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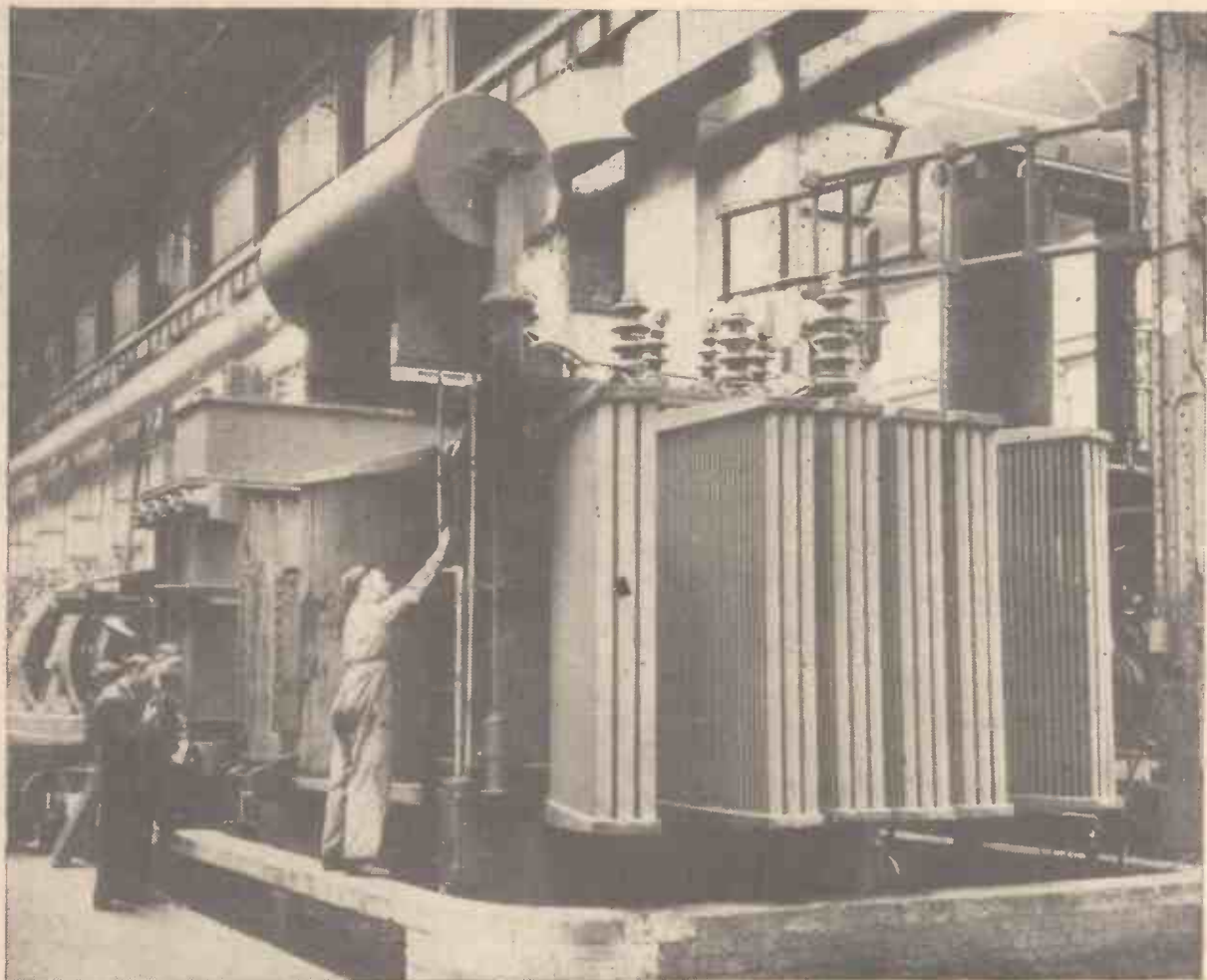
NEWNES

# PRACTICAL MECHANICS

9<sup>D</sup>

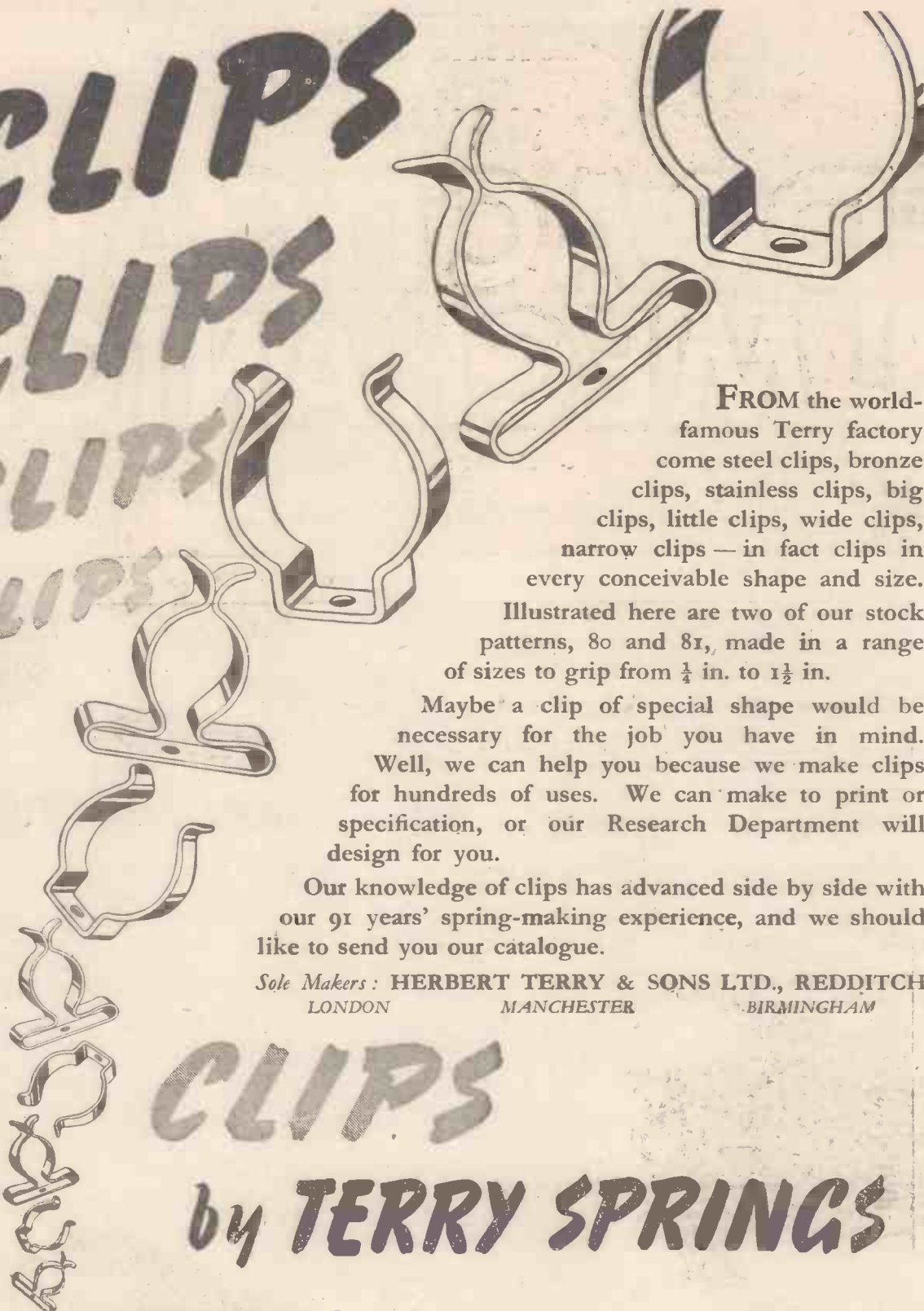
EDITOR: F. J. CAMM

FEBRUARY 1947



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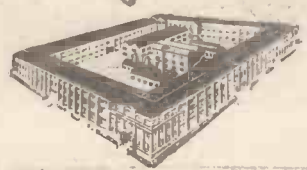
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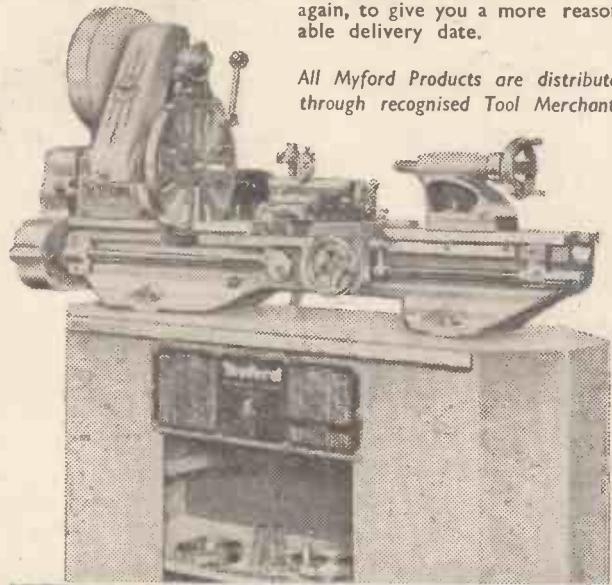
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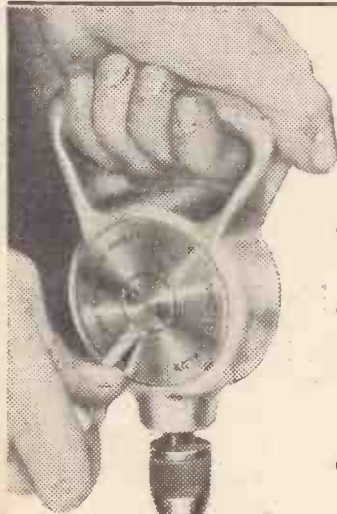
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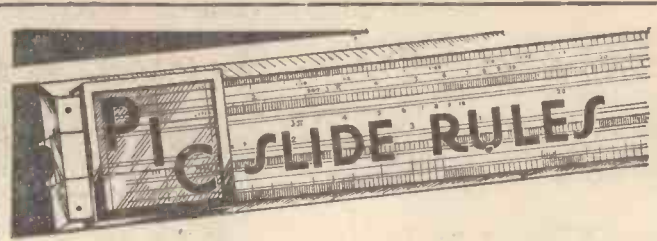
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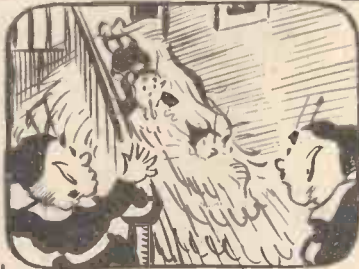
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# PRACTICAL MECHANICS

Owing to the paper shortage "The Cyclist," "Practical Motorist," and "Home Movies" are temporarily incorporated.

Editor: F. J. CAMM

VOL. XIV FEBRUARY, 1947 No. 161

FAIR COMMENT

BY THE EDITOR

## Occupational Analysis

**I**N America, boys and young men embarking upon a life vocation have 20,000 jobs from which to choose, according to the Division of Occupational Analysis United States Employment Service.

They have a national training school for boys, and the jobs, with descriptions fully explaining them, are listed in a Dictionary of Occupational Titles which has taken 10 years to compile. The dictionary is available in all of the 1,800 local employment service offices in the States and Territories, and constitutes the basic handbook of employment advisers. The American youth of today is therefore in a better position than our youths over here. The dictionary lists over 6,000 jobs for beginners. Suppose, for example, that you are interested in wood-working and desire to make that your career; in this book there are 35 commencing jobs in which you could be trained. If you are interested in automobile engines there are 70 commencing jobs, and if you are interested in farming and agriculture there are 50 commencing jobs.

In this way America hopes to abolish unemployment and to ensure that the right men are selected for careers. So often boys are pitch-forked into work selected for them by their parents and which they loathe.

We have in this country, it is true, instituted aptitude tests in certain factories, but the movement needs adoption by the Government so that one guiding principle permeates the whole of industry. The selection of a career to-day is much more difficult than it was hitherto, because there are more opportunities and a much wider selection.

Also, higher standards of education and intelligence are required. Good craftsmen can only be made when they are interested in their work.

In the Presidential Address to the Junior Institution of Engineers, Mr. A. W. Sproull dealt with this problem. He pointed out that in the old guilds of the 13th and 14th centuries members were bound together under a strict code of rules which did not allow any bad or makeshift work to be executed. The guilds appointed searchers who carefully looked over every piece of work produced. The dictum of each craft was the same: Producers must be protected against unfair competition and purchasers must be assured that the goods they bought were up to standard.

A boy desirous of learning a trade became apprenticed to a master in the craft for seven years, after which he reached the

status of journeyman, whose ambition was naturally to set up on his own account. In order to do this he had to submit a sample of his work to the wardens of his guild, who subjected it to a severe inspection. If his work was accepted it was known as his "master piece," which, no doubt, gave birth to the term which we now use in another sense.

To-day when a boy leaves school he is often bewildered by the choice of occupation offered to him. His headmaster is not able to help except to record his progress at school. The parents seldom know the natural aptitude of the boy, and often mislead him by placing him in a job for which he is unsuited. By the time the boy and the parents have discovered the mistake it is often too late to make a fresh start.

I should like to see in this country a National Youth Board so that the country can make best use of its potential brain power, and avoid the fitting of square pegs into round holes.

An unhappy aspect of the present situation is the ever-lengthening queue of young men and women anxious to emigrate, and this is the queue which we can least afford.

Ample opportunities exist in this country, but there seems to be no organisation for placing youth in industry. A young man leaves school eager and full of hope, and commences the task of finding a job to his taste. He finds it is not so easy. If some Government department under the aegis of the Ministry of Labour could take over the duties of finding suitable occupations for youths on the thresholds of their careers, industry would not be short of suitable labour. This is one aspect of our national life which certainly ought to be nationalised.

A great deal of industrial unrest is caused when a man is employed in uncongenial work not of his own choice.

### Fire Research

The Government, through the Department of Scientific Research, has established a Fire Research Organisation, and this is something entirely new in relations between Government and industry. The cost is shared equally between them, and the organisation will be responsible for the conduct of research on all aspects of the prevention and extinction of fires.

A Fire Research Station is to be established.

The Fire Offices' Committee, which is an Association of Fire Insurance Companies,

has for the last hundred and fifty years taken a leading part in the encouragement of fire protection in this country.

Since the early days of fire insurance, the companies have made it a practice to endeavour to persuade owners of industrial and commercial premises and goods to eliminate features liable to increase the risk of outbreak or spread of fire, and to introduce and to maintain features tending to reduce that risk.

Standards, recommendations, rules and the like have from time to time been issued by the Fire Offices' Committee. Fire protection appliances have been tested and lists issued of those found satisfactory.

In this way much has been done to reduce the general fire wastage potential throughout the country.

### Testing Station

In 1932, the Fire Offices' Committee agreed, at the request of various public and other bodies, to build and equip a testing station to provide facilities for fire resistance tests required, not for fire insurance purposes, but to furnish essential data to the central and local authorities and industry generally in connection with the construction of buildings. The station was immediately made available to the Department of Scientific and Industrial Research for research work.

The work at the station led directly to the appointment by the Department of Scientific and Industrial Research and the Fire Offices' Committee of the Fire Grading of Buildings Committee.

In the light of their fire protection work during the war and of the conclusion they reached that it would continue to be as necessary in peacetime as in war to do everything practicable to avoid fire wastage, the Committee decided at the end of 1943 that it was necessary in the national interests that there should be a central body specialising exclusively in, and able to give authoritative advice on, fire protection, and that fire research should also be developed.

It was with this end in view and after consultation with the Government departments concerned that the Fire Offices' Committee decided to establish the "Fire Offices' Committee Fire Protection Association," and to undertake fire research jointly with the Department of Scientific and Industrial Research through the formation of the "Fire Research Board of the Department of Scientific and Industrial Research and the Fire Offices' Committee."

# Modern Fountain Pen Manufacture

Centreless Grinding Ensures Large-scale  
Low-cost Automatic Production

THE fountain pen trade is a branch of the plastics industry in which profitable business in normal times is only possible by making use of every device for rapid and low-cost production which the skill and ingenuity of the engineering designer has rendered available. It is not many years ago that Italian makers in the trade were finishing their pen barrels by diamond turning with a production of some 12 barrels per hour per machine, and the amount of development work which has been done in the interval can be gauged from the fact that to-day this work is produced from tube with a cemented cap to form the closed end, and is being finished upon Scrivener automatic controlled-cycle centreless grinders with a production of some 800 finish-ground barrels per hour per machine. (Fig. 1.)

The principle of the centreless grinding process is shown by the diagram, Fig. 2, from which it will be seen that the part to be ground is placed upon a supporting workplate between a small control wheel and a larger grinding wheel. By a lateral movement of the control wheel the work is then advanced on to the grinding wheel, and when the grinding operation is finished the wheels again open and the piece is ejected.

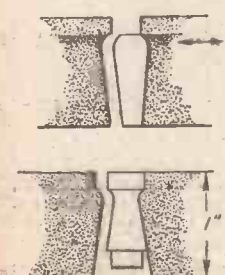
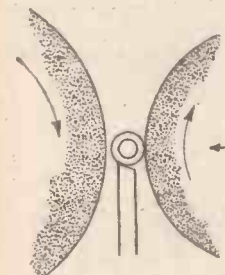


Fig. 2.—Diagrams illustrating the principle of the centreless grinding process.



Fig. 4.—This form would entail excessive wheel break-down at point a.

In a modern centreless grinder, such as the Scrivener controlled-cycle machine, the work is fed on to the workplate automatically from a magazine, and the control wheel also advances the piece automatically on to the grinding wheel—wheel advance, magazine feed, and ejector being so linked up and synchronised that the function of the operator is merely to keep the magazine supplied with blanks. The process is used for grinding barrels, caps and pen sections, different widths of wheel being required for each part as shown by Fig. 3.

The fullest advantage of this interesting development is secured in those plants where the production is sufficiently large to justify the installation of three separate auto-

matic machines which can be kept permanently set up with wheels and magazines, one for grinding the barrels, another for the caps, and another for the pen sections. Such a battery of machines would produce each of these parts at the rate of 800 per hour

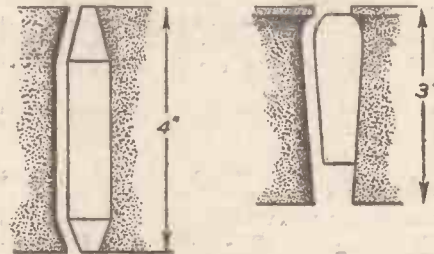


Fig. 3.—Barrel, cap, and pen section each require different widths of wheel.

net. Smaller makers would necessarily have to be content with a single machine, which would first have to be set up with wheels and magazine for producing (say) 25,000 barrels, after which different wheels and magazine would have to be substituted for grinding the same quantity of caps, and the work of changing the set-up would therefore entail a loss of somewhat over half a day's production. After a similar quantity of caps had been ground it would then be necessary to make another change-over for the pen sections with a similar loss of time and production in the process.

### Stock Removal

The stock removal in grinding fountain pen parts and plastics generally is heavy compared with what is usual in the engineering industry, being usually in the neighbourhood of .030in., and the finish required is also of an extremely high order, being specified as soft and silky to the touch. These requirements presuppose the employment not only of a substantially built centreless machine with very rigid spindle and bearings, but also of specially selected wheels. The limits of accuracy specified in the trade, while reasonably close, are not

so exacting as are demanded from centreless machines required for grinding such an engineering component as a diesel engine injection needle (for instance) where the

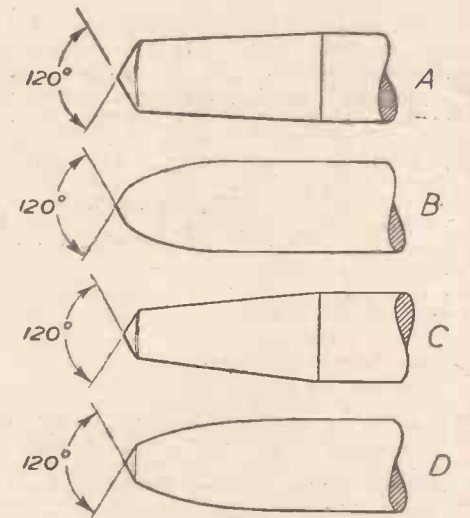


Fig. 5.—Various attractive end forms which can be ground by the centreless process.

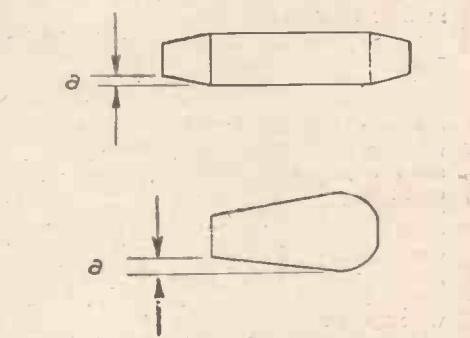
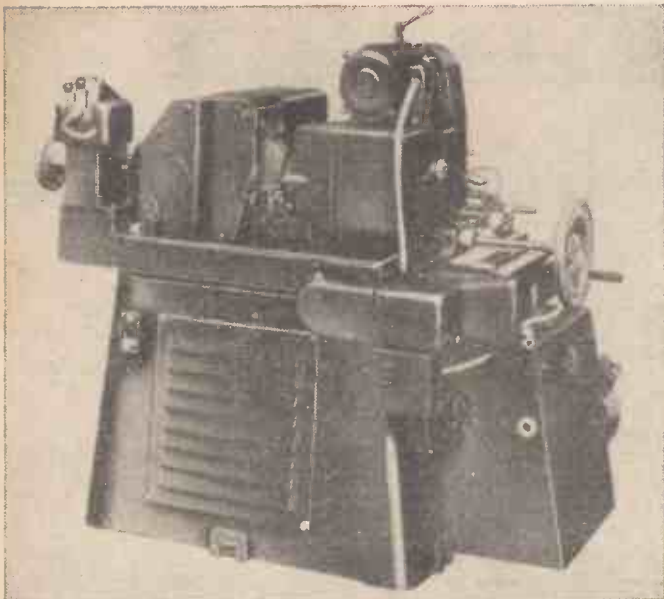


Fig. 6.—Depth of form must not exceed the amount of wheel advance if the piece is to be ejected.



Fig. 1.—Barrels, caps, and pen sections are ground by the centreless process.



Scrivener No. 1 patent controlled-cycle centreless grinder, as used for fountain pen manufacture and similar work.

limits for size are only plus-minus .0005in. on diameter, with a surface finish of 3-4 micro inches.

**Limitations of Process**

In the design of pen or other plastic parts which are intended for centreless grinding, it has to be borne in mind that the wheel of a centreless grinder cannot grind a full half radius at the end of a cylindrical piece in the manner shown by Fig. 4, as the wheel at point "a" would break down too quickly for this to be a practicable proposition. The nearest advisable approach to this form would therefore be an angular or domed end with a final included angle of 120 deg., and Fig. 5 shows four alternative forms for caps or barrel ends.

Another point which has to be borne in mind in connection with the older type of manually operated centreless machine, employing a hand lever for advancing the control wheel and work on to the grinding wheel, is that this method (which gives a partial turn to the lead screw) is only capable of advancing the wheel by

some 1/16 in., and if the depth of form on the work exceeds this 1/16in. then it is not possible to eject the piece automatically, as will be seen with reference to Fig. 6. In the Scrivener controlled-cycle machine, in addition to this advance being made automatically by hydraulic means, the amount of such advance can be anything up to in., which makes it possible both to grind and eject deeply formed pieces which could not have

been handled by the process before the development of this feature.

**Stylographic**

Although in the foregoing description mention has only been made of fountain pens, the centreless grinding process is equally applicable to the grinding of stylographic pencils and pens such as are shown by Fig. 7, where the ground portions are indicated by conventional grinding marks.

**Bars and Tubes**

The same machines, when fitted with bar-grinding equipment, also serve for grinding plastic materials in rod and tube form. In this process also the production of a modern machine is equally noteworthy, as it is possible to grind casein rod at rates up to 150ft. per minute in the smaller sizes.

(By courtesy of Arthur Scrivener, Ltd.)

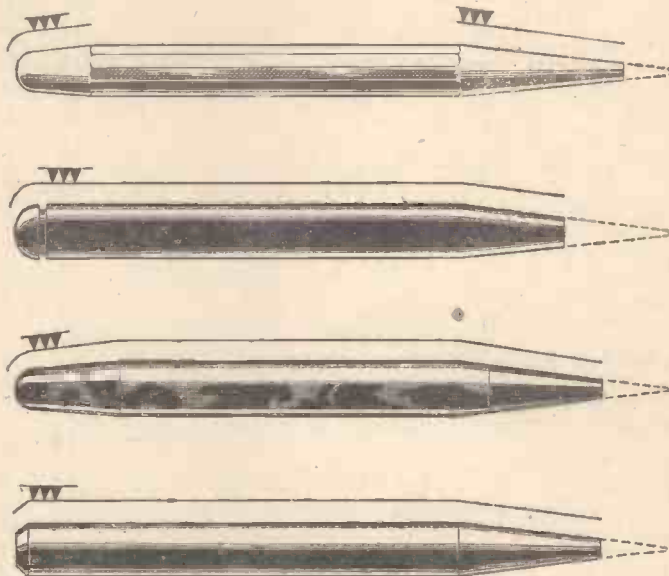
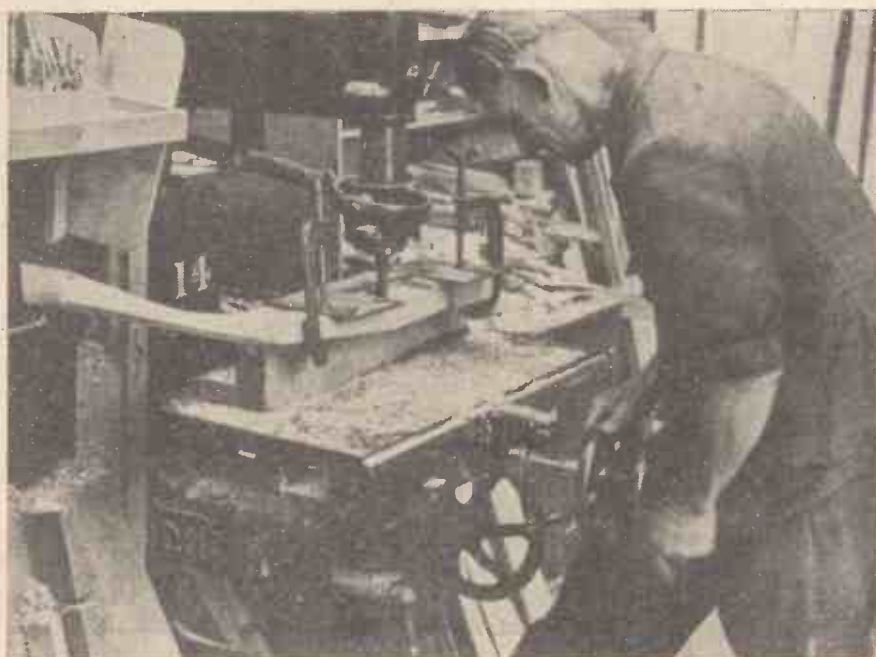


Fig. 7.—Stylographic pens and pencils centreless ground.

# British Cars for Overseas

**T**HE Daimler Company, Ltd., the oldest firm of motor car manufacturers in Great Britain, has, since the end of the war, converted its parent factory at Coventry from war production layout back to its normal peace-time role of producing motor cars for the home and overseas markets. The company has just completed an order from the Government of South Africa to design and supply Daimler cars for the use of the Royal Family during the forthcoming Royal Tour of South Africa. While the engine and chassis are constructed at Daimler's Coventry Factory, the coachwork is built by Hooper and Co., Ltd., of London, a Daimler subsidiary company. In addition to South Africa, Daimler are now shipping cars to Australia, New Zealand, India, America, Egypt, Malta, Iraq, Portugal, Holland, Denmark, Gibraltar, Belgium, Sweden, Greece, Switzerland, China, Malay States, South America, Siam, and the British West Indies.



A saw mill operator working a routing machine, utilising a pattern to ensure accuracy, during preliminary work on the coachwork. This picture was taken during the manufacture of Daimler cars for the forthcoming Royal Tour of South Africa.

# Equipment for the Home

Furniture and Appliances seen at the "Britain Can Make It" Exhibition

**O**UR homes are in such a sorry state after six years of war that almost anything clean is at least pleasing to the eye, whether we like the design or would like to see the exhibit in our own home or not.

Indeed, cleanliness and lack of shabbiness is the first thing that strikes the war-cooped traveller visiting Switzerland or Sweden for the first time since the war.

Let us take, first, the furnishing of the home. The display of furnishing fabrics, from plastics to woven and printed colour is certainly extensive. Many are extremely attractive. There is plenty of gay colouring, plain or patterned, as you please. The whole theme of the furnishing side is towards more light, gaiety and more room to move about in the least available space.

## Built-in Fitments

Because we no longer live in spacious drawing-rooms, the tendency to build everything into the wall—what I call the Wagon-Lits mentality—has become almost an obsession with interior decorators. I am all for cupboards being built-in. But if we are going to start immuring desks and book-cases there is not going to be much scope for future Chippendales and Sheratons that the 20th century may decide to reincarnate. As for walling up a radio-set, I regard it as almost as absurd as inventing an immovable teapot. No, nothing but safes and cupboards should be flush with the wall, unless absolutely necessary.

Of course, I realise that the furnished rooms displayed are designed specifically with a view to space-saving and the kitchens certainly do that.

If you have two adolescent boys and only one small room for them, the obvious solution is to arrange their sleeping on the ship's two-berth principle. All I say is, let us realise that this sort of thing is a makeshift, and not a wonderful new discovery in interior decoration.

While talking of rooms, I must mention

By the MARQUIS of DONEGALL

the bathroom with the two-lamp sun-ray equipment over a rubber-sponge bunk. Very nice indeed.

In a different bathroom I was glad to see that the electric heater was suspended out of reach. More than that, it has a fool-proof remote-control gadget. I have never been able to understand why more people and animals are not electrocuted in bathrooms. (I have even seen people balance a standard lamp on the edge to shave while in the bath. Somebody only has to trip over the wire and you've had it!) Wallplugs in bathrooms should be forbidden by law.

We must now go round the Exhibition and see what we can get to put in our house. To my mind two of the best things in the "Britain Can Make It" show are the very modern cutlery in the Main Hall and in the next showcase some beautiful chinaware. Evidently we have not lost the old English art of the 18th century.

I should have said before that the stuff for children, from toys to the modern nursery, in which everything—door handles, wash-basins, furniture—are child-height, is first class.

## Kitchen Equipment

As far as the kitchen utensils go, I was struck by a gadget with which you pummel meat to make it tender. Very necessary, these days!

Let us take a few more isolated exhibits as we move round. T.240 is a pint tankard in some modern pewter-like metal, and T.233 is one of the

much publicised combined step-ladder, ironing-board and baby chair. T.107 I pick out among the ironing boards because of its smart chromium finish, and it also incorporates a sleeve board.

P.7, a French walnut desk by Heal's, is to my mind the most pleasing desk in the Exhibition on account of its curved shape.

