip 50 and in the longitudinal bore of Short Coupling 52. Held in the Adaptor is a 4½ in. Screwed Rod 55 which will later act as one of the rams for raising the crane jib. An 8-hole Bush Wheel 56, fitted with a Threaded Pin, is mounted on the end of the 5½ in. Rod in Flat Plates 42, to serve as a handwheel.

The jib, itself, consists of three separate sections, one fitting inside the other. In the case of the lower and largest of these sections, two arms are each built up from two 12½ in. Angle Girders 57, placed one over the other and bolted together through their elongated holes in such a way that their horizontal flanges are separated by a space of about ⅛ in. At their lower ends Girders 57 at each side are connected together by a 3 in. Screwed Rod held in place by Nuts, the Nuts helping to hold two Flat Trunnions 58 in place as shown. Free on the Screwed Rod is a ½ in. Pulley without boss 59.

Fixed through the upper end holes of Girders 57 at each side are a Reversed Angle Bracket 60, on the inside of the Girders, and an Angle Bracket on the outside of the Girders. The Angle Brackets at each side are joined by a 2½ in. Strip 61 spaced from the Brackets by five Washers on each securing ⅜ in. Bolt. Reversed Angle Brackets 60 on the other hand, remain undisturbed, as their inside lugs will later serve as guides for the centre section of the jib. Still on the lower jib section, however, two 1½ in. Corner Brackets 62 are bolted through the second and fourth holes from the upper ends of Girders 57. Held by Collars in the lower holes of these Corner Brackets is a 2½ in. Rod carrying a ½ in. loose Pulley 63, then the completed section is mounted on a 5½ in. Rod 64, held by Collars in Flat Plates 43, the Rod passing through the apex holes of Flat Trunnions 58 where it is held in place by Collars. Screwed Rods 55 should be screwed through the transverse tapped bores of two Rod Sockets 65, secured one to each set of Girders 57, so that movement of handwheel 56 affects the position of the jib.

Coming to the centre section of the jib, this is very much easier to build, consisting simply of two 12½ in. Angle Girders 66 joined together at one end by a 2 in. Slotted Strip 67, two 1⅛ in. Bolts being used for securing purposes. Another 2 in. Slotted Strip 68 is fixed by Nuts lower down the shanks of these Bolts, beneath the Girders, then Angle Brackets are secured to the Bolts further down still. The free lugs of these Brackets are joined by another 1⅛ in. Bolt which carries a ½ in. loose Pulley 69. Slotted Strips 67 and 68, together with the vertical flanges of Girders 66, will later serve as guides for the upper jib section. Bolted to the lower ends of Girders 66 are two 1 in. Corner Brackets 70, the lower corners of which are joined by a ¾ in. Bolt carrying a ½ in. loose Pulley 71.

The upper section of the jib is now produced from yet another two 12½ in. Angle Girders 72 joined together to form a box girder by two Double Brackets, one at each end. The Bolts fixing the lower Double Bracket in place also secure two 1½ in. Strips 73 one above and one below the box girder to act as guides, while the Bolts fixing the upper Double Bracket in place help to secure two 2½ in. Strips 74 to the sides of the girder to extend it a distance of three holes. A free-running 1 in. Pulley without boss 75 is held by Collars on a 1 in. Rod journalled in the end holes of Strips 75.

