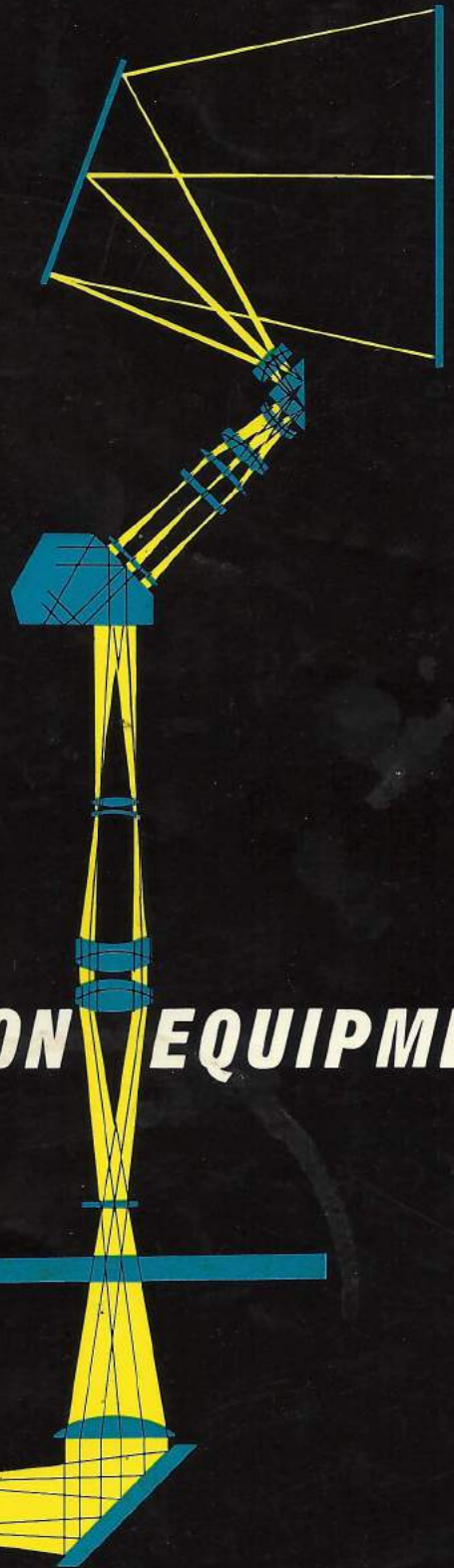


The logo for Optical Measuring Tools Ltd (OMT) is displayed in white on a teal background. It features a stylized white arc above the letters 'OMT' in a bold, sans-serif font.

# *OPTICAL INSPECTION EQUIPMENT*



products of  
**OPTICAL  
MEASURING  
TOOLS LTD  
MAIDENHEAD**



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All O.M.T. instruments are manufactured in accordance with specifications approved by The National Physical Laboratory and a certificate is given to this effect.

To customer requirement any instrument will be submitted to the National Physical Laboratory for certification at additional cost.

PRODUCTS OF

OPTICAL MEASURING TOOLS LIMITED, MAIDENHEAD



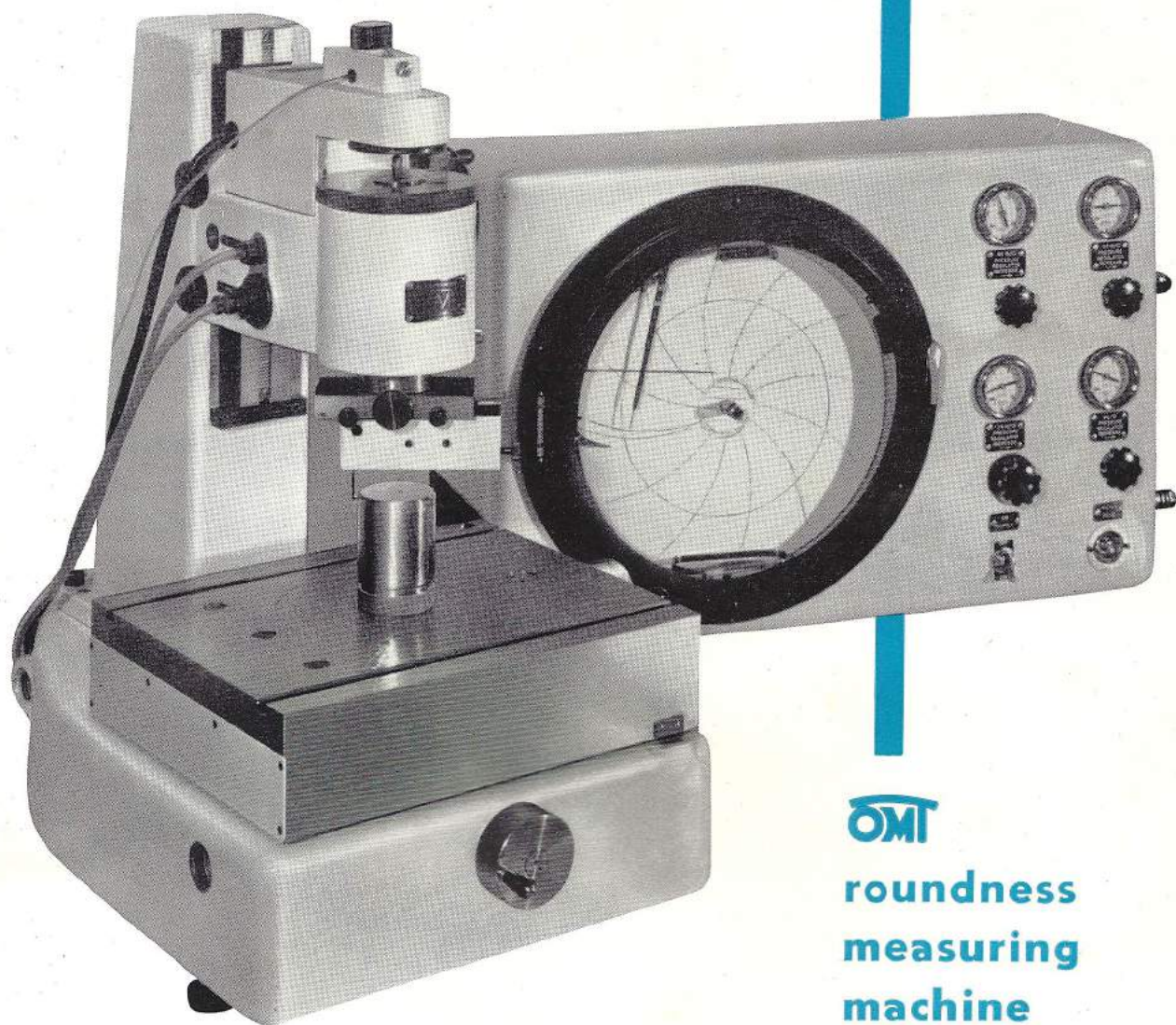
SALES ORGANISATION

**NEWALL GROUP SALES LIMITED**

PETERBOROUGH - TELEPHONE 67116

OR

MAIDENHEAD - TELEPHONE 26171



**OMT**  
**roundness  
 measuring  
 machine**

Providing facilities for roundness measurement to an extremely high order of precision, this equipment, developed in conjunction with the National Engineering Laboratory, East Kilbride, is offered at a price permitting it to be considered for general workshop application and production line inspection in addition to standards room employment.

The instrument comprises a bearing in which a spindle carrying a gauging pick-up is power rotated at 1 r.p.m. The pick-up bears a spring loaded controlling stylus to contact the work periphery; as the spindle is rotated the stylus moves round the periphery of the component and produces a signal in the pick-up head. This signal is amplified and fed to a circular chart recorder thereby indicating the state of roundness in documentary form.

To obtain a high degree of concentricity and low frictional torque necessary in this equipment an air bearing is used which requires a working pressure of

60 pounds per square inch. The concentricity with this bearing is maintained to within 0.000005" (0.000125 mm.).

The pick-up is a pneumatic type working from a pressure of 4 pounds per square inch. The magnification obtained is 5,000 or 1,000, the change-over being effected by rotating a small knob at the top of bearing unit (on the recorder chart a radial space of 0.05" (1.25 mm.) represents 0.00001" (0.00025 mm.) at 5,000 magnification.

The bearing and measuring unit may be assembled on the O.M.T. Toolmakers Microscope or can be supplied pedestal mounted as illustrated. In both cases co-ordinate movements are provided to enable the workpiece to be centred beneath the axis of rotation of the measuring unit.

Measuring range of the unit for internal diameters is from  $\frac{1}{8}$ " (3 mm.) to 6" (152 mm.) and for external diameters from  $\frac{1}{16}$ " (1.5 mm.) to 6" (152 mm.).

The recording cabinet which includes an air filter, pressure regulators and pressure gauges, can be placed in any convenient position for the operator.

The instrument is fully detailed in Publication I40/62



## standard horizontal omtimeter

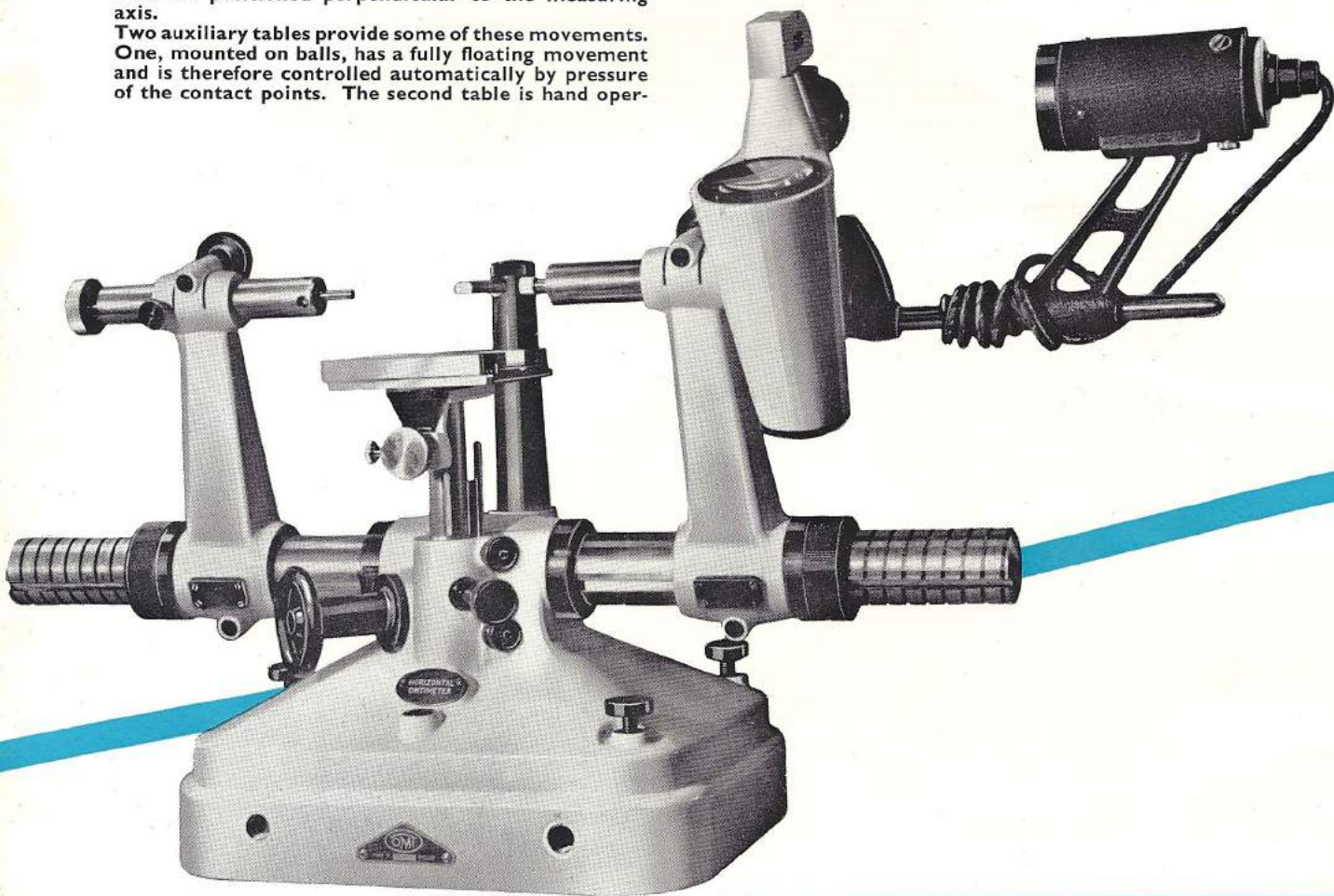
The O.M.T. Horizontal Omtimeter is an optical comparator having an extremely high order of accuracy with the measuring axis in a horizontal plane. Both indicator head and tailstock are traversed by coarse pitch nuts for rough setting, whilst final setting is made by a fine pitch screw in the tailstock. Many developments are embodied to simplify and expedite inspection of the wide range of work which is readily inspected with a horizontal measuring axis. Full provision is made for aligning work correctly by rotary and linear movements in both vertical and horizontal planes. This is particularly necessary when measuring distances between parallel faces, since the work faces must be positioned perpendicular to the measuring axis.

