I.T.5 'MODEL' GEOMETRY

The geometry of the 'model' may be broken down into the following divisions:-

5.1. Interior Orientation

5.2. Exterior Orientation, which in turn can be broken down into the following:-

5.2.1. Relative Orientation

5.2.2. Absolute Orientation. This can be broken down further into the following:-

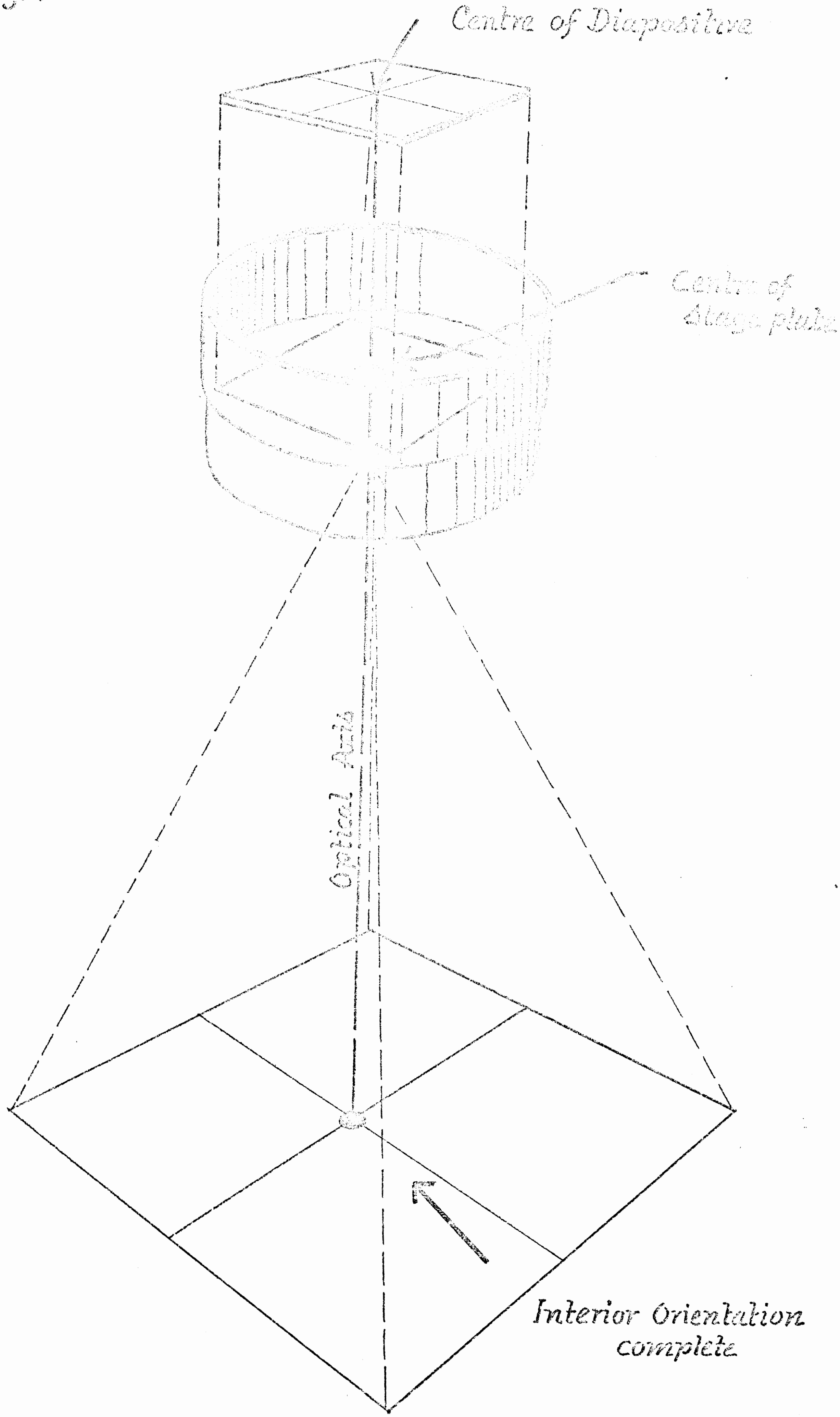
5.2.2.1. Scaling of the 'model'.