RR.50 is an attractive black electric space-heater by Cole, Ltd., of Southend, and as far as the model offices go I think that anybody would be pleased to work in the thoroughly hygienic and practical set-up



*G.E.C. Standard Pressed Steel electric cooker. The oven is heated by tubular sheath wire elements and is thermostatically controlled. The drop-down door is of three panel rigid design and its fall is controlled by a patent braking arrangement.*



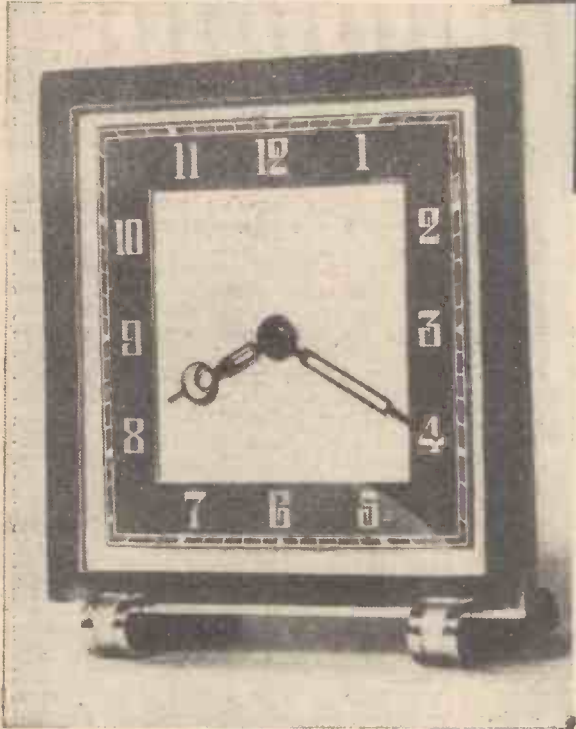
*A kitchenette in a small flat where neither washing nor water-heating has to be done. It contains a prefabricated unit or package kitchen, a new product in aluminium and plastic, made up of nine units. A corner of the adjoining dining-room can also be seen in the illustration.*

called "A Manager's Office," by Brian O'Rourke. A real effort had been made here to combine the functionally efficient with what is pleasing to the eye. Before leaving the office to return to things for the home we might mention that machines, such as duplicators and typewriters, are tending to become more streamlined and lighter by the use of war-developed alloys. For instance, the Gestetter duplicating machine and Sumlock Comptometer.

It was a clever idea amid all this streamlining of the sample rooms and offices to devote one corner to the horrors of the past. Here we see a nightmare of an old kitchen range with a rusty, dented bucket and disease-ridden kettle. Perhaps the worst of the lot is the knife cleaner that may well have been used by Mrs. Noah.

### Furniture Design

A word on furniture as a whole. Although, as I said at the beginning, I deplore "building-in" for its own sake, I would be the last to advocate cheap efforts to copy the styles of the 18th century by mass production methods. This indeed was the tendency in certain quarters during the Thirties. Whether you like the new furniture or not, you will have to admit that it is not copying anything, and that the designers have tried to meet the modern need for increased space and less dusting. In order to do this they have produced furniture which in some cases could not have been produced before the war because the necessary processes for making it had not been developed. For instance, some of the new plastic adhesives used chiefly for aircraft are so sturdy that the traditional type of joint is no longer necessary. This, of course, opens up a field



A modern clock with cream dial 3½ in. square, black hands, black and silver zone, chromium bezel, chromium and anodized metal feet. Height 4½ in., width 4½ in., depth 1½ in.

so far only exploited by Mr. Elias Swedberg, of Sweden, who ships out packaged furniture ready for the recipient to put together on the principle of a boy's construction set.

Apart from the elimination of joints, it is now possible to join metal to wood by adhesive processes, thus opening up an unlimited field of gay furniture. If, as we look at the furniture, we try to see some guiding principle in the minds of the designers we come to the conclusion that the moderns differ only in one thing from the masters of the 18th century. Both set out to produce useful and artistic furniture designed specifically to the requirements of their period. But whereas the Hepplewhites, Chippendales and Sheratons made admirable furniture for certain sections of the population, to-day's designers are trying to make admirable furniture to suit the requirements of the whole.

### Carpets

I suppose that of all the things lacking from our homes at present, carpets are in shortest supply. There are some very original carpet samples and rugs shown. But goodness knows when we will be able



A portable electric sewing machine.

to lay our hands on them. The carpet boys who have been abroad with the Forces have returned full of ideas. The tendency seems to be away from the stylised oriental design, and I have personally no regrets on that score. For instance, the hand-ruffed Donegal rug, with multi-floral design by Frank Gibson, for Sundour Fabrics, is far more pleasing to my eye than a lot of dingy triangles, swastikas and other oriental pseudo-Masonic symbols symmetrically hotch-potched.

It appears that floral design is becoming increasingly popular, and by that I do not mean a plain background with carefully spaced purple cabbages struck on it; but imaginatively drawn floral conceptions in bright shades.

New weaves and textures have been designed in which it is possible to produce so unobtrusive a pattern that its result is unconsciously to relieve the monotony of the plain carpet.

### Wallpapers

I will just finish with a word on wall-

## Winning the High Jump—By Prof. A. M. LOW

THE subject of weight is rather interesting for it is, of course, due to the earth's attraction. Now, in addition to the earth attracting things to it, the earth is also attracted to the things. Drop a stone and the stone falls to the ground, but do not forget that the ground also moves towards the stone. I will admit the movement is very small. Many things in this world are small. If I thump on the table in London it rattles the teacups in Australia, but so slightly that neither you nor I would notice.

To come back to earth our happy world is revolving exceedingly fast, and there is a tendency for everything to be thrown off exactly as in the joy wheel. But for gravity

papers, which is a comparatively youthful industry having virtually started with the invention of the rotary printing press about the middle of the last century.

The wallpaper industry suffered greatly from the fashion in the Thirties of clearing rooms of almost every form of decoration, including even pictures. But the wallpaper people have reason to believe that their product is coming into its own again, and are determined that Britain shall lead the world again in this industry.

Some wallpapers are shown in the Exhibition, and I think that they show considerable imagination in design.

### OUR COVER SUBJECT

A MISSION from the famous British firm, the English Electric Company, has been in Moscow discussing orders with the Soviet Government, and it is thought likely that they will get a contract for the electrical equipment needed for the rebuilding of the great Dnieper Dam, which the Russians deliberately destroyed in 1941 in the face of the advancing Germans. At their Stafford works, the English Electric Company is already producing huge generators, turbines and transformers for Russia and other countries.

The illustration on the front cover shows a large transformer under construction at the Stafford works of the English Electric Company.

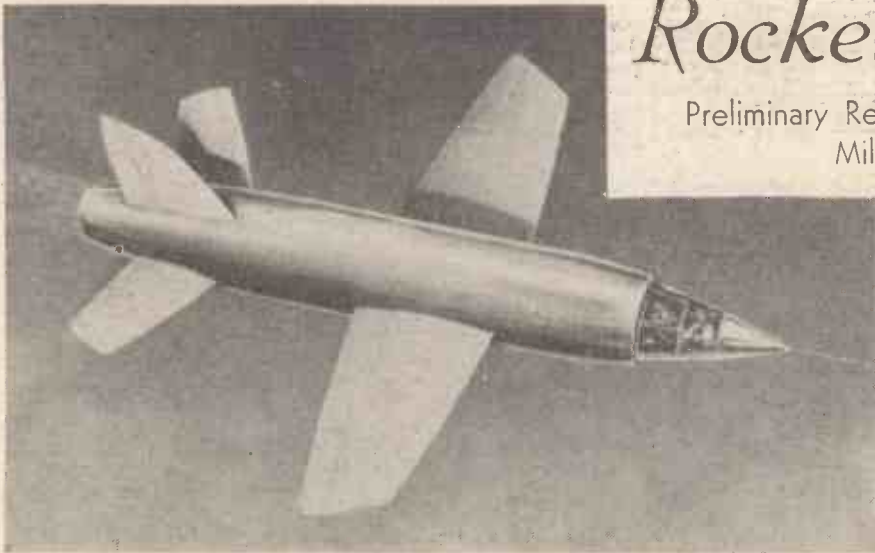
we would fly away like the ball in roulette. Now, the lines of the equator being longer than a smaller line nearer the poles, is clearly moving faster, just as the rim of a wheel travels quicker than the hub. So anyone standing on the equator is being thrown away against the force of gravity more strongly than another man in Alaska. It is perfectly true that if you want to break the high jump record, other things being equal, it would be better to attempt this feat on the equator. One pound of tea weighed on a spring balance varies all over the earth, but no one has yet thought of setting up a chain of stores round the equator to make good use of such a businesslike state of affairs.

# Rocket Propulsion

Preliminary Research With the "Natter": The Miles Trans-sonic Project

By K. W. GATLAND

(Continued from page 129, January issue)



An impression of the completed prototype, M.52, designed to reach 1,000 m.p.h. in level flight at 36,000 feet and climb to that height within one and a half minutes.

IT will be recalled that an exhaust-vane system, working in conjunction with tail-plane elevons, was the control arrangement finally adopted in the Ba.349 "Natter." The reason was that in spite of an initial acceleration of about 2g., the speed at which the machine climbed from its launcher was generally no more than 35 m.p.h., and hence, the airflow over wing and tail during the period contributed little to control and stability. The condition was further aggravated by the rearward position of the c.g. when the A.T.O. rockets were mounted at the tail; actually as far aft as .60 of the wing chord.

To offset the instability which had been observed during early tests of the BP-20 prototype, auxiliary surfaces one metre square were attached by means of explosive bolts to each tip of the tail stabilisers, and these were blown off simultaneously with the dropping of the spent take-off rockets. This modification temporarily increased the tail-span to 14.8ft.

After jettisoning, the c.g. moved forward to between 18 and 25 per cent. of the chord (depending upon the amount of fuel and armament) and the remainder of the flight was invariably well stabilised.

## Exhaust-vane Stabilisers

In order that the two conditions should be properly investigated, a proportion of the trial launchings was made with auxiliary tail-tips and part without.

These tests, however, were greatly hampered by the inefficiency of the Schmidding boost rockets: explosions resulting in the total destruction of aircraft were not infrequent, and the firing duration of those rockets which acted varied by as much as 100 per cent. from charge to charge. A few of the ascents were nevertheless successfully carried out, and although the increased tail-area did steady the near vertical climb, Bachem and his technicians were not entirely satisfied.

It was H. Bethbeder—credited as co-designer of the "Natter" with Bachem—who suggested the exhaust-vane system, and this would have displaced the tail-tip gear had the machine gone into service. Two vanes were fitted in a test machine, and these interconnected with the tail elevons so that—for instance—a pulling back on the stick raised both air-stream and gas-stream controllers. The significance of this

arrangement, however, was when the machine flew under the control of an auto-pilot, for in the almost vertical climb, any deviation from true course would automatically bring about a corrective movement of the controls and a return to the original flight path.

In the early stages of the ascent, as previously stressed, the air flowing over the wings and tail was moving relatively slowly, and this gave the air-stream controllers little opportunity for proper function. The gas-stream, on the other hand, was always fast moving, and thus the thin metal vanes set in the exhaust were effective both at high and low forward speeds, so long as the engine continued to function. At least this would have been the case had it been found possible to construct the vanes with sufficient durability, but despite hollow construction and internal water cooling, they invariably burned up and disappeared after the first 30 seconds of flight.

This should not be taken to imply that exhaust stabilisers could not be built with improved reliability. The experiments which Bethbeder conducted were necessarily hurried, and there is little doubt that given time for development a liquid cooled system could be made to work effectively throughout the full thrust period.

## The Auto-pilot

Another fault in the initial testing of the "Natter" was that the three-element auto-pilot was unreliable, and in the few flight tests made with the device the elements would not properly synchronize, with the result that ascents were erratic and far worse than in earlier launchings, when the controls were simply preset and locked.

In the majority of test-flights, small aileron-type tabs were fixed to the wings, so that the plane executed slow rolls during the climb above some 650 feet, when an altitude of about 9,000 feet was usually attainable.

## Glide-testing the "Natter"

Some interesting data were forthcoming when glide tests were conducted. A BP-20 was ballasted to a gross weight of 3,750lb., with the c.g. at 25 per cent. of the chord, and towed to an altitude of 20,650 feet by a Heinkel He. 111. It was then released, and in the time available for glide before the pilot baled out, the following characteristics were noted: (a) Stability was excellent and controls light and well coordinated for indicated air-speeds between 125 and 440 m.p.h.; (b) There was no rolling moment due to sideslip, and no apparent yawing moment due to the differential deflection of the elevons to produce roll; (c) The rate of roll was estimated at one revolution per second; (d) At 250 m.p.h. a full circle could be turned in approximately 20 seconds; (e) The controlled stalling speed was 125 m.p.h. indicated air-speed, which occurred at an angle of attack of about 30 degrees; and, perhaps most significant of all, (f) that the handling and flying qualities were judged by the pilot to be superior to those of any of the standard German single-seat fighters.

This particular flight might well have ended in disaster, for when the pilot operated the break-up control in order to gain his exit from the aircraft (which should have detonated the explosive bolts and released the complete nose section) it failed



This full-scale mock-up of the Miles M.52 shows clearly that most of the fuselage space was to be occupied by the special power jets engine and augments.

to work, and he had to battle his way out through the cockpit enclosure.

Although the release functioned smoothly in two earlier unmanned glide tests (when the gear was worked by a timer) it was not 100 per cent. reliable, and on later models was replaced by one having a purely mechanical action.

### Miles Trans-sonic Development

It is now opportune to investigate the Miles M.52 project aircraft, for although the contract for the full-scale machine was cancelled in February, 1946, its form design remains in the Vickers rocket-powered research model now undergoing flight tests. A great deal has been heard lately of these experiments in which, it will be recalled, the aim is to penetrate the "sound barrier" in level flight, and therefore no apology is offered for including details of the interesting "jet" aeroplane which led to its development.

The decision for Britain to build a piloted aircraft for free-flight research at trans-sonic and supersonic speeds was taken by the Air Ministry in 1943. It was well known at the time that German aerodynamicists were advanced in similar projects, and for that reason no time could be lost in meeting the possible threat of "faster-than-sound" fighters and bombers from across the Channel.

The "flying-bullet" is an apt name for the Miles project. Its design was the outcome of extensive calculations governing the flight of shells and bullets and of research with special laminar flow "bi-convex" wing and tail sections.

### The Project Stage

Armed with as much data on ballistics as they had been able to obtain, the Miles project engineers set about the task of shaping the fuselage. A three-stage jet engine and its fuel would obviously take up most of the space and naturally largely governed the cross-sectional diameter and length. The rest was a matter of suitably refining the shape to involve minimum resistance and to provide a cabin and suitable intakes for the engine.

Meanwhile, other technicians whose job it was to investigate wing form were busy with their own calculations and research, carefully refining out a special bi-convex aerofoil, strong yet thin and knife-edged for travel through the trans-sonic zone while embodying reasonable slow-flight characteristics.

The technical difficulties were immense, but with a basic pattern finally evolved, the next step was the construction of a complete



The bullet-like lines of the M.52 are well displayed in this model of the Miles trans-sonic project.

model for wind-tunnel tests. This phase of the proceedings was the one in which the theories and calculations were put to a thorough check. Fortunately, only a few minor alterations were necessary to pass the shape as satisfactory, and the project was soon ready for handing on to the general design offices where the work was carried on in detail.

Not only had the Miles technicians virtually to formulate a new aerodynamical theory but they had to devise a control system fully workable in the subsonic register, but equally effective when flying in the region of the trans-sonic and above. It was also necessary to furnish the pilot—placed in the aircraft's pointed nose—with an automatic means of escape in the event of emergency.

A moveable tail-plane was provided for maintaining trim during flight at the various speeds because, under certain conditions of flow, the normal trailing-edge type control ceases to function satisfactorily. The arrangement was tested at low speeds on the Miles "Gillette" Falcon, described in the previous article and illustrated on this page.

The main-plane, 27 feet in span and mid-set on the 33 foot fuselage, is the thinnest cantilever wing structure ever attempted. A set of dive recovery flaps only 3in. deep and 12in. long were to be fitted on the undersurface.

The materials used in the construction of the airframe and wings were naturally of much higher strength characteristics than

usually employed; a high-tensile steel structure with a heavy gauge high-duty alloy as covering.

### The Power Jet W2/700 plus No. 4 Augmenter

The power plant—23ft. long and 3ft. 6in. in diameter—was designed and built by Power Jets (Research and Development) Ltd. Its rated power is the equivalent of 17,000 b.h.p., but as will be seen, this was substantially improved by the incorporation of a ducted fan and augmenter.

There are three stages, the first consisting of an orthodox jet unit with centrifugal blower and turbine, the latter serving an additional purpose (stage two) as a ducted fan, bringing in a separate supply of air through intakes placed just behind the main annular air-scoop. The air from this source is then mixed into the main "jet" stream which flows on through a length of ducting where supplementary fuel burners are placed. In this third "augmenter" stage, further expansion (and hence, acceleration) of the stream takes place before its final ejection, thereby adding materially to the thrust of the basic engine.

A special tubular structure provides mounting for the engine and also secures the cabin.

### The Control Cabin

It was anticipated that testing should begin at 50,000 feet altitude and the cabin was pressurised to provide for this.

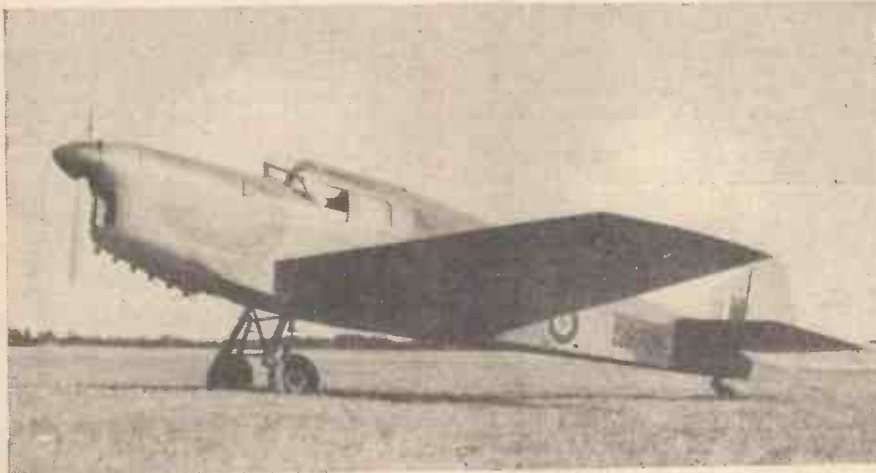
The seat for the pilot was placed directly upon the cabin flooring and his feet raised above floor level, the nose wheel retracting into a housing between them.

The controls were naturally servo-assisted. The expected control loads on the M.52, said Mr. Miles, were approximately 100 times greater than those experienced on even the largest of present day aircraft. And yet, despite the small size and great weight of this machine, it was expected to be easily manageable both at high and low speeds.

The all-up weight was calculated to be about 8,200lb. at take-off, with a wing loading of 58lb. sq.in., and this implies a high landing speed; 170 m.p.h. with a two-mile landing run were the figures quoted. Special tyres and wheels, in fact, had to be designed to withstand the shocks involved.

### Emergency Escape

To allow the pilot a reasonable chance of survival should any mishap occur during testing, the complete nose-section was made detachable, its release to be effected by means



The Falcon "Gillette." With this machine it was possible to test the slow-speed qualities of the special wing and tail-plane developed for the M.52.

of cordite charges which would blow the cabin (with pilot still housed within) clear of the aircraft. Cleats filled with the explosive were to be fixed to the cabin supports which would be sheared by the touch of a button. A large parachute, packed in the rear end of the cabin, would then automatically open and bring the speed down to a safe value for the pilot to bale out in the normal manner.

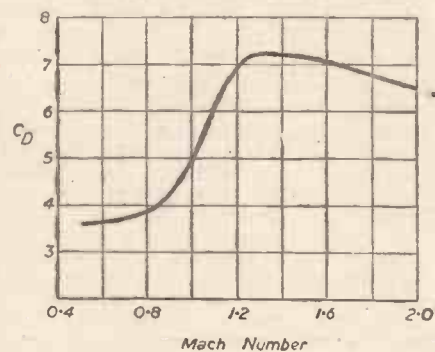
**Recording Equipment**

The aircraft having its sole purpose in research, many of the instruments had to be specially developed. The micro-observer, for instance, was intended to measure and photograph electrically all the readings required, this with the aid of sensitive Tinsley galvanometers on which there were 24 separate readings. Another special apparatus was a cathode-ray oscillograph to measure the strains produced in certain fundamental positions of the structure, photographing the results.

A full complement of 18 instruments, in addition to a transmitting compass and oxygen control, would have furnished complete data of flight conditions through the "sound barrier," and as the whole would be registered on film, the pilot had no other concern than control his aircraft. In the past are the days when test pilots grappled with knee pads, hurriedly scribbling down instrument readings with one hand while endeavouring to maintain control with the other.

**Contract Cancelled**

The reason why the contract for this enterprising machine was cancelled when the detail design was 90 per cent. complete,



The aerodynamic "curve of fate," showing how drag increases in travel through the trans-sonic zone.

with all assembly jigs finished and component assembly well under way, the engine ready for installation in the airframe, is officially stated to be "economy."

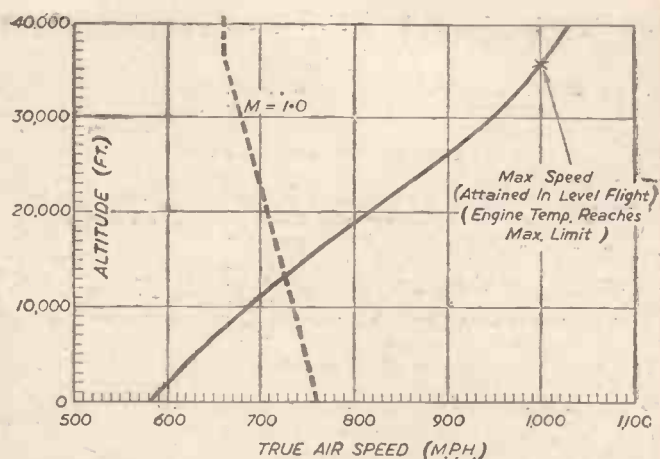
Not a particularly convincing explanation, this, especially in view of the obvious military importance of the development—unless, of course, the design is outmoded by recently acquired technique. The athodyd, for example, was virtually unknown at the time when the M.52 specification was drawn up (now nearly four years ago), and hence an athodyd research aeroplane might well be on the stocks "somewhere in Britain."

From the purely aerodynamical standpoint, the design compares favourably with the best the Germans had to show, although it is true that the Delta flying-wing layout (and wing sweep-back in general) was coming into prominence, and again this may have sufficient justification for abandoning the Miles venture.

Whatever may be the true reason for that vital decision, it must have come as a bitter blow—and one entirely "out of the blue"—to F. G. Miles and his design staff, pioneering as they were in an entirely new field of

development. There is no doubt that an aeroplane such as the M.52 is a much needed-item of equipment at the present stage of research, which could provide answers to innumerable aerodynamical problems. It would pave the way to the immediate development of aircraft capable of supersonic speeds, as fighters, mail and passenger transports—and although the spirit of the Miles project lives on in the Vickers trans-sonic model, there is a whole lot of difference between shooting off pilotless models through that perplexing zone of speed and actually experiencing trans-sonic conditions.

The Vickers models will help. Of that there is no question, but they can only be supplementary to a manned research aeroplane. Whether this can be taken to imply that work on the M.52 will at length be recommenced, or that another research aircraft is taking shape behind the guarded



Graph showing maximum speed of the Miles M.52 with power jets W2/ 700 plus No. 4 augments.

curtain of security, it is impossible to say. But that the work so successfully undertaken at the Miles Aircraft, Ltd., has provided unparalleled data on the theory of trans-sonic flight and of the formidable constructional and installatory problems involved is unquestionable; a genuine credit to British design.

(To be continued.)

# Mathematics as a Pastime—2

## The Square Root Emerges.

By W. J. WESTON

GET your ruler to measure lengths, your set-square to set out a right-angle, and your compass to cut off lengths.

You know that  $x^2 - y^2$ , the difference of two squares, is resolved into the factors  $(x+y)(x-y)$ , the sum of the numbers multiplied by the difference of the numbers:  $(99^2 - 98^2)$  is  $(99+98)(99-98)$ , that is 187. You can, therefore, express any number whatever as the difference between the squares of two numbers that differ by one. Thus:

- 9 is  $(5^2 - 4^2)$ , that is  $(25 - 16)$ ,
- 17 is  $(9^2 - 8^2)$ , that is  $(81 - 64)$ ,
- 20 is  $(10\frac{1}{2}^2 - 9\frac{1}{2}^2)$ , that is  $(110\frac{1}{4} - 90\frac{1}{4})$ .

You know, too, that the square on the side opposed to the right-angle of a right-angled triangle equals the sum of the squares on the two sides containing the right-angle.

Well, to lighten your work, apply those truths. For it is not the finding of a thing, but the making something of it when it is found, that is of consequence.

Suppose you want the square root of 17, for example, of  $(9^2 - 8^2)$ , that is. Draw your horizontal 8 units long (centimetres are convenient as the units). Erect a vertical at one end of the line. With a length of 9 units in your compass stretch from the other end of the horizontal to the vertical.

Read off your upright; if you have worked with care, you find that  $\sqrt{17}$  is slightly more

than 4 centimetres and 12 millimetres, slightly more, that is, than 4.12. Test the matter by finding the square root in the traditional way—that is, by applying the truth  $(a+b)^2 = a^2 + 2ab + b^2$ .

$\sqrt{17}$ :

17	(4.123
16	
81	
100	
81	
1900	
1644	
8243	
25600	
24729	
871	

We find the nearest square below 17: this is 16, of which 4 is the square root. Our  $a$  then is 4 and our  $a^2$  is 16. The 1 remaining out of 17 must, therefore, be  $2ab + b^2$ ; and, by inspection, we find that  $b$  must be 1. For  $(8+1) \times 1$  is .81. So we proceed, taking as  $a$  the part of the root already found, and finding  $b$  by inspection.

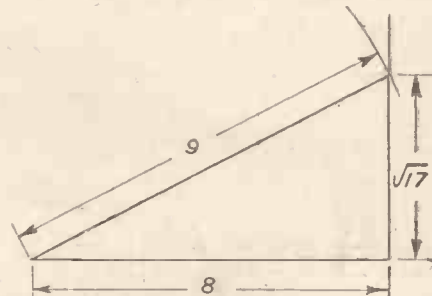
Of course, you remember that the interpretation of two consecutive digits like 42 differs from the interpretation of two consecutive letters like  $ab$ : the first is 4 tens + 2 units, the second is  $a \times b$ . If  $a$  is 4, and  $b$  is 2, then  $ab$  is 8 and not 42.

That this result is accurate enough you will see by reversing the process: that is, square 4.123:

4.123
4.123
12369
8246
4123
16492
16.999129

This is as near to 17 as makes no matter.

(To be continued.)



Extracting the square root.



# Making an Air Pump

Converting a Small Motor-cycle Engine to Perform the Duty of an Air Compressor for Tyre Inflation and Paint Spraying

By S. J. GARRATT

A SMALL motor-cycle engine can be converted to perform the duty of an air compressor for tyre inflation and paint spraying without extensive alteration, and either a two-stroke or four-stroke engine may be used. The exact details of modification will naturally depend upon the engine available in the first case, and this article must, therefore, be regarded as a general guide.

In general, however, the smallest available engine should be chosen, and as in many cases such an engine may be reclaimed from scrap, care should be taken to see that the main working parts, that is to say, the crankshaft, connecting rod, cylinder, piston, the main bearings, and both connecting rod bearings, are all in good condition. The valve gear does not matter, as it has to be removed. If it is found necessary to rebore the cylinder, a new piston should be obtained, which reduces the compression space.

## Reducing Compression Space

In many cases it is important to adopt some method of reducing the compression space, such as turning down the cylinder flange, or the cylinder head joint, or else bolting a block of aluminium on to the top of the piston. The compressor will probably give useful results if the compression ratio of the engine is about 5:1 without such alteration, but it will be more efficient if it is altered.

Piston rings should be examined and renewed if necessary, as they may be a source of serious leakage if not in good order.

Having overhauled the main parts of the pump, attention may be given to the valves. All the gear may be discarded entirely, including timing gears, cams and tappets, but the valves themselves must be retained. The exhaust valve should be ground in and fitted in the usual manner; it is not to be used as a valve, but is the most convenient means of stopping up the exhaust port. The inlet valve should also be fitted in the ordinary manner, but with a much lighter spring than usual, so that it can be lifted from its seat by a light pressure of the finger. If it opens with a pressure of about 6oz., it will probably work all right, and in any case springs of various strengths can be tried when the machine is running.

In the case of a two-stroke petrol engine, nothing need be done beyond altering the compression ratio, if it is possible to do so without altering the port timing, and stopping up the transfer passage, as explained later.

## A Delivery Valve

The compressor will require a delivery valve, and it will be better to make a special fitment for this instead of trying to make use of the engine valves. The illustration (Fig. 2) shows a suitable design for this valve, which is intended to be screwed into the sparking-plug hole. It is a straightforward job for a metal turner; the body should be made of mild steel, and the "banjo union" of brass or gunmetal. The ball itself should be of stainless steel, if

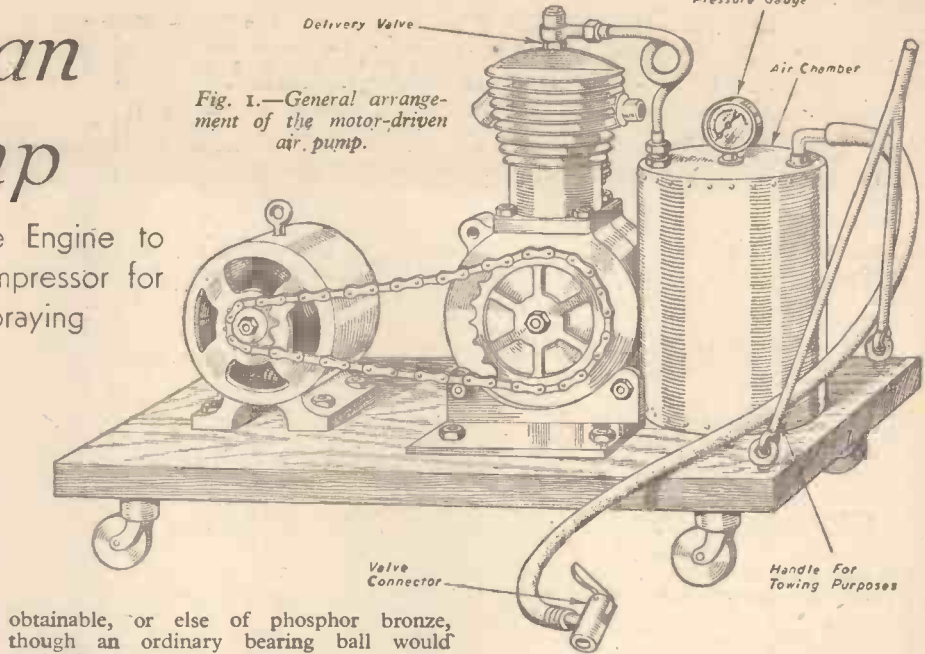


Fig. 1.—General arrangement of the motor-driven air pump.

obtainable, or else of phosphor bronze, though an ordinary bearing ball would probably give quite good service.