Two auxiliary tables provide some of these movements. One, mounted on balls, has a fully floating movement and is therefore controlled automatically by pressure of the contact points. The second table is hand oper-

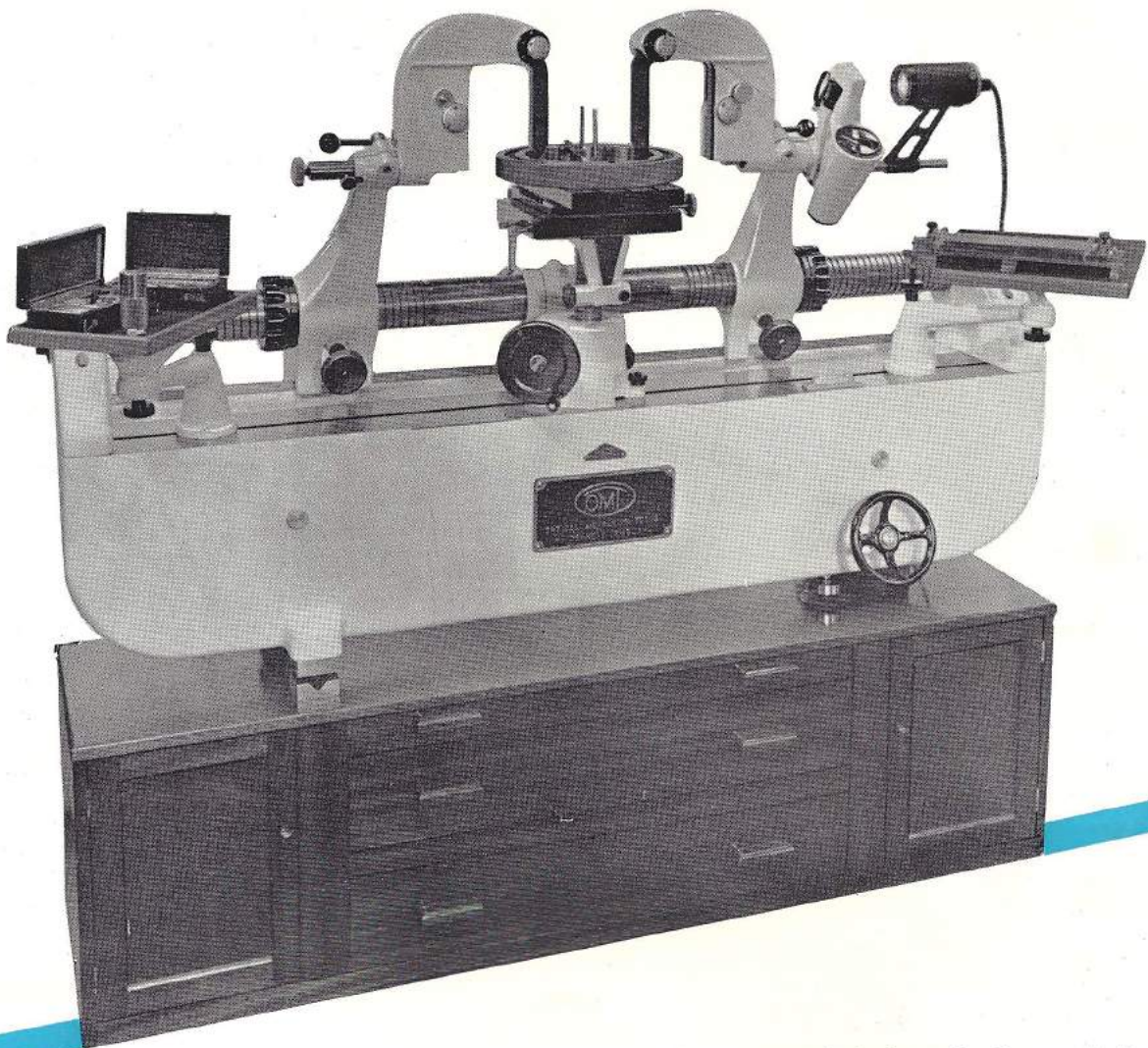
ated in horizontal planes, also vertical plane when in conjunction with instrument table for sensitive adjustment relative to contact points. The equipment includes a vertical centres cradle, slip gauge holders and internal contact fingers for inspecting plain or threaded holes.

The ease with which effective diameters of screw ring gauges are determined is typical of this versatile instrument. A master "Screw-form" is first built up from slip gauges and Vee-notched jaw blades. A range of ball-end tips is supplied for use in a manner similar to measuring wires used for external thread measurement. The internal fingers fitted with correct ball-ended tips are then used to set the instrument to zero against the built-up master.

To maintain the measuring pressure between 8 and 12 ounces the base is supported by levelling screws so that the tailstock may be lowered for external work and raised for internal work. An integral spirit level indicates the inclination applied to the measuring axis.



Capacity	English	Metric
Range of scale .. .. .	±.005"	±.120 mm.
Scale graduations .. .. .	.00005"	.001 mm.
Vertical movement of table .. .. .	3 3/8"	85 mm.
Max. external diam. gauged .. .. .	21"	533 mm.
Max. internal diam. gauged .. .. .	13"	330 mm.
Max. external diam. of work when internal gauging	17"	432 mm.
Min. internal diam. gauged with light fingers ..	1/2"	13 mm.
Min. internal diam. gauged with heavy fingers ..	1 1/8"	29 mm.
Min. pitch diam. of threaded hole gauged ..	3/16"	20 mm.
Max. external diam. of threaded hole gauged ..	8 3/8"	222 mm.
Max. depth reached by light fingers .. .. .	1"	25 mm.
Max. depth reached by heavy fingers .. .. .	2 3/8"	60 mm.



**OMT**  
**major horizontal**  
**omtimeter**

This instrument is the latest development in Horizontal Optical Comparators. It is designed and built to maintain extreme accuracy in checking the large workpieces which it accommodates whilst the comprehensive equipment facilitates inspection of internal and external threads and tapers as well as internal and external cylindrical surfaces.

The well ribbed bed is supported on two ball-float points and one fixed point on the base, which houses the equipment. The tailstock and measuring head brackets are mounted on a cylindrical slide and guided by a straight edge on the bed. The cylindrical slide has three supports to reduce deflection to a minimum.

The worktables have the same movement as those on the O.M.T. Standard Horizontal Omtimeter for aligning and controlling the workpieces. To maintain sensitivity, all the worktables have a ball-float movement in the direction of the measuring axis and a levelling screw in the bed serves for raising the tailstock end for internal work or lowering it for external work. The slope applied to the base may be indicated by spirit level supplied as part of the standard equipment. The height of the worktable, when measuring internal and external tapers, is controlled by a dial indicator supported on horizontal spindle which is mounted in the back stop column and used in conjunction with two cylindrical height gauges. This new feature is used together with special contact tips for measuring internal and external tapers for size in relation to an end face.

A pair of small auxiliary tables is supplied with roller supports for carrying end rods at their nodal points. Scales along the front of the base show the correct positions of these tables for various lengths of rods.

Capacity	English	Metric
Range of scale	±.005"	±.120 mm.
Scale graduations	.00005"	.001 mm.
Max. external diam. gauged	36"	915 mm.
Vertical movement of worktable	app. 7 $\frac{1}{16}$ "	195 mm.
Max. internal diam. gauged with light fingers	30"	760 mm.
Min. internal diam. gauged with light fingers	$\frac{1}{8}$ "	13 mm.
Max. depth gauged with light fingers	1"	25 mm.
Max. internal diam. gauged with medium fingers	30"	760 mm.
Min. internal diam. gauged with medium fingers	1 $\frac{1}{2}$ "	29 mm.
Max. depth gauged with medium fingers	2 $\frac{3}{8}$ "	60 mm.
Max. internal diam. gauged with heavy fingers	27"	685 mm.
Min. internal diam. gauged with heavy fingers	2 $\frac{1}{8}$ "	52 mm.
Max. depth gauged with heavy fingers	5 $\frac{3}{8}$ "	146 mm.
Min. pitch diam. of threaded hole gauged	$\frac{1}{16}$ "	20 mm.
Max. external diam. of threaded hole gauged	11 $\frac{1}{2}$ "	292 mm.
Min. diam. taper hole gauged	2 $\frac{3}{8}$ "	56 mm.



## vertical omtimeter

This high precision optical comparator is ideal for the standards room and also for production checking operations which require an unusually high degree of precision. Continuous accuracy is ensured by the basic simplicity of the instrument, which uses only one moving part, the contact plunger, to rock a mirror and swing a beam of light. The measuring scale, graduated in  $.00005''$  divisions, is magnified over 1,000 times, so that readings to  $.00001''$  may be estimated when observed through the eyepiece or when projected on a screen in the projection attachment.

If required, the instrument is supplied with a measuring scale graduated in  $.00002''$  divisions in which case the range of the scale is reduced to  $\pm .0025''$ .

The hardened rectangular worktable is lapped optically flat and is provided with grooves for trapping all dirt particles. Fine adjustment is provided for by a taper slide. The ball-pointed tip supplied with the instrument is mostly used with this table. Additional attachments can also be supplied. These include a circular adjustable table for use where work is required to be presented square with the measuring plunger, also a roller type Vee block table for use where check for ovality is concerned.

A flat faced or knife edge tip should be used with these additional table attachments.

Fine adjustment and locks are provided for all movements so that the instrument can be used for rapid inspection. Tolerance hands can also be provided and set to enable the scale to be used at a predetermined tolerance plus or minus. If desired, a metric scale graduated to  $.001$  mm. can be supplied as an alternative to the inch scale.



A comprehensive description of this instrument is given in Brochure 51/61



## **NEWALL** measuring machine

The modern engineering practice of making parts interchangeable created a need for tools and gauges to be absolutely accurate. These must be accurate when made, and periodic checking must be possible to detect any alterations in size which may occur, due to various causes encountered whilst in regular use.

The **NEWALL** Measuring Machine is specially designed to meet this need, and due to the fact that it is extremely simple to use, both in manipulation and reading, and that it permits the making of extremely accurate measurements, it is particularly suited for general employment in toolroom or workshop.

The machine maintains an overall accuracy of 0.0001" per foot and the combined features are such as to eliminate all possibility of personal error in taking measurements.

The headstock is a self-contained unit embodying a fiducial indicator, the indicator mount, and the rocker arm; the rocker arm being spring-loaded away from the indicator spindle. The roller measuring system is situated directly under the centre line of the measuring anvils.

The tailstock incorporates the locating mechanism with its attendant indicator level, the locator being brought into position by means of an external knob.

On English-reading machines, measurements can be made to 0.00001" and on Metric models to 0.0001 mm.

English	Size Range	Metric
0-24"		0-600 mm.
0-48"		0-1200 mm.
0-72"		0-1800 mm.
0-144"		0-3600 mm.