5.2.2.2. Levelling of the 'model'.

The following instructions are broken down into the above mentioned divisions.

The object of these instructions is to show how to contruct a stereoscopic 'model' on multiplex stereoplotting equipment using photographic replicas, on glass, of over - lapping pairs of vertical aerial photographs in such a way as to be able to extract information from this 'model' and present it in a two dimensional form on an orthographic projection. (true to shape and size)

Fig. 1


Centre of Diapositive
Centre of Stage plate
Optical Axis
Interior Orientation complete

5.1. INTERIOR ORIENTATION

Is the registering of either negative or positive within the optical system of a projector or camera in such a way as to duplicate the projection of rays which was captured by the aerial camera lens at the instant of exposure. In the Multiplex it brings the centre of the diapositive to the optical axis of the projector (see fig.1.)

The procedure for interior orientation in the Multiplex is as follows:-

1. Lay out the required stereoscopic pair of photographs in the direction required for mapping. Check to see that there is enough room between the stereoscopic 'model' and the instrument plot to enable unrestricted movement of the tracing table within the 'model' area. Should the tracing table ride up onto the instrument plot then the height reading of a point in this area will decrease by the thickness of the plot, thus placing this point out of terms with the remainder of the 'model'. If the 'model and the plot conflict it may be necessary to reverse the direction of the 'model' layout.

2. Lay out the related pair of diapositives in the same direction as the prints.

3. Remove the coloured filters from the condenser lens unit.

4. Raise the condenser lens unit of the first projector and spread the spring loaded cams. Place the required diapositive on the stage plate of the projector with the emulsion side face down and the panel situated in the reverse position to that of the laid out prints.

5. Replace the spring loaded cams, tap gently all around the upper face of the diapositive with the blunt end of a pencil or some similar tool to ensure a complete contact of emulsion and glass then replace the condenser lens unit.

6. Using the small knurled screws situated on the exterior of the lens body and at right angles to one another adjust the image so that the intersection of the white line coincides with the black spot. Interior orientation is now complete.

7. Repeat procedures 4 - 6 for the other projector

5.1.A. PROJECTOR ILLUMINATION

To ensure that the projection illumination is central and that the maximum amount of light is obtained over the whole projection format:-

1. Remove the coloured filter.

2. Raise the projector lamp unit to its maximum by unscrewing the knurled cap on top of the lamp housing. This will have the effect of reducing the projector light to its minimum area, where one may be able to perceive the lamp filament shape.

3. Centre the reduced projection around the interior orientation elements i.e. centre white cross and black spot by using the knurled tangental screws attached to the exterior of the lamp housing.