The spring should be fairly light—just enough to make the valve return smartly on to its seat.

Only the main dimensions are given, because it may be necessary in some cases to modify the arrangement to clear other parts of the engine. One point to watch when making the body is to see that the radial holes come immediately above the valve seat without breaking into the seat, and that the outer ends open clearly into the recess of the "banjo" ring.

After completing the compressor, there is the question of drive to be considered. An electric motor—when power is available—is by far the most convenient, and it is best to have one of about ½ h.p., which should suit most circumstances. It should be borne in mind that the power required does not depend only on the size of the pump, but the load is largely dependent upon the volume of air delivered.

## Power Supply

When electric power is not available, the compressor may be driven by another motor-

cycle engine, both being arranged on a stout wooden base on small wheels—preferably with caster action—and a handle to pull the whole outfit about. A similar arrangement can also be adopted for an electric drive (see Fig. 1), but in this case a long flexible electric lead would be required.

In either case, the motor, whether petrol or electric, should not be directly coupled to the compressor, but a chain or belt drive with a reduction ratio of about 4 or 5:1 should be used, so that the compressor runs at a slower speed than the motor.

## An Air-pressure Chamber

It is advisable to arrange an air-pressure chamber on the delivery pipe to even out the intermittent delivery from the compressor. A small, stout cylindrical tank, say gin. long and about 6in. diameter, would be suitable. It should be about 1/16in. thick and well riveted together—an ordinary soldered tin-can would probably burst sooner or later. This chamber could conveniently be arranged on the same baseboard and fitted with a pressure gauge. The delivery from the pump is connected to the air chamber, while a flexible tube of suitable length leads from another connection in the air chamber to the tyre valve. This flexible connection should be about ¼in. in bore and capable of standing pressures up to, say, 50lb. per square inch for ordinary touring cars, or 100lb. per square inch for lorries, etc.

## For High Pressures

If the unit is to be used for high pressures, such as are used on large lorry tyres, particular attention should be paid to reducing the compression space in the compressor cylinder, and it will be advisable to use a greater reduction on the drive, say 8 to 1 or 10 to 1. In any case, the flywheel should be retained on the compressor.

The lubrication of the compressor must not be overlooked, but provided that a small quantity of oil is kept in the crank chamber, no elaborate lubrication system is necessary. Care should be taken, however, to see that the piston rings are in good condition, so that oil does not get by, otherwise it might get into the tyre, with detrimental results. In the case of a two-stroke engine, the crank chamber should be sealed off by stopping up the connection to the transfer port, an air inlet being provided by drilling as many holes as possible in the outer walls of the transfer port, so that air can be drawn direct into the cylinder instead of via the crankcase.

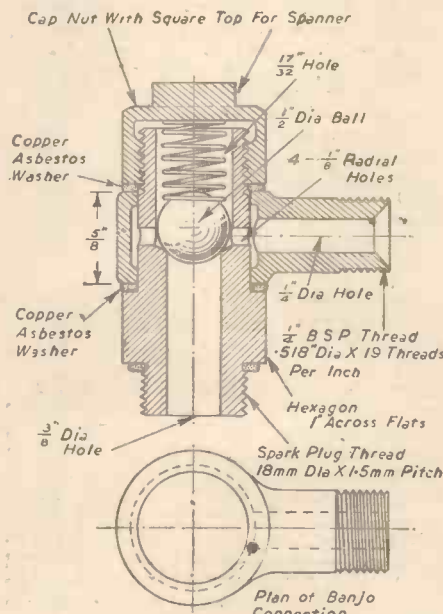
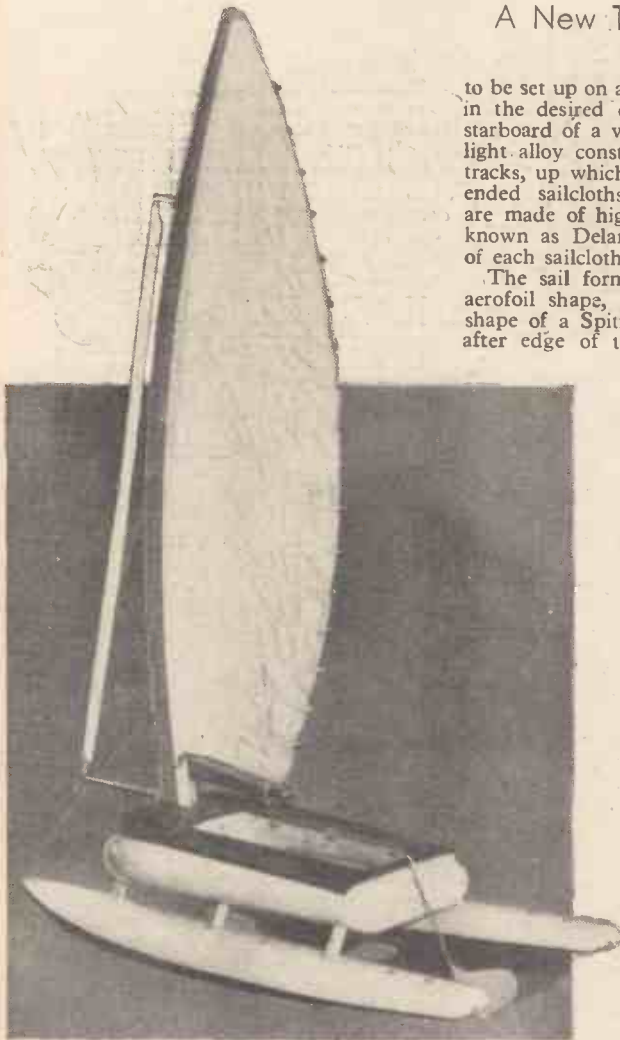


Fig. 2.—A suitable design for the delivery valve.

# The Wingsail Catamaran

A New Twin-float Type of Yacht Which Sails Into the Wind



General view of the Wingsail Catamaran, showing the aerofoil-shaped sail and streamlined floats

**T**HIS new craft, invented and designed by Mr. Wells Coates, F.R.I.B.A., with Leslie Appleton, M.A., as consulting engineer, has already created a considerable amount of interest in the "Britain Can Make It" Exhibition, and the following particulars may be of interest.

Mr. Wells Coates has been an amateur yachtsman since childhood; and as a part of his early life was spent in the Far East he has sailed many different types of craft with peculiar sails and rigs. He was a fighter pilot in the World War I, and was a technical staff officer in the R.A.F., in charge of fighter aircraft development, in the late war. He has combined, therefore, his interest in sailing with his knowledge of flying and of aerodynamics, and his associate, Mr. Appleton, has recently joined his firm after nine years as an aircraft designer with the Hawker Aircraft Company. They have together developed the new rig which will be known as the "Wingsail," and produced in this country and abroad by Wingsails, Ltd. (temporary address: 18, Yeoman's Row, S.W.3).

## Aerofoil-section Rig

The "Wingsail" rig, for the first time, makes it possible for a true aerofoil section

to be set up on a mast and maintained rigidly in the desired curvature, either to port or starboard of a vessel. A revolving mast, of light alloy construction, carries twin sliding tracks, up which the twin battens and "Y" ended sailcloths travel. The sail battens are made of high-pressure laminated plastic known as Delaron and run the full length of each sailcloth.

The sail form itself is the most efficient aerofoil shape, and may be likened to the shape of a Spitfire wing. The "leach" or after edge of the sail is in the form of a catenary curve which enables the leachrope, which runs through small rollers placed at the ends of the battens, to exert a pressure along the length of the battens, thus forcing them to flex against the mast and maintaining the curvature of the whole sail. Another control alters and maintains the angle between the boom and the mast, and once the desired curvature is set up the whole mast and sail is operated in the normal way by the mainsheets.

This form of sail is capable of sailing straight into the wind, as the sail form is not maintained by pressure of the wind on the windward side, but by the design of the mast and the sail itself. An increased lift is given to the rig by the arrangement of the foresail, which is shown in the model illustrated. As the foresail is not a rigid aerofoil, but a "flapping" sail, it is clear that, when sailing into the eyes of the wind, it must be set at an angle to the wind which will ensure that its "flow" or curvature is maintained. Thus the "tack" for the foresail—the attachment at the forward base of the triangle to the jib-boom—is arranged so that it may be slewed athwart the vessel, to windward or to leeward, thus presenting the desired angle to the wind, which angle is not the same as that presented by the "wing-sail." An important increase in lift is provided by this device, which prevents the sail from "stalling"—to use a flying term.

## Twin Floats

The designers desired a high performance vessel for the first tests of a high performance Wingsail, and the Catamaran, or twin-float type of vessel, was chosen. This is a very old form of sailing vessel—the Polynesians used it in 500 B.C., or before, but modern principles of design have been applied to the shape of the floats. These are hydroplanes of a special type, which rise at a certain speed, and the whole vessel skims across the surface of the water, attaining high speeds very quickly; it is estimated with a 24ft. Wingsail that 16 knots will be easily attained, and in the racing version a speed of 20 knots is possible.

The platform across the floats is arranged to be fixed at six points, and the fittings are so designed as to enable the span between the floats and height of the platform above the water to be varied. Thus a suitable setting of the platform and floats may be arranged to meet local water or wind conditions on the day of sailing.

The whole Catamaran is arranged to "package" on to a trailer suitable for towing by a motor-car.

A camping version of the Wingsail Catamaran provides camping comfort, with two bunks for two people, by means of a spacious tent rigged on crutches and stays, and held up by the main wingsail halyards.

Arrangements have been made for the production of Wingsail rigs in 24ft., 30ft., 36ft., 42ft. and 48ft. sizes by the use of standardised production methods—the masts, being made of 6ft. sections to suit the requirements of the full range. The Wingsail rig, complete with foresails and all control gear, will be available some time this year for use in converting existing yachts to this highly efficient rig, and for use in newly designed craft.

A prototype of the Wingsail Catamaran is now being made and will shortly go through its "flight trials." It is proposed that when orders for 100 vessels have been secured mass production of the vessel will be commenced. So much interest has been caused by this design that tooling of production vessels and their fittings, etc., has already been commenced.

## New Materials Used

The design uses the qualities of certain new materials and methods to the full. The Catamaran floats are moulded in the new I.C.I. product "nuron"—a synthetic plastic resin which impregnates the cloths which are laid on either side of an "Onzote" infill, forming a very light and strong "sandwich" of stressed-skin structure.

The mast structure is formed by the specially designed light alloy extrusion tracks which take the rollers of the sail battens, plus a nosing in light alloy on stressed-skin principles. The battens themselves are in high pressure laminated plastics, and light alloy fittings are used throughout.

The sides of the platform are also in the "nuron" sandwich moulding, and the lockers, and other fittings, are finished in a mahogany veneer over "egg-box" construction panels. The base of the platform is to be constructed in a single panel of "dufaylite" sections used as an infill between thin plywood skins.

The Wingsail Catamaran and its variants projected for the future will introduce a new era in sailing, what may be described as "High Speed Sailing."

## REFRESHER COURSE IN MATHEMATICS

By F. J. CAMM.

8/6, by post 9/-

# The "P.M." One-valver

A Simple but Very Efficient Receiver  
Designed for the Beginner Who Wishes  
to Construct His Own Coil

WHEN a receiver is built which employs a coil made by the constructor, a far greater thrill and a feeling of satisfaction is experienced when stations are tuned in than if a commercial product has been used. Unfortunately, however, it is not always possible to make in the average constructor's den many of the components required for a modern multi-valve receiver. In such instances it becomes essential to purchase reliable precision-made commercial products, but even so, there is no reason why those parts required for the more simple sets should not be tackled by the enthusiast and, by experiment, modified until the utmost efficiency is obtained. That forms the true pleasure of home construction, and should be the keynote of every constructor.

Bearing all this in mind, and the fact that everyone cannot afford to purchase components *ad lib.*, the "P.M." One-valver was produced to try and satisfy many demands. The receiver is about the simplest of the simple one-valvers possible to make, consistent with sensitivity and selectivity.

### The Circuit

This calls for little comment. It is an orthodox triode arrangement employing the leaky-grid system of rectification. The only feature which might be called unusual in the light of the average modern circuit is the method of obtaining reaction.

It will be seen in the theoretical circuit, Fig. 2, that the old form of *swinging coil*, or inductive coupling, is used to feed back sufficient high-frequency currents from the anode to the grid circuit to provide the required reaction so essential in this type of receiver to increase sensitivity and selectivity.

This system, in spite of its age, is still very efficient, providing care is taken with the design of the coils, the selection of the valve and the applied anode voltage. It also saves the cost of a reaction condenser.

### Construction

A wooden baseboard and panel was used, the sizes in each case being 5½ in. x 8½ in.

The .0005-mfd. tuning condenser, of the solid dielectric type, is mounted a little above the centre of the panel to allow ample room for the reaction control strip which projects through a small slot.

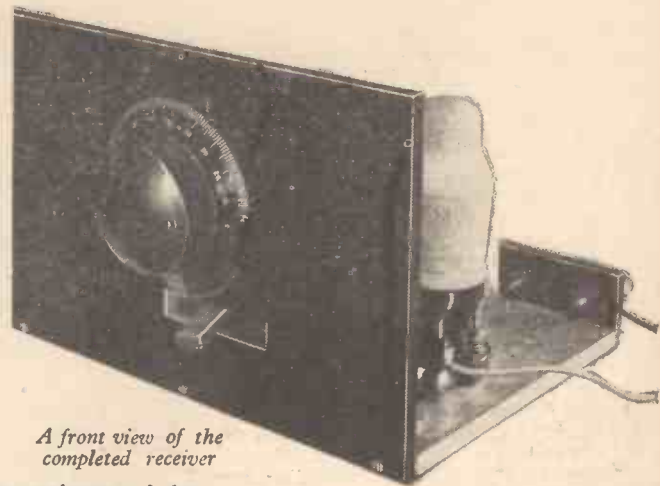
The valve-holder, an ordinary four-pin, baseboard-mounting type, is fixed on the right-hand side of the baseboard, while the coil assembly comes in line with, and to the rear of, the tuning condenser.

Two simple terminal or plug-and-socket strips are fixed to the rear edge of the baseboard to enable connections to be made to the aerial and earth and headphones. The grid-leak (2 megohms) can be of the ½-watt type, and the grid condenser (.0003 mfd.), an ordinary paper tubular or whatever type happens to be to hand.

### The Coil

This component is the vital part, and although its design is such that no difficulty should be experienced with its construction, every attempt must be made to wind the three separate sections as evenly as possible and to make the formers clean, rigid and secured firmly in the manner described and illustrated. The general assembly is shown in Fig. 4. The bottom coil former, which is fixed to the baseboard with a slight smear of glue or other adhesive, holds the long-wave winding, and this consists of 130 turns of 34 S.W.G. enamelled wire.

Above that is the reaction coil. This is wound on a plain former with 27 turns of 34 S.W.G. enamelled wire. The



A front view of the completed receiver

former is fixed to a narrow wooden strip which, in turn, is pivoted on a small wooden block so that the coil can be moved over and away from the L.-W. coil. The wooden strip must not be screwed too tightly to the block or else smooth movement will not be possible; it is advisable to place a small washer on each side to provide an even bearing.

The top former carries the medium-wave section, and this consists of 43 turns of 26 S.W.G. enamelled wire, a tapping connection being made at the 12th turn from the upper edge. This is best formed by twisting a small loop in the wire when

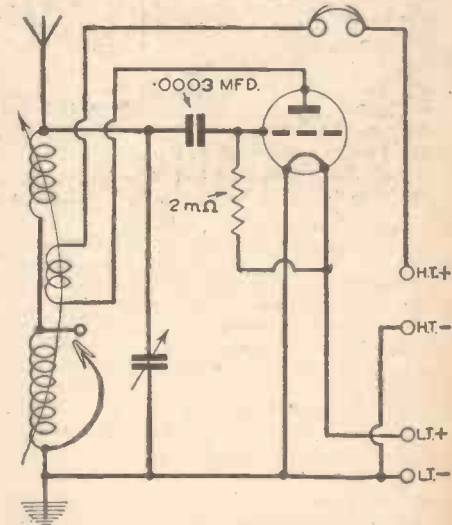


Fig. 2.—The theoretical circuit. An ordinary 2v. H.F. triode will be quite satisfactory

reaching the specified turn during the actual winding of the coil, removing the enamel coating from the loop with a sharp penknife or a piece of fine sandpaper.

The former is held in position by an upright piece of wood, which is fixed to the baseboard by means of a screw passing up through the base. Take care to ensure that it is firm. Inside the coil former is fastened another strip of wood, by means of adhesive, and this enables the coil to be supported by means of the horizontal strip which is fixed to the top of the vertical wooden post. A spot of glue will form a firm joint without any risk of damaging the coil or the former.

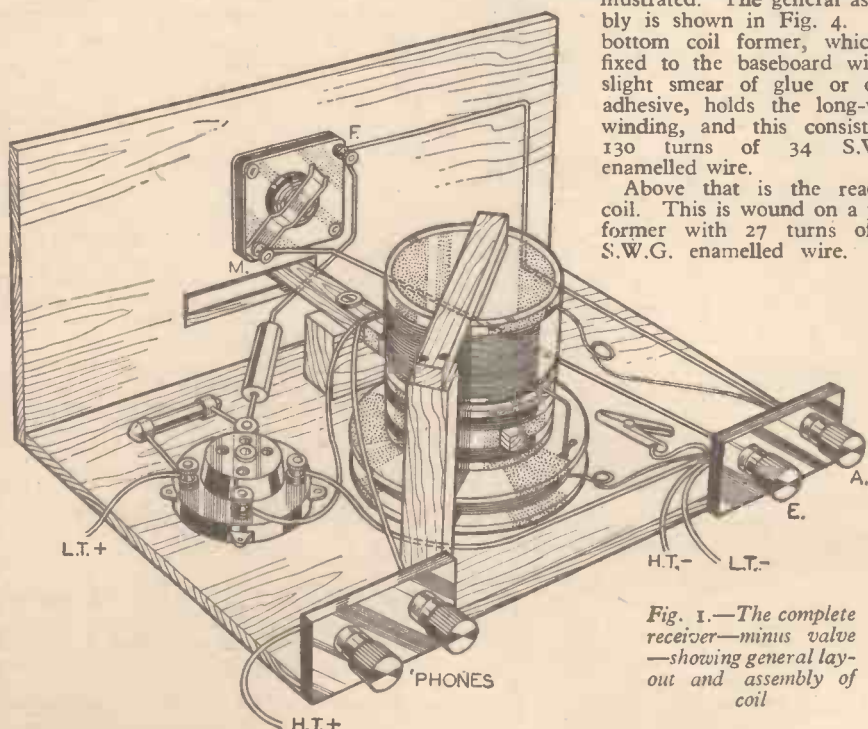


Fig. 1.—The complete receiver—minus valve—showing general layout and assembly of coil

It is essential to see that the space between the medium- and long-wave coils is just sufficient to allow the reaction coil to move freely in between.

**Formers**

These can be made from 2in. diameter paxolin tubing or ordinary cardboard tubes. If the latter is used, as in the case of the model being described, they should be dried in a gentle heat to remove any trace of moisture and then cut to size with a sharp knife or a fine-toothed saw, the edges being cleaned up afterwards with sandpaper. The medium wave requires a length of 1½ in., the reaction 2½ in., and the long waves 3½ in. The first two are just plain pieces of cardboard cheeks. These can be cut from thin, stiff board, their diameter being 2½ in. Before cutting them out, a circle equal to the diameter of the tube should be drawn (2in.), and then the outer, or cutting circle, marked off. The object of the 2in. circle is to enable the tube to be stuck to the cheeks in the correct central position. Let the adhesive set hard before attempting to wind the coil.

The start and end of each winding are made fast by boring two fine holes each side of the formers and threading the wire through them twice.

**Operation**

The batteries required are a 2-volt accumulator and a 60-volt high tension, although if a 120-volt battery is to hand a slight increase in signal strength can be obtained by applying, say, 70 to 80 volts to the detector.

The tuning is carried out by the variable condenser in the normal manner, but the sensitivity is governed by the position of the reaction coil with relation to the others.

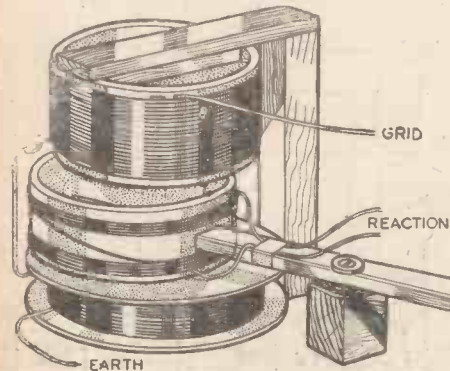


Fig. 4.—The general assembly of the coil unit. The medium-wave section is at the top, reaction in the middle, and the L.W. at the bottom. All windings are in the same direction.

Maximum effect is gained when the swinging reaction coil is in between the top and bottom sections, but it must be adjusted to give the loudest signals without any trace of oscillation. The control may seem a little touchy at first, but a little experience with it will soon enable the correct handling to be obtained.

When the long waves are required the clip is removed and left free, while for medium waves it must be clipped on the junction formed by the connection between the end of the medium and the start of the long-wave windings.

An aerial of medium length should be used. If too long, the damping will stop satisfactory reaction; therefore it is well worth while trying the receiver on an efficient form of indoor aerial. It will be noted that no "extras" are fitted, such as by-pass condensers, H.F. choke, or on-off switch.

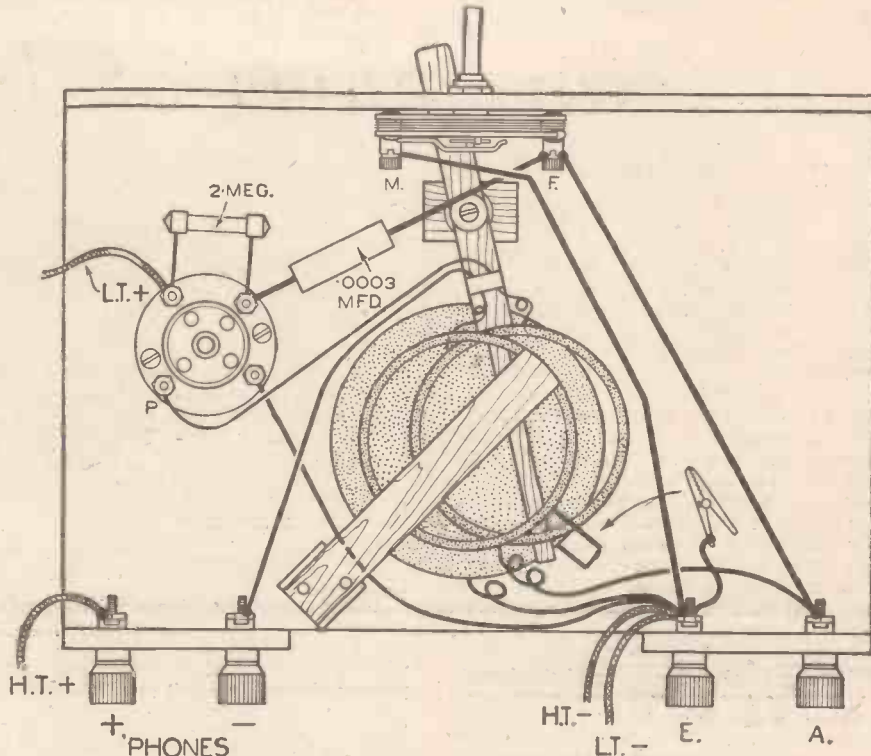


Fig. 3.—Plan view of the receiver, showing wiring.

Wave-changing is effected by means of the crocodile clip.

**Hotting-up the Circuit**

In certain areas it may be noticed that the selectivity is not sufficient to allow clear separation of all receivable transmissions. The simplest and quickest way of improving such matters is to include between the aerial terminal and the coil tapping point a small condenser, say, one having a value of .0001 mfd. The value is not supercritical, though it will be found that the smaller the capacity the sharper will be the tuning, but the signal strength will decrease correspondingly. It is better, therefore, to use a variable condenser, in which case the maximum value can be in the neighbourhood of .0003 mfd. If a component of this type is used it can be mounted on the left-hand side of the panel, so that easy control can be obtained. Another way of improving the selectivity is by lowering the aerial tapping point on the medium wave section down the coil, but as this would mean increasing

the total number of turns on the coil, so that it would cover the same wave-range, it is not advisable in this instance. There is no reason, however, why those wishing to progress with their knowledge should not carry out experiments in this direction, making up a separate coil on a longer former for such purposes.

**Dial and Tuning Condenser**

Although a variable condenser of the "solid" dielectric type is specified for the "P.M." One-valver, there is no reason why any standard type of air dielectric kind should not be used, provided it has the same capacity, namely, .0005 mfd. On actual test it will, no doubt, be found that a greater efficiency will be obtained with a condenser of the latter kind, but if it is decided to use one, it should be remembered that the coil unit might have to be moved more to the rear of the baseboard. The general appearance of the set will be improved with the fitting of a slow-motion dial, though the use of one having station names marked on it is not advised unless one is prepared to experiment with the coils to obtain accurate settings of the dial pointer.

**Progress on the "Brabazon I"**

STEADY progress is being made on the Bristol Type 167 "Brabazon I" in its hangar at Filton, Bristol. Large areas of skinning have now been completed, and the clean lines of the finished airliner are emerging from the tangle of jigs and scaffolding which surrounds the aircraft.

At first glance there seems to be little order in the layout of the shop, but, in reality, every detail has been planned not only to assist construction but also to facilitate removal to the new hangar for assembly.

The aircraft itself is losing its early resemblance to a Zeppelin as skinning goes steadily forward. Already the greater part of the nose and much of the fuselage aft of the mainplane have been covered.

On the tailplane jig, 20ft. above the floor, the tail assembly has now taken shape, although the fin and rudder will not be built until the 167 reaches its new hangar. The leading edges of the tailplane were built on the floor. Some indication of their size is given by the fact that while riveting was in hand one man worked inside the section.

# Inventions of Interest

## Fountain Shaving Brush

A CITIZEN of the United States of America has applied for a patent in this country for a fountain shaving brush.

Briefly, the invention consists of a shaving brush in which the handle portion is divided into two compartments. The outer is a reservoir for holding a soap and water mixture, while the inner houses a heating element.

A feed tube extends from the outer compartment or reservoir through the inner to the brush and is surrounded in the inner compartment by the heating element, whereby the soap and water mixture is heated on its way to the brush.

The end of the tube adjacent to the brush is provided with a distributing head which also serves as a massaging element and which is warmed by the heating element by conduction through the feed tube.

In the reservoir is mounted a valve in the form of a plunger controlling the passage through the feed tube. Upon reciprocation, the plunger, in co-operation with lateral passages in the upper end of the feed tube, functions as a pump to force the soap and water mixture through the feed tube.

## Anti-pest Process

IN a complete specification recently accepted by the British Patent Office, it is remarked that the destruction of insects, particularly house flies and mosquitoes in domestic and other buildings, is a problem which has received considerable attention with a view to preventing the contamination of food by these pests.

Now certain inventors contend that they have discovered that a coating composition having properties deadly to insects can be obtained by incorporating with a film-forming medium a toxic chemical. Compositions in which this chemical may be embodied include distempers, oil paints, and resinous varnishes, lacquers and wax polishes.

On applying these compositions to the surface of a structure such as a wall or an article of furniture, it is found that the resulting film is not substantially different in appearance from a similar film containing no toxic material. But when insects alight upon it, or pass across the coated surface, they are injuriously affected. And prolonged contact usually occasions the death of the insects in the course of a few hours.

Further, it appears that the poisonous nature of the composition is retained for a considerable period.

The inventors affirm that there is no deleterious effect upon human beings or domestic animals.

## Interlocking Building Blocks

AN inventor has been conceiving new methods of house construction. One of these ideas is an improved kind of building block or slab.

It has already been proposed to form building blocks having on the upper and lower faces interlocking projections and recesses of dovetail shape. Others have been suggested with upwardly tapering walls. The latter description are assembled by positioning one block above another and lowering it so that it may enter the projections into the respective blocks. The new invention is an improved form of this interlocking means.

It is interesting to note that the designer of this interlocking building block is a woman.

Her idea is a block which comprises a body portion provided on its upper and lower

faces with one or more transversely extending wedge-shaped projections and recesses. These projections have vertical side-walls converging from the inner to the outer side of the block. And the recesses are of a shape corresponding to that of the projections and are constructed to interlock therewith by a sliding movement transversely in relation to the blocks.

The information on this page is specially supplied to "Practical Mechanics" by Messrs. Hughes & Young, Patent Agents, of 7, Stone Buildings, Lincoln's Inn, London, W.C.2, who will be pleased to send free to readers mentioning this paper a copy of their handbook, "How to Patent an Invention."

The side edges may also be furnished with recesses and projections. These blocks engage with a wedging action which ensures a rigid joint and correct positioning and alignment of the blocks.

The blocks may be of different sizes and shapes to allow variations in building construction. For example, the main wall blocks may be made in three or more sizes, each a multiple of the normal building brick.

The projections and recesses are arranged so that the blocks slide into position from the outer side of the building, so that external pressure, such as wind, tends to force the blocks into tighter locking engagement.

The blocks may also be made in small sizes of wood, metal, plastic or other material for use as a toy.

mentioned new device is to furnish a method whereby the pilot of a seaplane may, at will, free his machine from the net without necessitating the manual disengagement of the hook from the net by somebody who must descend for the purpose.

The invention consists in a hook for a seaplane, with a Y-shaped shank, the free ends of the divergent arms of the Y being adapted to be pivoted to floats on the seaplane. The central limb of the Y carries at its free end at least one fluke pivoted thereto. To restrain the fluke from movement in relation to the shank is a locking device which is operated by lock-controlling means.

The fluke may be formed with a notch in which may engage a spring-influenced bolt slidably relative to the shank of the hook. When it is desired to release the hook, means would be provided for withdrawing the bolt against the action of the spring.

## For Mine-sweeping

AMONG recent applications for patents in this country there has been accepted one relating to boats with mine-sweeping gear or other towing gear such as, for example, may be required for towing targets.

The inventor maintains that he has provided an arrangement which is compact and easily accessible, yet is of small extent, and situated in such a position as to have little effect upon the accommodation, lay-out and the general manoeuvrability of the boat,



A wingless gyro-glider undergoing tests at the General Electric Test Centre in Schenectady, New York. I. B. Benson, one of the engineers responsible for its design, is at the controls.

## To "Land" Seaplanes

THE subject of a specification lately published by the British Patent Office is improved means for "landing" seaplanes at sea.

It appears that it is known already for a parent ship to tow a metallic net on which a flying boat can "land" and to which it can be anchored by means of a hook.

The primary object of the above-

which, for this type of craft, is an important asset.

The invention comprises a boat, particularly a high-speed boat, having mine-sweeping or other towing gear, in which the machinery for this gear is housed in a compartment adjacent to the transome, and the sweeping wires are attached to pulleys secured to the forward end of the compartment.