Full details of this measuring machine are given in Publication 19/60



**OMT**

## projection pantometer

(STANDARD MODEL)

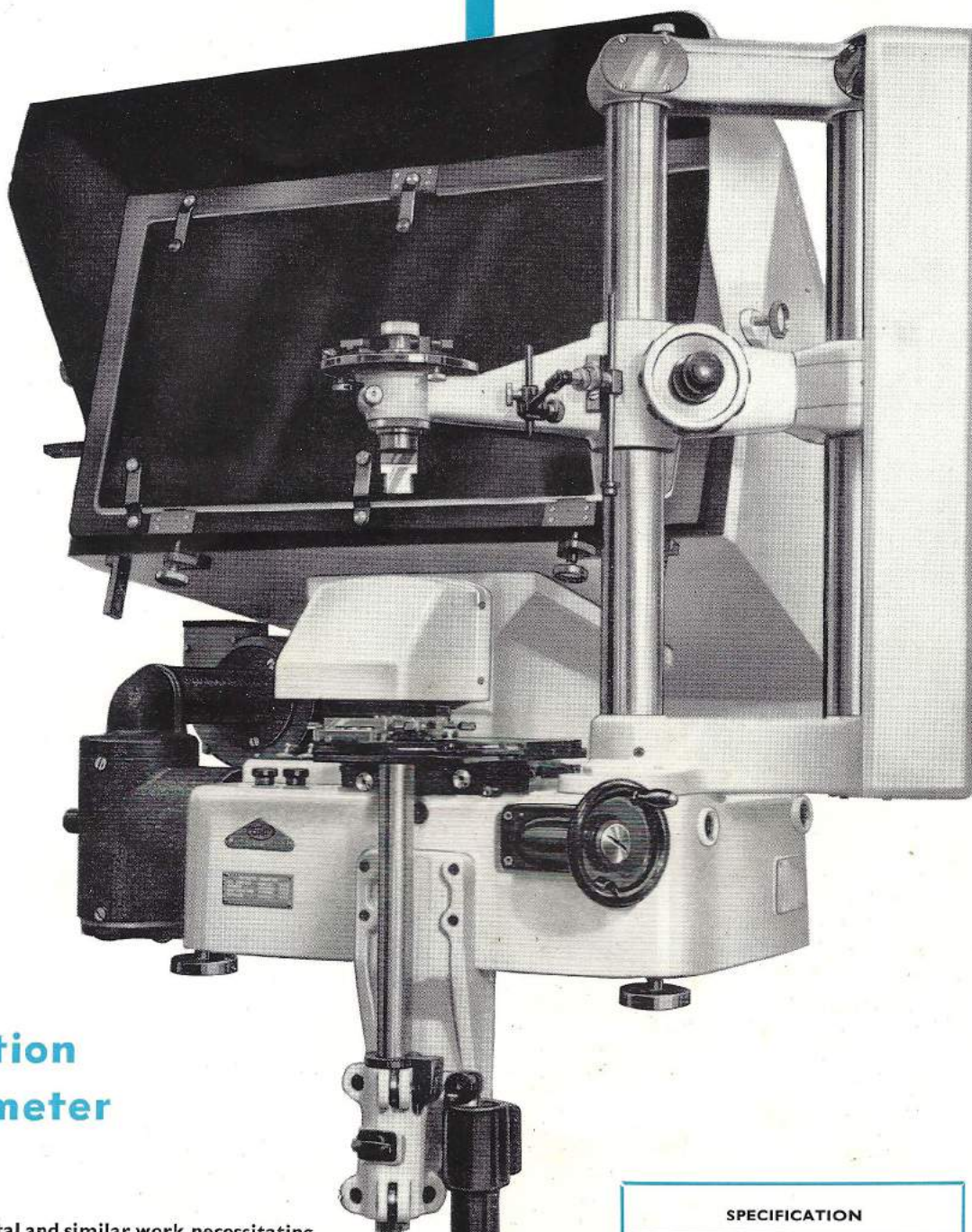
This instrument has been developed for the rapid and accurate inspection of three dimensional contours, such as turbine blades, where the normal method of projection is impossible due to the interference in the light beam of the twist in the blade or the root. By means of an optical system a magnification of 30x is used with a screen of 6" diameter and blades of 3" wide by 15 $\frac{1}{8}$ " long can be inspected for size, accuracy of radii, thickness at various positions and squareness of blade to its root fixing.

The work is held vertically in a holder which is rotatable and adjustable for height. Two diametrically opposed styli are mounted on a freely floating table and are lightly spring-loaded to bring a stylus into contact with the blade surface. By rotating a handwheel the stylus is made to follow the blade contour and when the end of the blade is reached, an automatic reversal of the table takes place and the second stylus traverses the opposite side of the blade. The floating table also carries two lenses spaced at a distance identical with the spacing of the styli. Thereby, the styli and the lenses follow an identical path when the table is moved. Mounted below these lenses is a graticule containing contour lines corresponding to the contours which are to be checked. When the table is traversed with the stylus in contact with the blade, the corresponding lens will also follow the path of the blade contour and this will be compared with the contours on the graticule. Any departure from the true form will be observed on the screen where the image of the contour passes through tolerance circles.

For full identification as to the actual portion of the blade which has caused rejection, numbered lines across the section of the blade may be marked on the graticule at various intervals and corresponding to similar lines normally used on the detail drawing of the blade.

Brochure 43-58/61 gives comprehensive details of all O.M.T. Projection Pantometers





**OMI**

## projection pantometer

(MODEL E)

For experimental and similar work necessitating frequent changes in the blade profile the master against which the work is to be compared, must be capable of quick and simple preparation. In the Model "E" Pantometer this master is a tracing drawn 10x full size on some translucent material such as Kodatrace or tracing cloth which is clipped on to a glass screen. As in the Standard model, the work tolerance is in the form of a graticule which is projected by the optical system on to the drawing. In this instrument, however, the tolerance circles move around the drawn master contour and any departure from true form or position is readily seen.

The controls and work holding bracket on the Model "E" Pantometer are identical with those of the Standard Pantometer but, of course, no contour graticule is necessary.

### SPECIFICATION

Magnification, 10x.

Worktable Movement,  $3" \times 1\frac{1}{2}"$  ( $76 \times 37.5$  mm.).

(a) Maximum height between stylus and face of workholder bracket,  $16\frac{1}{2}"$  (413 mm.).

(b) Maximum height with universal workholder,  $15\frac{1}{8}"$  (384 mm.).

The actual capacity as regards length of work is this dimension (a) or (b) minus the thickness of the blade adaptor.

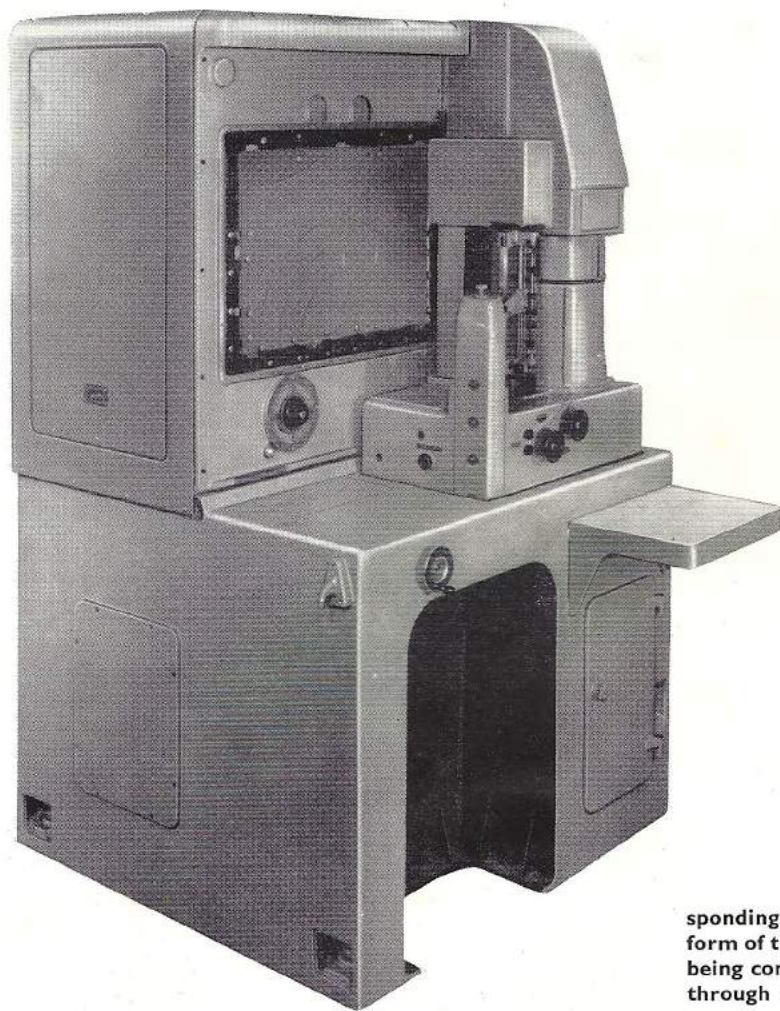
Screen size,  $24" \times 12"$  ( $600 \times 300$  mm.).

Lighting, 230v. 250w. prefocus tungsten filament lamp. (Please state specific voltage of supply when ordering).

Width,  $30"$  (762 mm.).

Depth,  $36"$  (914 mm.).

Height,  $33"$  (838 mm.).



# NAPIER-OMT

## contour and profile projector

Introducing a new approach to accurate and rapid inspection of aircraft engine compressor and turbine blades, this instrument has also widespread applications for checking other profiles and contours.

A design feature of the projector is the novel method adopted to explore the contour being inspected. It has previously been the general practice for this to be achieved by means of a feeler attached to the top slide of a compound table and in contact with the stationary workpiece, movements of the feeler being reproduced by a lens or a graticule positioned on the same slide.

On the Napier-OMT projector, however, the work is rotated and, as applied to the inspection of a turbine blade, operation of the instrument is as follows:—

A pivoted arm carrying at one extremity a circular disc feeler is located against the contour to be explored whilst at the reverse end of the arm is mounted an objective lens, with its optical axis equally distant to the centre of the feeler disc from the pivot axis.

To explore the contour, the holder containing the blade is rotated thereby causing the pivoted arm to swing in an arc. The projection lens swings in a corre-

sponding arc over a graticule carrying the correct form of the cross section being inspected, this graticule being connected to the blade holder so that it rotates through the same angle as the holder.

Situated above the projection lens is a fixed collimation lens, this projects the image of the rotating graticule on to the screen which carries a semi-circular fiducial mark with appropriate tolerance zones. As the blade is rotated, the 20x image of the graticule blade-form rotates round the semi-circle on the screen and errors are displayed by the deviations of the graticule form image from the fiducial circle markings on the screen.

The projector also provides facilities for the analysis of:

- (a) Lean or displacement of the blade-form from the stacking line.
- (b) Twist or rotation of the blade section.
- (c) Form errors.

#### INSTRUMENT CAPACITY

Maximum cross section which can be checked ... ..	2-6"	(66 mm.)
Maximum inspectable length of workpiece ... ..	6-0"	(152 mm.)
Screen size ... ..	24" × 16"	(610 × 406 mm.)



# 15-inch universal projector

Latest addition to the extensive range of O.M.T. high precision optical inspection equipment, the 15" Universal Projector has been developed for the basic purpose of determining the accuracy of contours such as templates, gears, cam forms, screw threads, etc.

The scope of employment of the instrument is, however, considerably extended beyond the function of profile inspection through provision of supplementary features including an episcopic projection unit, a precision compound work-table, and a unity relay lens system.

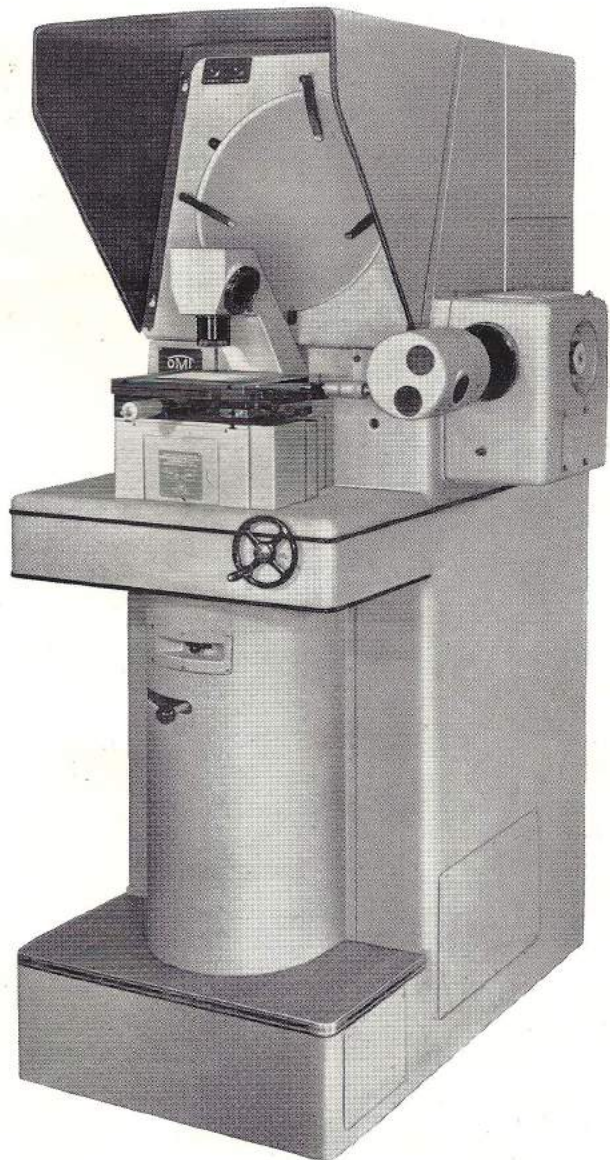
Although an instrument of the highest precision and multi-purpose application, design considerations have resulted in the projector being simple to operate.