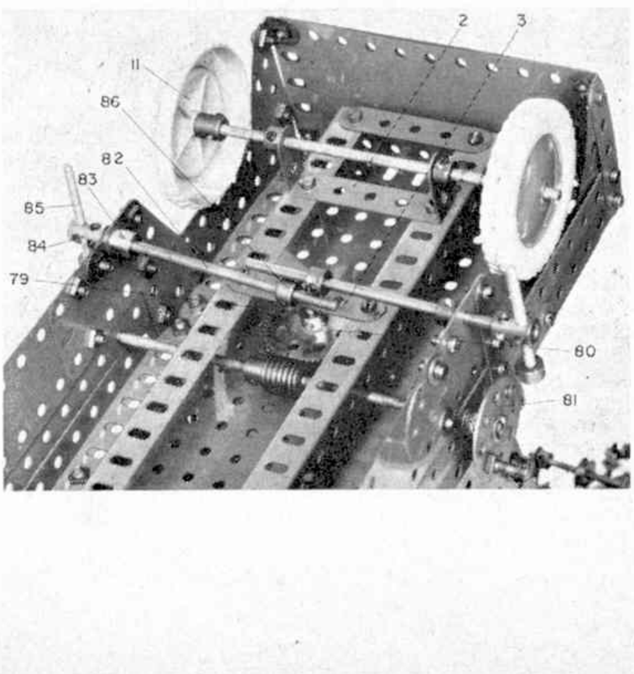
At this stage the three jib sections can be slotted inside each other, temporarily removing the parts that would otherwise prevent this being done, then the operating cords should be fitted. First, a 5 in. Crank Handle 76 carrying a Ratchet Wheel 77 and extended, via a Coupling, by a 1½ in. Rod, is journalled in Flat Plates 42 where it is held in place by a Collar. A good length of Cord is then tied to an Anchoring Spring on the Crank Handle, is taken round Rod 64, brought up and round Pulley 63, taken back and around Pulley 69 and is finally tied to the lower end of the box girder formed by Angle Girders 72. A Pawl mounted on a Pivot Bolt held in appropriate Flat Place 43 engages with Ratchet Wheel 77 to prevent the jib closing up under its own weight when Crank Handle 76 is released. However, when the Pawl is disengaged and the Crank Handle turned in the reverse direction, the weight of the jib should cause it to close up.

In the case of the load hook, a length of Cord is simply tied to a Hook, passed over Pulley 76, taken down the centre of the jib and round the Screwed Rod joining Girders 57, to be secured to a 5½ in. Rod held by Collars in Flat Plates 43, An 8-hole Bush Wheel 78, fitted with a Threaded Pin, is fixed on the end of the Rod to serve as the handwheel.

Next, the finished crane section can be mounted on the body, being held by a 3 in. Rod 79 fixed in the boss of Bush Wheel 45 and projecting through the Ball Race (to which a Ball Cage must of course be added), as well as appropriate Flat Plate 13 and 2½ in. Strip 3. It is secured by a Collar beneath this Strip, while, above the Strip, is fixed a 57-teeth Gear Wheel 80 which meshes with a Worm on a 6½ in. Rod journalled in compound strips 20 and held in place by a Collar and an 8-hole Bush Wheel 81. This Bush Wheel is spaced from Strip 20 by three Washers and is also fitted with a Threaded Pin so as to serve as the handwheel controlling the slewing movement of the crane.

Last of all, two pull-out stabilising rams are each produced from a 4 in. Keyway Rod 82 mounted in the boss of a Double Arm Crank 83 bolted to the inside

The mechanism controlling the slewing movement of the crane is clearly shown in this detail shot of the rear underside of the model.



lower edges of compound flexible plate 23. Fixed on the end of the Rod is a Short Coupling 84, through the end transverse tapped bore of which a 2 in. Screwed Rod 85, carrying a Collar on its upper end, is screwed. The Keyway Rod is prevented from turning in the boss of Crank 83 by a Key Bolt screwed into the upper tapped bore of the boss and reached, when the ram is to be extended, by a screwdriver inserted through a hole in appropriate Flat Plate 13. A Collar 86 fixed to the Rod acts as a stop to prevent the Rod being pulled completely out of its mounting. When operating the crane, by the way, it is important to remember that the stabilising rams must be pulled out and Rods 85 screwed down to the ground otherwise the model is in danger of tipping over when the jib of the crane is swung out to the side.