# An Electric Table Lamp

## How to Make an Inexpensive and Attractive Fitment

By R. J. CHAMBERLAIN

**M**INIMUM prices of electric table lamps nowadays average approximately £2 10s. The attractive model illustrated was made by the writer for about 10s., or if the plastic shade is fitted—not the home-made type—the price is 18s.

The plastic shade is obtainable in yellow and crimson hues from a well-known mail order store. The advantage with these celluloid shades is, of course, the easy way they can be kept clean. Parchment and silken types soon get dirty with repeated dusting. However, many of these, although cheaper than the plastic style to some extent, are well made and designed in various shapes, not to mention colour.

If desired, a rather neat, simple, inexpensive shade can be made at home from modern floral wallpaper and wire. The method employed is so straightforward and the results so effective—as can be seen in the illustration, Fig. 1—that you will probably decide to make your own lampshade.

The plastic shade is, naturally, more transparent than the paper type. The opaque glow from the home-made shade is quite pleasing, nevertheless, and you might prefer it.

### The Column

A distinctive feature about the lamp is the column. This was made from a 6in. by 3½in. square-cut cabriole-shaped wooden foot which the writer happened to have in his possession. The foot saved a great deal of trouble, because it was only necessary to alter the toe slightly and remove the "wings" from the sides as shown in Fig. 1.

It is quite likely that you may be able to purchase one of these small legs from a woodworkers' supply shop. If only a turned cabriole leg can be obtained, it will be excellent for the purpose, the wings being the only parts to remove. If, on the other hand, you are unable to obtain either style of foot, the only course is to shape the column, squarely, from a block measuring 6ins. by 2½ins. by 2½ins.

It is merely a matter of pencilling the shape on two sides of the block, then cutting roughly to shape with a bow-saw and trimming and paring neatly to the guide lines with a gouge and chisel, finally smoothing the shape with a spokeshave, rasp and glasspaper. If you possess a lathe; a suitable column, based on the design shown, it can be easily turned, including the base, the latter being turned solidly from a block 6in. by 6in. by 1½in.

Assuming you manage to obtain a foot like the one depicted or a round-shaped type, it is bored down the centre for the lead cable (standard twin flex), using a ¼in. bit. Prior to drilling the hole, obtain the lamp holder shown in Fig. 4. It is a switch-bar type for pendant (hanging) or table lamp (inverted) use.

Now, in the normal way, this fitting, with the nipple screwed out, screws upon a threaded brass fitting screwed to the top end of the column. Since this brass fitting may be difficult to obtain, the actual nipple supplied with the holder can be utilised. A neat seating, therefore, for the nipple is bored in the top of the column, following which the flex hole is bored, working carefully from both ends of the foot. It is imperative that the boring is accurately done, because, as will be seen by the sectional side view in Fig. 3, the leg shape rather "cuts" into the centre of the leg.

The nipple seating is begun with a ¼in.



The finished lamp fitted with a plastic shade.

bit to a depth of ¼in. The remainder is bored with a ¼in. bit to a depth of ¾in. or 1in. Much depends on the size and shape of the nipple you are supplied with; the use of calipers will determine the diameter of bits to use. Should your bits make a seating which is a trifle too large, remember that the nipple can be smeared with plastic wood and pushed gently into its seating; in this case no glue will be needed.

### The Base Discs

The column base consists of three discs of wood cut from ¾in. hardwood, such as birch or beech. If you have made the column from deal, then the base discs can be cut from the same kind of wood, using a bow-saw or a padsaw, or a coarse fretsaw. If none of these tools is available, cut out three squares 6in., 5in. and 4in. respectively with a panel saw. Scribe the diameters with compasses, then saw off the corners to the radii lines to make the squares rough octagon shapes, finally paring the wood circular on a flat block of wood with a chisel, using shoulder pressure.

### Assembly of Base Discs

To prevent warping, the base discs must be assembled so that the grain of each disc runs crosswise to the other. Select the smallest disc, C, mark the position of the bottom end of the column upon it, then drill and countersink screw holes within the guide lines (see dotted lines at Fig. 2). Disc C is affixed to the column with 1½in. by 6in. flathead iron screws.

Disc B, also drilled and countersunk for screws, is attached beneath disc A, centrally. Disc A is drilled and countersunk for four screws. In its centre a 1¼in. diam. hole is bored with a centre bit. A ¼in. hole is then bored from the edge to the central hole. This is the outlet for the flex wire.

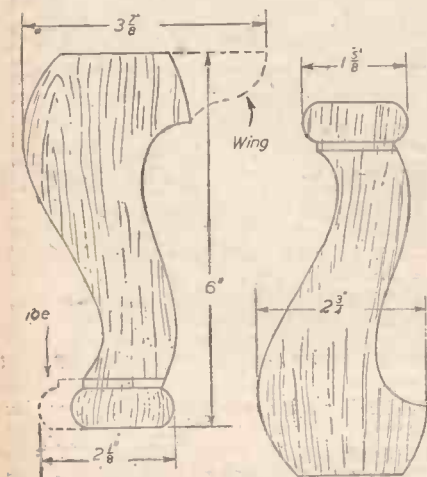


Fig. 1—How the column is shaped from a wooden foot. It is only necessary to alter the toe and remove the wings.

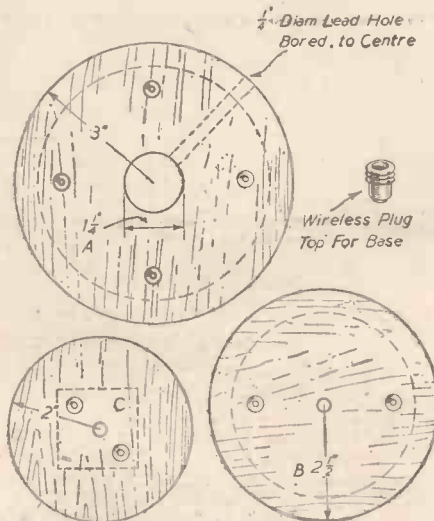


Fig. 2—Size and shape of the three base discs, which are screwed together so that the grains run crosswise to each other.

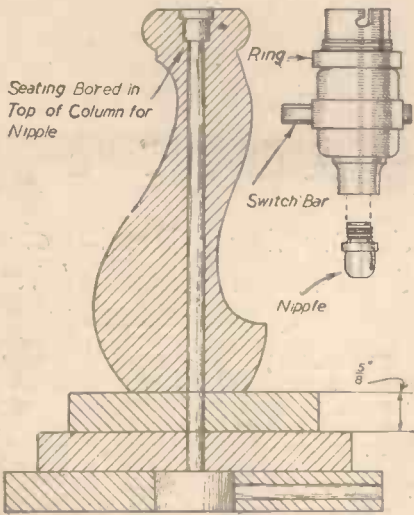


Fig. 3—Sectional view of base and column, and detail of lamp fitting used.

The hole can be set off by fitting the top part of a wireless plug into it.

Having attached the larger disc, this completes the wooden stand. If you have used birch or beech, it will only be necessary to apply about three thin coats of french polish to the work with, preferably, a soft mopping brush. Use a light walnut polish and allow one application to dry before adding another. The first coat will undoubtedly soak into the wood and raise the grain slightly. This must be rubbed down with No. 1 and No. 0 glasspaper. Give the second coat, allow to dry; if it dries rough, rub down and apply a third coat.

If the brush produces streaks, due to stiffness of some of the bristles, make a small pad from cotton wool and linen and use this for bodying-in and finishing off the polishing. The whole secret of french polishing, by the way, lies in the consistency of the polish itself. The thinner the polish, the better the ultimate finish; it may mean more applications, but results are worth it.

**The Shade Holder**

Rather than make a wire shade holder, the writer purchased one from the store which supplied the plastic lampshade. It cost 1s. and was altered at the top as shown in the side elevation in Fig. 4. The alteration enabled the plastic shade to fit down more snugly on the holder prongs. You may care to follow the same plan.

Having prepared the holder, connect several feet of standard twin flex wire to the lamp holder. The wire, of course, is first threaded down through the column and out at the base. To prevent twisting, however, the wire should be brought through the column only, then attached to the holder, the latter being screwed firmly upon its nipple, and the remainder of the wire run through the base hole. A plug, or adaptor, is connected to its free end.

**Home-made Lampshade**

If you wish to make your own lampshade it is quite likely that you will have a roll of "waste" wallpaper in the house or a cutting which will provide a strip 36in. long by 10½in. wide. While a floral-design paper is desirable, almost any design of wallpaper will serve, provided that it is not too dark.

The writer made his shade from a modern "plastic" wallpaper of good quality, beautifully designed in cream, brown, pink and golden tints, with touches of dark brown. The paper was somewhat thicker than the normal stuff.

It was thought at first that it might require to be made more transparent by rubbing

the reverse side all over with a piece of white candle, then heating the paper before a fire to melt the tallow so that it became absorbed into the paper and produced a parchment effect.

Assuming a strip of suitable paper has been obtained, cut to the size mentioned and fold it over at the edges to make 1½in. hems. These hems do not need to be pasted down.

When the hems are folded over (at the reverse side of the paper) the next stage is putting a crinkle in the paper. A neat way to do this is to use half of a folding 3ft. rule.

The paper is set beneath one of the sections (which is lifted and pressed down on the paper), then a crease made, following this up closely with additional creases, all being about ¼in. wide and bent in concertina fashion.

When the paper is completely creased, make two wire rings. One of these (the top ring) measures about 4in. in diameter; the other (the bottom ring) measures about 10in. diameter.

**Attaching the Wire Rings**

The ends of the wire are connected with tubes of tin about 1in. long. These tin jointers, which resemble shoe-lace tags, fit tightly over the end of the wire, the opposite end being kept free at the moment, this applying to each ring.

At this juncture the shade crinkles are drawn neatly together, then holes pierced through centrally with the hems, using a bradawl. This, of course, makes a hole in every crease. Keeping the paper crinkles

- | MATERIALS REQUIRED |   |
|--------------------|---|
| 1                  | column block (or foot)—6in. by 2½in. by 2½in.                   |
| 1                  | top base disc (C)—4in. diam. by ½in.                            |
| 1                  | centre base disc (B)—5in. diam. by ½in.                         |
| 1                  | bottom base disc (A)—6in. diam. by ½in.                         |
| 1                  | switch-bar lamp holder, with nipple.                            |
| 1                  | wireless plug top.  |
| 1yd.               | or more of standard twin-flex cable.                            |
| 1                  | wire lampshade holder.  |
| 8                  | iron flathead screws, 1½in. by 6.                               |
| 1                  | strip of wallpaper, 36in. by 10½in., and some stiff brass wire. |
| 1                  | pearl, or frosted, 1 amp, 50 watt or 75 watt.                   |

held flat together, insert the free end of the wire rings through the paper, then connect

the wires together with the tin jointers.

The bunched paper is arranged around the rings so that the edges meet, and these are joined together with tube glue, thus completing the shade. The diameter of the wire rings, plus the variation afforded by the crinkles in the paper, enables the paper to "fan" out without trouble.

To make the shade more attractive, a silken fringe could be sewn to the bottom hem of the paper, at the interior. This could be done on a sewing machine prior to inserting the wire rings.

The top ring rests upon the tips of the wire holder. The latter will have to be adjusted adequately to ensure a good fit. To complete the lamp, a 6in. disc of green baize, with a 1½in. hole in the middle, is attached to the underside of the base with a suitable adhesive. This covers the screw heads and prevents the lamp from scratching polished surfaces.

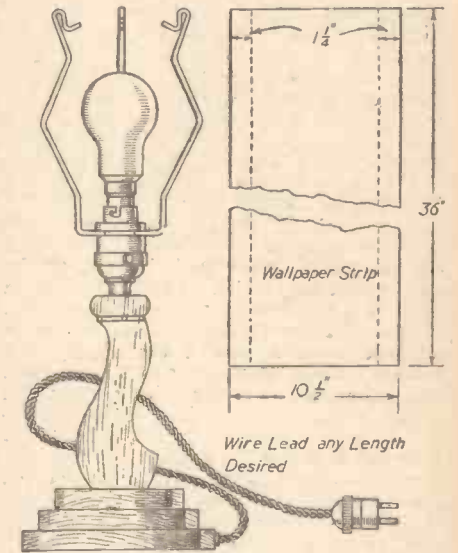


Fig. 4—A side elevation, showing lamp and shade holder in place.

**Powerful Diesel-electric Locomotive**



The 75,000th locomotive recently built by the American Locomotive Company. This 6,000 h.p. diesel-electric locomotive weighs 450 tons, and is capable of 120 miles per hour.

# A Remote-controlled 1in. Scale Model Tank



Side view of the finished model tank.

THE scale of the model is 1in. to the foot, making an overall length of a little more than 2ft., a width of 11in. and a height of 8½in. Motive power is obtained from a 12-volt car battery and trickle charger through a 3.2-amp. 12v. A.C./D.C. electric motor driving worm and pinion reduction and chain drive to two half-shafts which carry the final drive sprockets engaging the track.

The control box is incorporated in the case in which the tank itself is transported. From the 12-volt battery, distribution press-buttons and switches direct the current to the components in the tank through 15ft. of seven-core cable, one core being the common earth. A seven-pin plug is fashioned to represent an inlet louvre at the side and

engages seven brass strips fixed inside the pannier. A locking device for this plug is provided. (Figs. 1 and 2.)

## Constructional Details of a Scale Model "Churchill" Tank

By PHILIP F. DODD

The following is a description of the evolution of the model, and may serve as a guide to those enthusiasts who may be prompted to construct a model on similar lines.

### The Hull

The main body of the hull is constructed of 11 panels of good quality plywood accurately cut to scale (Fig. 3), these being secured to each other by means of glued wood blocks and ½in. x 2 gauge brass wood screws. The pannier bottoms are of 14 S.W.G. sheet brass cut and drilled to receive nuts and bolts for the securing of each of the 22 suspension units. These are individually detachable, this operation being as awkward as in prototype practice! The pannier tops, on which the top run of the track slides, are removable to permit access to the suspension unit nuts, securing these

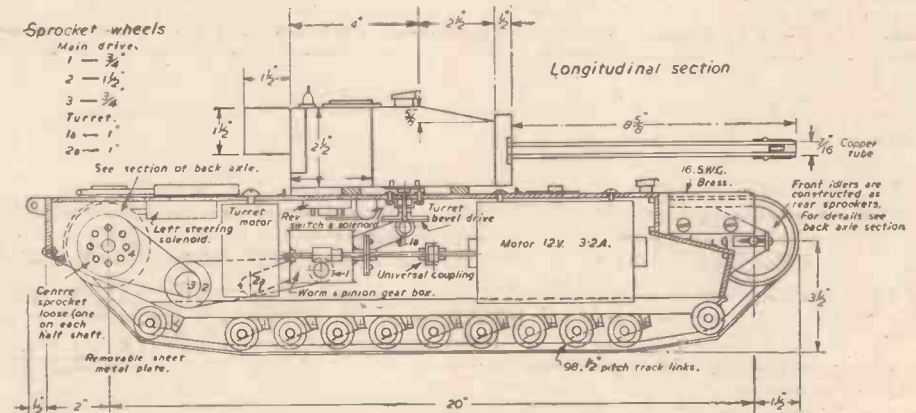


Fig. 1.—This sectional view shows the layout of the driving motors and transmissions.

By means of the above controls the tank may be controlled to start, stop, travel forwards and backwards and steer to the left or right while travelling either forwards or backwards.

units to the pannier bottoms. Representations of doors, hatches, hinges, mud guards, lamps, etc., are included and are glued to the hull. (Fig 4.)

GENERAL DIMENSIONS :	
Weight .. .. .	34lb.
Width .. .. .	11in.
Height .. .. .	8.5in.
Length .. .. .	24.3in.
Vertical climb ..	3.5in.
Gap crossing .. .	10in.
Speed 3,000 r.p.m. .	.41 m.p.h.
Power unit .. .	12 v., 3.2 amp., A.C./D.C.
Track width .. .	1 1/2 in.
Track length (each)	3ft. 11in.
Drawbar pull .. .	16.5lb.

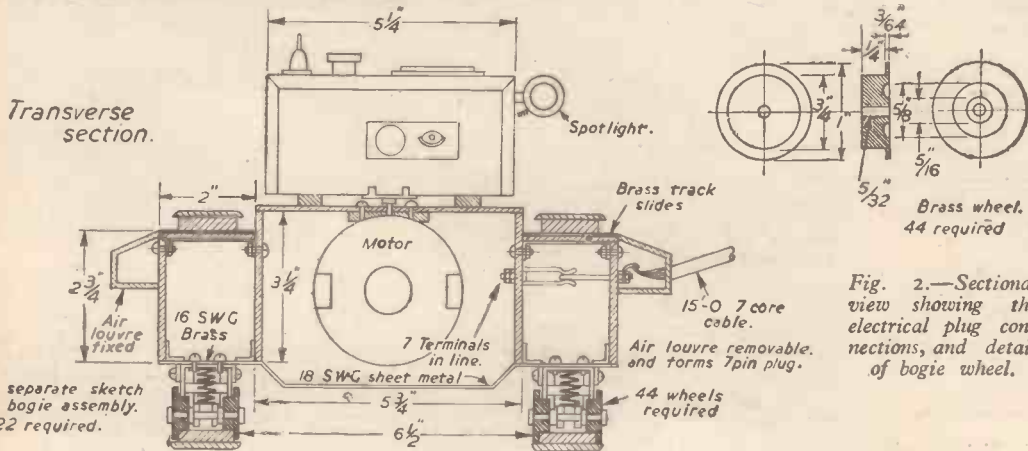


Fig. 2.—Sectional view showing the electrical plug connections, and detail of bogie wheel.

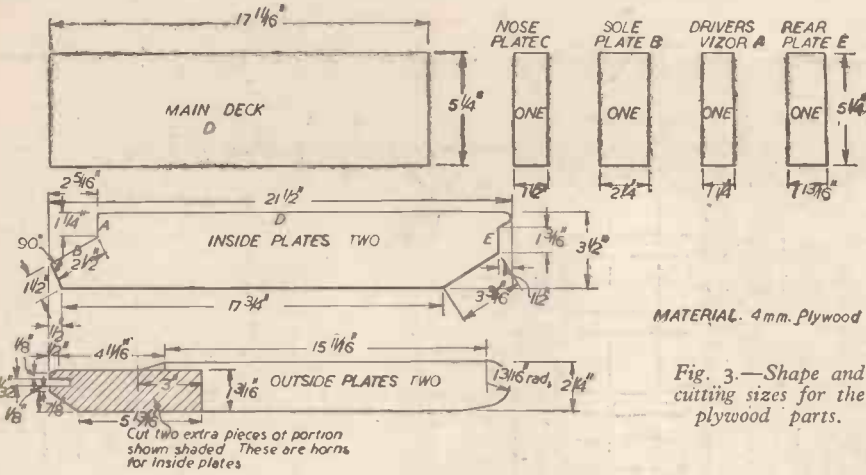
### The Turret

The turret is carved out of solid spruce and mounts a representation of a machine-gun and a large calibre gun with muzzle brake. Traverse is effected by a 12-volt electric motor of the windscreen-wiper type driving through chain drive to bevel reduction gear. (Figs. 1 and 2.)

### Transmission from Motor to Half-shafts

The motor was originally series wound, and in order to effect reversal of direction of the tank a solenoid of the car direction indicator type was





MATERIAL. 4mm. Plywood

Fig. 3.—Shape and cutting sizes for the plywood parts.

employed to carry out a gear change through a system of linkages. As this resulted in gear teeth slip and their inevitable wear; it was decided to rewind the motor, isolating the armature windings from the field windings and wiring for control through a solenoid-operated reverse switch. No trouble has been experienced with this method, and the time was well spent in making a rather elaborate reversing switch. The drive is transmitted from the motor through a universal coupling to an insulating coupling. This was found necessary due to the fact that one brush of the motor is earthed and, had the motor not been isolated from the "machinery" of the tank the armature shaft would have also been earthed. This insulating coupling consists of two Meccano bush wheels spaced with cardboard and held together with nuts and bolts, the latter having insulating sleeves. From this coupling a shaft carrying a worm wheel is housed in a gearbox casing made of sheet brass and stayed to a transverse member fixed to the hull. Engaging the worm wheel is a 19-tooth pinion mounted on a transverse shaft carrying one  $\frac{3}{4}$  in. sprocket wheel on each side of the gearbox. The shaft is carried in Meccano collars sweated to brass strips, these strips in turn being secured to the hull by means of nuts and bolts. Originally the drive was taken direct from this shaft to the back axle, but subsequently a countershaft was added in order to experiment with the changeability of sprocket wheels to determine the optimum reduction between motor and back axle. (Fig. 5.) The ratios now employed are:

- Motor to gearbox output shaft 19 : 1
- Output shaft to countershaft 2 : 1
- Countershaft to back axle ... 2.7 : 1

This results in an overall ratio of 102.6 : 1. The motor speed is 3,000 r.p.m. under load, and that of the final drive sprocket about 30 r.p.m. The circumference of the final drive sprocket is 8 in., and therefore the tank will travel at 240 in. per minute or .41 m.p.h. This is calculated on the assumption that the surface over which the tank is travelling is reasonably smooth and flat.

**Steering Mechanism**

Many types were tried and many moments of exasperation were experienced before deciding the type which would be adopted finally and which would be operationally foolproof. In all cases two half-shafts were employed, flats being filed thereon where necessary as sufficient grip on the axles was not afforded by the wheel set-screws.

The first method to be used was a modified type of controlled differential steering with external contracting brake shoes acting upon drums mounted on and fixed to each half-

shaft. The differential itself consisted of two 2 in. sprocket wheels forming the cage and spaced apart by rods tapped at both ends. Spur-gears were employed throughout. However, sufficient pull, to obtain locking of the half-shaft by the steering solenoid (a 12v. direction indicator type), was not afforded, and so the idea was scrapped.

**Dog Clutch**

The second method employed the same differential, but each half-shaft was prevented from revolving by means of a sliding member which was in constant engagement with studs mounted in a collar secured to each half-shaft. (Fig. 6.) It was arranged so that when steering was necessary the solenoid actuated the sliding member and locked it by means of a dog clutch, which was mounted on the sliding member, the corresponding part being fixed to the hull. It was found that the motor was not sufficiently powerful to provide the necessary

torque to overcome the doubling up of speed of the driving half-shaft of the differential.

The third method resulted in the differential being discarded and mounting two 2 in. sprocket wheels loosely on each half-shaft. Meccano bush wheels locked to each half-shaft were provided for the purpose of transferring the drive from the sprockets to the final drive sprockets. This was effected by means of a sliding member, one side having one half of a dog clutch engaging a mating half fixed to the hull, as in the second method, and the other side having a bush wheel to which were fixed long studs. These studs passed through the bush wheel fixed to the half-shaft, and thence engaged the holes in the sprocket wheel. It will be seen that when steering was required, the solenoid, by a system of linkages, actuated the sliding member, thus withdrawing the studs from the sprocket wheel, and breaking the drive; on further movement, the sliding member locked itself in the dog clutch and

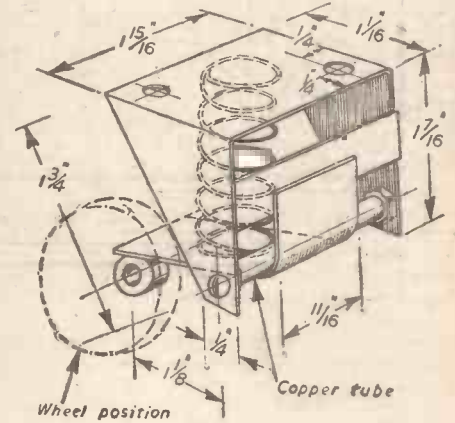
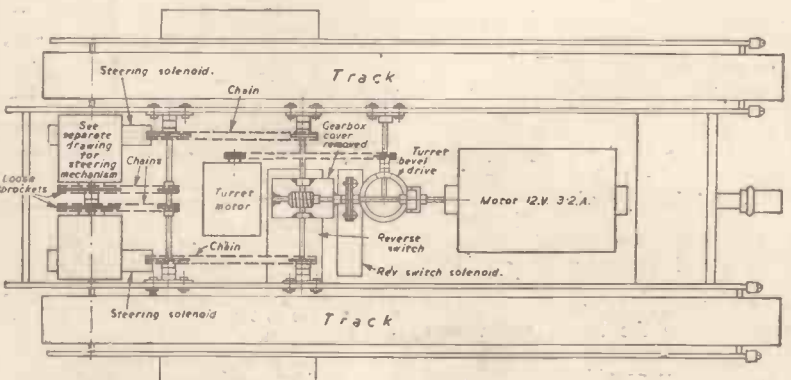
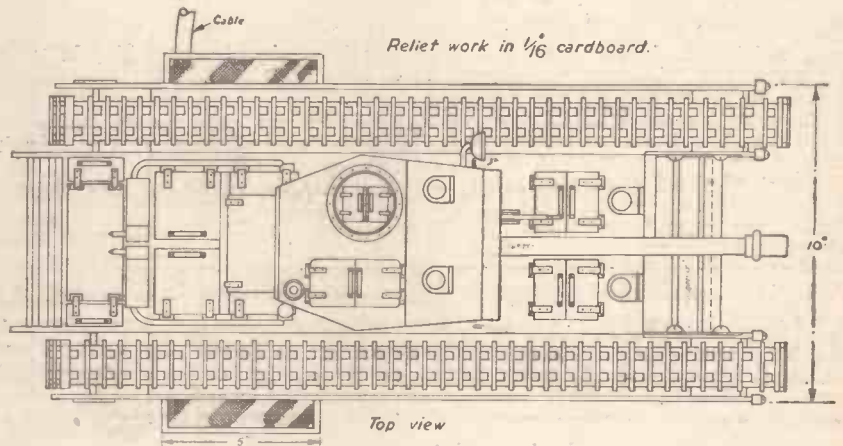
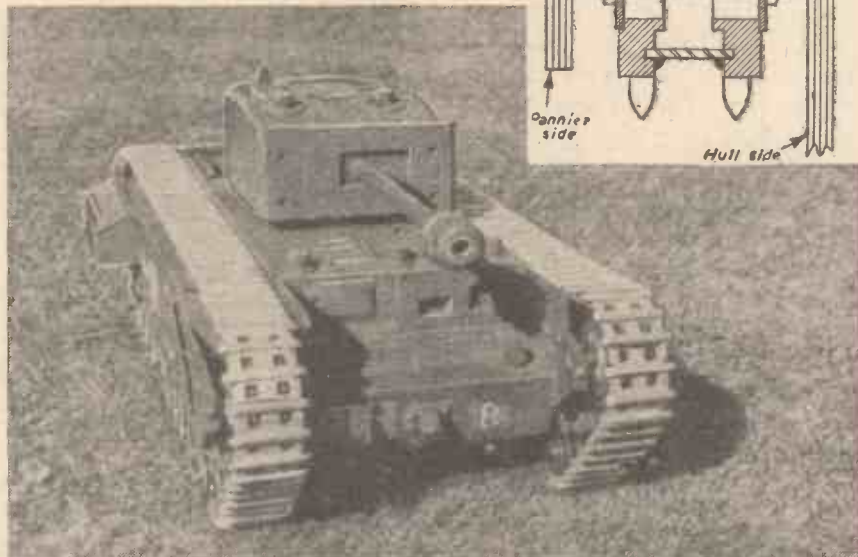


Fig. 7.—Details of suspension units.



Figs. 4 and 5.—Plan and underside view, with cover removed.

resulted in the locking of the half-shaft. The solenoid was sufficiently powerful to withdraw the studs even when the studs were under load, but the return spring was not sufficiently powerful to disengage the dog clutch, which was of small diameter. The final method was taking shape and required only a few modifications to this third method. Due to the inability of the return spring to disengage the dog clutch, the latter was therefore removed and a radial stud with roller was fixed to the hull. The other half of the dog clutch, which was mounted in the sliding member, was replaced by an arm, this arm carrying two small bevelled studs parallel to the main half-shaft, and locking with the roller when steering. The roller and bevelling resulted



Front view of the completed tank.

in easy withdrawal. The tension exerted by the return spring had always to be less than the pull exerted by the solenoid. This is obvious, as otherwise the mechanism would not operate. Therefore, any increase in the tension of the return spring to effect prompt withdrawal of the locking mechanism resulted in failure of steering. Similarly, in order to ease the friction between the long studs in the sliding member bush wheel and the holes in the sprocket wheel, screws were inserted in the diametrically opposed set-screw holes in the sprocket wheel bosses. These screws carried rollers which were contacted by the studs in the sliding member bush wheel.

**Final Drive and Idler Sprockets**

Each unit is made of two bicycle sprockets of the fixed wheel type (2.6in. diametral pitch, 16 teeth, 1/4in. pitch) and spaced apart by a 1/2in. strip of 16 S.W.G. mild steel sweated to each sprocket. Two steel bush wheels form the centering hubs and are clamped to each other on both sides of each sprocket by through studs and subsequently sweated to the sprockets themselves. The torque to propel the tank proved a little beyond the capabilities of the Meccano wheels due to the tendency for the bosses to work loose in the wheel itself. But it is certain that the Meccano parts employed have stood up to a strain for which they were never designed. In all cases, solder was run in between the bosses and wheels concerned.

Track adjusters are provided on the idlers, giving an adjustment of 1/4in. on either side of normal. A link may, therefore, be added

or subtracted without resulting in too tight or too slack a track.

**Suspension Units**

Each frame of the 22 suspension units is fashioned from four suitably shaped plates of 14 S.W.G. sheet brass and soldered together. (Fig. 7.) A jig was assembled and saved a great deal of time. The axles run in bearings made of brass collars soldered to a shaped rocker arm. The movement of the rocker arm is limited by a brass strip transversely soldered to the suspension unit frame. The arm itself is mounted on a copper tube, the ends of which swivel round 5/32in. Whitworth screws which are secured to the frame by mating nuts. Side plates between each individual suspension unit give added rigidity. Two of these must be removed before detaching any one suspension unit.

The 44 bogie wheels are turned out of the brass bar following as closely as possible the design of the prototype. They are secured to the axles by two 5/32in. Whitworth nuts positioned on both sides of each wheel.