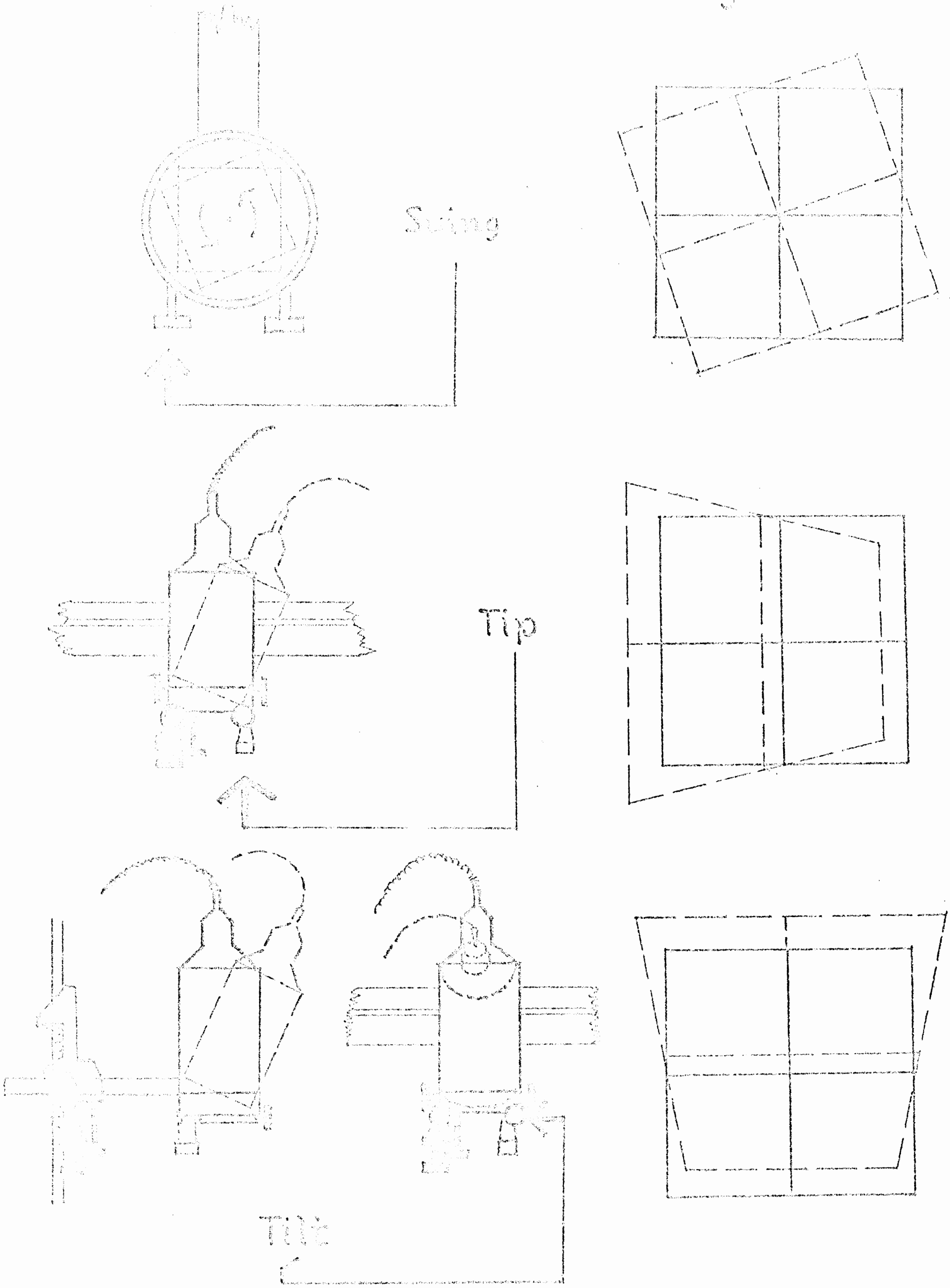
4. Replace the coloured filter.

5. Lower the projector lamp unit by screwing up the knurled cap to a point where the maximum illumination is obtained throughout the whole of the projection format without discolouring.

6. Repeat procedures 1 - 5 for each projector.

PROJECTOR MOVEMENTS

Fig. 2a



5.2. EXTERIOR ORIENTATION

Exterior orientation is comprised of the following sections:-

1. Relative orientation
2. Absolute orientation
   1. Scaling
   2. Levelling

5.2.1. RELATIVE ORIENTATION

The purpose of relative orientation is to reconstruct the same perspective conditions between a pair of photographs that existed when the photographs were taken. The procedure of relative orientation is founded on the fact that each point in the ground was the origin (and hence intersection) of a pair of corresponding rays one to each exposure station. Therefore their reprojected counterparts in the Multiplex must also be made to intersect pair by pair. This is accomplished by a systematic procedure of applying rotational movements to the projectors, at the same time observing the images on the platen of the tracing table until the corresponding images are made to coincide over the entire model area. This procedure of relative orientation is familiarly referred to as 'clearing y parallax'