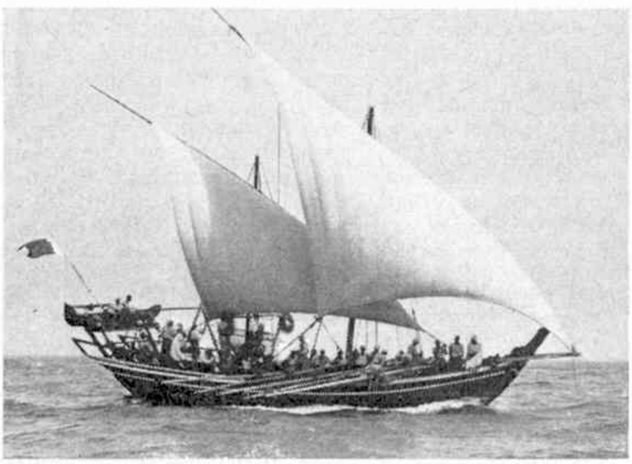
PARTS REQUIRED

2—1	3—15	2—55a	2—126a
5—2	3—16a	1—57c	2—133
7—2a	2—18a	26—59	2—133a
1—3	2—18b	2—62	1—147
1—4	1—19h	3—62b	1—148
13—5	1—22a	4—63d	1—168
2—6	4—23	2—64	2—173a
8—6a	5—24	2—72	1—176
10—8	4—30	2—73	5—187
3—9	220—37a	2—80b	11—188
5—9a	185—37b	1—80c	5—189
2—9b	80—33	2—81	5—192
4—9c	2—38d	2—103	8—221
4—9d	1—45	1—103c	2—230
2—11	2—46	4—111	2—231
16—12	4—48	8—111c	4—235
2—12a	1—48c	3—111d	2—235a
2—12b	4—52a	1—115	2—235d
2—14	2—53a	2—125	1—235f

DEVON'S MUSEUM OF SAILING CRAFT

by ARTHUR GAUNT

DEVONSHIRE, FOREVER associated with Drake and other Sea Dogs, is today building-up a fascinating collection of sailing ships from various parts of the world. The International Sailing Craft Association, as the supporters of the project have named it, has been founded because the age of sail marked an important stage in the evolution of man, and concerns



A pearling dhow, one of the two presented to the Exeter collection of sailing craft.

an aspect of human history equivalent to the development of steam power and great engineering feats.

You will find this maritime museum at Exeter, where about twenty sailing ships and man-propelled working craft are already being preserved, mostly in working condition.

Until recently the creation and maintenance of such a museum of full-sized working craft would hardly have been possible. A suitable site would have been hard to obtain, most small ports in Britain being in regular use and unavailable for an enterprise of this sort. The problem was heightened by the difference of preserving wood, iron, canvas, and rope.

Science, and the shrinking of coastwise trade, have now largely taken care of these snags. Exeter, geographically an ideal sport for a museum of sailing ships, is no longer economic as a port. Again, with television in nearly every household, and with the gradually increasing amount of leisure time, the scheme can be brought to the notice of a vast number of people with opportunities to make use of it.

Scientific progress has enabled the problem of preservation also to be solved. Synthetic materials, plastic paints, and effective fungicides and insecticides can nowadays help to save or replace many things that would otherwise soon perish.

Exeter City Council have co-operated in establishing the new museum by granting a site in the Quay area. Here the large craft can be kept afloat along the west bank of the River Exe and in the basin nearby. The smaller vessels can be housed in cellars to the west of it, and can be moved to the Quay whenever the weather allows.

The arrangements for the smallest and most fragile craft are to keep them in two warehouses on the east bank.

Among the variety of vessels so far acquired is the ceremonial barge *Venita*, built about the year 1900 for the Duke of Westminster. Another noteworthy acquisition is the steam tug *St. Canute*. She was built in Denmark in 1931 to serve as a firefighter and ice-breaker. Her displacement is 130 tons, and she has a triple expansion coal-fired engine.

But oar-propelled coats are being collected too. These include two Irish currachs—an eight-oared four-man one measuring 26 ft. and a four-oared two-man example measuring 16 ft. The International Sailing Craft Association also possess a lifeboat built in 1886. Trolley-launched, this life-saving craft was oar-propelled for more than 40 years, and was equipped with an engine only shortly before being withdrawn from rescue operations in the 1930's.

A 25 ft. double gun punt, with all its equipment (such as a breach-loading gun), is also being preserved, and there are two coracles representing Britain's most primitive type of craft still in use.

Unusual interest attaches to a 120-ton two-masted dhow giving by the Kuwait Government. She was to have sailed to Britain last year but the closure of the Suez Canal prevented this, and the donors agreed to hold her until the Canal opened again.

The preservation association, however, has been provided with a second dhow. A 52 ft. one has been specially built for the Devon museum by the Ruler of Bahrain.