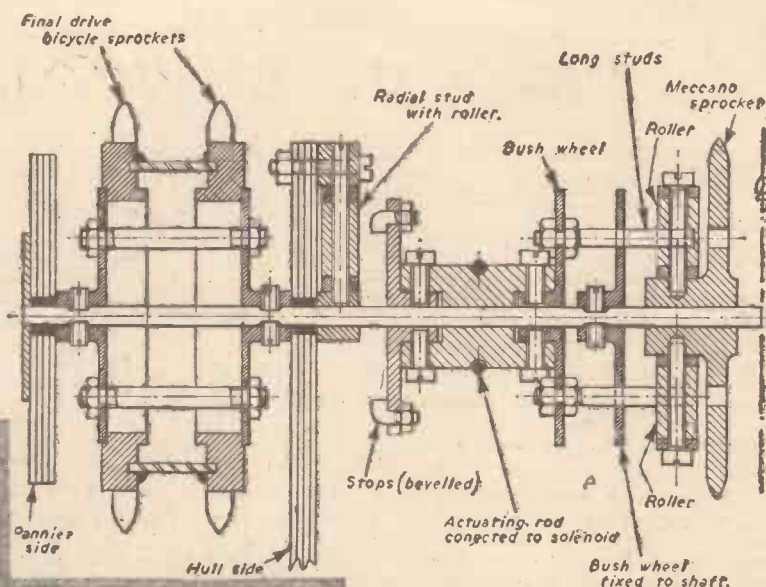


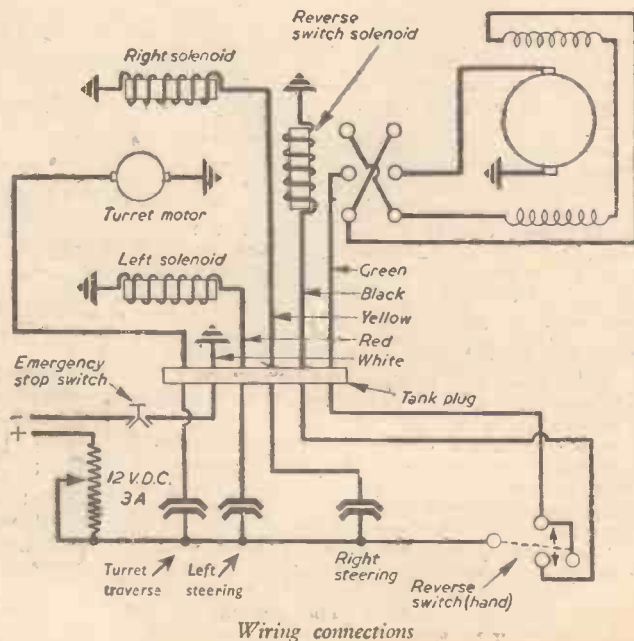
Fig. 6.—Section of symmetrical half of rear axle.

Suspension springs are 9/16in. internal diameter expansion springs of 1/16in. diameter wire, extended over their limit, and used as compression springs. Scale pitch worked out at 13 turns in an inch and a half. The extremities of the springs are sweated to the suspension unit frame and rocker arm.

**Tracks**

Considerable trouble was experienced with the tracks. In the early stages of development, it was decided to utilise two parallel bicycle chains for each track and to sweat brass strips across for the purpose of connecting the two chains and to represent the spuds. An experimental length was made but without much success as the links were of such hard steel that they almost refused to take solder. An awkward situation arose when it was found that as the bogie wheel centres were 1 1/2in., all the wheels would settle into the "waist" of each link, the chain being of half-inch pitch.

(To be continued)



Wiring connections

# Repairing Domestic Electrical Appliances

Further Hints on the Upkeep and Repair of Domestic Electrical Appliances, and How to Avoid the Many Pitfalls That May be Encountered

(Continued from page 123, January issue).

## Electric Fires, Toasters, etc.

THESE are the easiest to repair, because the elements are exposed and very accessible; here we include the fires, toasters, hair dryers, soldering irons, and so on. In the bowl type the element is usually protected by a stout iron wire guard. This is clipped over the edges of the bowl and is easily removed. Unscrew the element and the former. This is a fire brick former fitted with a G.E.S. cup. It often happens that the centre contact of the holder becomes weak through overheating. Arcing occurs here, with a result that the fire burns intermittently and finally goes out altogether. The contact can be replaced by a strip cut from the longer pole of a flash-lamp battery. Make this exactly the same size as the original or it may touch the edges and cause a short. If the element has burnt out this is obvious, because the spiral will be slack and broken. Each spiral is wound for a definite voltage. Do not cut the spiral, but pull it out to the required length by trial. One connector is made first and the wire pulled out to fill the

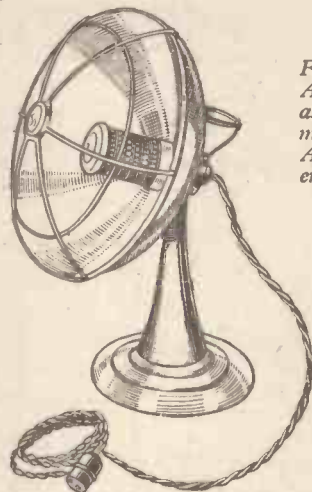
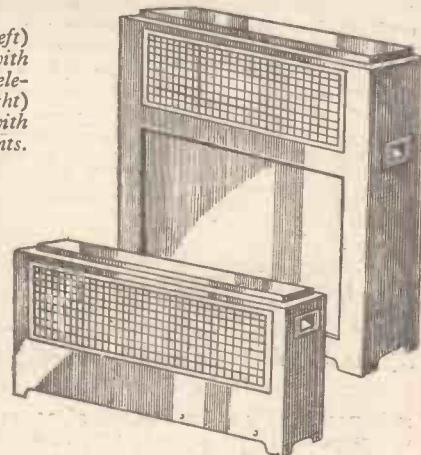


Fig. 10.—(Left) A bowl fire with an exposed element. (Right) Air heaters with enclosed elements.



The bowl fire is rarely found in loadings over 1,000 watts.

When replacing broken elements in larger fires, remove the old former and wire by disconnecting at each end—this is a simple

## By "Home Mechanic"

screw—and replace with a new one. When ordering spares, quote the fire make and type, the loading in kilowatts and the line voltage. There is a type of fire with two spiral elements wound on flat fire-brick formers, each of a loading of 750 watts.

caused by a small fan revolving above the lamp. This fan is really a two-bladed shutter that revolves in the hot air rising from the lamp. If the fire receives a blow, the fan may jam or come off its pivot. It is easily replaced. Do not lubricate the fan, but a little blacklead—a few strokes with a BB pencil—on the pivot will be found effective.

Hot plates are rewound, as are toasters and bowl fires. Some hot plates have a concealed and embedded winding, but these cannot be repaired at home, and must be returned to the maker.

The domestic cooker falls in the same class as the fire, but here there are several points that may go wrong. Elements can burn out, but are easily replaced, as they can be obtained and fitted just as a fire element. A cooker is a high-load piece of apparatus, and as a result the switches are quite large and, due to the arrangement of the elements, are rather complicated.

These switches are of the rotary type, having generally either two or three positions and off. Switch failure is due generally to burning of the contacts, with consequent arcing and finally open circuit on some points. The contact blades cannot be replaced, so a new switch is required. Disconnect the leads, but do not disturb their relative positions; there may be four, five or six terminals on the switch with as many as 12 leads connected to them, hence care is necessary. If you are in doubt before removing any collection of leads, tie together and label. Take care so as to avoid crossing of the leads.

## Fire Hum

Some fires and heaters have a very nasty habit of humming, like a transformer, but louder and more penetrating. If an old fire starts this, then it is generally due to a loose connection, or even a loose bolt on the fire case. Tighten up all nuts and bolts and connections. If a new fire does it, look for the possible loose connection or bolt, but, failing this, you are advised to change the fire.

So far we have only mentioned the all-important question of earthing, and not given it the importance it deserves. We cannot overestimate the importance of a good earth on all portable appliances, especially those near water pipes, etc. Some appliances are not provided with an earth connection, but one can easily be made. For a fire, drill a 1/4 in. hole in the case, push through it a 3/16 in. bolt, put on two large

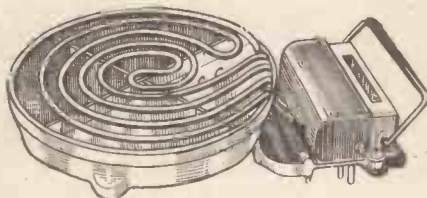


Fig. 12.—(Left) A hot plate. (Right) A four heat boiling plate.



grooves, and then joined to the other screw. Slight tension only should be felt in the spiral when both ends are connected. To make a connection, double over one end of the wire and hoist it up tightly, then pass this round the screw between the two washers and tighten up. If a contact becomes loose, the wire will arc here and finally burn through, and once an element has broken after being in use it cannot be rejoined. The wire becomes brittle and breaks when bent. Screw back the former tightly before switching on.

## Elements

A similar element is found in toasters—a small spiral—but here the spiral is arranged in rows vertically. Attachments and replacements as before. In the hair dryer the element is wound on a light former of mica. It is of single wire. To examine the element remove the cap at the end of the air tube and then pull the element out. The former is plugged into a holder in the base. An element easily burns out when the fan fails, so before replacing an element in a dryer in which the fan has failed, repair the fan first, then the element. The element is wound of single wire.

Either one or both may be used, depending on the switching arrangements. A further type has for the element a carborundum rod of special manufacture. Replacements are very easy, but fairly expensive.

## Fire "Glow" Fans

Many modern fires have a supplementary lamp to cause the "glow." The flicker is

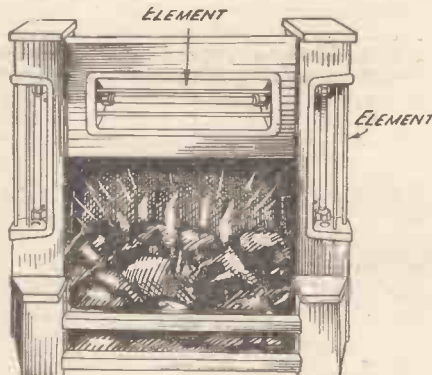


Fig. 11.—A flickering "coal" fire with three heater elements.

washers, and clamp the earth wire tightly between. An iron may be earthed by passing a lead under one of the cover-securing nuts. A hair dryer, if made of bakelite, need not be earthed, but must have a metal sleeve over the heater, and the earth wire may be passed under one of the screws securing it. All fixed apparatus will be earthed, cookers, fires, etc., but periodically examine them. The earth must be capable of carrying the maximum load of the appliance;

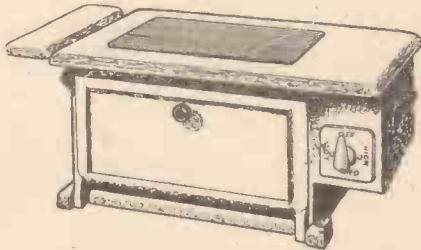


Fig. 13.—A small electric cooker showing the rotary switch.

it is possible for a few strands of an earth to corrode through and yet leave the appliance earthed. It is not safe, however, because the cable would fuse at the weak spot and leave the cooker still "live." The same can apply to fires. The earth wire is usually regarded by the layman as being quite unnecessary, but this is not so. The regulations state that the earth wire must be protected if necessary. This may not be needed when the appliance is first installed, but later it becomes apparent.

#### Domestic Motors

Domestic motors are generally of one type with series commutator. Others in use are repulsion-induction and squirrel cage, but, fortunately, repairs in these are not often necessary, because there are few electrical moving parts to wear.

Running repairs consist of oiling and greasing and cleaning the commutator. This work is easy and does not need the dismantling of the machine.

With commutator machines, and especially those small ones that are frequently overloaded, the brushes require constant care and attention. Sparking is always present; it is not necessarily a bad sign, but when the sparks extend right round the commutator, stop the machine and examine. New brushes are fitted by lifting the tension springs and extracting the old ones. Fit brushes of exactly the same type. Never be tempted to file up any scrap carbon and use this as a brush. It will damage the commutator and cause excessive sparking. We have used this method in cases of emergency, but have replaced the makeshift with a proper one immediately. The brush position in some machines is often obscure, and it is necessary to dismantle the covers and cases on vacuum cleaners and hair dryers, etc. The replacing of a brush spring is quite easy. First draw out the brush and then make a new spring from stiff brass wire of a similar gauge.

Commutators must be cleaned with soft rags. Don't try to smooth down with sandpaper or emery. If a commutator is badly fitted and worn, it must be repaired by an expert. If a machine is over-oiled and oil gets on the commutator, this must be cleaned and dried. It may be necessary to separate the bars and remove the carbon. Do this with a pin or needle, and smooth down the rough edges with a steel burnisher. Too much grease is as bad as too much oil, and if this gets on to the winding, may cause, like oil, a short or a fire.

#### A "Burn-out"

In the case of a burn-out of either armature or field, carefully dismantle and inspect

all connections. Examine and test both armatures and field to discover in which the connection has gone. It will probably be the field, so carefully remove one coil and strip off the insulation tape. Now take a sample of wire and find out its gauge. If you do not have a micrometer, then take a sample with you to the shop when you get the new supply. Also count the number of turns. There will be the same amount of wire on each pole, but as an additional check examine the other pole as well. Weigh the total amount of wire and get slightly more than this from the suppliers. Rewinding is now a simple matter, but take the usual care with insulation and other problems.

If the trouble lies in the armature, this is not so easily remedied. First test by examination, as a burnt-out armature is always obvious. Here again, strip one coil and very carefully note the connections. Draw these on paper and pin the paper on the wall over your bench. You might have been unlucky and picked a coil that will not unwind; therefore leave this and examine the armature closely until you find the coil that was put on last, and start from this and count the number of turns. Weigh the total amount of wire. When dismantling, keep count of the turns on each coil as they should be the same. Observe the relation of the slot to the commutator segment and

the armature and field, and this must be identical with that removed. If it is thicker the correct number of turns cannot be put in each slot. It is essential that exactly the same amount of wire is put on each coil in order to balance the armature, both electrically and mechanically. Unevenly wound coils cause excessive sparking and noisy running. Great care must be exercised in soldering the connections to the commutator bars, and a non-corrosive flux must be used. This method of rewinding by counting the original turns is superior to a purely theoretical one based on calculations, etc. We advise readers to use the above, even when the windings are charred and burnt quite badly. Most insulation is double cotton, and if this is used in all cases it will suffice.

#### Rewinding Heater Elements

Readers may wonder why we have given no details for rewinding heater elements and fires, etc. The chief reason is that manufacturers will not supply small quantities of these wires. A pound reel is generally the smallest, and the price of a pound would be prohibitive for the average reader. Secondly, the elements are all standard now, and as they can be obtained from the makers at reasonable prices it is not worth while

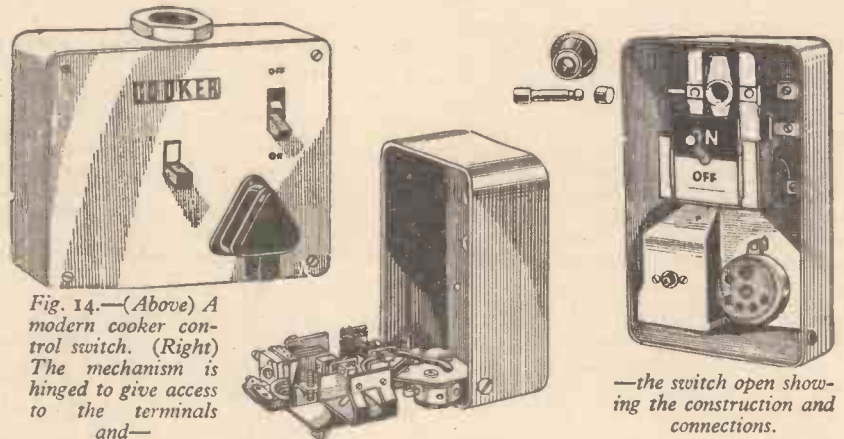


Fig. 14.—(Above) A modern cooker control switch. (Right) The mechanism is hinged to give access to the terminals and—

—the switch open showing the construction and connections.

the brush line to the interpole line. Find the gauge of wire on the armature and obtain new wire as before.

#### New Insulations

New insulations must be used on both

making them. Thirdly, mica of sufficient size and quality is difficult to obtain. When one considers the above it is obviously not worth while to consider rewinding an element.

## Hard to Move

THINGS are hard to move not only because of weight but because of their inertia. A conductor who tried to use a baton made of lead would be unable to follow the delicacies of the music. This is one reason why the diaphragm of a loud speaker cannot reproduce all the notes which were originally there. It is why headphones can give better music if one can put up with their irritation. It is, by the way, not difficult to broadcast to headphones without wires, and this makes an amusing form of dance. The participants enjoy themselves while the rest of the room sit in silence and, dare I say it, in comparative peace.

An interesting illustration of this inertia effect appeared on the screen when the German rocket film was illustrated. The rocket seemed to stand still quite a long time before it shoots off and one wonders why it does not topple over without the benefit of gyroscopic force or of the lower strata of air to keep it straight.

In effect the apparent lag is very small and

the inertia is so great that it has no time to fall sideways. Some motor-cars are shocking examples of inertia neglect. As they dash down the road a wheel strikes a bump and the axle tries to swing so that the other wheel tends to go down. To avoid breaking, the axles are made heavier, which merely increases inertia. One cannot get out and dig a hole for the opposite wheel to fall into, so something else has to happen. It is that the passengers go up, rattling the car, spoiling the steering and making discomfort paramount.

Some people are quite happy to sit in a lightly-sprung car with shock absorbers to prevent spring breakage. They also use soft cushions which spread the area of pressure but are quite ineffective to aid springing.

The lighter the moving parts that are thrown upwards by the bump the quicker they are to get off the mark when kicked upwards by the road. That is why pneumatic tyres are good, because the part pressured, as it were, is very light and the air is lighter still.

# The Bristol "Theseus" Propeller Turbine Engine—2

Further Technical Details and Operating Notes

## Bearings

There are six main bearings in the Theseus I gas turbine, two of which carry the propeller shaft, two the compressor rotor assembly and the other two the propeller turbine wheel and its driving shaft. The rear compressor bearing and the rear propeller turbine bearing are single row ball bearings capable of carrying all the resultant thrust. In the case of the rear compressor bearing the thrust of the compressor is balanced against the thrust of the compressor turbine in so far as it is possible, so that the bearing has only to carry the resultant thrust.

## Rotor Assemblies

In both the compressor and propeller turbine rotor assemblies, the forward bearings are roller types in order to allow for the differential longitudinal expansions between the casings and the rotors.

## Mounting

The unit is mounted in a symmetrical triangulated structure which is designed to pick up directly from four suitable points. The engine is supported in this frame by four fabricated steel mounting beams which bolt on to the front of the centrifugal section of the compressor casing. The turbine assembly, as has been explained previously, is mounted separately from the main mounting face.

The heat exchanger is mounted at the front end from points half-way along the main mounting members and at the rear from the rear framework almost in line with the pick up points. Ample provision is made to cater for expansions in this assembly.

## Oil System

The only parts requiring lubrication are the bearings and reduction gear and the auxiliary gear drives. This is provided for by the oil sump and pumps already mentioned and a small oil cooler for the dissipation of the frictional heat generated by the reduction gear.

## Fuel System

The fuel system is of the design developed by Joseph Lucas, Limited, and incorporates a fuel pump, a barometric control, accumulator and dump valve and fuel injectors.

The fuel employed is kerosene to the latest M.O.S. specification, although alternative fuels may be used for special purposes with the agreement of the engine manufacturers.

## Control System

Single lever control will be provided. This will normally operate the fuel delivery only to obtain the appropriate propeller speed for any given flight condition. If desired, however, this lever may be arranged to control also propeller feathering and reversing. Propeller pitch control under normal conditions is entirely automatic.

## Auxiliary Gear Box Drive

This is taken from the rear of the propeller turbine via an extension shaft and the gear box will be mounted on the bulkhead.

(Concluded from page 118, January issue)

## Jet Pipe

The ducts leading to the control discharge jet will be decided by aerodynamic and other features of the particular aircraft installation, but remote automatic control will be provided to actuate the flap of the jet control.

## Starting

Starting is effected by energising the electric starters to accelerate the compressor, after which the fuel is injected and ignited. This sequence is entirely automatic and is controlled solely from the starter switch.

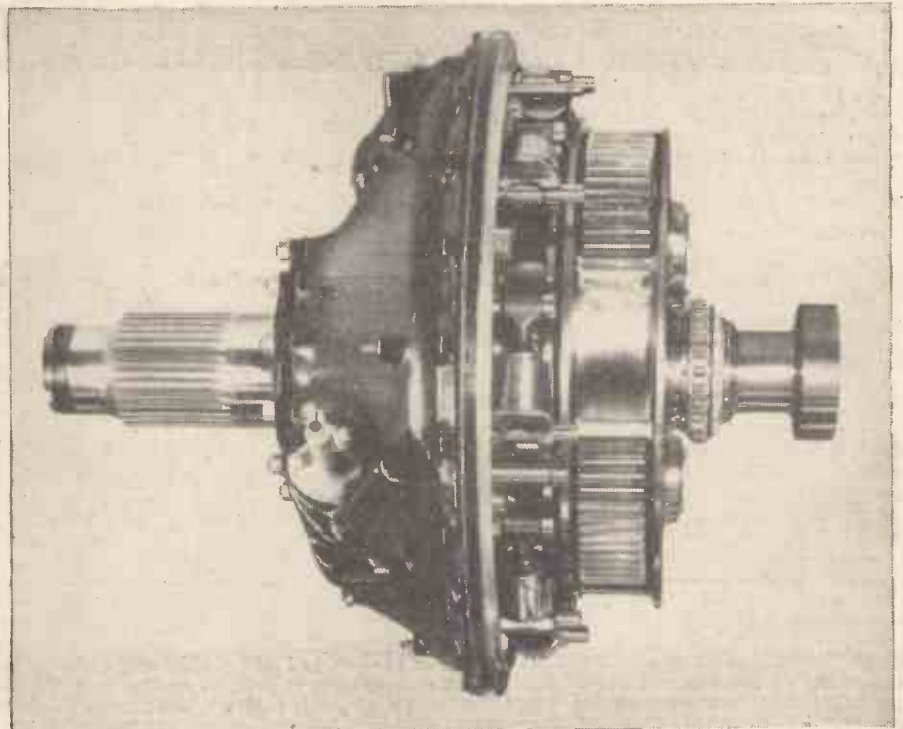
The oil consumption of the unit is low, of the order of 3 pints per hour maximum.

## Fuels

The fuel proposed for the engine is kerosene to M.A.P. specification RDE/F Ker., or latest specification (specific gravity .810 max.). As previously mentioned, alternative fuels may be used for special purposes.

## Engine Instruments

The following instrumentation is considered to be the minimum that must be included in the aircraft:



The reduction gear assembly.

## INSTALLATION PARTICULARS

### Mounting of Unit

Provision should be made in the aircraft structure for the jet pipe discharging to the rear, either as a single jet or in divided form. It is essential that this pipe should have smooth and gentle contours, and it is desirable that the design be developed conjointly with the engine manufacturers.

### Propeller

Provision is made in the design for feathering and reversing propellers, and a standard No. 5 propeller shaft is specified. The direction of rotation of the propeller is left-hand tractor.

### Oil System

A small oil cooler is necessary for the dissipation of the frictional heat generated by the reduction gear, equivalent to a maximum of 50 h.p. approximately.

- (a) Revolution counter for the compressor.
- (b) Jet pipe thermocouple direct reading instrument.
- (c) Reduction gear oil outlet thermometer.
- (d) Turbine bearing thermocouple direct reading.
- (e) Air compressor delivery pressure gauge.
- (f) Fuel delivery pressure gauge.
- (g) Lubricating oil to reduction pressure gauge.

### Maintenance

Care has been taken in the design to ensure that those assemblies requiring periodic inspection are easy of access. It is desirable that this should be maintained in the complete aircraft installation. The components requiring this servicing are as follow:

- (a) Combustion chambers.
- (b) Fuel injection nozzles for the combustion chambers.

- (c) Fuel and oil pumps, situated on the oil sump.
- (d) Sump oil filter.
- (e) Electric starter.
- (f) Auxiliary gear box.

**Notes : Heat Exchanger**

The Theseus propeller turbine was one of the first of its kind in this country, and embodies many unique and interesting features. Foremost among these is the heat exchanger, the first to be used in an aircraft power plant and which is a remarkable feat of engineering.

The heat exchanger weighs approximately 500 lbs. and on the Atlantic or several of the other longer Empire routes it will save its own weight in fuel after the first few hours. For short journeys the heat exchanger can be omitted, the Theseus still having a very

Theseus engine is for a long-range medium-speed, aircraft, and great interest has been shown in this engine by many aircraft constructors. Messrs. Handley Page, Ltd., have already announced their intention to fit this propeller turbine into a prototype Hermes aircraft. Many other applications are being considered.

The heat exchanger requires some several hours' flying in order to save its own weight in fuel, and this factor makes the heat exchanger version of the Theseus essentially a long-range power plant. This does not mean, however, that it cannot also be used on shorter journeys, since the heat exchanger can be omitted, resulting in a power plant having a slightly increased fuel consumption but with a considerably decreased weight. The fuel consumption, even without the heat exchanger, is very much less than that of contemporary

accomplished, including a 100 hours' endurance run at operating conditions with most satisfactory results.

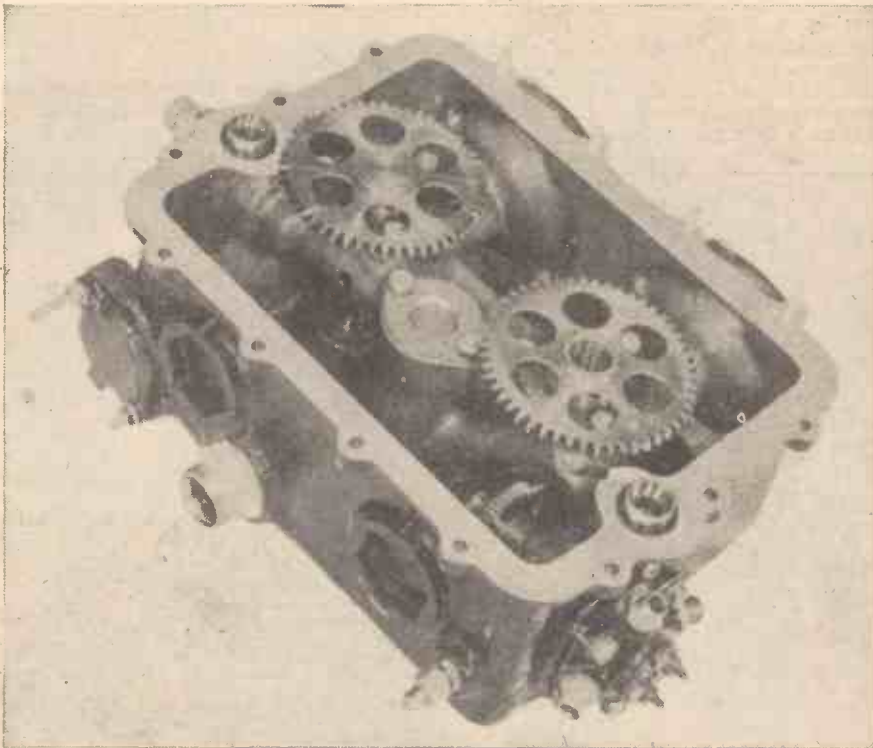
**Future Development**

The Theseus propeller turbine, in common with other designs now being actively pursued by the Bristol Aeroplane Co.'s Turbine Department, has considerable scope for development incorporated in its design. Stresses, gas speeds and maximum temperatures have been kept moderate, and it is felt that in course of development it will be possible to increase its power output and improve its specific fuel consumption appreciably.

The basic requirements for the attainment of improved efficiency and reduced weight are constantly under review, and metallurgical research in the Bristol laboratories is continually under way in order that the manufacturing technique best suited to the special high-temperature materials used in the gas turbine is employed.

**Trend of Aircraft Design**

With the extremely rapid rate of development taking place in the gas turbine field, it is difficult to forecast the precise form and size of units which will be required. Furthermore, since the gas turbine lends itself readily to changes in size for a given fundamental form, a range of power units "tailored" to suit particular aircraft categories can be



*The oil pump, with casing removed.*

much lower fuel consumption than contemporary jet engines. With the heat exchanger the fuel consumption is of the same order as a reciprocating engine of similar power, as can be noted from a study of the performance curves.

Where it is considered an advantage to install the engine without a heat exchanger, the power plant can be made much shorter and lighter without any detriment to its power output or reliability.

**Propeller Drive**

Another interesting feature of the Theseus is the use of a separate turbine drive for the propeller, there being no mechanical connection between the compressor and propeller turbines. The speeds of the two turbine wheels are maintained at a constant ratio by means of an ingenious mechanism which controls the pitch of the propeller blades. This separation of the compressor and propeller drives results in many advantages, mainly on the question of control and ease of starting.

**Applications of the "Theseus"**

The original and main application of the

jet engines and still of the same order as for reciprocating engines of similar power.

Initial flight testing will be carried out on an Avro-Lincoln aircraft, where the two existing outboard engines will be replaced by Theseus propeller turbines. Eventually, all the engines will be replaced by Theseus type. Extensive bench-testing has already been

quickly developed. It becomes essential, therefore, to maintain a close relationship with the trend of aircraft design. To this end, constant co-operation is maintained between the aircraft and gas turbine project departments of the Bristol Company in order to ensure that engine design is kept abreast of aircraft requirements. A wide range of possible engine layouts is under consideration for both this company's and others' projected aircraft.

Specification—THESEUS I.	
<b>LEADING DIMENSIONS</b>	
(a) Overall diameter	48in.
(b) Overall length	106.00in.
(Cone fitting line to engine-mounting centres.)	
<b>WEIGHT (nett dry)</b>	2,130lb.
<b>PROPELLER</b>	
SINGLE ROTATION :	
R.p.m. (maximum power)	1,070 r.p.m.
<b>MAXIMUM POWER OUTPUT</b>	
(ICAN conditions) :	
(a) Sea-level static	1,950 b.h.p. 500lb. jet thrust
(b) Sea-level 300 m.p.h.	2,350 equivalent b.h.p.
(c) 20,000ft. 300 m.p.h.	1,500 equivalent b.h.p.
<b>FUEL CONSUMPTION</b>	
(a) Maximum power sea-level 300 m.p.h.	
	0.57lb./equiv. b.h.p./hr.
(b) Maximum power 20,000ft. 300 m.p.h.	
	0.50lb./equiv. b.h.p./hr.
NOTE.—Equivalent b.h.p. is defined as propeller shaft h.p. ÷ (jet h.p. ÷ propeller efficiency).	

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# THE WORLD OF MODELS

The Eighth Annual Exhibition of the Leicester Society of Model Engineers: A New Book—  
"Ships and Men"  
By "MOTILUS."

**T**HE Midlands have been in the news lately with model exhibitions, one of the most recent held being that of the Leicester Society of Model Engineers.

In my journeyings in the world of models it is often my privilege to visit model engineering societies all over the country, so I was pleased to accept the invitation of Alderman David Bentley, J.P., of Leicester, to visit this eighth annual exhibition of the

engine, supplied current for the electric lights, and steam from the boiler not only operated the figures of the bandmen, with their traditional jerky movements, but also piped a merry tune on the well-modelled mechanical organ. Altogether a fine piece of workmanship, for it was not only a good reproduction in miniature, but by the accurate combination of colour, sound and even smell, it caught the imagination of

societies that we looked for marine models. However, as hopeful representations are being made to the Council for a model boating lake, it is not unlikely that in the near future this section will expand. The quality of the work was high and well exemplified by the model steam coaster built by Mr. S. Parker, which was supplied with alternative power plants in steam and petrol. Two unusual models were of the *Golden Hind* and the *Elizabeth Jonas*, galleons also the work of Mr. Parker and wrought entirely in metal, even to the sails and flags. These were not painted.