Component magnifications of 10x, 20x, 50x and 100x are obtainable through gauge projection lenses mounted in a turret which also includes an additional location for fitting a lens to a user's specific requirement. The projected image is viewed on a 15" diameter rotary protractor screen calibrated in degrees and adjustable to one minute of arc by means of a vernier scale.

Incorporation of the O.M.T.-designed unity relay system is an outstanding feature of the projector. This addition to the optical system provides facilities for magnification variations to be made almost instantaneously and without refocusing. An important aspect of this feature is that an extensive working distance, constant for all magnifications, is maintained between the front lens of the system and the workpiece.

The episcopic projection system which produces a highly accurate and extremely well-defined image, offers facilities for precisely measuring blind holes, recessed components and work produced by die-sinking processes.

The precision work-table is a 20" x 8" compound slide, with a vertical adjustment of 5" and co-ordinate movements of 6" x 2"; table location to 0.0002" is obtained by means of precision screws fitted with micrometer drums.



## SPECIFICATION

### ROTARY PROJECTION SCREEN

Size .. .. . 15" (380 mm.) diameter  
Rotary adjustment .. .. . To 1 min. of arc

### GAUGE PROJECTION LENSES

10 magnifications covering 1.5" field of view  
20 magnifications covering .75" field of view  
50 magnifications covering .3" field of view  
100 magnifications covering .15" field of view

### PRECISION COMPOUND TABLE

Size .. .. . 20" x 8" (508 x 203 mm.)  
Co-ordinate movement .. .. . 6" x 2" (152 x 51 mm.)  
Co-ordinate setting .. .. . To 0.0002" (0.005 mm.)  
Vertical adjustment .. .. . 5" (127 mm.)

### INSTRUMENT DIMENSIONS

Height .. .. . 72" (1830 mm.)  
Width .. .. . 32" (813 mm.)  
Depth .. .. . 42" (1067 mm.)  
Weight (approx.) .. .. . 1,792 lbs. (813 Kg.)



## large capacity projector model WP 100

This instrument, the latest in a range of high-precision projectors manufactured by Optical Measuring Tools Ltd., has been developed to provide a single instrument with universal applications in modern methods of engineering inspection.

In addition to inspection by projection of contours such as templates, gears, cam forms, broached parts, screw threads, hobs, cutters, etc., it caters for measurement of blind holes by surface projection, and provides accurate means for general inspection of recessed components and work produced by die-sinking processes.

The front base of the WP 100 Projector is a high-quality iron casting which ensures rigidity and stability. The rear portion is a welded structure of heavy steel section, entirely clad in sheet steel, and a floor completes enclosure of the optical system. In its basic form the projector is supplied with a 20" x 10" rectangular table with "T" slots for the attachment of fixtures and an elevating mechanism.

Four gauge projection lenses mounted within one turret give a 6" field of view at 10x magnification with correspondingly reduced fields at 20, 50 and 100 magnifications. The lens turret has both vertical and lateral adjustment for lens selection and no movement of the workpiece is necessary for focusing if the magnification is changed. A rotary turret accommodates the condenser lenses and an episcopic projection unit is supplied if required. Operation of this unit, which is mounted in front of the condenser turret, simply entails movement of the mirror column into the light path and the attachment of a transmission mirror to the lens in use.

To provide sufficient illumination for both diascopic and episcopic projection, a 250 volt, 1000 watt, high pressure mercury vapour lamp is utilized; the housing for this incorporates a forced draught cooling system. The 60" x 40" clear glass projection screen is supported in a cast aluminium frame which reclines at 11° to the vertical plane for ease of viewing. Fitted to the screen frame are vertical straight edges capable of horizontal movement. To these are fitted locators for positioning, either horizontally or angularly, a further straight edge.

Provision is made for accurate movement of the rear mirror to give fine adjustment of magnification, to compensate for expansion or contraction of materials where these factors are involved.

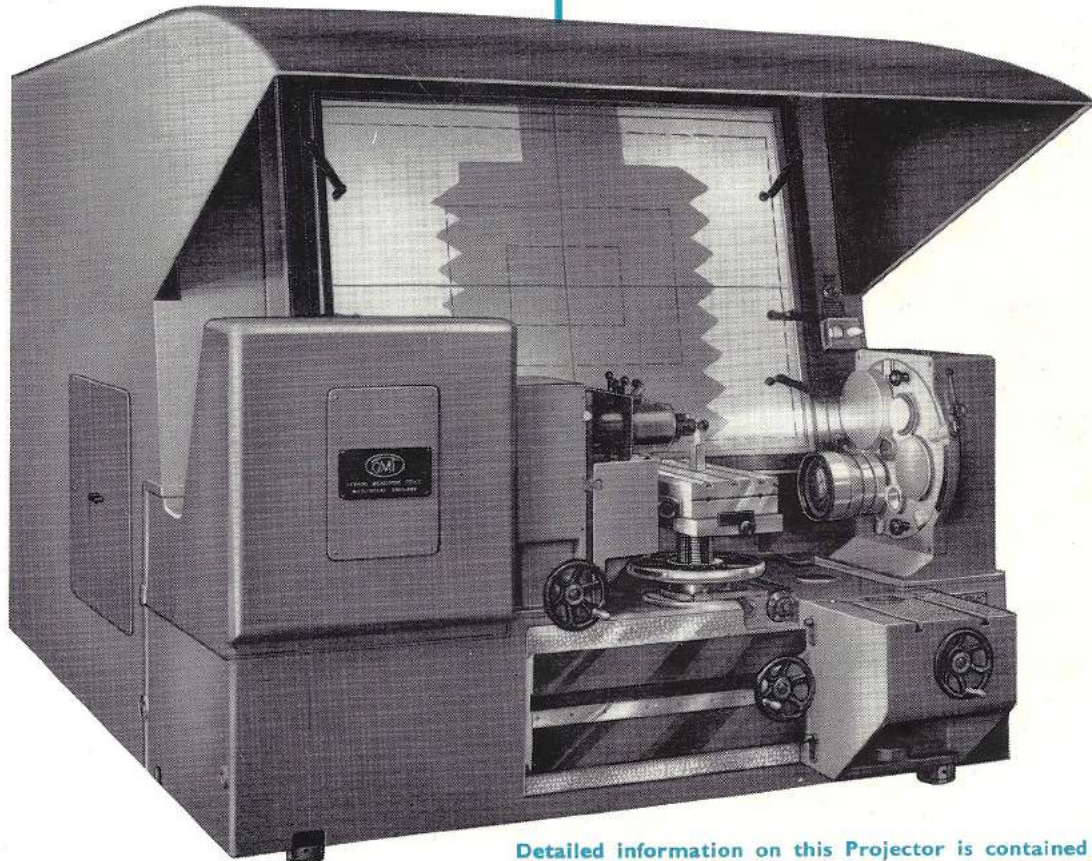
### AUXILIARY EQUIPMENT

An extensive range of auxiliary equipment, including knee bracket, centres, vertical glass workplate, vee blocks, die checking attachment and precision compound table, are available for use with the projector. The entire worktable assembly can be rotated through 12° either side of its normal position to compensate for helix when inspecting screw threads, hobs, etc.

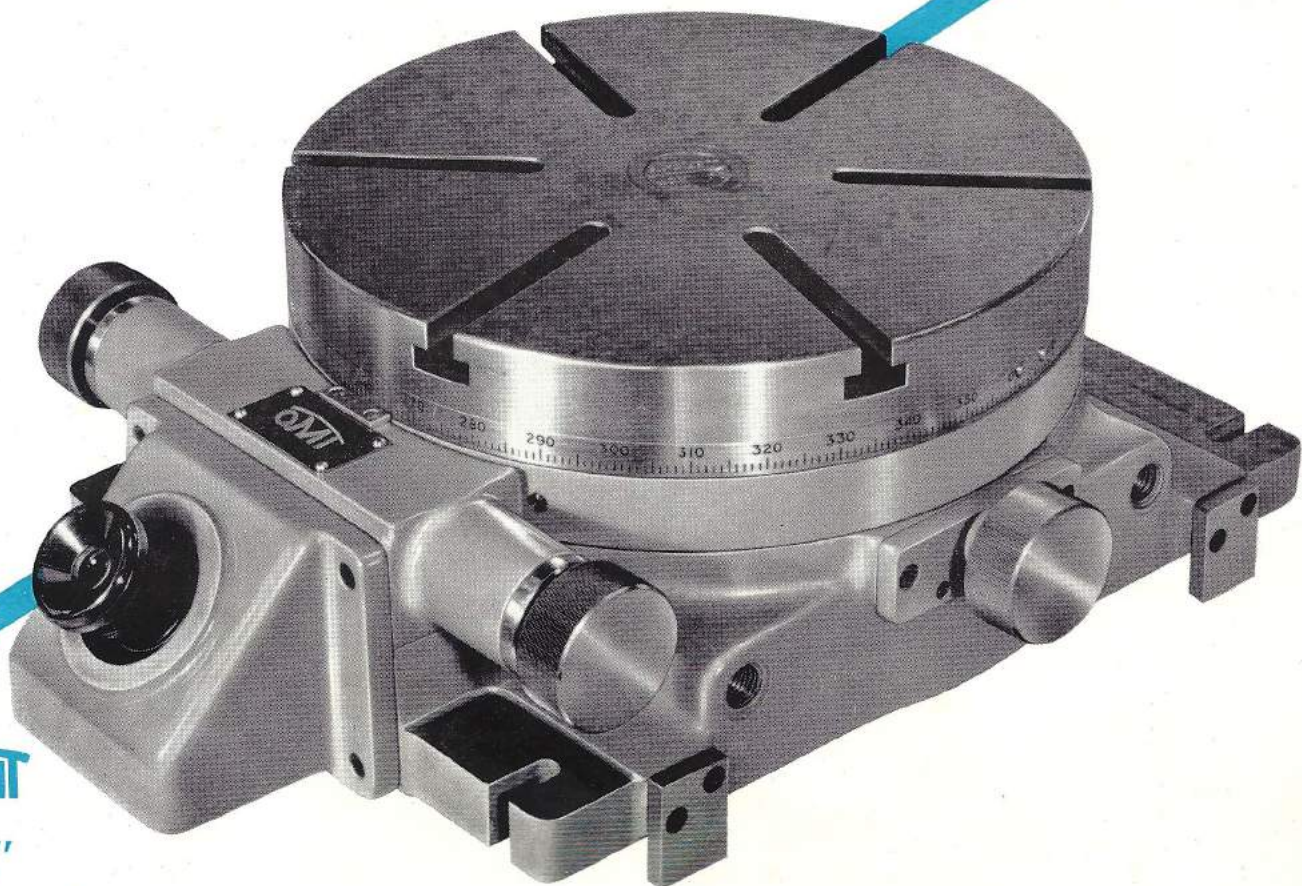
### SPECIFICATION

Screen size—60" x 40" (1524 x 1016 mm.).

Projection Lenses Available			
18" Projection Lens covering	6" field at	10x magnification.	
9.7"	"	3"	20x
4"	"	1.2"	50x
2"	"	.6"	100x
Overall height	..	..	6' 11" (2108 mm.).
" width	..	..	7' 8" (2337 mm.).
" length (over screen hood)	..	..	11' 8" (3556 mm.).
" " (over Knee Bracket)	..	..	12' 4" (3759 mm.).
Weight	..	..	9,520 lbs. (4318 kgs.).



Detailed information on this Projector is contained in Brochure 135/61



**OMT**

**10"  
optical  
rotary  
table**

**specification :**

Diameter of work table	10"	254 mm.
Overall Height	5"	127 mm.
Overall Size	15 $\frac{1}{4}$ " x 13"	387 x 330 mm.
Scale Readings (direct)	30 secs. of arc.	
Scale Readings (by estimation)	6 secs. of arc.	
Width of 30 secs. division of scale	$\frac{1}{16}$ "	1.58 mm.
Magnification of Microscope	70 x	
Net weight	80 lbs.	36.25 kgs

The complete range of O.M.T. rotary indexing tables is described in Brochure R.I.T./62.