The projector mounts are constructed so that each projector may be rotated about each of three axis:- x, y, & z. The rotational movements are known as SWING, TILT & TIP and known internationally as k = KAPPA w = OMEGA, and ϕ = PHI (as in pea) respectively. Motions along the x, y, and z, axis are supplied in the Multiplex and referred to as bx, by, and bz but these motions are not essential to the construction of the angular relationships.

The diagrams under 'PROJECTOR MOVEMENTS' show the rotational movements around the x, y, & z axis and how these motions would appear to distort the projected image of a grid. (see fig. 2)

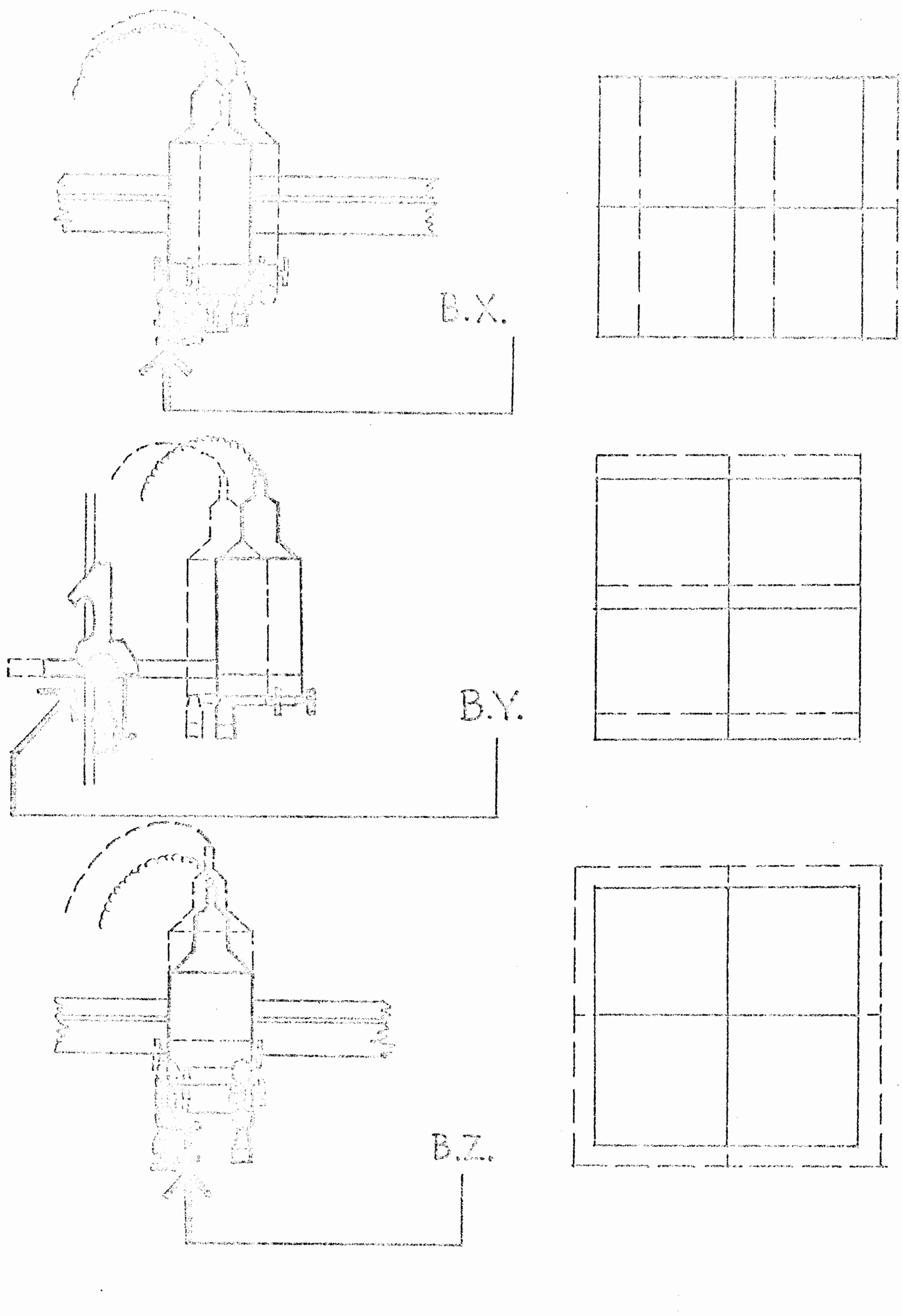
PARALLAX = The apparent shift of an image due to a shift in the point of observation.