AMONG THE MODEL BUILDERS

with Spanner

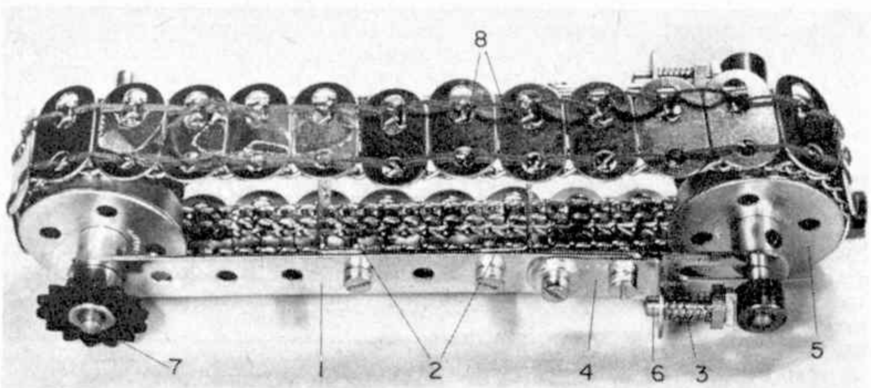
TO DO WITH CRAWLER TRACKS

IT HAS never been claimed by Meccano Limited that the Meccano Parts range is 100 per cent complete, but even if the company thought this was so, the idea would soon be dispelled by the number of suggestions for new parts sent in by modellers.

Meccano do receive a lot of ideas for new parts, many of which, on the surface, would make useful additions to the range. When talking about proposed new parts, however, several things must be taken into account, the most important of which are the tooling and production costs of the parts in relation to their potential sales. It must be remembered that all Meccano parts are mass-produced on automated machines which are extremely costly to prepare for a production run. The sales of the parts produced must cover the costs involved, otherwise the resulting loss would not only make the particular parts, themselves, unacceptable from a manufacturing point of view, but would also weaken the range as a whole. This reason alone puts paid to most of the suggestions received, as the majority are either for too complex a part or for a specialised part with very limited appeal—or both ! It's unfortunate, but sadly true.

This, of course, does not alter the fact that such parts do have a definite use, but one of the joys of the Meccano system is that, in most cases, existing standard parts can be built up into constructions which perform the work of the proposed parts, perhaps not as well as would a specially-produced item but usually well enough. A good example of the type of thing I have in mind is a Crawler Track which is something required for a lot of Meccano models. Meccano do not as yet manufacture one and so the only way of obtaining a working example is to build one up from standard parts. Three such examples are described here, the first two being relatively simple ideas taken from past issues of Meccano Magazine and the third being a more-complicated unit designed and built by Pat Lewis of Formby, Lancs.

Example No. 1, taken from the October 1956 M.M., really needs very little description as it consists of nothing more than a series of 2½ in. Flat Girders joined together by Cords. The arrangement of the Cords, though, is interesting. Two lengths are required for each side of the track, one length being formed into a series of loops which are pushed through a row of holes in the Flat Girders. The second length of Cord is then threaded through these loops, after which the two Cords are pulled tight and their ends tied together.

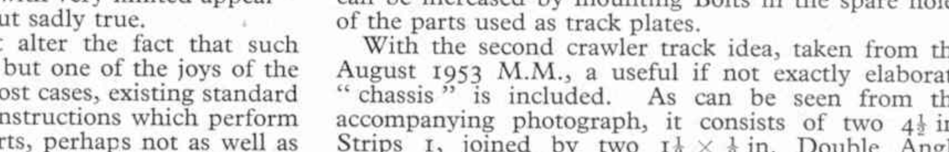


A simple, but effective Crawler Track Unit re-built from the August 1953 issue of Meccano Magazine. Note the built-in tensioning device.

The track illustrated uses 2½ in. Flat Girders, but these particular parts are not essential. Smaller Flat Girders could be used, for instance, or Perforated Strips—2½ in. or 1½ in.—perhaps even Fishplates ! The " chassis " on which the track is mounted would depend on the model being built, but the track, itself, lends itself ideally to friction drive, supplied by a Pulley (or Pulleys) fitted with a Motor Tyre. Grip can be increased by mounting Bolts in the spare holes of the parts used as track plates.