For use on jig borers, horizontal borers, grinding machines, vertical and universal millers and for numerous inspection functions—wherever highly accurate rotary indexing is required. O.M.T. Circular Tables are simple to use, easy to read and rigidly built, maintaining high accuracy over long periods. Built as scientific instruments, they are also fine sturdy units capable of carrying heavy loads.

The 10" Table is rapidly turned to angle required and indexed by slow motion thimble. A precise illuminated glass scale on the rotating member is viewed through a microscope showing divisions of 30 seconds of arc and can be read by estimation to 6 seconds of arc.

Work surfaces are hand scraped to less than .0002" of parallelism with base surface for all positions in the full revolution. The table spindle which rotates in a plain bearing and is supported by a large diameter anti-friction thrust bearing has a taper bore for receiving a plug with cylindrical head when centring the table to a machine tool spindle or to an inspection jig. A screw cap protects this taper bore when the setting plug is removed. Rigid locking of table to the base without distortion is ensured by two internal clamps.

An identical model, but with 12-inch platen is also available.



**OMT**

## 16" projection type rotary table

This well-known rotary table is now being used in machine shops, tool rooms and inspection departments in many factories throughout this country and overseas, and has been found invaluable for an extremely wide variety of machining and inspection applications.

Like the other tables in the extensive O.M.T. range, the 16" Projection Table is a composite example of precision engineering at its best and the finest products of our optical division.

The scientifically designed Meehanite body affords maximum rigidity ; and a 2-speed handwheel controlling a worm and wormwheel, which can be disengaged, provides for ease of operation. This drive makes it possible to carry out a variety of light milling operations to a degree of accuracy which has hitherto been difficult to obtain. Due to the nature of the design of the optical system the accuracy of scale readings is in no way dependent upon mechanical elements and is, therefore, unaffected by any wear that may occur in the course of time.

The 16" Projection Table is now available with two alternative types of screen reading. One model embodying an optical micrometer has a screen, as in the illustration, which can be read direct to 1 second of arc. An additional feature of this model is that by using the optical micrometer, which is operated by two knurled knobs adjacent to the screen, the scale may be set during one machining operation in readiness for the next.

The alternative model, which has been primarily developed for applications where a lesser degree of accuracy is required, has a fixed screen and reads direct to 10 seconds of arc.

Both models are available with power-operated platens. Identical models, but with 18-inch platens are also available.

### SPECIFICATION

Angular Measurement :  
Optical Micrometer Model — Direct to  
1 second of arc.  
Vernier Screen Model — Direct to 10  
seconds of arc.  
Platen Diameter : 16" (406 mm.).  
Overall Dimensions : 22" × 20½" × 5½"  
(559 × 520 × 150 mm.).  
Nett Weight 263 lbs. (106 kgs.).

**OMT****30"****projection****type****rotary table****SPECIFICATION**

Angular Measurement : Direct to 1 second of arc.  
Platen Diameter : 30" (762 mm.).  
Rotational power :  $\frac{1}{2}$  h.p. electric motor,  
440 V, 3 phase 50 cycles supply.  
Rotational speed : 4 r.p.m.  
Permissible load on table : 1 ton (1016 kgs.).  
Overall size of table :  $40" \times 32" \times 9\frac{3}{4}"$   
(1020  $\times$  810  $\times$  250 mm.).  
Approximate weight : 1,344 lbs. (610 kgs.).

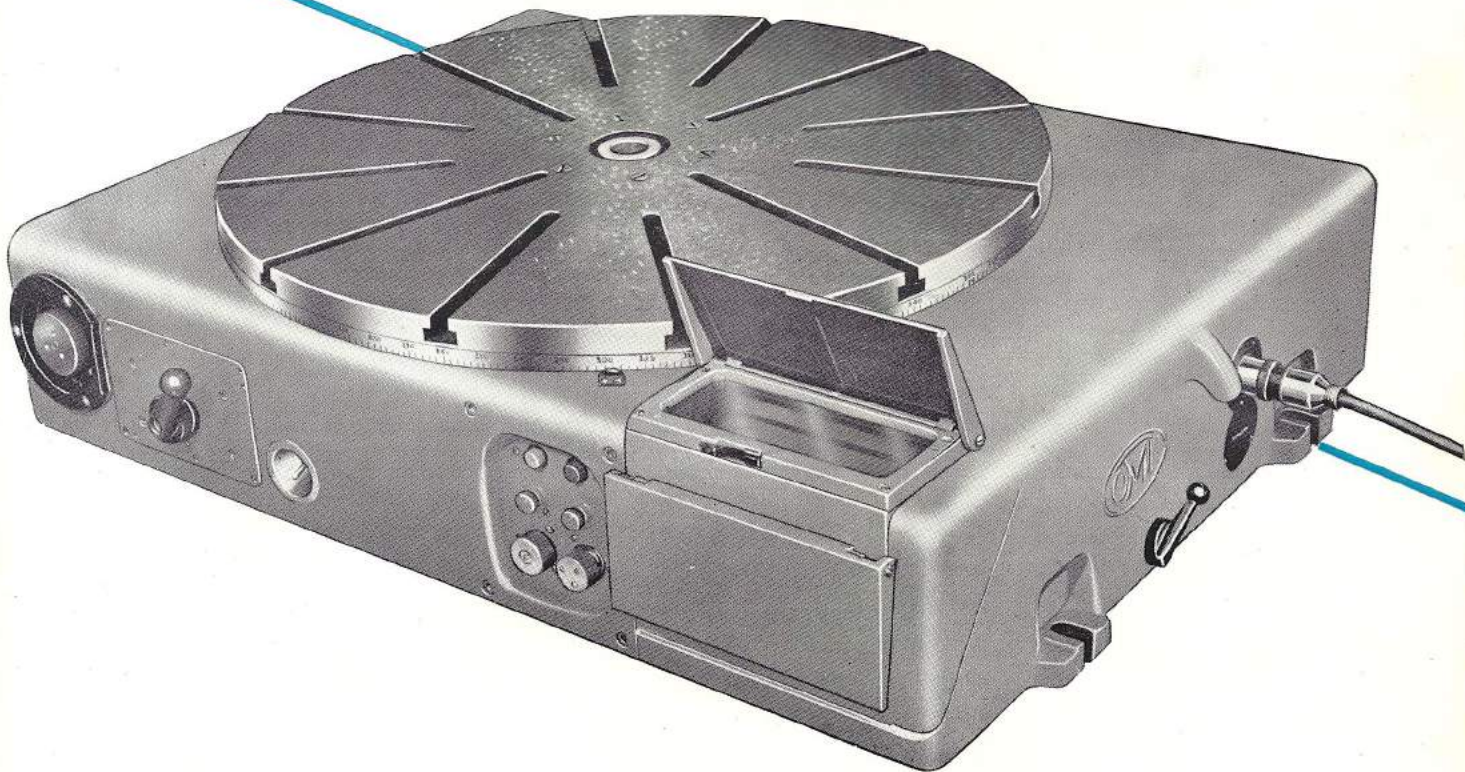
This model embodies the principal optical features of its smaller counterpart, the well-known 16" Projection Table, but has, of course, a far greater capacity for size and will accommodate components up to 1 ton (1016 kgs.) in weight.

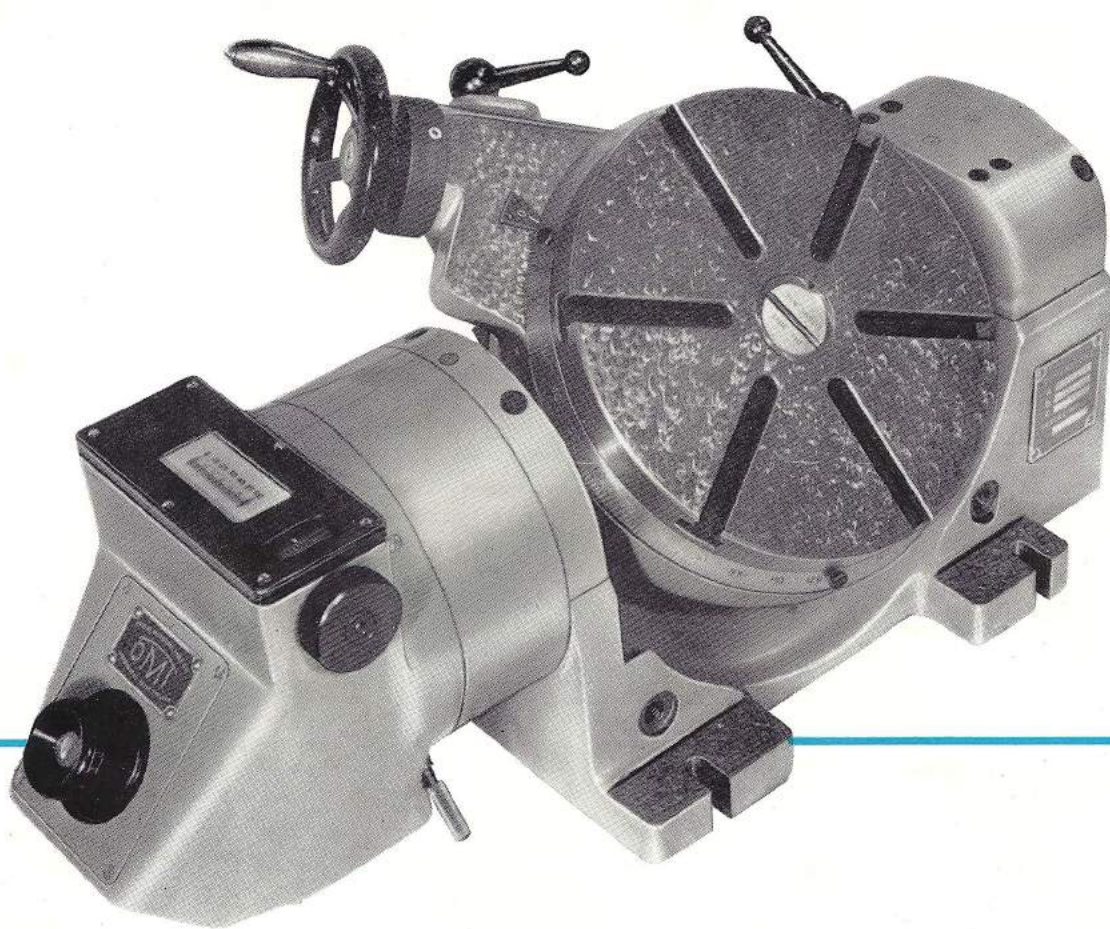
The table has a platen diameter of 30" (760 mm.) the rotary movement of which is effected, through a worm and wormwheel, by a  $\frac{1}{2}$  h.p. electric motor giving a speed of 4 r.p.m. Readings, direct to one second of arc, are taken from the screen unit which is situated at the front right hand corner of the table and which consists of two adjacent projection screens. One screen is set at an angle convenient for normal viewing and the other is for use when the table is carrying work considerably larger than the platen diameter, thus obscuring the normal screen. The reading is transmitted from one screen to the other merely by the movement of a small lever. Angular movement can be read from a scale on the periphery of the platen whilst in motion, and final adjustment made with the optical micrometer which is operated by knurled knobs situated adjacent to the screen unit.

An efficient clamping device is incorporated and the 12v. 18w. lighting unit is fed, through a built-in transformer, from the normal power supply.

By virtue of innovations in design the initial accuracy of the table is unaffected by any wear that may occur in the mechanical parts.

To accommodate larger components, a similar model with 36-inch platen is offered.





**OMT**  
**8-inch**  
**optical**  
**rotary**  
**inclinable**  
**table**

Designed for use with jig boring machines, precision milling machines, in the toolroom, or wherever highly accurate rotary indexing is required.

Designed for use with small or medium capacity jig borers and other high precision machine tools, this model has a 90° maximum angle of inclination. The positioning accuracy for both rotary and tilting movements provides an alternative form of employment for the precise inspection of workpieces featuring compound angles.

Angular movements of both rotary and inclinable motions are taken from accurately engraved glass scales; in the case of the rotary movement, readings direct to 2 seconds of arc are projected on to a brightly illuminated screen. The degree interval to which the table is set is read from an external index ring; this is adjustable through 360° permitting the table to be set to give a zero (0°) reading in any position.

Angular position in the inclined plane is observed through a microscope; the scale readings for this movement are direct to 30 seconds of arc.

Both rotary and inclinable motions are controlled by worm drive to prevent slip when unlocked; clamps are fitted to securely lock each movement.