## Model Locomotives

Nearly one-third of the exhibits were locomotives in all sizes from 4mm. to 1½ in. scale and ranging from a fine model of Blekin-sopp's locomotive of 1812 in 1 in. scale, by Mr. H. Murray, of Derby, to a beautiful example of model craft by Mr. S. P. T. Tilley, of Northampton, of the famous "Green Arrow" to ½ in. scale.

The best work by a member of the Leicester Society was an N.E. tender locomotive, which deserved and won the cup presented by the *Leicester Mercury*. This locomotive was of uniform good workmanship throughout, and the painting and lining were as carefully carried out as the metal-work, which is a "hall mark" not often enough attained. This model was the work of Mr. C. H. Horrocks. (Fig. 2.)

Among the more unusual exhibits were

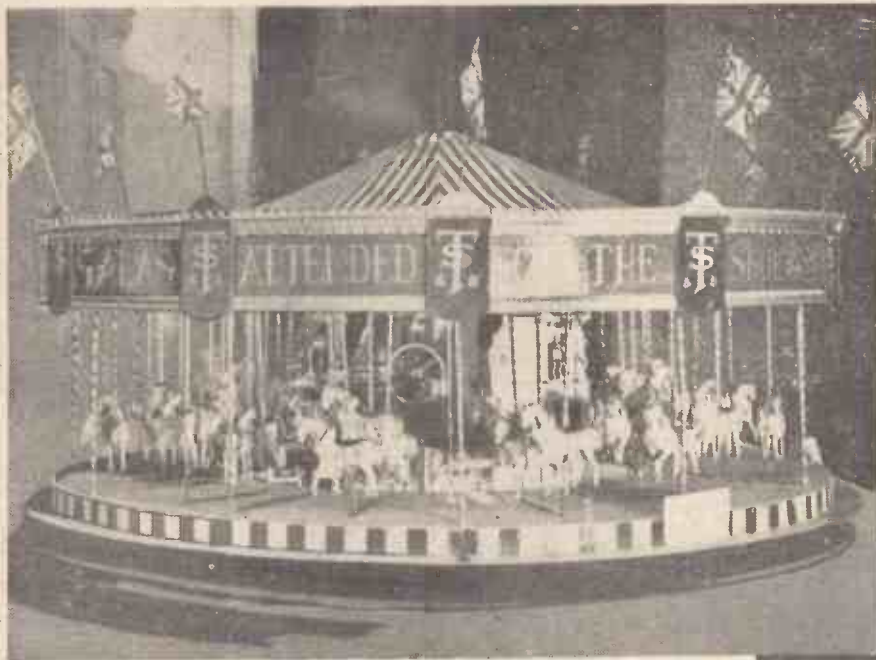


Fig. 1.—A model 1½ in. scale circus roundabout, made by S. and R. Taylor.

Leicester Model Engineers. I might mention that Alderman Bentley has had little previous experience in the realm of models and, in fact, had been asked to open the exhibition rather by virtue of his civic position and personal interest in the cultural aspect of the city's affairs. I was glad to have the opportunity of telling him of the scope of model work and the good craftsmanship which it encouraged, and this was well supplemented by the exhibits we viewed prior to the official opening ceremony.

The exhibition was held for a three-day period in two large rooms at the St. Mark's Schools, in Belgrave Gate, and it is a tribute to the organisers that the display of over 200 models was well set out, with every exhibit properly described—and catalogued—in good time for the official opening.

The range of models was most comprehensive, and the many builders will forgive me, I hope, for not mentioning all of them, but I am forced to restrict myself to a certain length of article and will therefore write of those which made an especial appeal to me.

## Model Circus Roundabout

A working circus roundabout, complete with leaping horses, driven by a correctly modelled showman's steam engine, was perhaps the most striking individual exhibit. (Fig. 1). A dynamo, belt-driven from the

everyone and vividly recalled the hey-day and hurly-burly of the traditional fair ground. The model was 1½ in. scale and was made by Messrs. S. & R. Taylor.

Another fine steam model that was doing actual work for the show was a large two-cylinder undertype engine, supplying power for driving a number of small models of stationary and launch engines. This was an excellent piece of modelling—the steel and brass work being exceptionally well finished. The maker was Mr. A. Wallis.

## Marine Models

It is understandable, as Leicester is farther away from the sea than most towns in England, that model ships were not much in evidence. Apart from several model yachts of very creditable design and sound construction and a small number of power boats, it was to the loan section of



Fig. 2.—Mr. C. H. Horrocks and his model tender North Eastern locomotive, which recently won the cup presented by the *Leicester Mercury*.

a small working model of a coal mine, with a pithead gear working automatically to raise and lower the lift cage from the working level to the surface. This was made by an older model-maker, Mr. E. E. Beardsmore, of Woodhouse Eaves. Another good piece of mechanical work was an electric clock, in which all the gears were made by hand from wood, the work of Mr. S. G. Johnson.

#### Scale Model Tramcar

Some particularly good models were of city transport vehicles, and mention must be made especially of those made by Mr. E. Thornton, of Coventry. A  $\frac{3}{8}$  in. to 1 ft. model of a Bradford tramcar was quite outstanding in detail and finish—the latter being remarkable because of the lettering, which was most exquisitely carried out. It was a pleasure to note the attention to accuracy in reproducing every external detail, even in this small scale—and Ben Johnson wrote more than he knew when he committed to posterity the words “in small measure we just beauty see,” for although the majority of people see little that is lovely in a real tramcar, this model was, indeed, most pleasing to the eye.

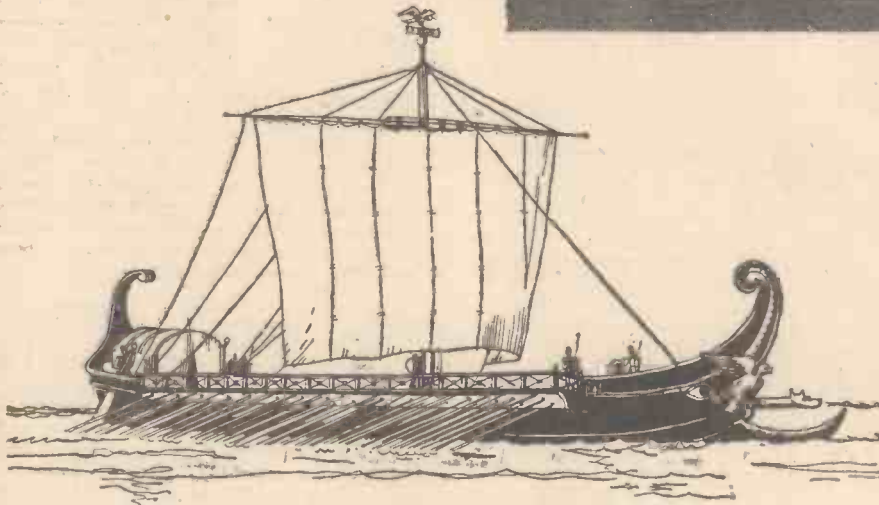


Fig. 3.—A Roman Trireme. Circa A.D. 100.

It was only to be expected that the newer elements in the model world—the petrol engine and the aeroplane—would be well represented. There were numerous I.C. engines from 5 to 30 cc., which almost without exception were of the precision this form of power unit demands, while the flying aircraft showed that the builders had mastered the technique of both design and construction in making models at once efficient and attractive.

Thus I made my admiring way round this crowded show, attracted by every exhibit for its merit—especially to a  $\frac{3}{8}$  in. scale L.M.S. locomotive, built by one who had never before used metal-working tools, and to a  $\frac{7}{8}$  in. bore and stroke stationary engine made by a one-armed man.

But after seeing them all and riding behind the passenger-hauling locomotive which opened the show, making its official journey with Alderman Bentley as driver, I gravitated again to the roundabout for a last sight, sound and smell of this colourful feature!

#### “Ships and Men”

A most interesting book to those who are lovers of ships and the sea has just been published by Messrs. G. G. Harrap & Co.,

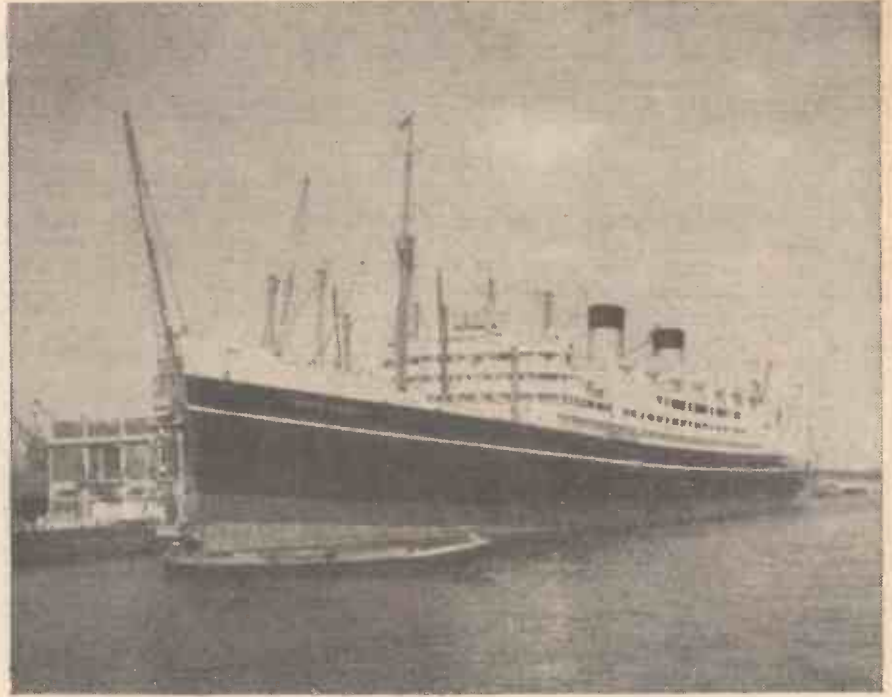


Fig. 4.—M. S. Dominion Monarch, 27,000 tons. This illustration and the one on the left are taken from the book “Ships and Men.”

Ltd., the authors being Mr. W. J. Bassett-Lowke and Mr. George Holland. Published at 15s., in crown quarto size, with profuse illustrations in both half-tone and line, this book contains well over 300 pages, and is an account of the development of ships from their prehistoric origin to the present day, and throws an interesting light on the achievements and conditions of the men who have built and worked upon them. Two illustrations from the book are given in Figs. 3 and 4.

Much care and labour has been expended in assuring the accuracy of the factual information given and, if the interpretation offered of the facts, especially as regards the social conditions of the men who sail the seas, provokes controversy, it can only increase the appeal that the book will hold for all who are interested in ships. The

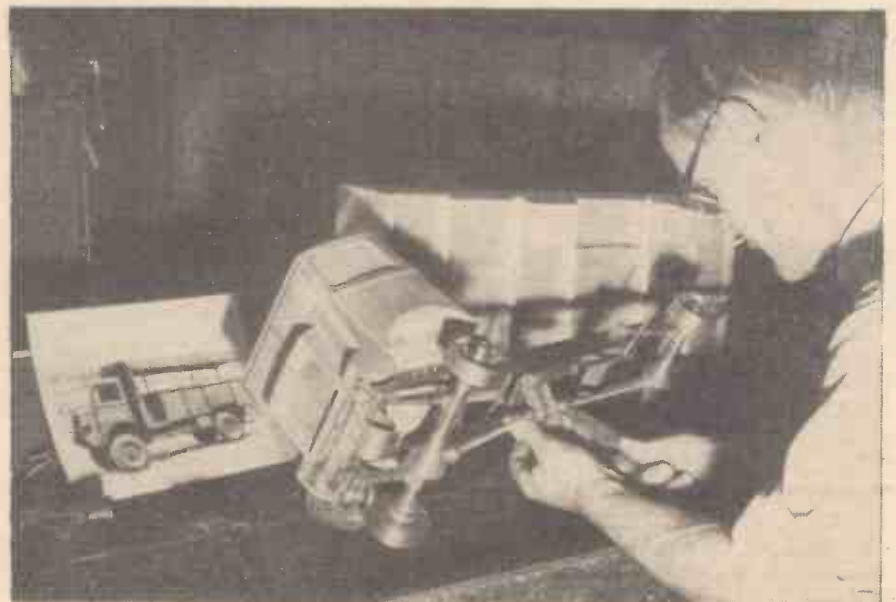


Fig. 5.—A model Bedford vehicle in course of construction.





A group of well-known personalities of the model world at the opening of the Messrs Bassett-Lowke's new London extension. Third from the right is Mr. W. J. Bassett-Lowke the managing director.

book explains fully the evolution of the ship from the earliest form of dug-out canoe down to the modern transatlantic liner, and by setting the various stages of its development against the background of general history, maintains the thesis that ships are at once a mirror and expression of their times. The writing has mainly been carried out by Mr. G. Holland, while Mr. Bassett-Lowke has provided the general idea and valuable data from the technical side. The

book, which bears the inimitable stamp of his direction on the artistic and illustration side, is available from booksellers, and also from Bassett-Lowke, Ltd., at Northampton and at both London and Manchester branches.

#### Model Motor-vehicles

The making of model motor-cars, both professionally and by amateurs, has had a big impetus lately, no doubt encouraged by

Mr. D. F. Russell's new Sportsdrome, with its 72ft. model racing track, at Eaton Bray, near Leighton Buzzard, Bedfordshire.

Professional model-makers are mostly engaged on the scale models of the various vehicles produced by manufacturers, and these models are then used for exhibition and publicity purposes.

The illustration, Fig. 5, shows the chassis and cab of a Bedford vehicle in the course of construction. The scale most frequently adopted for this type of model is one-tenth full size.

A full range of scale model motor tyres has been produced by Messrs. Dunlop, and are now available at leading model shops.

#### Bassett-Lowke's Extension of Showrooms

Quite an event in the model world was the opening, on December 11th last, of an extension of the well-known showrooms and retail shop of Messrs. Bassett-Lowke, Ltd., at 112, High Holborn, W.C.1. These additional premises were opened by the chairman, Mr. Cyril Derry, in the presence of members of the staff and well-known personalities of the model world. Among those present were included Mr. Percival Marshall, of the *Model Engineer*, Mr. J. N. Maskelyne, of the *Model Railway News*, Mr. D. F. Russell, of *Model Cars*, *Model Mechanics*, the *Aero Modeller*, etc., and Mr. F. J. Camm, your editor. Although post-war restrictions did not make it possible for Messrs. Bassett-Lowke, Ltd., to oblige customers with their pre-war range of goods, it was interesting to notice that many of their standard lines are gradually coming back, not forgetting their popular "Eclipse" steam engine, which now retails at 50s. and is certainly a good line for the steam power boat builder for the spring.

## Letters from Readers

### Film Strip Projection

SIR,—With reference to my article in the September number and letter in the December issue, re heat elimination, Messrs. Chance Brothers referred me to the following firms for polished pieces of their "ON 19" glass:

The Leech Optical Co. Ltd., Prismatic Works, Whetstone, Leicester; the British Optical Lens Co., 315, Summer Lane, Birmingham 19.

A thickness of 2mm is sufficient, and the standard need only be "sub-optical." The cost is high, but the glass is a wonderful product.

Alternatively, similar glasses are used in episcopes, and a broken piece might be obtainable, or pieces of ordinary glass of different kinds might be experimented with. If sufficient illumination for a screen 3 or 4ft. wide cannot be obtained from 60-100 watts the optical system must be inefficient.—M. K. KIDD (Chatteris).

### Copper Naphthenate

SIR,—I note in your December issue, in reply to an enquiry concerning eliminating wood-worm, that your correspondent is unable to obtain the necessary liquid in small quantities, and I beg to advise you that we have for some years obtained this from: Messrs. Bryce Weir, Ltd., Balmoral Road, Watford, Herts, and have found it to be most efficacious.—W. E. HILL & SONS (New Bond Street, W.1).

### "Neglected Inventors"

SIR,—With reference to your reader's letter in your December issue about the refusal of the Patent Office to supply a specification as it was not open to public inspection under Section 91 (4) of the Patents and Designs Acts 1907-1939, this was probably an invention still rendered secret by the last World War. The invention is not described by the reader in his letter.

The Institute can give advice to members, both technical and legal on inventions and introduce same to industry by correspondence, interview or exhibition.—SIR A. MOIR, Hon. General Secretary, Institute of Patentees, 25, Victoria Street (South Block), London, S.W.1.

### Watch-cleaning Solutions

SIR,—Having just received the December issue of PRACTICAL MECHANICS, I came across the query of Mr. Huckridge (Neath), who requested information on watch-cleaning solutions. I should imagine that solutions given are expensive (No. 2 solution being rather a trouble to make up!).

I am well aware that there are many variations to this cleaning process, but the method I use here is very satisfactory:

Solution I.—S.B.P. petrol.

Solution II.—To one quart hot water add one teacup of soft soap and half a teacup ammonia (gently warmed).

Solution III.—S.B.P. petrol.

Solution IV.—S.B.P. petrol (I use a

"dryer" rotating basket over a gentle heater).

Soft soap is obtainable on permit for watch cleaning.

S.P.B. petrol is a special brand of cleaning petrol, also obtainable quite easily on a permit for watchmakers.

Some people use trichlorethylene or some alcohol for their final dip, but the objection lies in the fact that it leaves the articles so dry that they rust and tarnish easily, particularly the hair spring and pinions. I tried adding one-fifth white spirit to the last dip, but without much success. (The petrol seems to leave a microscopically fine film of oil.) Of course, ordinary petrol *must not* be used (as you state).

I hope that these notes will be of use to other readers.—H. W. JONES (Cirencester).

### The Wright Airplane

SIR,—On page 124 of the January, 1947, issue of PRACTICAL MECHANICS, the caption to the photograph of the Wright bi-plane would lead one to believe that the photograph is of the original 1903 Wright bi-plane, now in South Kensington Museum. This is not the case; the photo is definitely that of the 1908 version, which is substantially different to the 1903. For instance, in the latter the pilot lay prone, the disposition of the radiator and engine was different, as an inspection of the 1903 job in South Kensington will show.—C. B. MAYCOCK (Barnet).

### WIRE AND WIRE GAUGES

By F. J. CAMM. 3/6, or by post 3/9 from George Newnes, Ltd., Tower House, Southampton Street, London, W.C.2.

# QUERIES and ENQUIRIES

A stamped addressed envelope, three penny stamps, and the query coupon from the current issue, which appears on back of cover, must be enclosed with every letter containing a query. Every query and drawing which is sent must bear the name and address of the reader. Send your queries to the Editor, PRACTICAL MECHANICS, Geo. Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2.

## Electric Fire Elements

CAN you tell me what ingredients are used in the making of porcelain elements for electric fires?

Where can I obtain these materials, and in what proportion are they mixed?—R. J. Marr (Portsmouth).

ELECTRIC fire elements are of very variable composition, but they all contain china clay. The following is an average composition:

China clay . . . . . 40-55 parts (by weight)  
Quartz . . . . . 25-32 parts (by weight)  
Feldspar . . . . . 20-28 parts (by weight)

The above ingredients are ground finely, mixed intimately, compressed into shape hydraulically, and then fired in an electric furnace at a temperature of 1,400 deg. C.

It is impossible to produce such fire elements in any other way, since moulding of the ingredients alone will not produce the necessary strength.

The necessary ingredients can be obtained from any firm dealing in pottery materials, such as: Messrs. Everitt & Co., Ltd., 40, Chapel Street, Liverpool.

Messrs. J. G. Gregory & Son, Ltd., Newcastle, Staffs.

## Removing Cellulose Paint

CAN you give me particulars of a method of removing cellulose from a motor-car?

Also, can you tell me where I could purchase small quantities of spraying quality cellulose enamel and cellulose thinners?—J. E. Coyle (Durham).

THE best way to remove cellulose paint from a car is to apply a commercial cellulose paint stripper, such as is supplied by Messrs. Nobles & Hoare, Ltd. (address below), and then to scrape the softened paint away by means of a blunt scraper. You can make a paint-stripping liquid for yourself by mixing equal volumes of acetone and amyl acetate and by dissolving a little wax in the liquid to prevent it from evaporating too quickly when applied to the paintwork. Unfortunately, however, these liquids are very difficult to obtain at the present time.

Cellulose enamel and thinners can be obtained from: Messrs. Nobles & Hoare, Ltd., 3, Cornwall Road, London, S.E.1.

Messrs. James Beard, Ltd., 16-20, Great Ancoats Street, Manchester, 4.

British Cellulose & Lacquers, Ltd., Kangley Bridge Road, Lower Sydenham, London, S.E.26.

Again, all such materials are very difficult to obtain at the present day owing to the big demand for them, and the scarcity of the raw materials of their manufacture.

## Eliminating the Wood-boring Beetle

I READ in an old copy of "Practical Mechanics" that the furniture beetle could be treated with Ortho-dichlorobenzene. I tried this on a wicker bedroom chair that is worm-eaten rather badly, but holes are still appearing in the woodwork.

Can you please suggest another method of attack on the pest? The chair is rather new, and I very much want to save it.—E. E. Davies (Croxley Green, Herts).

ORTHO-DICHLOROBENZENE, used either alone or in conjunction with paraffin or white spirit, is an excellent remedy for wood-boring beetles. The trouble, however, is to get the fluid to penetrate the wood, and this appears not to have happened in your case since the beetles have emerged after your application of the liquid.

At the present time of the year there is very little which you can do because the woodworms (if any) are now deeply embedded in the wood, in which position it is very difficult to reach them with penetrating liquids, except, of course, in such cases in which the liquids are applied under pressure.

Your best plan is to wait until next March, during which month the worms come up to the surface of the wood prior to changing into the little brown-black beetles which bore their way out of the wood. You may be assured that no more holes will appear in the wood until the end of March next. Hence, during the month of March you should apply paraffin or white spirit (with or without dichlorobenzene) to the wood at weekly intervals, and keep up this treatment until the following August. The same treatment should be followed (in a milder manner) during the following March-August period. This will give a certain cure.

If you use dichlorobenzene, use it in the dilution of 1 part dichlorobenzene to 6 parts of paraffin or white spirit.

Creosote may also be used at the same dilution. It is cheaper and is equally effective, but it smells badly.

Again, you can dissolve copper naphthenate in paraffin or white spirit until you get a strong, green-coloured solution. This is applied to the wood during the above-selected months of the year. The copper salt enters the wood and remains there, thus rendering it permanently toxic to all boring creatures. In this case there is some slight green staining of the wood.

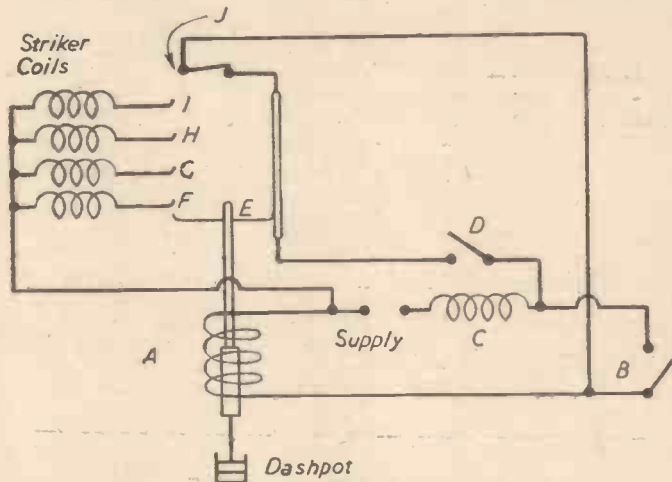
Copper naphthenate may be obtained from Messrs. A. Boake, Roberts & Co., Ltd., Carpenters Road, Stratford, London, E.15.

In general, it may be said that almost any oily liquid will kill the woodworms and the adult beetles provided that it is able to get at them, that is to say provided it can be made to penetrate the wood effectively. For this reason it is best to apply all such liquid hot, since a hot liquid penetrates better.

But, as remarked previously, there is little use in commencing the treatment now. Begin your operations about mid-March, and persevere with them right through the summer. Meanwhile, fill up all existing holes with plastic wood.

## Four-chime Doorbell

I WISH to operate either two or four chimes from a bell-push at a door. Will you kindly inform me if a solenoid will be powerful enough if wound to suit an ordinary bell transformer, 3, 5, 8 volts 2 amps? Also, can you give me particulars of construction, size of wire, number



Circuit diagram for a four-chime door bell. (F. E. Dodds.)

of turns, diameter, and arrangements of contacts?

The tubes I have for this purpose are 18 gauge and the largest is 3ft. 4in. long.—F. E. Dodds (Hayes).

WE consider the four-chimes would be the best for your purpose. The power available should be quite sufficient. Unfortunately, it is impracticable to give full constructional details of the various items in this reply, but you may be able to work this out from the diagram and description given below.

A is a solenoid coil, the plunger of which is attached to a piston which operates in a dashpot; the dashpot may be closed at the bottom end with the exception of a very fine hole, or may be completely closed at the bottom and contain oil, a fine hole being provided in the piston. The oil of the dashpot is to slow down the movement of the plunger when the coil is energised by pressure on the door push-button B. This push-button also energises a small coil C which closes spring-mounted contacts D. This item may be taken from an electric bell, the contacts and connections being suitably modified. The contacts D ensure the coil A remains energised long enough to complete the movement after the press B has been released. The rising of the plunger causes the moving contact E to touch the contacts F, G, H and I in turn, these contacts energising

the coils of the gong-strikers. The striker mechanisms may also be made from electric-bell movements with make-and-break removed so they have a single stroke. A rubber buffer may be advisable for the striker armatures to ensure the striker moves clear of the chime after this has been struck. When the plunger has reached the top of its stroke it opens contact J, which de-energises the coils C and A so the contacts D fly open and the plunger drops until again energised by B. We would mention that a D.C. supply is more suitable for this device than A.C., although A.C. could be used.

For use on A.C. the iron pole-faces of the electromagnets should be slotted for a stout copper wire to be fitted to encircle about two-thirds of the pole-face. Even so, the mechanism would be much quieter on D.C.

## Lagging a Hot-water Cylinder

WILL you please inform me as to the most efficient method of lagging a hot-water cylinder and the compound used? The cylinder is about 15 gallons capacity and is heated by a saddle boiler in the kitchen range, plus a non-automatic immersion heater. The cylinder is in a very awkward place and in the corner of two walls. Should all exposed hot-water pipes also be lagged?—I. A. Brotherton (Bowerham).

IF the cylinder in question is situated in a very confined space, then the best method of lagging it efficiently would be by the use of asbestos rope or asbestos tape, which should be bound tightly round the cylinder. You will not find this a very difficult job to carry out, since the tape can fairly readily be pulled round the cylinder sides.

For the greatest efficiency it is an excellent practice to lag the entire line of hot-water piping to and from the cylinder. In this way you will conserve in a maximum degree the water heat. You will, of course, prevent the pipes and the cylinder itself from radiating their heat, so that the room in which the cylinder is situated will not be as warm as it was previous to the lagging.

You can obtain asbestos tape, rope or sheet from Turner Brothers Asbestos Co., Ltd., Rochdale. It is possible, also, that you may be able to get the material locally from Messrs. Slingers, Corporation Street, Preston. Another supplier is Messrs. J. Milne Cooper & Co., Ltd., Kobar Works, Bradford, Yorks.

## Waterproofing Fishing Nets

I SHALL be obliged if you can inform me of a suitable dressing for fishing nets (fresh water only). My nets have been waterproofed with "Cuprinol." The dressing I am asking about has a stiffening effect on the nets when dry. I have tried linseed oil but this takes too long to dry, and in time seems to crack and let in the moisture. If it is possible to buy this type of dressing would you let me know where I can obtain same or, failing that, the method and contents of the solution?—J. L. Pywell (Kettering).

THE following solution will give a similar effect with your nets as the proprietary solution which you mention:

Copper naphthenate . . . 30 parts (by weight)  
dissolved in  
Benzol . . . . . 50 parts (by weight)  
White spirit . . . . . 20 parts (by weight)

(Copper naphthenate is obtainable, price about 3s. 6d. per lb., from Messrs. A. Boake, Roberts & Co., Ltd., Carpenters Road, Stratford, London, E.15.)

To stiffen the net, soak it for several hours in a warm solution made by dissolving 5 parts of glue in 100 parts of water (by weight). Allow the net to dry. Then immerse it for five minutes in a solution made by mixing 1 part of commercial formalin (obtainable from a local druggist) with 3 parts of water.

## THE P.M. LIST OF BLUEPRINTS

The "PRACTICAL MECHANICS" 220 CAR  
(Designed by F. J. CAMM)  
10s. 6d. per set of four sheets.

"PRACTICAL MECHANICS" MASTER  
BATTERY CLOCK\*  
Blueprints (2 sheets), 2s.

The "PRACTICAL MECHANICS" OUT-  
BOARD SPEEDBOAT  
7s. 6d. per set of three sheets.

A MODEL AUTOGRIO\*  
Full-size blueprint, 1s.

The above blueprints are obtainable, post free from Messrs. George Newnes, Ltd., Tower House, Southampton Street, Strand, W.C.2.

An \* denotes that constructional details are available, free, with the blueprint.

SUPER-DURATION BIPLANE\*  
Full-size blueprint, 1s.

The 1-c.c. TWO-STROKE PETROL ENGINE\*  
Complete set, 5s.

STREAMLINED WAKEFIELD  
MONOPLANE—2s.

LIGHTWEIGHT MODEL MONOPLANE  
Full-size blueprint, 2s.

P.M. TRAILER CARAVAN\*  
Complete set, 10s. 6d.

P.M. BATTERY SLAVE CLOCK\* 1s.

This latter process cannot be applied over the copper naphthenate treatment. Since, however, the copper naphthenate treatment renders the nets completely waterproof, it will be advisable to dissolve a little resin in the naphthenate solution. This will result in the nets being stiffened according to the amount of resin which you add to the solution.

The glue-formalin treatment is quite efficient, of course, the formalin solution acting by rendering the glue quite hard and insoluble. Both treatments are effective, but they cannot be combined.

**Sealing-wax**

**CAN** you please supply me with a formula for making sealing-wax? Also, I desire a means of keeping it pliable while in a container, but to harden quickly on coming into contact with the air.—E. A. Sargeant (Heston).

**THERE** are very many different formulae available for the making of sealing-wax. Some contain waxes, others plastic resins. The traditional sealing-wax, however, is essentially a pigmented resin-shellac mixture, and the formula given below conforms to this type of composition. All quantities are approximate, some variation being permissible.

Shellac . . . . .	20 parts (by weight)
Pale resin . . . . .	12 parts (by weight)
Turpentine . . . . .	22 parts (by weight)
Talc . . . . .	17 parts (by weight)
Pigment . . . . .	25 parts (by weight)
Tricresyl phosphate . . . . .	4 parts (by weight)

As a pigment, use vermilion for red, chromium oxide for green, lampblack for black. The small proportion of tricresyl phosphate is not essential, but it tends to retain the wax in a pliable condition as you desire. By increasing the proportion of this substance, the degree of softness may be increased.

Tricresyl phosphate is a clear, oily liquid which costs about 3s. 6d. per lb. It may be obtained from any laboratory furnisher, such as Messrs. J. W. Towers, Ltd., Victoria House, Widnes, or from Messrs. W. & J. George and Becker, Ltd., 17-29, Hatton Wall, London, E.C.1. Ordinary castor oil might be used as a substitute for it.