'y' PARALLAX= The lack of correspondence between common images in the 'y' direction, of a dual projecting stereoscopic 'model'

Prior to Relative orientation procedures, projectors must be set vertical by eye and the by, bx motions set at their mean values.

PROJECTOR MOVEMENTS

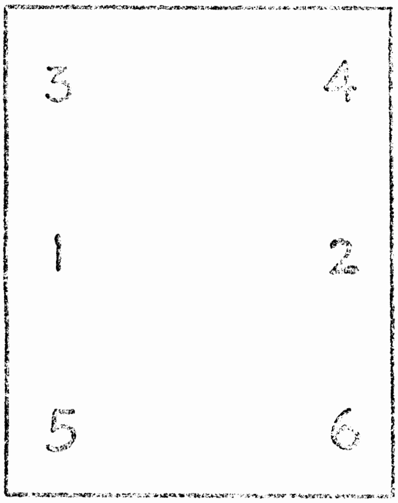
Fig.2b



5.2.1. Continued

PROCEDURES:-

Model area diagram.



Let py = parallax in the 'y' direction and let projector 1 be on the left of projector 2. Now referring to 'model' area reference diagram.-

1. Eliminate py at position 1 with 'k' of projector 2.
2. Eliminate py at position 2 with 'k' of projector 1.

3. Assess py at positions 3 and 5. If py is unequal displace the detail of projector 2 equally from the detail of projector 1 by using 'φ' of projector 2. Maintain the common images colinear in the y direction by raising or lowering the tracing table platen during this action.

4. The detail of projector 2 will now be equally displaced from that of projector 1 and in the same direction. Correct py by using 'w' of projector 2, then overcorrect approximately three times.