With the second crawler track idea, taken from the August 1953 M.M., a useful if not exactly elaborate " chassis " is included. As can be seen from the accompanying photograph, it consists of two 4½ in. Strips 1, joined by two 1½ × ½ in. Double Angle Strips 2. Each Strip is extended by a 2 in. Slotted Strip 3, slotted hole outwards, the securing Bolts also holding a 1 × ½ in. Angle Bracket 4 in place. Journalled in the slotted holes of Strips 3 is a 2½ in. Rod, carrying two 1⅛ in. Flanged Wheels 5 and held in place by Collars, in one threaded bore of which a Threaded Pin 6 is tightly fixed by a Nut so that it does not foul the 2½ in. Rod. Tension Springs are slipped on to the shanks of these Threaded Pins, which are then engaged

A sketch showing the arrangement of the Cords used in the first Crawler Track idea described above.



in the holes in the short lugs of Angle Brackets 4. Another $2\frac{1}{2}$ in. Rod, also carrying two $1\frac{1}{8}$ in. Flanged Wheels, is held by a Collar and a 1 in. Sprocket Wheel 7 in the end holes of Strips 1. The drive would be taken to Sprocket Wheel 7.

The track itself is, if anything, even easier in design than the track in our first unit. It consists simply of a number of Fishplates 8, attached by Cord to two identical lengths of Sprocket Chain. Each length of Cord is passed through a hole in a Fishplate, is threaded round one of the links in the appropriate Chain and is brought back through the same hole in the Fishplate. It is then taken on to the next Fishplate where the procedure is repeated, and so on until the required length of track has been built up. Once completed, the track is passed round the $1\frac{1}{8}$ in. Flanged Wheels and its ends joined. The action of the Springs on Threaded Pins 6 hold the track in tension provided the track is made just short enough to partially compress the Springs.

To move on, now, to Mr. Lewis's more complicated unit, this also includes an interesting "chassis", each member of which consists of two $5\frac{1}{2}$ in. Strips 1, placed one on top of the other for strength, extended at each end by two 2 in. Slotted Strips 2, these also placed one on top of the other with their slotted holes inwards. Two 1 in. Triangular Plates 3 are bolted to each chassis member in the positions shown, the members then being connected by two $1\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strips 4.

Journalled in the end holes of one set of Strips 2 is a 2 in. Rod, held in place by two $1\frac{1}{2}$ in. Pulleys 5, fitted with Motor Tyres. Also mounted on the Rod, between the Pulleys, is a Large Fork Piece, the Rod passing through the holes in the lugs of the Fork Piece. Another Large Fork Piece, flanked by a further two $1\frac{1}{2}$ in. Pulleys 6, is similarly mounted on a $2\frac{1}{2}$ in. Rod, journalled in the end holes of remaining Strips 2. Fixed on the Rod, outside the chassis members, is a $1\frac{1}{2}$ in. Sprocket Wheel 7, to which the drive would be taken.

The Large Fork Pieces at each end of the chassis are next connected by a 7 in. compound rod, obtained from two $3\frac{1}{2}$ in. Rods joined by a Coupling 8, the compound rod being tightly fixed in the bosses of the Fork Pieces. Idler wheels are then supplied by four 1 in. Pulleys 9, fitted with Rubber Rings, fixed in pairs on two 2 in. Rods, journalled in Triangular Plates 3.

Last comes the track proper, this being produced from $1\frac{1}{2}$ in. Strips 10, lock-nutted together through their end holes to leave their centre holes free. Fixed to each Strip through this centre hole are two Angle Brackets 11 which together form one track plate. The completed track, of course, runs on Pulleys 5 and 6 which should be sufficiently far apart to enable the lock-nutted Bolts joining Strips 10 to pass between them. Track tension can be adjusted by means of the slotted holes in Strips 2. Please note, by the way, that the Parts List for this and the preceding mechanism apply only to the units as illustrated. They would of course vary if the size of the track were altered.

The Meccanoman's Club

Before closing this month, I would like to mention an organisation which will be of interest to many readers of Meccano Magazine—The Meccanoman's Club.