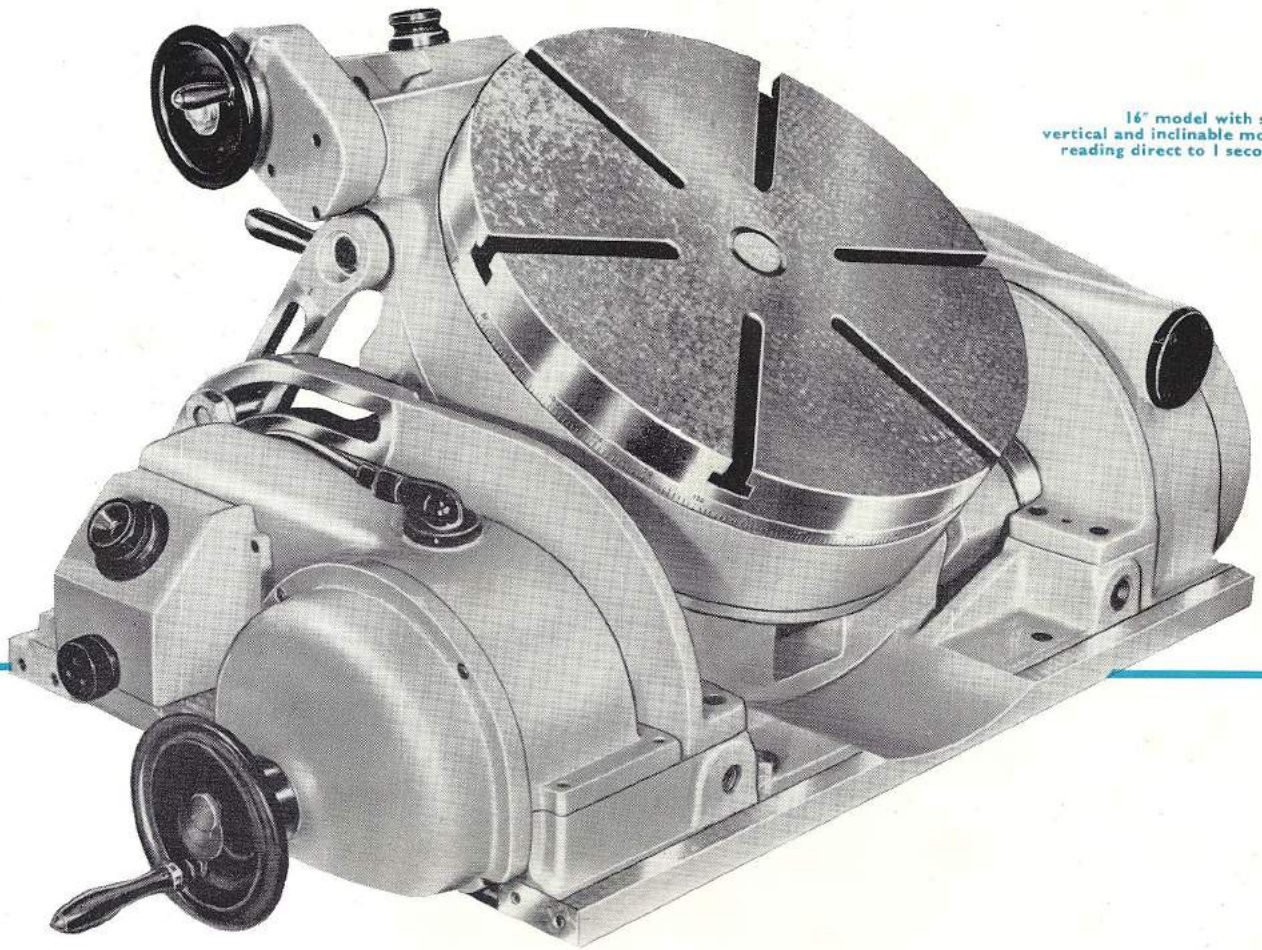
Centralisation of the rotational axis of the platen under the axis of a machine quill is obtained by use of a setting plug which locates in the No. 2 Morse taper socket in the platen.

**SPECIFICATION**

Diameter of platen	8" (203 mm.).
Height of table (horizontal position)	8" (203 mm.).
Height of table (vertical position)	13½" (336 mm.).
Overall size	22½" × 12½" (565 mm. × 324 mm.).
Pitch of base clamping slots	8" (203 mm.).
Centre hole for setting plug	No. 2 Morse.
Scale reading (rotary movement)	2 seconds direct.
Scale reading (inclinable movement)	30 seconds direct.
Intervals on adjustable external index ring	1 degree.
for rotary movement	±5 degrees.
Adjustment of fiducial for index ring	



16" model with scales for vertical and inclinable movements reading direct to 1 second of arc



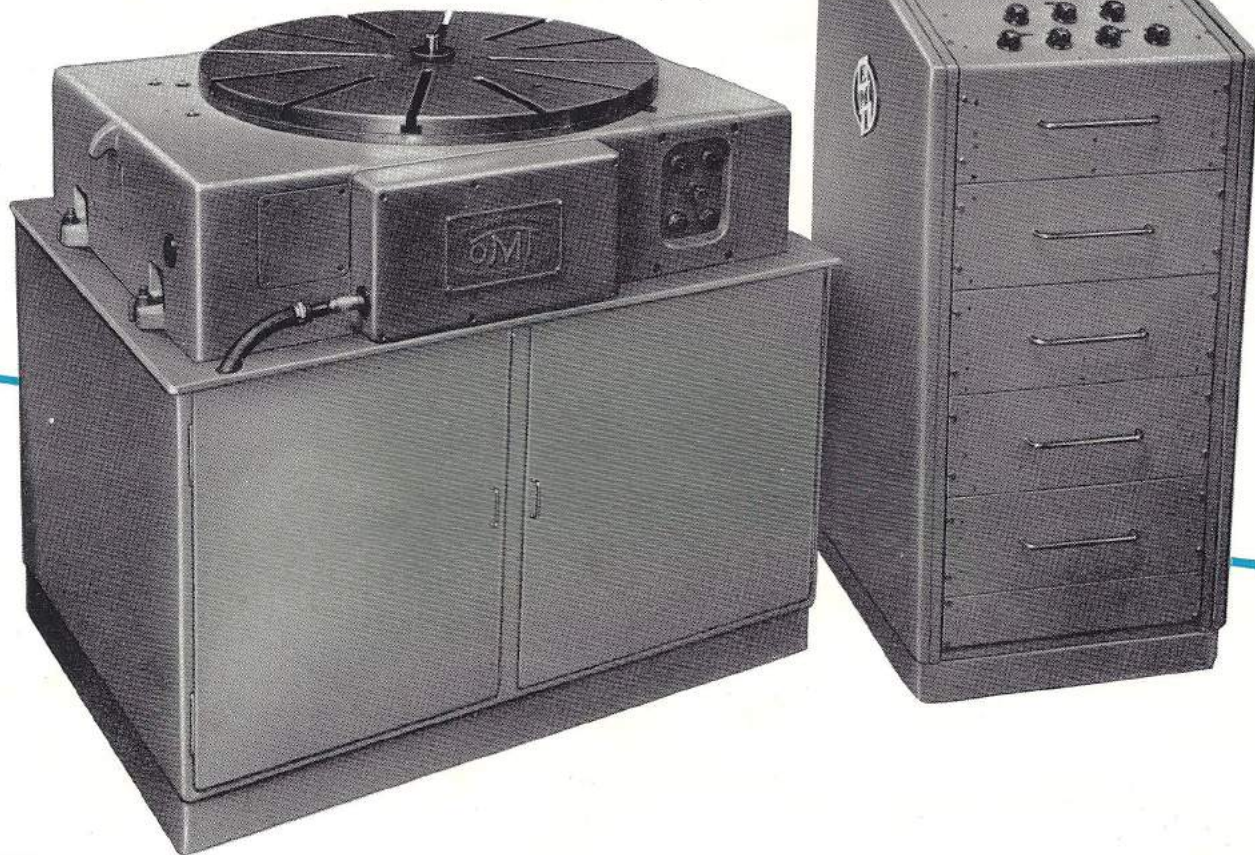
## OMT 12" & 16" optical rotary and inclinable tables

Similar in principle to Plain Rotary Tables, but incorporating tilting action to 90 degrees, the O.M.T. 12" and 16" Optical Rotary and Inclinable Tables combine the precision of first-class optical instruments with the rigidity and durability of high-grade machine tools. They are designed to facilitate accurate tool-room machining operations or inspection of workpieces using compound angles.

The rotary and inclinable motions are controlled by worm drive to prevent slip when unlocked, and the angular movement of each is read from accurately engraved glass scales through microscopes which permit readings direct to 30 seconds of arc and 6 seconds of arc by estimation (integral low voltage lamps supply the illumination of the glass scales). Alternative models can be supplied with scales readings direct to 1 second of arc. Each model incorporates an eyepiece designed to facilitate reading of the rotary scale at any position throughout the axis of inclination. Locks inside the inclinable base hold the worktable rigidly without distortion, whilst support bars maintain the angle of inclination when locked.

On both models detachable datum blocks are provided for the location of the table square with the angles of inclination.

Specification	12" Model		16" Model	
	English	Metric	English	Metric
Worktable diameter . . . . .	12"	300 mm.	16"	406 mm.
Circular movement of table..	360°	360°	360°	360°
Maximum angle of inclination	90°	90°	90°	90°
Scale of both microscopes read direct to . . . . .	1 sec. or 30 secs. of arc		1 sec. or 30 secs. of arc	
Height of table when horizontal	8"	203 mm.	9½"	235 mm.
Overall height with table vertical	18"	457 mm.	21"	533 mm.



## OMT 30" rotary table with EMI electronic positioning system

### specification

Diameter of Platen ...	30" (762 mm.).
Speed of Platen rotation	1½ revolutions per minute.
Number of Tee Slots ...	12.
Width of Tee Slots ...	⅝" (15.9 mm.).
Maximum Table Load...	1,200 lbs. (544 Kg.).
Approximate weight of Table ...	1,344 lbs. (610 Kg.).
Accuracy of setting ...	Within ±3 seconds of arc.
Repeatability ...	±1 second of arc.
Number of settings ...	Unlimited.
Overall size of Table ...	40" x 32" x 9½" (1020 x 810 x 250 mm.).
Size of Control Console	24" x 24" x 44" high (610 x 610 x 1118 mm.).
Power requirement ...	220 volts, single phase A/C.

Developed in conjunction with E.M.I. Electronics Ltd., this automatic indexing table controlled by manual setting dials or punched tape increases efficiency and reduces costs in the machining of components where accurate hole spacing or highly precise milling operations are entailed. Employment of the table in many cases eliminates the need for marking out or the requirement of expensive jigs and fixtures. Positioning is rapidly established and a setting accuracy of within ±3 seconds of arc with repeatability to ±1 second is attainable.

Constructed to an identical high order of accuracy as the optical model, mechanical features of the table include:— High precision double roller journal bearings, pre-loaded to eliminate radial clearance; lapped roller support for the platen to provide axial stability and a solenoid-operated pneumatic clamping system.

Facilities are also incorporated for positioning the table to absolute zero having set the workpiece to within ±5° of its true location. As an aid to rapid checks for concentricity the table may be rotated continuously by means of a push button control.

The basic measuring element of the control system is a rotary inductosyn which indicates the actual movement of the table and not merely the movement of the worm drive or lead screw. The accuracy will therefore never vary due to any mechanical wear which may occur.

The equipment is fully described in Publication 136—30/59

## OMI lathe toolsetting microscope

The Lathe Toolsetting Microscope is an extremely useful instrument for the checking of thread forms which are produced by a single point tool, and the form and setting of the tool.

The instrument may be mounted between centres to check the squareness of the tool with the traverse, or alternatively it can be located on the work by a vee accurately machined into the base.