**Hectograph Copier**

**CAN** you please give me the recipe for the clay-type hectograph copier?—Blake Hyde (Liscard).

**THE** following is a formula for the making of hectograph material containing clay. It gives a firmer surface than the more usual glue hectograph, but it does not permit of so many copies being taken as does the latter.

Glue . . . . .	100 parts (by weight)
Glycerine . . . . .	500 parts (by weight)
Clay (China or Stour-bridge) . . . . .	60 parts (by weight)
Water . . . . .	375 parts (by weight)

Part of the glycerine can be substituted by a strong sugar solution or by a strong calcium-chloride solution: It is always advisable to add a few drops of carbolic acid to act as a preservative for the glue.

All quantities given above are to be taken as approximate only, there being considerable permissible variations from these quantities.

**Base Exchange Mineral**

**WILL** you please give me the name of the base exchange mineral as used in domestic water-softeners?

Where can this mineral be obtained, and its price? Also, why must sodium chloride be used to saturate the base exchange mineral to regenerate it?—J. Short (Allendale).

**THE** water-softening mineral to which you refer is "Natural Zeolite." Both natural and synthetic zeolites can be obtained from the Permutit Co., Ltd., Gunnersbury Avenue, London, W.4, or from any laboratory supply agents, such as Messrs. W. & J. George and Becker, Ltd., 17-29, Hatton Wall, London, E.C.1. You may also be able to obtain such mineral from Sofnol, Ltd., Greenwich, London, S.E. The price of such mineral is variable, but it should not cost you more than about 3s. 6d. per lb.

A solution of common salt (sodium chloride) is used to regenerate the base exchange mineral for the reason that when the salt solution is passed through the base exchange mineral a chemical interaction takes place which results in the calcium, magnesium and other hardness-forming elements, which have been retained by the base exchange mineral, being replaced by the sodium of the salt solution, the sodium being a non-hardening element in water.

**Cementing Rubber to Glass**

**I** WISH to fix firmly rubber sucker pads to glass; could you please tell me what medium I should use?

Could you also give me the address of a manufacturer who makes tinted celluloid (as used in sun spectacles)?

What bonding medium is necessary to fix rubber to brass?—K. L. Carpenter (West Bromwich).

**A** THICK solution of ordinary shellac in strong ammonia is said to be an excellent cement for attaching rubber to glass. The rubber is cemented at first, but after the evaporation of the ammonia it hardens again and becomes more waterproof than ever.

Another method is to flow a solution of bitumen in paraffin over the glass and, after the paraffin has evaporated leaving a thin bitumen film on the glass, to smear this over with ordinary rubber cement. The

contacting rubber surface is also treated with rubber cement, and then brought into contact with the treated glass surface with firm pressure, which is maintained for a day or so.

These bonding media are also suitable for cementing rubber to brass and copper.

Celluloid in all its varieties is obtainable from either of the following firms:

British Xylonite Co., Ltd., Hale End, London, E.4. The General Celluloid Co., Ltd., 190, Hanworth Road, Hounslow, Middlesex.

**Silver and Nickel Plating**

**I** WISH to silver plate, or nickel plate, a small brass article. Could you please tell me what salts to use and the voltage necessary? Where can I obtain the salts and the anode? The article has been much handled and polished, so what would be the best way of cleaning it?—H. C. Burford (Raynes Park).

**THE** best plan which you can adopt is to purchase your silver- and nickel-plating salts ready made up from a firm of plating specialists, such as Messrs. W. Canning & Co., Ltd., Great Hampton Street, Birmingham. Since the silver-plating salts contain the highly poisonous potassium cyanide, you will have to provide credentials to the suppliers.

A nickel anode should be used for nickel plating and a silver one for silver plating. Both these can be obtained from the above-mentioned firm. A platinum or carbon anode can in both cases be used as an alternative, but in this instance the composition of the bath will continually change as the nickel (or silver) is progressively abstracted from it by deposition at the cathode.

Silver plating should be effected at about 2.5 volts; Nickel plating at about 4 volts. In each case, the current density should be between 15 and 20 amps. per square foot of surface to be plated.

Thorough chemical cleanliness of the surface to be plated is very essential. The brass surface can be cleaned and degreased by boiling in a solution of caustic soda made, say, by dissolving 1 part of caustic soda in 6 parts of water. Alternatively, you may use one of the "cleaning salts" which are supplied by the above-mentioned firm.

Messrs. Johnson, Matthey & Co., Ltd., also supply silver-plating materials. Their address is: Hatton Garden, London, E.C.

**Self-cementing Cloth**

**I** N pre-war days it was possible to buy an adhesive-backed cloth that could be affixed to the back of rugs, home-made mats, etc., by applying a hot iron. This is now unobtainable. As I have some suitable cloth, could you give me the formula for the necessary adhesive?—F. G. Pope (Portsmouth).

**MOST** of the self-cementing papers, fabrics and cards were prepared with rubber latex composition, but since this product is as yet quite unobtainable by the average user, we are giving below an alternative formula for a self-sticking adhesive. Here, again, the formula is rather complex, and the materials are not readily obtainable. However, you might inquire at Messrs. A. Boake, Roberts & Co., Ltd., Stratford, London, E.15, in regard to them. Nitro-cotton (gun cotton) can be obtained from a good firm of laboratory furnishers, such as Messrs. W. & J. George & Becker, Ltd., 17-29, Hatton Wall, London, E.C.1, or Messrs. A. Gallenkamp & Co., Ltd., Sun Street, Finsbury Square, London, E.C.2.

Nitro-cotton . . . . .	5 parts (by weight).
Ethyl Acetate . . . . .	4 parts (by weight).
Toluene . . . . .	2 parts (by weight).

To the above is added the following solution:

Ester Gum . . . . .	4.5 parts.
Castor oil . . . . .	3 parts.
Butyl phthalate . . . . .	3 parts.
Ethyl acetate . . . . .	2 parts.
Toluene . . . . .	2 parts.

This composition remains permanently sticky.

**Removing Stains from Stonework**

**I** HAVE a white stone wall from which I wish to clean marks made by iron, and also bronze, letters attached to the wall. These have weathered and left streaks on the wall.

I have tried scratch brushes, weak sulphuric acid and also a strong solution of "Prolene," but without success.

Do you know of any chemical which will remove or bleach these marks?—E. Ward (Nottingham).

**BROWN** iron stains can be removed from concrete and stonework by swabbing the area over with a strong solution of oxalic acid (Schedule I poison), applying hot. A solution of ammonium oxalate has a similar effect. The same stains may be often removed by applying to the area a sloppy paste made of chloride of lime and water. After this has been on for a few minutes the area is acidified by treating it with dilute acetic acid (say 1 in 3). Hydrochloric acid will do equally well, but it is apt to dissolve a little of the stonework.

It may be necessary to repeat these treatments a few times before the brown stains are entirely eliminated. Needless to say, the area, after treatment, should receive a good scrubbing over with hot water and soap.

The greenish stains resulting from the bronze are more difficult to get rid of. The above chloride of lime (bleaching powder) treatment may or may not be effective, but it is worth trying first of all. If it is not successful, apply a strong solution of caustic soda or soda ash, preferably hot, to the stains, and then wash away with plenty of water. Ammonia may be similarly applied.

Acids, spirits and organic liquids are useless for this

type of stain removal. It is necessary to apply to the stonework some substance which has a chemical action on the stains and which will convert them into soluble compounds which can then be washed away.

The trouble which you mention is a common one, particularly the greenish bronze stains, but we think that, with a little patience, care and perseverance you will succeed in eliminating the stains by one or more of the processes above-mentioned.

**Papier Mâché**

**A** S plywood, beaverboard and similar materials are at the moment unobtainable, and I wish to line out a shed, I have thought of making sheets of papier mâché, size 24in. x 20in. x 1/4in. but require advice as to a suitable waterproof "bond" and strengthening agent.

Would you please give me a formula for making sheets suitable for my purpose, and any suggestion you have on the subject?—T. E. Dunster (Abingdon).

**A** GOOD binder for papier mâché is ordinary glue. After hardening, the material is brushed over with a solution of formalin (commercial formalin 1 part, water 4 parts). This hardens the glue further and insolubilises it, rendering it unaffected by water. Formalin can be obtained from any local druggist and pharmacist, and it is fairly cheap.

Papier mâché can be made from paper pulp and glue water, but a good quality material should contain heavy and insoluble mineral fillers to give it body and substance. If the product is to be coloured, a suitable pigment can be introduced into the composition. A good formula is:

Paper powder, paper shreds or paper pulp . . . . .	100 parts.
Zinc oxide . . . . .	75 parts.
Barytes . . . . .	25 parts.
Pigment . . . . .	As desired.

The above to be made into a paste with glue solution or with cellulose acetate solution.

The above mixture should be fairly stiff in consistency and it should be trowelled to a smooth surface in a wooden-sided tray or mould, the wood being well greased to prevent adherence.

**Anti-moth Powders**

**COULD** you please tell me the best thing to do with a tent to keep it safe from moths?—R. D. Harvey (Worth).

**THERE** are two things which you can do to your tent to preserve it from moth attack. First, you can rub either D.D.T. powder or Gammexhane powder (both obtainable now from any druggist or pharmacist) well into the tent fabric on both sides and then fold the tent up for storage.

Alternatively, you can purchase from Messrs. A. Boake, Roberts & Co., Ltd., 1 or 2lb. of copper naphthenate ("Novenate Copper"), costing about 3s. 6d. per lb. About 10 parts (by weight) of this greenish material are then dissolved in 100 parts of white spirit, paraffin or solvent naphtha. The resulting strong green solution (inflammable) is then brushed on to both sides of the fabric and allowed to dry. The tent will thereby be coloured green, but the copper naphthenate, being highly toxic to insects and fungi, will be free from moth attack and also from rot.

**Canvas to Leather Cement: Poster Colours**

**COULD** you please tell me how to make: (1) A strong waterproof cement or glue for joining leather to leather, and canvas to leather. (2) Showcard water colours, red, purple, blue, brown, yellow, black and white.—C. A. Hurst (Hull).

**CANVAS** may be attached to leather by means of ordinary glue. After setting, the upper side of the canvas is wetted with a liquid made by diluting 1 part of commercial formalin solution (obtainable from a local druggist) with 3 parts of water. The formalin hardens the glue and renders it water-resistant, so that after the formalin liquid has dried off from the canvas, an effective joint should readily result.

When a leather-to-leather joint is being made, one of the leather surfaces should be wetted with the strong commercial formalin solution prior to being laid over the glued surface. The two surfaces are then gently rubbed together and placed under pressure.

Alternatively, for a leather-to-leather joint (waterproof) you can use a good casein glue, such as that prepared by Messrs. James Beard & Co., Ltd., Great Ancoats Street, Manchester.

(2) Showcard water colours are made up on a basis of pigment, extender and binder. The pigment is, of course, the coloured insoluble material, such as green oxide or chromium, etc. The extender is a neutral insoluble white material, such as chalk or china clay, whilst the binder is a material which unites the whole and prevents it from rubbing off when applied to the paper. As a binder, ordinary dextrine (British Gum) is the most satisfactory. An average composition is:

China clay (or chalk) . . . . .	30 parts.
Pigment . . . . .	40 parts.
Dextrine . . . . .	30 parts.

These materials are intimately mixed and then made into a paste or a thick liquid with water. A drop or two of carbolic acid should be added to prevent mouldy growths being formed by the dextrine. Vary the proportion of pigment and extender according to the shade required. If the colour "rubs" when dry on the paper, add more dextrine to the mixture.

Another class of poster colours comprises merely strong solutions of dyes in water or spirit. These give transparent results, but the colours are much more delicate and, moreover, they are seldom light-fast.

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# Firestone

BEST TODAY \* STILL BETTER TOMORROW



Editor: F. J. CAMM

VOL. XV

FEBRUARY, 1947

No. 300

All letters should be addressed to the Editor, "THE CYCLIST," George Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2.

Phone: Temple Bar 4363

Telegrams: Newnes, Rand, London

Comments of the Month.

By F. J. C.

## The Majority Rule

WE deplore decisions reached by committees under a rule which says that resolutions must be passed by a two-thirds majority, or some other percentage. This really means that a minority can inflict their opinions on the majority.

It is our view that in all cases where the interests of a large number of people are concerned, such as the members of a national organisation, a majority vote should decide a resolution. Any national body which professes to speak for the majority should not announce its views to the Press if those views have been obtained on a minority vote.

It is even more important to have a simple majority vote when national committees do not take a referendum of the opinions of their members or their affiliated clubs. This is a point which the Minister of Transport and other interested bodies should bear in mind when they receive memoranda from national bodies.

It is the duty of the Ministry of Transport to make quite sure before accepting such memoranda that they emanate from truly democratic bodies which really reflect the opinions of their members.

### Track Sport

THE National Cyclists' Union have been goaded into action by the new committee set up to put track sport on the map. The N.C.U. has largely adopted the proposals of this committee, but whether this is an attempt to forestall the efforts of this committee or to allay further criticism is not clear at present. It seems reasonably certain, however, that Track Sport in 1947 as a result of these new efforts will be on a better scale than has obtained hitherto.

### Cycle Tracks

ACCORDING to the British Road Federation the Swedish authorities are very conscious of the need for the provision of adequate cycle tracks, and the necessity of making them attractive to the cyclist.

In Sweden the use of cycle tracks where provided is obligatory, and cycle tracks and footpaths are provided as occasion demands, a traffic flow of 500 bicycles with 300 other vehicles per day being deemed to justify their construction. The tracks may be separated from the carriageway by verges, may be constructed at a different level to the carriageway or may be diverted entirely from the site of the highway to make them more attractive to the cyclist. Wherever possible tracks are 6ft. wide accommodating two streams of traffic, whilst the surface is of the same quality as the main carriageway.

In one respect Sweden is ahead of us. At rush hours certain city streets are confined to one class of traffic, motor vehicles or bicycles, and this system has been most widely adopted in the centre of towns where

a one-way system during peak periods is being introduced in conjunction with the segregation of traffic.

Cycle tracks in this country, however, are never likely to be popular on several counts. All of the points for and against them have been very fully discussed in this journal. It is significant that where paths have been provided they are very seldom used, and it is noted that accidents have not noticeably decreased.

As the Minister of Transport said in a recent speech it is easy to be penny wise and pound foolish in the matter of road construction. Lack of correct planning has resulted in costly transport delays in our towns and cities, and made the modernisation of the Urban road system much more costly than it need have been. We are pleased to learn that he does not intend to make the mistakes of the past.

He went on to say that "Our aim is to build roads which will be adequate not only for present needs but capable of carrying a greater volume of traffic than that which was experienced pre-war. Furthermore, having built these roads we intend that their traffic use is not impaired by building development. The modernised trunk road system which we envisage will result in a great saving to road transport both in time and in other operating costs and in wear and tear of vehicles. Moreover, they will enable outside loads to be moved freely over long distances."

Last May in the House of Commons he gave particulars of the Government's Ten-Year Plan for the Roads—a plan which has met with the full support of the British Road Federation and other bodies. That plan provides for a large works programme of major improvements on existing roads, both in town and country areas, and the building of some 800 miles of motorways. During the next two years it is intended to press on as rapidly as the resources of the country permit with the first stage of that plan, beginning with those schemes which can give the greatest help to industry, particularly in the development areas, as well as those which will help to make highways safer for all classes of road users, not forgetting the 45,000,000 pedestrians.

### The Severn Bridge

IT is proposed to invite tenders for preliminary work on the Severn Bridge, which will be the largest suspension bridge in Europe and a lasting monument to the skill of British engineers and workmen. How far the construction of this bridge will assist in the development of the industries of South Wales will be clear when it is stated that compared with the existing route via Gloucester it will effect a saving in distance of 50 miles between Bristol and South Wales, of 10 miles between South Wales and London, and in conjunction with

its associated roads will provide a fast route between the Midlands and South Wales.

Another major scheme serving development areas is the proposed Jarrow Tunnel. The Bill giving the Durham and Northumberland Councils the necessary powers has now been passed, and the Ministry of Transport is making a 75 per cent. grant towards the cost of this scheme.

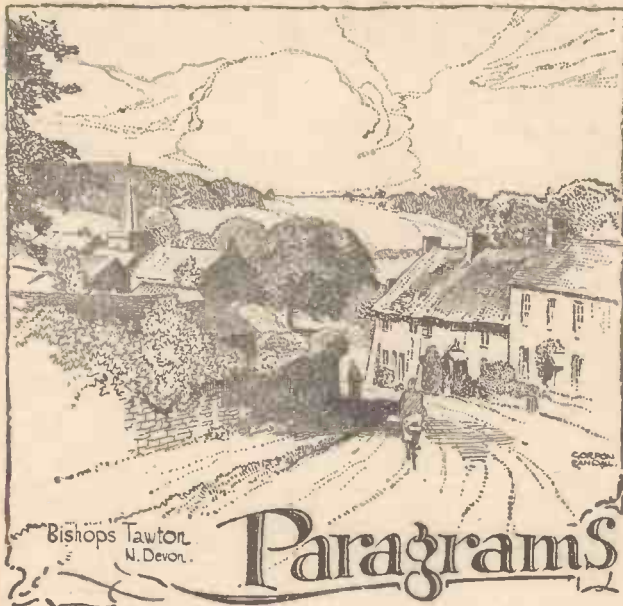
During the first stage of the ten-year plan it is also proposed to resume some of the schemes which at the outbreak of war were either postponed or closed down. Among these is the lower Thames tunnel between Dartford and Purfleet. The pilot tunnel was constructed before the war, and it is proposed during the coming year to invite tenders, on behalf of the joint committee of the Kent and Essex County Councils, in respect of the main tunnel. This tunnel will provide a most valuable link between the industrial areas north and south of the river.

Some of the pre-war schemes will have to be somewhat modified to fit in with the new pattern of our highway system. For example, it is now clear that the Maidenhead and Slough By-passes, totalling about 17 miles in length, will eventually form part of the route from London to South Wales via the Severn Bridge, and plans are being recast accordingly.

Many sections of road which are heavily built-up should, as through traffic routes, be replaced by new roads to by-pass the existing built-up areas. It is intended that where these sections of new road are of substantial length and circumstances are favourable, and the free movement of through traffic so requires, they will be constructed as single-purpose roads to be reserved for the use of motor traffic only. Powers to enable this to be done will be sought.

Apart from this, the Ministry is proceeding with the preliminary survey work for the purpose of determining the future lines of the principal trunk roads. Detailed location surveys for some 300 miles of route are now being carried out by the Ministry's staff as well as that of the local highway authorities on my behalf.

Road users will be glad to know that special attention is being paid to the selection of lines of route that will avoid undue interference with the natural features of the country. A new road, provided it is so designed as to fit into the landscape, should be not an eyesore but a thing of beauty, opening up fresh vistas of the countryside. Judicious planting of trees and shrubs will not only increase the harmony between a road and its surroundings, but, moreover, add materially to road safety. For example, it is intended that, on curves, shrubs should be planted in the central reservation to screen drivers at night from the glare of headlamps.



Bishops Cleeve  
N. Devon.

## Paragrams

### Marking The Spot

ONE of the features of Leicester's Safety Week, arranged by the Leicester and Leicestershire Accident Prevention Council, is the erection of signs at 16 of the city's danger spots showing the number of accidents which have occurred at these spots during the last few years, and giving details.

### Can I See Your Permit?

A "CYCLE permit" is to be issued by head teachers to each of the ten thousand Nottingham children who cycle to and from school every day. There are 14 rules for road safety and good manners printed on the permit, and steps will be taken by the teachers to see that, as far as possible, these rules are observed by the children.

### Dummy Run

IN order to see how a proposed new traffic plan would work in the market place at Boston, Lincs, a dummy roundabout was marked out with sawdust, and sawdust lines also indicated suggested alterations in the carriageways. "Keep Left" signs were, on this occasion, police officers. The test lasted about an hour and appeared to be successful.

### A Heavy Shower

A CYCLIST riding along the road near Huntingdon thanked his lucky stars he was riding at a distance when he saw a large lorry in front of him suddenly let loose a shower of bricks into the roadway. The accident was due to the sudden collapse of one side of the lorry, and anyone caught in the shower of bricks would have been seriously injured.

### Beauty Spots For Public?

SEVERAL picturesque portions of the Beaumanor Estate, Leicestershire, have been withdrawn from the sale by auction. It is understood that the Leicestershire County Council is negotiating for the purchase of Beacon Hill, the second highest spot in the county, and Windmill Hill, another beauty spot, with the idea of preserving them in their present state.

### Under Consideration

FOLLOWING two more accidents at dangerous cross-roads at Wigston, Leics., the Urban Council discussed the provision of traffic lights or some other safety device. One councillor said the dangerous nature of this road junction was under discussion when he first joined the Council 25 years ago, and had been discussed dozens of times since then. The matter is still under consideration and the County Council is to be asked to take action.

### Errand Boys' T.T.

LEICESTER errand boys held their annual cycling reliability trial through the streets of Leicester on December 5th. Leicester and County Accident Prevention Council arranged the first trial last year in an endeavour to improve road manners amongst the city's errand boys, and to teach them the rules of the road. Last year there were only two dozen entrants, mainly from the Post Office, but this year the errand boys seem to have got over their suspicion of the trial and the number of entrants was more than doubled. One feature of the trial course, arranged by Sgt. Brough of the City Police, was the number of tricky right-hand turns he managed to discover.

### Those Dogs

THE report of the Chief Constable on road accidents in Grantham during the past three months emphasises the danger caused to cyclists by dog owners

who allow their animals to run wild in the roadway among the traffic instead of keeping them under proper control. Dogs which have the urge to run wild after anything they see moving on the road should, the Chief Constable stressed, always be kept strictly on a lead as they are a constant cause of accidents.

### No Wobbler

WHEN a motorist was charged at March (Cambs) Police Court with driving without due care and attention, after having struck a 72-year-old cyclist as he passed him, the cyclist became most indignant when it was suggested that he might have wobbled as the motorist went past. Cross-examined, the cyclist denied that he ever wobbled as he rode along, and he told the defending solicitor: "I can ride a bicycle as well as you can." A conviction was recorded against the motorist and he was fined £1 and costs, with endorsement of licence.

### Humber Bridge

IF the Minister of Transport, Lindsey County Council, or anyone else shows any signs of losing interest in the scheme for a proposed bridge over the Humber, or a tunnel under it, Barton-on-Humber Urban District Council will live them up again. The Council realises that if there is a crossing of the Humber the town will become of considerably increased importance, and it will do everything in its power to help the scheme forward. A deputation has been appointed to interview the Minister of Transport, and the local M.P. is arranging to be present at this meeting.

### Cyclist's Action Fails

A CYCLIST who brought an action in Atherstone (Warwickshire) County Court for damages of £200 from a local farmer in respect of injuries he received when he collided with a horse on the road in the dark, failed in his claim as the judge ruled that it was not reasonable to expect a farmer to examine all his hedges every day to see whether there were any gaps through which an animal might force its way on to the road. The case has now been before the Court of Appeal, and the decision of the County Court judge has been upheld by Viscount Maugham. The appeal was dismissed, with costs against the cyclist.

### Badges for Good Cyclists

SCHOOLS all over the country are to issue special buttonhole badges to those of their scholars who are careful and safe cyclists. The Royal Society for the Prevention of Accidents is forming a Cycling Safety League, and the badges will be issued to the children by the League after the passing of various tests, which include road manners, an elementary knowledge of the Highway Code, and the ability to check that a cycle is in a safe and rideable condition.

### Attack Better Than Defence

TWO airmen from Brampton (Hunts) R.A.F. station, both aged 19, both named Michael, and both charged with riding together on one bicycle, swung to the attack when they wrote to Huntingdon Bench before the hearing of their summonses. They sent a long typewritten letter, which they both signed, complaining bitterly about the poor transport facilities between Huntingdon and Brampton, and that the only means of transport was a taxi, "far beyond the means of the average airman," and they suggested a late bus service. Each offender was fined £1, but the Bench refused to comment on their remarks.

### Who Wants a Cycle?

HUNTINGDONSHIRE County Council are unable to take over huts at the R.A.F. station at Little Stukeley because over 11,000 cycles are at present stored in a number of the huts. Mr. David Renton, M.P., has taken up the matter in Parliament, but was informed by the Secretary for Air that the shortage of manpower made it impossible for all these cycles to be removed for some time. Mr. Renton's retort to this was: "Is the Hon. gentleman aware that the bicycles were put in the huts that are particularly required long after negotiations were started?"

### Grantham Road Club Anniversary

GRANTHAM Road Club has celebrated its twenty-third anniversary with a dinner and concert, in addition to the annual prize-giving. The president of the club, Mr. Fred Bates, presented the prizes and spoke of the club's progress generally. He mentioned that two founder-members, Mr. H. T. Barnett and Mr. W. Brading, were at the gathering. The club is in a thriving condition, with a membership of 76.

### Ace Cyclist Retires

AT the first post-war dinner of the St. Ives and District Wheelers' Club, the retirement as a racing cyclist was announced of Vernon Wilson, who this year was the winner of the club's 100, 50 and 25 miles races. Reference was also made by speakers to the club's past successful season, the keenness of members, and the hopes for further successes in the future.

### Very Considerate

IN a letter to Whittlesey (Cambs) magistrates, a cyclist who had been caught riding without lights explained that he must plead guilty to the offence, but he had switched off his lights because his dynamo made so much noise, and he decided not to use it "in fairness to the local inhabitants." A police-witness said he heard the dynamo working but it hardly made enough noise to disturb the sleeping countryside. The magistrates imposed a 15s. fine.

### Their Lucky Day

TWO girl cyclists, charged at Boston, Lincs, with riding without lights, had their summonses dismissed on payment of costs as it was the first court over which the newly appointed Mayor presided, and the exercise of his prerogative saved the girls about £1 each in fines.



### Winter Sunshine

The crossroads at Wilmington, Sussex sketched from the Old Forge.



# Around the Wheelworld

By ICARUS

## Make Me Minister of Transport!

IF the Government will exercise a little wisdom and make me Minister of Transport (unpaid) I will guarantee within two years to solve the traffic congestion problem, and to reduce accidents, fatal and otherwise, by 75 per cent. Some of the reforms are so obvious that it is difficult to understand why they are not made.

Everyone who uses the roads of London, for example, knows that congestion is caused by too much control, and too many traffic lights. Yet as more vehicles come on to the road more and more traffic lights are erected when less and less are required. Obviously, if a greater number of vehicles have to pass along a given road in a given time they must be made to travel faster. Our present system is to introduce more controls to slow them up. The traffic lights are thus rendered ineffectual.

As Minister I would not take away the rights of any road user, but I would certainly ignore the fatuous and selfish demands of sectarian organisations. I would take away all authority in the Metropolis from the Traffic Branch of Scotland Yard. I would permit unilateral parking, and where parking facilities are not available I would see that Scotland Yard was instructed not to prosecute business motorists. There is the offer, and I hope the Government will accept it.

Our present Government really represents the talking classes.

## Committee for Track Sport

THERE has been no modification of the plans of the Committee for 1947 Track Sport, says the hon. secretary, A. R. Haine, despite a statement to the contrary by the N.C.U. secretary. The Committee, while recognising that the announced plans of the N.C.U. for 1947 show that the reforms aimed at have been, to a certain extent, met by headquarters, are still pressing for the adoption of their original plan for a separate company, under N.C.U. control (except on the financial side), and a proposition to this end will appear on the agenda of the annual meeting of the London Centre of the N.C.U.

The 1947 Committee at one of its recent meetings agreed that, in view of the N.C.U. announcement, they would wholeheartedly support the N.C.U., and whoever was appointed as the supervisor-organiser, through the 1947 season, without, however, relaxing their efforts to bring their whole scheme into being for 1948.

In view of Press criticism which suggested that the Committee were mainly interested in pushing forward their scheme in order to make a profit out of the sport, the hon. secretary was asked to emphasise that the plan, as printed and circulated, provides only a reasonable interest to the shareholders (essential in any scheme standing on a business-like footing), and the major profits would go back into the game either directly in the form of improvements at Herne Hill, aid to riders in international events, etc., or indirectly, in the form of dividends, to the founder shareholders of the proposed new company, who would, of course, be the original promoting clubs and organisations, including the N.C.U.

## The Highway Code

THAT colossal mass of waste paper known as the Highway Code has now been distributed to every household in the country. Over 14,000,000 copies of it have been so

distributed, and I am prepared to wager that not one person in a hundred has read it.

More than 100 persons are killed and about 3,000 injured on the road in this country every week. Yet they continue to ignore the advice given to them. It has been augmented by a poster campaign.

The Highway Code has been in existence now for so many years that we are entitled to say that it is a failure, and that further paper should not be wasted on it. Accidents have steadily increased since it was first introduced in Hore-Belisha's day.

## Skating on Cycles

A RECENT edition of Pathé News showed a shot taken in Prague of cyclists figure-skating on the ice. The commentator said that with a cycle and nerves you have a new kind of physical jerks. I saw the film and quite agree with him!

## Dunlop's War Secrets Film

THE story of the "beetles," a vital factor in the success of the Mulberry, is fully told for the first time in a new type of documentary film, "Far Horizons," produced by Cossar Turfery for Verity Films, which tells the story of the Dunlop war effort. The film combines the qualities of a feature story with a background of industry during the war years, and will be seen early this year at 73 centres in England, Scotland, Northern Ireland and Wales. "Beetles" were, of course, the rubber bags which were forced into the gaps torn by rough seas in the concrete pontoons, keeping the Mulberry afloat. Damage to the pontoons submerged one end of the harbour, but it was successfully brought back to the surface when the "beetles" were inflated.

## "Cycling Record"

MY congratulations to the British League of Racing Cyclists in producing the *Cycling Record*, which is the official journal of the British League of Racing Cyclists. They claim that it will have a circulation of 5,000 copies monthly, and a potential circulation of 75,000. It is to be sent to the secretary of every cycling organisation throughout the world. The format is on newspaper lines.

## B.L.R.C. Executive Meet

A MEETING of the national executives was held at Nottingham on December 28th, 1946, when it was announced that the Pathé News Reel film of the 1946 Brighton to Glasgow Road Race, together with the League film of the Wembley start, is to be made available to each club and section at a hiring charge.

The national hon. secretary has been granted powers to engage part-time paid assistants for clerical work.

The stages in the Brighton to Glasgow Road Race on August 4th, 1947, will be as in 1946—Brighton, London, Wolverhampton, Bradford, Newcastle, Edinburgh and Glasgow.

The league has a most ambitious programme for 1947, and it will once again lead the field in obtaining publicity for cycling.

The following letter from Jimmy Kain explains itself:

"Further to the manifesto recently issued by the national executive of the B.L.R.C., inviting the R.T.T.C. and all road

men to unite in an endeavour to obtain direct representation at U.C.I. Congress, it will interest your readers to learn that the national committee of the R.T.T.C., through their national secretary, have informed me by letter dated December 10th that the policy of the council is 'clearly defined' and that the matter 'cannot be discussed.'

"By strange coincidence I have just sighted an old agenda of the Road Racing Council ('parent' of the R.T.T.C.) dated August 27th, 1929. Item No. 3 reads: 'To receive offer of a trophy from L. Meredith, Esq.'