Actually, the Meccanoman's Club is not a "club" in the sense that it does not have any club rooms or hold any meetings, but it is still an extremely useful organisation because it has, as its founder puts it, ". . . the world's postal services at our command." It is, in fact, a sort of postal club which offers members, at a price, an immensely wide variety of literature from informative and specialist booklets, through photocopies of just about every Meccano publication ever printed as well as previously-unpublished private model-building instructions, right down to lists of "Meccanomen" in most major countries throughout the world. A stereotyped club magazine, "The Meccanoman's Journal," is published quarterly and, having read this regularly, I can vouch that it contains many interesting articles, models and mechanisms, hints, open correspondence, etc. No membership fee for the Club is charged, but the subscription to the Club magazine is 25s. per year. There is no obligation to take the magazine, however, although to my mind it typifies the "fellowship" side of the Club.

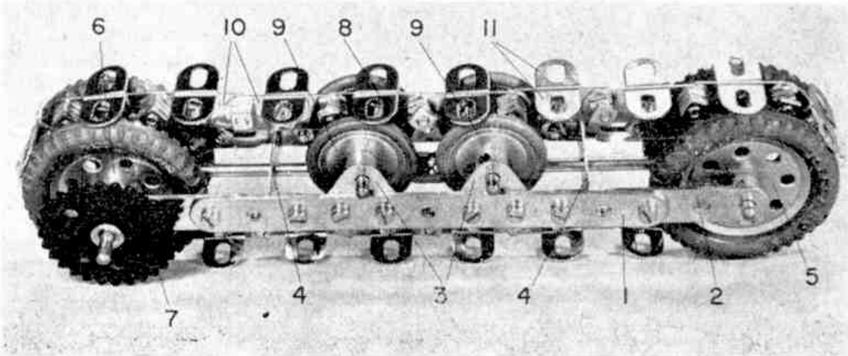
For further information on the Meccanoman's Club please contact The Chief Meccanoman, 248 Woolwich Road, Abbey Wood, London S.E.2, enclosing a stamp or Reply Coupon for return postage.

PARTS REQUIRED
(Lewis Mechanism)

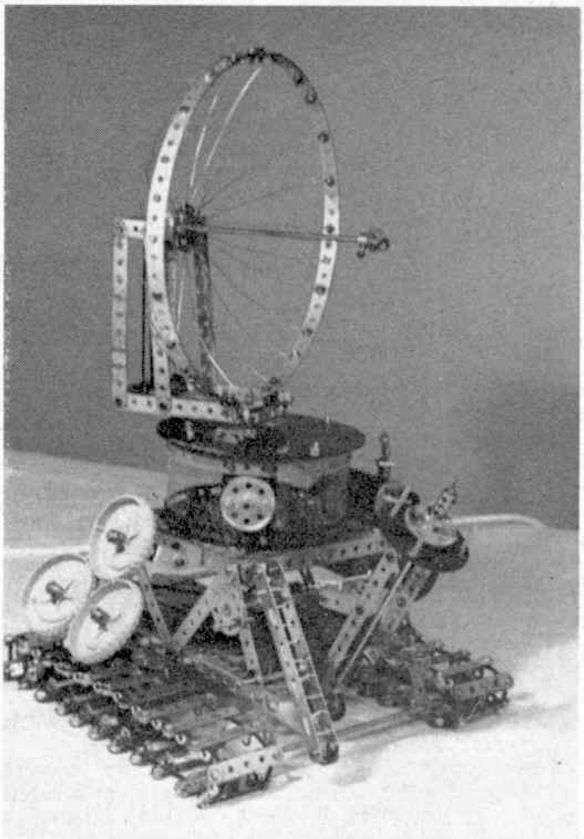
4—2	3—17	2—48	2—116
20—6a	4—21	8—55a	4—142d
40—12	4—22	4—77	4—155
2—16	76—37a	1—63	
1—16a	56—37b	1—95a	

PARTS REQUIRED
(1953 Mechanism)

2—2a	4—20	1—40	1—94
28—10	8—37a	2—48	1—96a
2—12b	8—37b	2—55a	2—115
2—16a	2—38	2—59	2—120b



An inverted view of another Crawler Track Unit, this one designed and built by Mr. Pat Lewis of Formby, Lancs. In operation, the unit is mounted with the idler wheels at ground level.