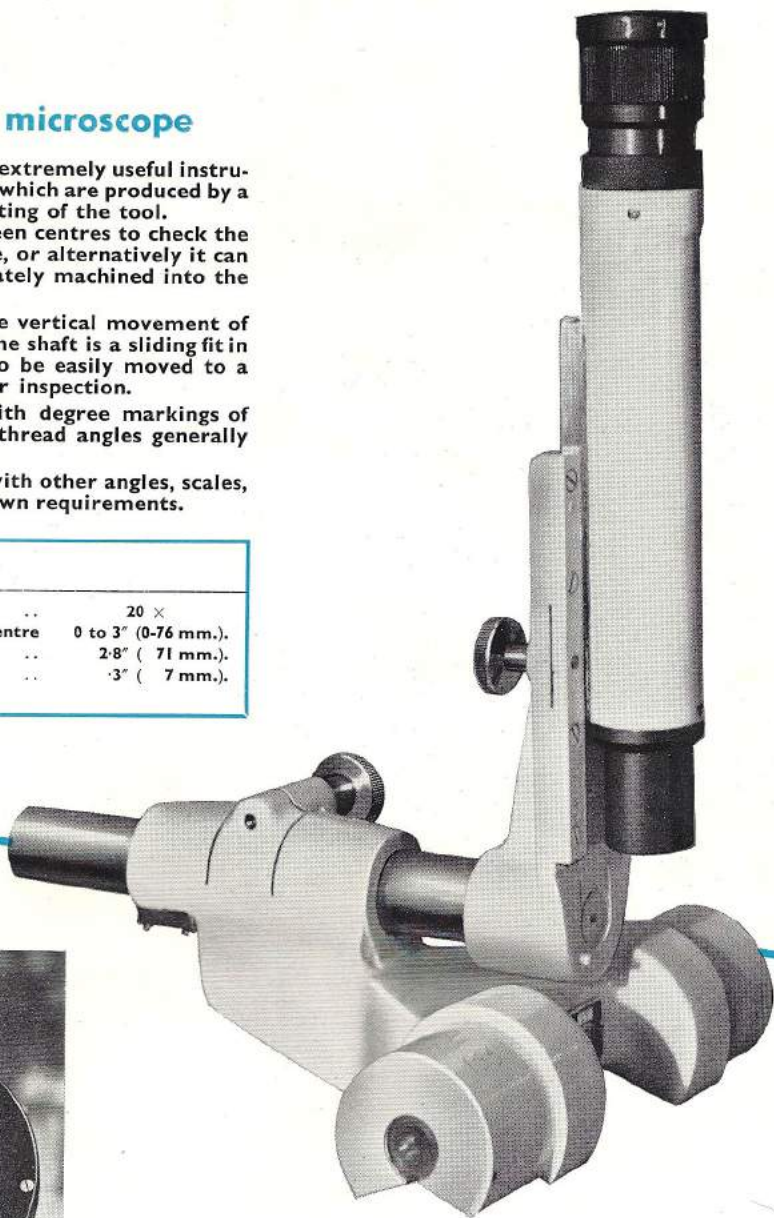
Adjustment for focus is provided by the vertical movement of the microscope in dovetail slides, and the shaft is a sliding fit in the bracket to allow the microscope to be easily moved to a position directly over the article under inspection.

The standard graticule is provided with degree markings of  $47\frac{1}{2}^\circ$ ,  $55^\circ$ , and  $60^\circ$  to conform with the thread angles generally used.

Special graticules can be also supplied with other angles, scales, contours, radii, etc. to suit customers' own requirements.

### SPECIFICATION

Magnification of Microscope .. .. .	20 X
Distance from work centre to Microscope centre	0 to 3" (0.76 mm.).
Focal length of Microscope Lens .. .. .	2.8" ( 71 mm.).
Field of view .. .. .	.3" ( 7 mm.).



## OMI thread grinder microscope

This instrument, designed for use on thread grinding machines, enables the form and position of the thread to be checked during the grinding operation.

The microscope is fitted with a range of line templets against which the thread forms of the wheel and work are observed. Work and wheel profiles and line templets are observed against a fixed angular scale for measuring the error in each half angle of the thread forms.

The lighting unit consists of a watertight chamber with low voltage lamp mounted below the grinding wheel.

A standard line templet is supplied with each instrument and special templets can be supplied to order.

Cross line angles :  $90^\circ$ ,  $60^\circ$ ,  $55^\circ$ ,  $47^\circ$ ,  $30^\circ$ .

Field of view :  $0.26''$  (6.6 mm.).

Focal length of Microscope Lens: 2.05" (52 mm.)



## optical dividing heads OW7 & OW12

These precision-built optical dividing heads have been designed primarily for inspection and light machining purposes. The back face of each instrument is truly flat and square to the axis, so that the head may be used with the spindle in the horizontal or vertical plane. The eyepiece is easily accessible in either position. Type OW7 incorporates a scale observed through a fixed eyepiece and reading direct to one minute.

Type OW12 is designed for employment where a greater degree of precision is required and embodies a scale reading direct to 2 seconds, viewed through a micrometer eyepiece.

For coarse adjustment, an external scale ring is provided close to the eyepiece. Rotation is effected by a handwheel through a worm and wormwheel which can be disengaged for rapid positioning simply by the movement of a lever.

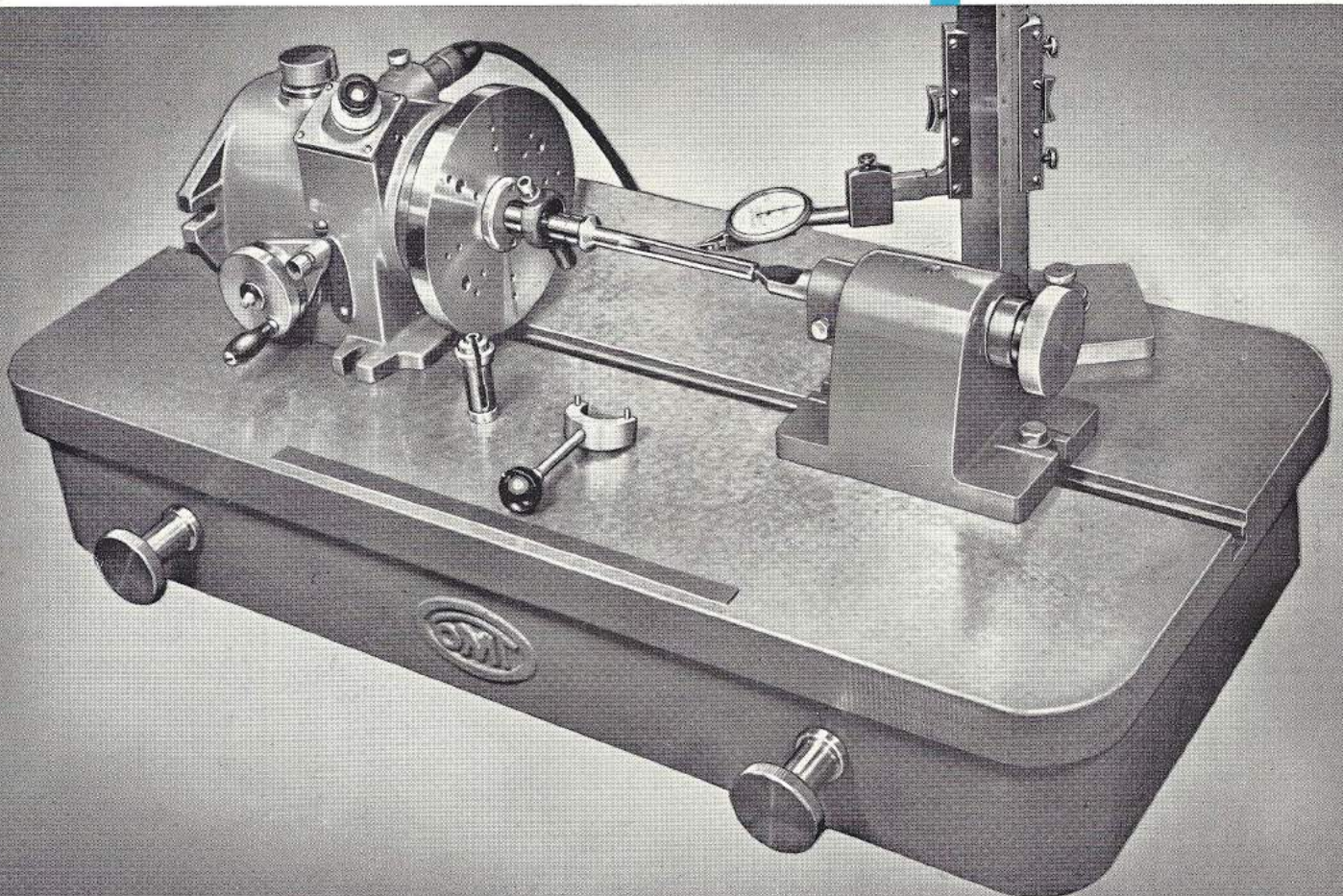
A positive non-deflecting locking device is also incorporated and is operated by a knurled knob adjacent to the eyepiece.

Illumination is by a 6-volt, 3-watt lighting unit which is fed from the mains through a small transformer.

Work can be held either in collets or between centres, and a face plate is provided. Included in the equipment available with either head is a tailstock and a baseplate unit which is sufficiently large to accommodate clockstands, height gauges, etc.

SPECIFICATION	
Centre height .. .. .	3½" (82 mm.).
Maximum distance between centres ..	14½" (368 mm.).
SIZE OF HEAD	
Length.. .. .	7½" (190 mm.).
Width .. .. .	6½" (170 mm.).
Height .. .. .	7½" (190 mm.).
SIZE OF BASEPLATE	
Length.. .. .	30" (760 mm.).
Width .. .. .	15" (380 mm.).
Height .. .. .	6" (150 mm.).

18 Brochure 54/60 gives further details of this equipment





## thread form inspection instrument

This instrument meets the demand for a simple, inexpensive means of checking a variety of thread forms and indicates errors by comparison with a master thread form in a templet ocular and with the magnification of 30x provided.

It embodies a base, supporting a table which can be moved crosswise in a vee groove by means of a lead screw, nut and small hand control wheel. The table in turn supports a headstock and tailstock moving also along a vee groove and which can be adjusted to suit the varying lengths of work. The tailstock centre is spring-loaded, the headstock centre movable by screw and hand wheel.

To the rear of the base is mounted a bracket and column supporting a microscope and thread templet ocular and which can be swivelled by means of screw and handwheel to suit the helix angle of the thread under inspection. Lighting is provided for by a green filter lamp unit, positioned in the base.

A glass work plate mounted in a cylindrical holder for positioning to centre height on the table is also provided for viewing flat work and test pieces, etc.

### SPECIFICATION

Capacity of Machine when Using Centres.  
Maximum diameter of work 3" (76 mm.).  
Maximum length of work 12" (305 mm.).

Capacity of Machine when using Vee Blocks.  
Maximum distance between Vee Blocks—16"  
(406 mm.) (Work may be extended beyond Vee  
Blocks).

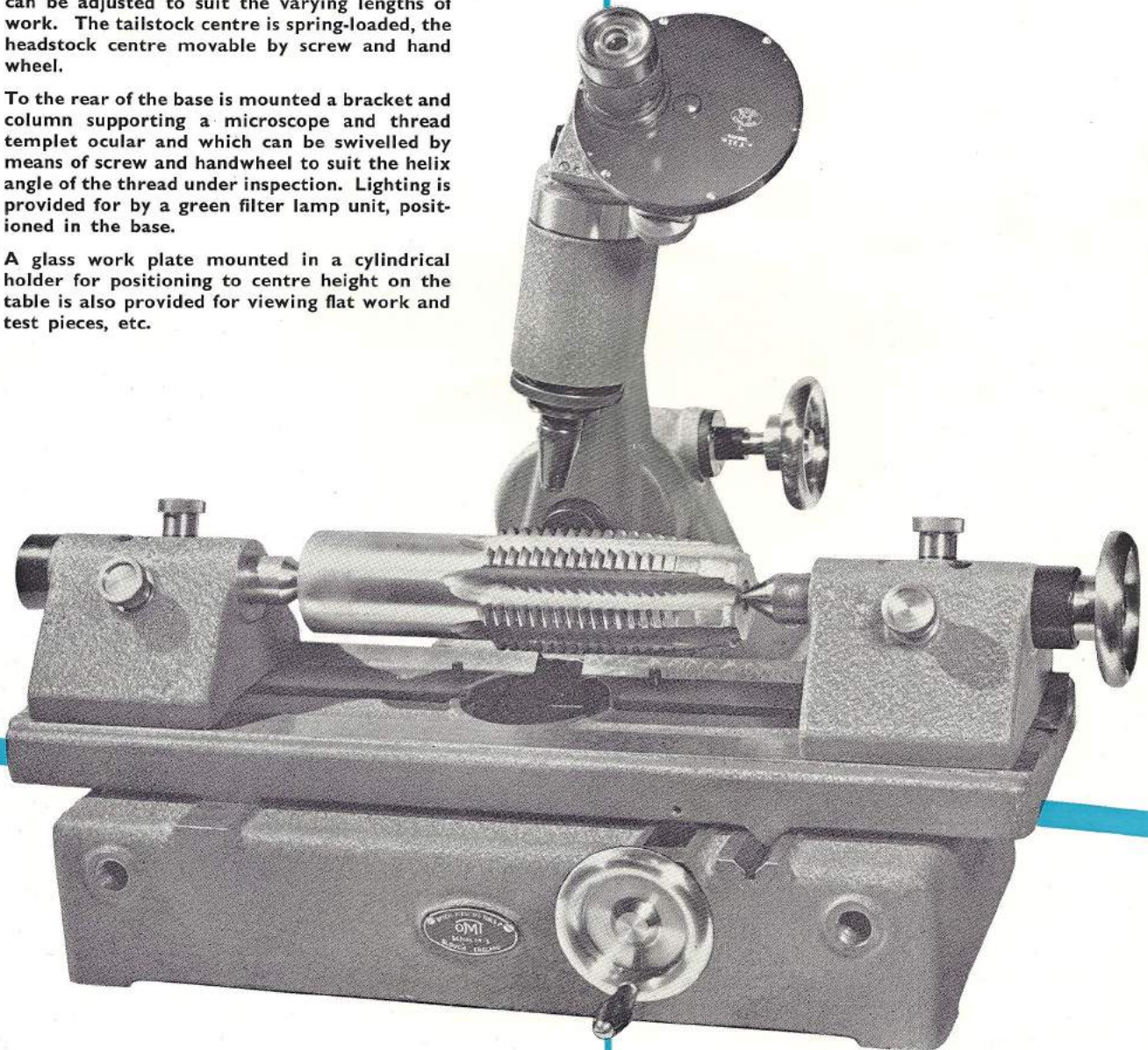
Maximum diameter of work—1½" to 3" (43 mm. to  
76 mm.).