"This world-famous rider, multiple winner of world's championships, was desirous of donating any of his famous trophies for a road championship of Britain. . . . The chairman of that meeting ruled that the matter 'could not be discussed,' the council having 'no powers.'

"For generations before 1929, and 14 years following, British road sport went championless. . . . In 1943 the B.L.R.C. initiated the first road race championship in British cycling history, the winner being Ernie Clements. In that same year the league also promoted the first British time trial championship, winner 'Ted' Jones.

"In 1944 the R.T.T.C. suddenly found the 'powers' to copy the B.L.R.C.! . . . Will the R.T.T.C. be another 15 years too late before they discover the powers to discuss the hard-earned claim of English road men to direct representation in the parliament of international cycling . . . the U.C.I.?"

## Independent Scotland

AT the inaugural meeting last year of the Scottish Cyclists' Union it was unanimously decided to make application to the "Union Cyclists' Internationale" for the independent recognition of Scotland, with a view to taking over the full control of all cycle sport in Scotland, amateur, independent and professional (both sexes) on road and track. A full calendar of road and track races will be promoted, including a six-day road race (U.C.I. rules) of approximately 600 miles.

George Edwards and Alec. Hendry (both members) plan to attack many Scottish places to place records.

## World's Champion at Herne Hill Track on Good Friday

THE Southern Counties Cycling Union have contracted world's professional pursuit champion, Gerrit Peters, to race at their famous Good Friday meeting at Herne Hill. His Madison partner, Cees Pelleneers, who will be remembered for his fine riding at the last Wembley "Six," Gerrit Schulte (the Pedalling Fool), and yet another Gerrit, Boeyen, who, with Schulte, won the recent Paris Six-day Race, have also been signed.

These four Flying Dutchmen have between them won most of the major events this winter season, and are without question the most formidable Madison riders in the world to-day.

Further riders will be engaged to compete against the Windmill team in an Omnium.

At the present time both Peters and Pelleneers are nursing fractures in the same hospital, received, however, in separate crashes.

Cees Pelleneers was amateur road champion of the world in 1934 and has been connected with the bike game since he was 14 years of age, as a boy helper, in six-day events.

# Wayside Thoughts

By  
F. J. URRY



Falkland Palace,  
Fife-shire.

The home of James VI,  
and visited many times by  
Mary, Queen of Scots.

## Makers Awheel

HERE is something to digest in these quiet moments. I was out with the Centenary Club at the beginning of October, eighteen high executives of the cycle manufacturers, spending a long weekend with headquarters at Llandrindod, and from the Saturday morning until the Sunday evening our total cycling miles were a trifle over sixty. It seems a feeble count when committed to print, but those leagues were full of beauty, interest and hearty companionship. Those elderly men of the trade do not want to ride far and like the miles to be easy ones; and I cannot blame them overmuch, for truth to tell they are cyclists more as the result of the power of persuasion and as a gesture of faith towards the article they make than as wanderers to pleasant places for the glory of health and exercise that ranks so highly in the appreciation of the regular riders. They—with certain exceptions—are not regular riders, but that they ride at all is a compliment to the pastime and, as they have discovered, has evoked in them a camaraderie that would never have occurred otherwise. They first rode as a duty; some of them surprisingly discovered more in the game than they had previously appreciated, and now ride for joy and as a kind of escape from the complexities of our modern problems. But the collection of miles is not their forte, always providing there are enough furlongs to give them that sense of freedom inherent in cycling, together with that happy, youthful companionship at feeding times and after that makes life on the road a joy for all of us. In April, 1939, thirty members of the trade inaugurated the idea of club membership by doing one little mountain crossing, and on every lengthy run since—and there have been many—they have kept up this spirit of exploration. On this occasion it was over the hills from Abbey Cwmhir to Rhayader, a beautiful little journey burished with the bronze and green and gold of a lovely autumn day; and if they were a trifle critical of the rough track they at least were appreciative of the day and "the land of their fathers." That Saturday and Sunday were perfect examples of how to enjoy cycling without counting the miles, and better still, perhaps, how to encourage a comradeship to grow and flourish within the narrow nurture of a competitive soil. That, it seems to me, is the value of the Centenary Club to itself and to every cycling interest; it persuades the big people to understand the cyclists' point of view, it encourages comparisons between bicycles and their equipment, and it elevates the pastime from the angle of the ordinary everyday rider as apart from the opinions of the racing man and the self-styled experts. I wish the club would ride and argue a little more often, but that they do it at all is good for them and the game.

## Personal Freedom

THE year is not very old, and all the troubles of this agitated, peacetime seem to have burdened its beginning. Yet I cannot feel depressed, for spring is round the corner, and I have a feeling that the new year is going to see things on the mend as far as our game is concerned. The chance is not going to come

with a rush, but as a sort of creeping improvement in machinery—which will create new interest—and in catering—which will encourage that interest to grow and take to the road with the feeling that England is at long last returning to its old habits with the addition of certain improvements. If this is an optimistic vision, then I prefer that dream to many of the views now so widely expressed, suggesting we are decadent and half promising all of us a rather wearisome future. As a people I think we are far too resilient to descend the social scale, and as a pastime I am certain cycling will grow and gather strength because it is, and always must be, one of the high spots of personal freedom. We who ride bicycles for the love of the game have been balked of its full enjoyment because the right types of machinery and equipment have not been forthcoming from the trade. That position is slowly altering for the better, more good stuff is procurable, and most notably, decent tyres are beginning to come on the market. For be it known that no bicycle, however good in its design and its own full satisfaction unless the tyres are of the best, and the seat is supremely comfortable to sit on all day, and not just for a short journey of ten miles. These two things are fundamentals in making and keeping any individual a cyclist and both of them are likely to be obtainable before summer blooms. The good machinery is with us from numerous

factories; it is expensive compared with pre-war prices, and we may have to wait awhile for the fulfilment of our orders; but the money cost and the time lag are worth the best obtainable.

## Our Catering

IN another place I have been taken to task for mildly criticising many of our catering establishments, on the grounds that times are difficult in the matter of food supplies, and labour in the form of help is hard to find and satisfy. All of which is true, but such conditions are common in every business, yet I have not noticed that the want of courtesy is lacking in the same degree as I have found in the catering business. Actually, touring cyclists are not expecting to be presented with sumptuous meals, but they do feel that a welcome and the best possible hospitality should be offered them. They understand, none better, the many frustrations and disappointments that make catering a worry; but they also understand their own troubles have to be met and overcome, and the manner in which they can make do and manage should also be possible to the people who cater, take tourists' money, and on whom they so largely depend for the introduction of happiness in their roaming holidays. For touring success is dependent on reasonable catering, and the curt refusals to be helpful, which happened to me on so many occasions during the spring and summer of 1946, is not encouraging to the spread of the finest form of outdoor holidays I know. Mine has not been the only grumble, because the touring organisations have sensed the need of improving the arrangements made with their varying caterers, and it is to be hoped their aid and advice will lead to a better state of affairs during this year of grace. I know how difficult it is to please every caller, for there are always some impossible people who expect a miracle to happen; but I feel that a genial welcome goes such a long way to make even the plainest of fare taste sweet, and that is what we are asking for now. The improvement in fare will come later, more quickly, we hope, than now seems possible; and we shall not scorn the return of ham and eggs.

## Quiet Journeys

IN many ways I am sorry to miss the high spirits of the club run so frequently, because it is among the joyful expressions of cycling, and I was reared up to regard it as such. The fact of the matter is that the years are inclined to find me lagging superfluous among the younger element, and although I "get there" in due course, it is not quite the same thing as once was the case when I was one of the crowd. Occasionally I go club-riding when the miles are not too many and I can reach home in time for an hour or so of ease; and sometimes it is a little comic to hear—when the youngsters have wound up the speed—someone in front inquire if the "old man" is all right, and I turn

round with the others to see! Curious the way we do not count ourselves old at this game of cycling; yet it is true that the old speed up hill has deserted me. I am by no manner of means disturbed about it, for I still climb the hills as of old, quietly and with all the old joy, for speed is one of the least attributes to the happiness of cycling. My riding in these days is done either as a lone prowler or in the company of friends who temper the speed to the hoary-headed, and I'm sure this activity has its special blessings, and is but another facet of the many cycling has to offer to the regular rider. A day "on my own" is a refreshment in exercise, and this winter I have enjoyed numerous trips in weather which most people would say is impossible. A few Sundays ago I rode five-and-twenty miles before lunch, and all the while rain was falling heavily, yet I did not get wet, and only the front tails of my coat were slightly dampened. Why? Good mags and a quiet pace. And I had most of the road for my own use, crept along some flooded patches, heard the storm roar and thresh through the woods, and thoroughly enjoyed a morning on which no other game would have been possible. It may sound an exaggeration, but it is true enough; nor is the action brave or defiant; it is merely taking the greatest active joy from elemental storm that would otherwise seem depressing.

## Importance of Club Life

I MET a club man of the younger school a few days ago, a rider of moderate ability as far as speed counts, who deplored the selfish imposition on club life of the B.A.R. competition. I have held that opinion since the inception of the movement, for remembering the old days and the full fixtures of club racing events, I am sorry to see the manner in which they have faded away. While the big open events are organised and run over the fastest possible courses, and with the B.A.R. competition in being, the fast men will naturally be attracted thereto, and his club events can go hang. It is what has happened and what will happen for as long as the big annual competition lasts, and club life in the really club-able sense of the term is suffering. The moderately speedy rider, often as keen or keener than the first-class pedaller, frequently finds himself eliminated from the big opens, feels frustrated, and as often as not his young enthusiasm is thereby dampened. The happy-go-lucky days of closed club racing are nearly gone, and with them the best sporting instincts of club life, for the weekly "opens" scatter racing men and helpers to the four corners of the land, segregate the membership and destroy the old and valuable social amenities. Actually my days of keen racing interests are over, and from the purely personal angle the changed conditions do not thereby affect my joy in riding; and perhaps this fact may be the reason for my criticism; nor should I have mentioned the question here and now had it not been for the gist of the talk with an active racing man of modest pretensions. I think we are all in danger of placing too much importance on the outstanding performances, and too little on the sporting quality of the game for every rider who cares to stretch his muscles to the limit. Hero-worship has its good points, but road racing, if it is to be worthy of the real spirit of speedy cycling, must surely champion the mediocre, which is the bulk of the lads and lassies who play the game, and in my opinion the right way to do that, and the happiest, is a revival of the club racing fixtures, backed by the full loyalty of all the club members, and where such fixtures clash with "opens" then let the "opens" go hang. It is the only way I see of preserving racing club life from an exploitation which may finally lead to lack of club interest and disintegration.

## Taking the Weather

SOME people would say I am foolish or pig-headed—or even worse—to go riding 30 miles on a morning of storm with thrashing rain flooding the countryside. It may be true in the minds of other people, but I am not conscious of it; but I am very much alive to the undoubted pleasure of seeing a sobbing land of running water, with gurgling ditches and roaring rivers, for such visions come rarely and unless you have seen the land you love under many aspects of weather, you cannot know it intimately. The other angle of the story is that on such a morning what else could one do? And it is certain the exercise gave me, as always, the delight of being alive and a little superior to the elements. I took three and a half hours to cover my 30 miles, with one short stop for tea at the end of a 12-mile struggle with the gale, and when I arrived home only my coat fringes were dampened, and my shoes were wet as a result of paddling through a little stretch of flooded road. Which says something for the mags I wore. I tied a handkerchief around my neck to mop up the drippings from contact with collar and shirt, and wore an old cap back to front to keep the driven rain from penetration when I went with the wind; and all the way I was a very comfortable rider over very lonely roads. I had my exercise, heard and saw the gale swing over the wet and soaking earth, and arrived home full of the flush of the fight and very hungry. I had once more proven I could still ride into and with the storm for half a day without getting weary, dreary, woe-begone or damp, and that gave me great satisfaction and the feeling that there are tours to come and I can face them with the joy of journeying whatever the weather, always excepting heavy fog or deep snow. Apart from the actual enjoyment of the ride, it is pleasant to prove yourself out and discover the only thing lacking in the gamut of the game, is a little less speed than was the case 40 years ago. It was an entertaining experiment in testing age against the elements, and the result made me feel comfortable.

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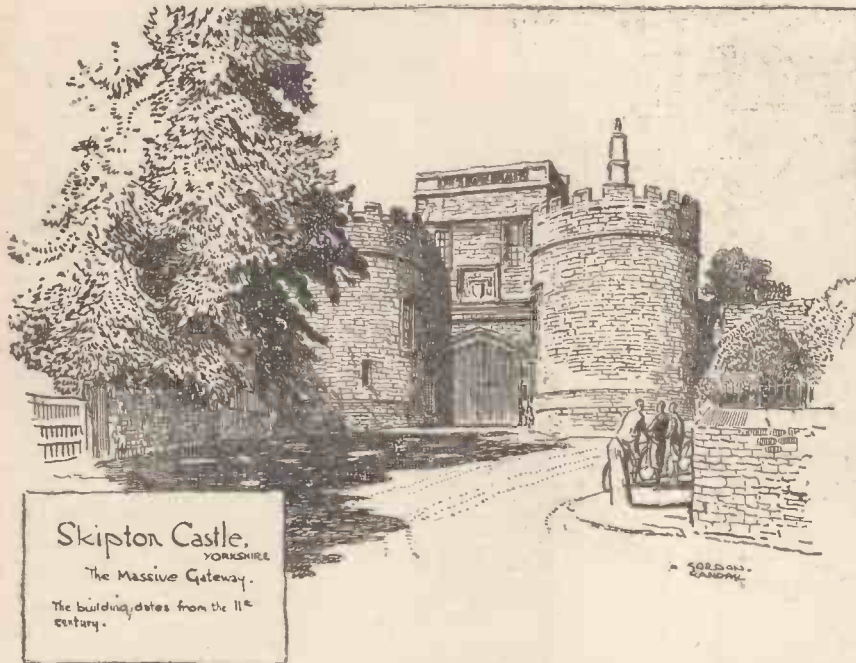
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# CYCLORAMA

By  
H. W. ELEY



**Skipton Castle,**  
YORKSHIRE  
The Massive Gateway.  
The building dates from the 12th century.

### A Fund That Should be Better Known

**I** REFER to the Motor and Cycle Trades Benevolent Fund, founded many years ago by that stalwart cyclist, journalist and advertising agent, A. J. Wilson—known to all the “old brigade” as “Faed.” The fund, according to my information, is in a most healthy financial state, and continues to do excellent work in relieving distress and helping those “lame dogs” of the industry whose needs quite possibly cannot be met through the medium of any other organisation. But there has never been sufficient publicity about the good work done . . . and now, I gather, there is to be some really intensive work put in to “tell the world” about the fund and make it known throughout the factories where eligible members may be found. Sir Edmund Crane is interesting himself in the project, and it is well known that he has the work of the fund very much at heart.

### All-weather Riders

**T**HE real cycling enthusiast is never deterred by inclement weather, and I was reminded of this fact the other weekend when, in the teeth of a biting wind, and with cold hands and feet, I trudged over Hampstead Heath, walked through Ken Wood, and tried to get my bit of “Rural London”—to fortify myself for all the tasks of the week ahead. By “The Spaniards” I noticed many keen riders—obviously enjoying the wintry morning—and riding as joyously as if the day had been warm and sunny. What a myth it is to imagine that the only weather to enjoy is sunny warmth! There is a lot to be said for the tang in the air on a wintry day—for the iron-bound road—for the gossamer rime on the hedges—for the crisp snow crunching under one’s feet! And the cyclist can enjoy it all, with a greater sense of freedom and independence than almost any other out-of-doors enthusiast. . . .

### The Neglected Tyre

**H**OW well I remember—in the dark days of the war—those constant and urgent admonitions about “care of tyres”; the emphasis was often on the hackneyed

subject of “under-inflation,” and even today there are thousands of cyclists who neglect to inflate their tyres properly—and they pay a heavy penalty! It is the whole principle of the “pneumatic” that the tube must be filled with air . . . and under-inflation causes undue “flexing” and inevitably induces damage. It is such an easy matter to see that one’s tyres are inflated hard . . . and one gets a dividend in mileage! The saddle, too, is often neglected, and it always amazes me to see so many good riders content to suffer discomfort because the saddle has “sagged.” Tyres and saddles are vital items in our riding equipment, and both will amply repay a little attention.

### In Grey Derbyshire

**A** MONTH or two ago I included in this causerie some eulogistic comments about Essex, and extolled the little-known beauties of that county. I received a minor “fan-mail,” and some of my correspondents evidently share my views about the glories of Essex. Others point out to me that other counties have their unsung glories . . . and one correspondent urges me to go to Derbyshire . . . to taste the loveliness of Dovedale; to realise the fascination of stone walls dividing the fields; to visit such little towns as Youlgreave, and to wander around ancient Ashbourne, not forgetting to visit that famous inn “The Green Man”—with big sign spanning the street, and a room wherein is the chair in which the great Doctor Johnson was wont to sit and sup his ale. Well, I know my Derbyshire tolerably well, and have indeed sat in that historic chair! And I have cycled along the Ashbourne-Uttoxeter road in most weathers . . . and been unable to travel it because of snow-drifts and blizzards! No county can give us more scenic variety than Derbyshire . . . for apart from the grandeur of the Peak, there are the homely fields and farms of that portion around Sudbury, and Hanbury, and Needwood Forest—along the borders of Staffordshire is some of the finest country in England, but I am grateful to my correspondents for putting Derbyshire into my thoughts . . . some day in spring, when the snowdrops are in the dell, and the lark overhead, I will

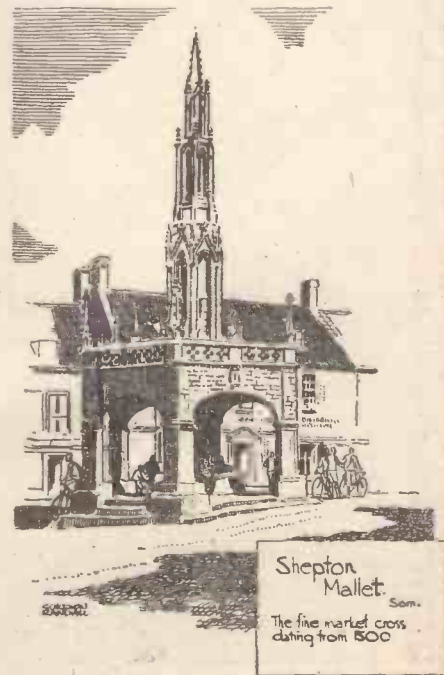
take train to Ashbourne, and from there ride out into the villages I love. . . .

### A Great “War Story”

**N**O less a literary giant than Sir Ronald Storrs has written the story of the wartime activities and achievements of the Dunlop Company, and his book “Dunlop in War and Peace” is a fascinating narrative of the work of a great industrial organisation which devoted its resources, its manpower, its materials and its energies to the task of helping the nation to victory. No doubt other great firms could tell a similar story: the point is that the Dunlop Company has chosen an eminent writer to record their story . . . and this amply-illustrated book, with its record of huge output, strange “win-the-war” devices, and its tale of the heroism of men and women, is well worth reading. And . . . it reminds us that the cycle was a vital means of transport in the war years! This being the case, it is well that references should be made to the enormous production of cycle tyres. A good book, with a real interest for all who ride on tyres.

### February Nature Note

**N**OT yet is the sun warm on the back as one rides out into the countryside but, nevertheless, there are welcome little signs of spring . . . the gurgling rain in the ditches is the magic which will make a million little plants shoot out their greenery; and in the big meadow, where the cows squelch in the grass, there are one or two coltsfoot blossoms to herald the springtime, when the cowslips will deck the fields, and the violets be found, shy and modest, in the bank of the tangled lane. “February Fill-dyke” they used to call this month in the countryside . . . and it has the reputation of being wet and cold. But it brings us St. Valentine’s Day, and it is the month when whips and tops emerge from their winter hiding, and boys again begin to play the ancient game of marbles. Above all, it is the prelude to the real spring, and the time of the singing birds, and the flowerets in field and hedgerow.



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The fine market cross dating from 1500

# My Point of View



By "WAYFARER"

YORK.

A magnificent view of the Cathedral and part of the old City wall sketched from above the station.

## New Version

LETTERS which are now known to most people—P.A.Y.E. Meaning: Pedal, And You'll Enjoy't!

## Hedgehog Bump

A RUSTLING noise attracted my attention as I was pushing my bicycle up a hill the other night. Shining my light into the gutter, I found a hedgehog pretending it wasn't there. "Wonder what it's like to run over a hedgehog?" I pondered, remembering that the poor dears are often done to death by motor-cars. Five minutes later I knew. My lamp was not shining very brightly at the moment, and what looked like a dark patch on the road nearly threw me off my machine. I am now able to endorse Mr. Punch's advice to cyclists about to run over hedgehogs: "Don't."

## Extremes Meet

ON the Saturday before Christmas I had great difficulty in keeping warm, particularly in regard to my hands, owing to the extremely low temperature prevailing. On the following evening I did the final 20 miles of my usual Sunday journey with my gloves tucked away in my bag. Extremes meet, or almost meet, in the way of weather.

## Unsuspected

AT the foot of a quite mild hill which I must have traversed hundreds of times during the last 25 years there has just been planted a whopping big board bearing the words: "DANGEROUS BEND." All these years I have been unconsciously playing with fire owing to the quite unsuspected danger in connection with that alleged hazardous road feature, the danger of which remains unsuspected. I am one of those oddities who, on observing that a road goes out of sight, presumes that there must be a reason for it—probably in the form of a bend, which is not of necessity dangerous. In fact, there is no danger where I am concerned, for the simple reason that I do not create it.

## Truant Outing

IT was my fortune to be able to play truant from business on the afternoon of Christmas Eve, and, needless to say, I went for a ride—to secure a tonic (and appetiser) which was all the more necessary because I had done a 90-mile motor-car journey on the previous day. It was pleasantly cold, and the sunshine was on a generous scale. When, however, the sun went off duty (as it did in a blaze of glory, leaving a picturesque aftermath of colour) the temperature crashed, and, with the crisping of the roads through the agency of Jack Frost, I wondered what sort of a ride home would fall to my lot. That bridge, however, was not for crossing until the time came.

The farm to which I so often go, half a mile along a rough cart-track from a famous main road, gave an unexpected "No" to my request for tea. The folks were busy getting turkeys and geese ready for their customers and could not break away from their task. Here was a dilemma. The nearest tea-places were some five miles distant, one of them involving a walk of about half an hour up a long hill. Close at hand was a town which has not succeeded in securing my affection or respect, and I decided that, in the circumstances, my feelings must be set aside—"any port in a storm"—and that I must seek hospitality there. Victory was achieved at the second attempt, and I had quite a nice

tea in a big café. Then out into the night again I went, making for home. The brilliant array of stars lightened the darkness, and the roads were in fine condition, though here and there the tyres threw up small showers of hoar frost. In and about the scattered villages curtained windows shone a welcome to me, and now and again the voices of carol singers smote my ears. The promise of glazed roads was, fortunately, not fulfilled. It was all very pleasant, that truant outing which took me along mile after mile of secluded lanes on the eve of Christmas Day.

## Not So Good

A RELATIVE of mine has just received an interesting letter from an old school-fellow who lives at Grand Turk, Turks and Caicos Islands, British West Indies. She says: "This is a tiny island about five miles long and one mile wide. Most of the centre is below sea-level and is covered with salt ponds. The settlement is on the west side, and on the east side is a line of hills about 75 feet high, going from end to end of the island. There are less than 50 native white people and some 400 black people, and about 20 Europeans, of whom 10 are

children. No cinema, no golf course, no public services (electricity, drainage, etc.), no means of transport other than foot, bicycle, and, in a few cases, private car, no indoor sanitation and no water laid on. We just dip the latter from the tank. Very hot in summer. Swimming lovely. Island very barren—mainly low scrub, but most of the bushes flower. Mail service very erratic. Can't buy clothes here, but have to send away for them." An enthusiastic cyclist naturally views this island, and these conditions, from the cycling point of view, and they are obviously not so good. There is an absence of news about the roads, but one imagines that these would be nothing to write home about, and it would be safe to presume that the pastime of cycling is at a very low ebb in Grand Turk, with the week-end habit of necessity non-existent. "Can you put me up for the night, please?" has probably never been said by anybody there, especially bearing in mind the island's total length! I, personally, am all for remoteness, but the absence of fresh meat, of cows' milk and, during the long summer, of fresh vegetables (other than potatoes) are "added insults" to the lack of cycling elbow-room. Nor do "quantities of oranges and bananas—and sunshine" make amends for such completely restricted movement.

## The Crux of the Matter

I HAVE been reading the rather confused debate on road accidents which took place in the House of Lords towards the end of November. Teynham said, alliteratively, that safety must be sought through education, engineering, and enforcement (I, personally, would stress the first of these three E's), and that better roads would have an effect (note that: "an effect") on the appalling rate of accidents. Cecil opined that it was speed, coupled with the weight of the vehicle, that constituted the danger. So, one imagines, heavy vehicles should be prohibited! "Speed," said Howe, "is not the main cause of accidents, although it is one of the causes." Waleran's contribution was to appeal to the Government to make an Order forbidding any motor-vehicle pulling up facing the traffic. For the life of me I cannot discern how this would reduce accidents, as drivers can surely see another (stationary) vehicle, whether it is back to front, or vice-versa. It is just as much, or as little, a danger. And it appears to me that the suggested Order would cause great delays and create fresh dangers to the car folk who had to keep on-crossing roads on foot. Llewellyn thought that road reconstruction was at the root of the problem. So there's the choice for us to make. Only one thing is clear: accidents are not caused by anything motorists do, or fail to do!

What is the crux of the matter? Without of necessity committing themselves to state the main cause of accidents, most motorists will tell you that our road system is hopelessly inadequate. Our roads are too narrow and too full of curves and bends. For the sake of argument, let us accept that authoritative view. What then? Would not the present-day position be appreciably eased if all motorists gave practical effect to the knowledge they possess, instead of driving as though they were using wide, straight roads? I submit that there is only one answer to that question: there is no excuse for driving at speeds which are out of keeping with the prevailing conditions.

## Appreciated Leisure

A RATHER wise man-of-the-world said to me some little time ago that the people who most enjoyed their opportunities for physical recreation were those

who had to work for their living. He admitted that it would be pleasant to be of independent means, and to indulge one's fancy for large-scale travel, but (he added) how much nicer it is to be compelled to work for five or five and a half days a week! How, then, one appreciates one's fugitive opportunities for walking, or golf, or rock-climbing, or cycling!

How true it all is! Recently, there came to me a period of two months of idleness. Bits of work had to be done, but these could be dealt with just as and when the spirit moved me, and I was free to go a-cycling for seven days a week, every week. It all sounds very nice in theory; in practice it was not so alluring (despite my intense enthusiasm for cycling), and I was conscious of a feeling of relief when the day came for me to resume toiling for my living. Once again I was contributing to the world's work, instead of appearing to be a drone and to be bating on the community, and once again I became aware of the high value to be attached to one's leisure hours. Once again I found myself looking forward to the week-ends, determined to make the most of my opportunities. Yes, one's playing-time is appreciated when it has to be worked for—when it has to be wrested from a relatively few hours on Saturday afternoons and Sundays.

## Sounds Like a Fairy-tale

ONCE upon a time it was readily possible for a cyclist, touring about the country, to knock at the door of a cottage at 9 p.m., or thereabouts, and ask, with confidence, to be provided with accommodation for the night—or to call at a guest-house at tea-time and be supplied, on request, with ham and eggs (plural), accompanied by plenty of bread and butter—or to find tinned fruit and cream served normally as part and parcel of one's tea. Once upon a time a touring cyclist would pay, in many places, no more than four or five shillings for supper, bed and breakfast. (We do not always realise that there are thousands of cyclists—newcomers to the pastime—who have never experienced the foregoing conditions.)

It all sounds like a dream in these days, when so many caterers have temporarily gone out of business and when there are so many restrictions on supplies and when prices have stiffened. But I believe that those dream-days will return—not perhaps as regards the teas at 8d. and 9d. which was once able to obtain, but in the matter of "chancing your arm" at the fall of darkness and being sure of obtaining accommodation. Further, when hens are no longer under the thumb, so to speak, of a paternal government—their produce being hurried off to a packing-station, there to remain until maturity has set in—our request for eggs (with a hiss) will not be laughed to scorn. No special measure of prescience is needed to realise that there will not be any great improvement in the catering world until rationing ceases. Then we shall see what we shall see.

## Deferred Answer

ON a characteristic December day I was lurching at a country pub—beg pardon, hotel—with one of the high-ups of a prominent firm of cycle manufacturers, and he, after a while, propounded this problem: "If you had to pack up cycling and were given the opportunity of having one more tour, where would you go?" That takes some answering, doesn't it? Momentarily, I side-stepped the problem by saying that I must have notice of the question, and adding that I would be quite content to spend my last cycling days in the delectable country so near at hand, namely, the tangle of Worcestershire lanes in which it was my good fortune to spend so much time during last "summer." Actually, I was there on both days!

But, on coming to devote serious thought to a problem which need not—yet—be viewed seriously, I found myself in something of a dilemma, and it was obvious that the "one more tour" would become a very extended one. The only way to satisfy myself in this respect would be to do again all, or nearly all, I have ever done as a cyclist. So I would pack my tooth-brush and pyjamas and set out for North Wales and mid-Wales, for the Yorkshire Dales and the Lake District, for the Cotswolds and the New Forest, for the Lincolnshire Wolds and the Norfolk Broads, for the Isle of Wight and the Isle of Man... for Galloway and the Grampians, for Glencoe and the Great Glen, for "the Road to the Isles" and for the isles themselves, for Loch Lomond and Loch Shiel, for the Lammermuir Hills and the Five Sisters of Kintail, for Schiehallion and Ben Cruachan, for Ardnarmurchan and the Falls of Morar... for the Ring of Kerry and Connemara, for Slieve League and the Bloody Foreland, for Lough Mulroy and Lough Swilly, for the Antrim Coast Road and the Wicklow Mountains. I would be in danger of keeping the Grim Reaper waiting while I completed my "one more tour."

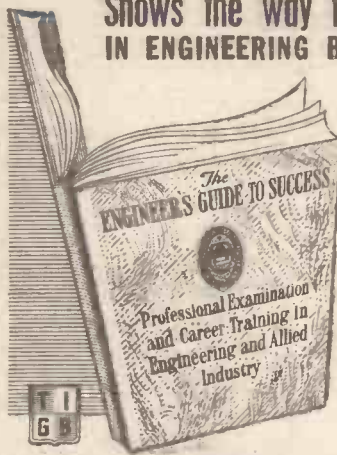
## Obvious

SOME people have so fallen into the practice of talking and writing of "bicycles and tandems"—as though tandems were not bicycles!—that it is hardly surprising to find a man describing himself as an "enthusiastic cyclist and tricyclist." In my innocence, I would certainly have thought that a man who rode on three wheels instead of the more usual two came in the "cyclist" category!

## Doubled

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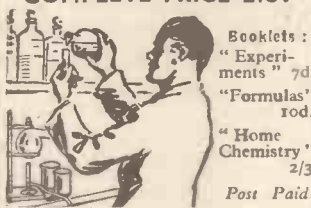
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