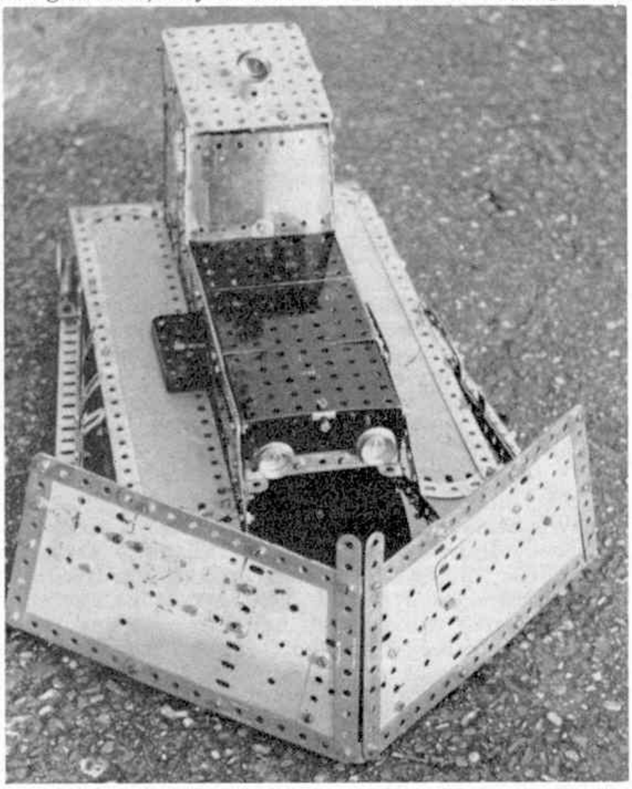


MECCANO CONTEST WINNERS

by Spanner

ENTHUSIASTS THE world over have for some time now been anxiously awaiting the results of our last Meccano Model-building Competition which closed at the beginning of February. Well, the mammoth task of judging the hundreds of entries in the contest was actually completed in March (when this issue of the M.M. was prepared) and all winners were notified by post shortly afterwards. For the interest of unsuccessful entrants, however, we give below a list of the winners, together with some illustrations of winning models, but, first, we would like to make a few general comments on the Contest.

To begin with, the number of entries received was most encouraging, as also was the building standard of the great majority of models entered. The judges did remark, though, that a small, but noticeable group of contestants in both Sections fell into the trap of sacrificing strength and realism to size. This unfortunately kept them out of the winning ranks, because, as we warned when announcing the contest, large, rickety structures invariably take second place to smaller, but stronger, well-built models.



Heading photograph: With a tradition of more than 60 years behind it Meccano is still the system of tomorrow, as is realised by Peter Miller of Points Claire, Quebec Province, Canada. This model of a Moon Exploration Vehicle won him first prize in Section A !

Above: Although not built very often, Snow-Ploughs make good subjects for Meccano models. Martin McGorie of Bodle Street Green, Nr. Hailsham, Sussex, built this example with Outfit 7 plus an Elektrikit—and gained second prize in Section A with it.

Also, it was surprising how many people did not mark their entries correctly, following the instructions given in the Competition announcement. We asked for the name, address and appropriate Section letter to be written on the back of *each* photograph and/or drawing entered, yet this was not done in quite a number of cases. Admittedly, it is only a small point, not sufficiently great to cause disqualification, but it does give the judges a bad impression. Entries without the Section letter or any indication of the competitor's age, by the way, were automatically placed in Section B to avoid the danger of older competitors' entries being judged in the younger Section, thus reducing the chances of younger competitors.

Talking of age, the judges of this latest Contest were particularly impressed by the number of first-class models entered by very young children. Peter Jones of East Grinstead, for example, was only five years old, yet his model netted him a prize in Section A ! In fact, the youngsters seem to have the right idea, generally, judging by the number of uncomplicated, but well-designed and built models entered.

Mind you, a well-built advanced model epitomises the versatility of the Meccano system, and this is where the majority of Section B competitors came into their own. By and large, the models entered in this Section were magnificent and covered every conceivable subject. The judges had an extremely difficult time choosing the thirteen winners and wish to say that those finally chosen were, in their opinjon, the best of a whole host of models that were well up to prize-winning standard. We hope that this will be of some consolation to unsuccessful entrants and wish them better luck in future contests.