Helix adjustment—10° Right and Left hand  
(Vernier reads to 10 mins.).

Magnification—30x.

Field of View—0.26" (6.6 mm.).

Lighting Unit—6 volt.





## toolmakers' microscope

This robust instrument simplifies accurate inspection of thread forms, form tools and complete contours.

The work is supported over a glass workplate whilst a beam of light transmits the image of the workpiece contour on to a line templet within the ocular of the microscope.

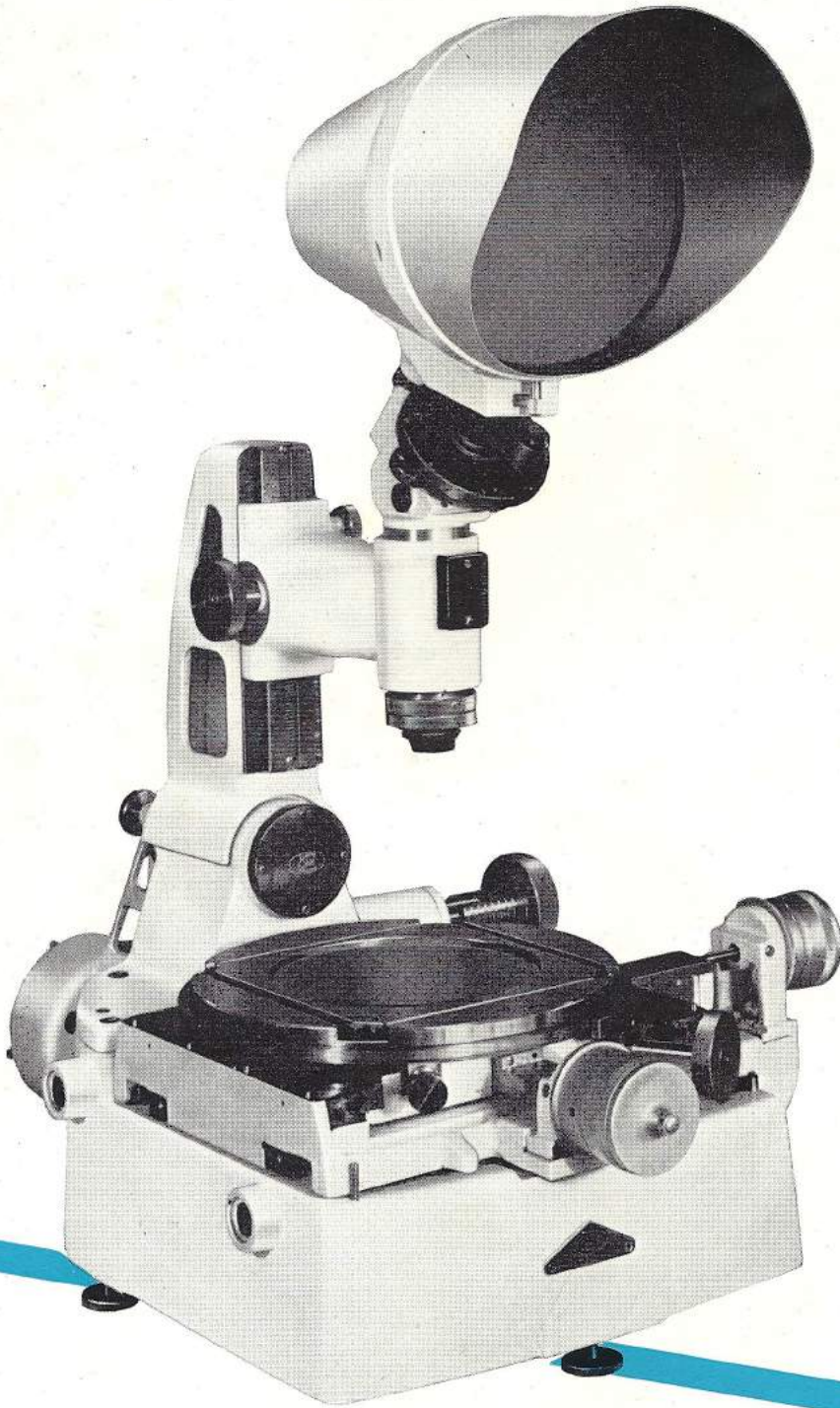
The worktable may be rotated or moved transversally or longitudinally for making angular or linear measurements. The linear movements are controlled by micrometer adjustments in conjunction with gauge blocks and are restrained by air brakes to prevent damage to micrometer spindles.

Oculars are supplied for thread form and general contour inspection. The thread templet oculars carry several ranges of thread forms and cross lines of the full thread angles and rotate through the line of vision of the eyepiece. An angular scale is also used in conjunction with thread templet oculars for detecting errors in each half angle of thread form inspected. The protractor ocular carries a cross line surrounded by a full circular scale. The circular scale is observed by a separate integral microscope for reading direct to one minute of arc.

A projection screen may be fitted over the eyepiece for use with all oculars, and transparent drawings may be mounted on the screen to serve as line templates. A special scale is provided for preparing such drawings and making measurements on the screen.

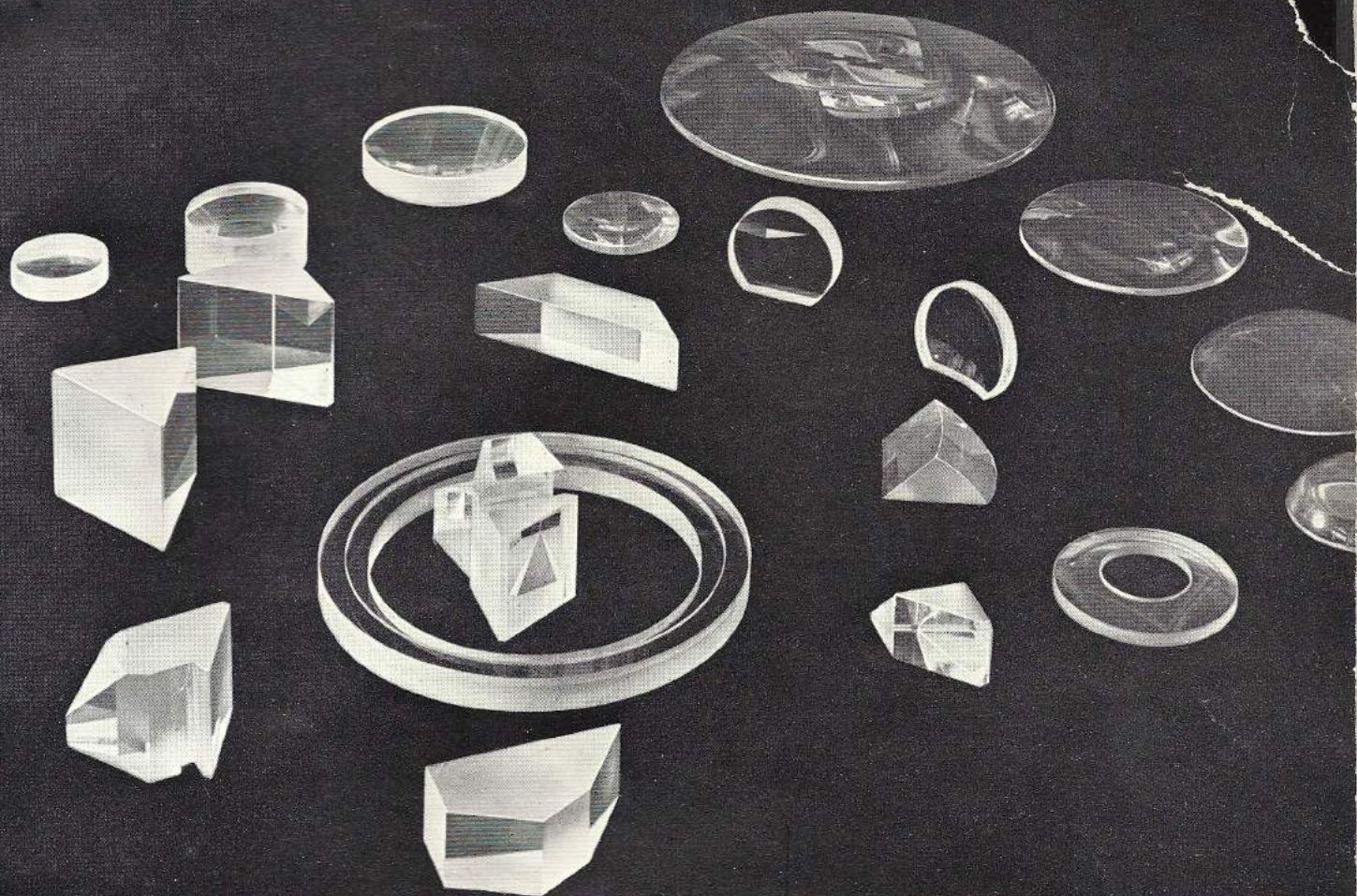
By exchange of objective systems magnification of 10x, 30x, 60x and 100x can be obtained.

Thread Templates can be supplied for Metric, U.S.S., Acme, Unified Thread Form, or any special form of thread.



Capacity	English	Metric	Reading direct to :
Longitudinal traverse .. .. .	6"	150 mm.	.0001" (.0025 mm.).
Transverse traverse .. .. .	2"	50 mm.	.0001" (.0025 mm.).
Maximum height of work profile above table	8"	205 mm.	—
Diameter of worktable .. .. .	11"	280 mm.	—
Worktable rotation .. .. .	360°	360°	0° 3'
Tilt of column to right and left .. .. .	12°	12°	—
Depth of throat .. .. .	6½"	165 mm.	—
Centre cradle capacity, under 1½" dia. ..	12½"	318 mm.	—
Centre cradle capacity, under 3½" dia. ..	10"	254 mm.	—
Maximum diameter carried by vee blocks	4½"	114 mm.	—
Thread templet angular scale	7°	7°	0° 10'
Field of view diameter with 30x magnification	2"	5 mm.	—

A comprehensive description of this instrument is available in brochure 48/62



## **OMT** unit optics

Optical Measuring Tools Ltd. has one of the most modern installations in Great Britain for the production of precision lenses, prisms of all types, optical flats, graticules, plano mirrors, etc., and contracts for the manufacture of unit optics of every description.

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Evidence of the superlative quality of O.M.T. optical and engineering products is portrayed in the Newall 35 mm. black and white and technicolor cameras which the company has produced for G. B. KALEE, LTD. and TECHNICOLOR LTD.

Other noteworthy O.M.T. achievements in this field have been cinéradiography cameras, automatic 35 mm. film printers and a wide variety of special purpose optics, including polyhedral prisms designed for experimental colour television in the U.S.A.

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