5. Eliminate py at positions 1 and 2 with 'k' as in steps 1 and 2.

6. Repeat steps 3 - 5 until common images correspond exactly.

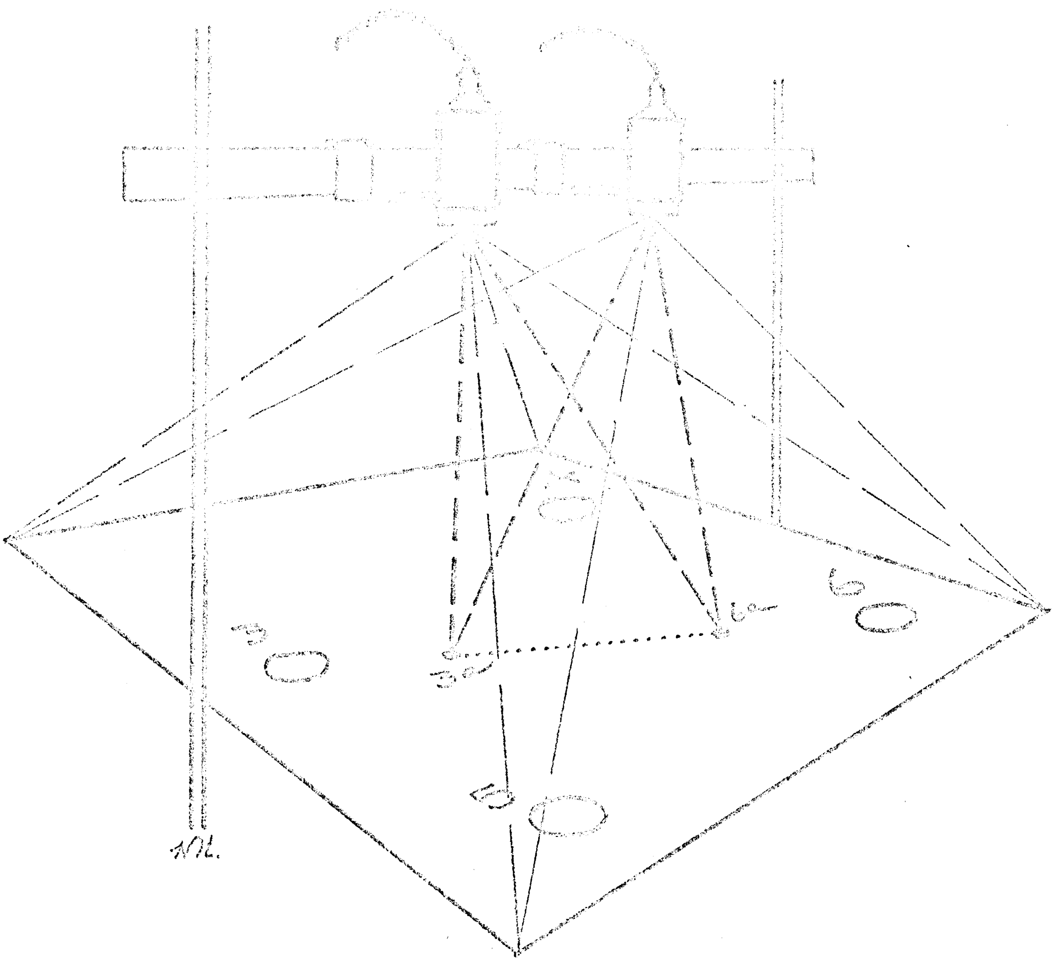
7. Eliminate py at positions 4 with 'φ' of projector 1. Maintain the common images colinear in the y direction by raising or lowering the tracing table platen until images coincide exactly.

8. Check for py at position 6. If any py is obvious repeat steps 1 - 8.

TO ASSESS Px CLOSURE IN MODEL BEFORE REL. ORIENT.

$2p_1 - p_3 - p_5 = 2p_2 - p_4 - p_6.$

Fig 5 SCALING MODEL



3 4 5 & 6 Plotted positions for Control.

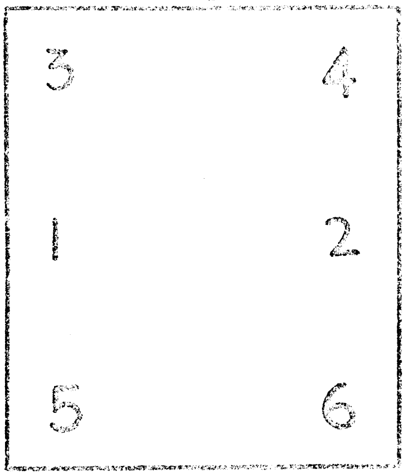
3a & 6a Model positions for same Control.

Distance between 3a & 6a Observed as less than 3 to 6.

Therefore Model scale is smaller than the plot scale.

5.2.2. ABSOLUTE ORIENTATION

Model area diagram



Absolute orientation involves 'scaling and levelling' of the stereoscopic 'model'. Scaling and levelling are so closely tied in with one another that one can rarely be obtained without the other. The first requirement will be to scale the 'model' approximately.

5.2.2.1.A. APPROXIMATE SCALING:- Consider each model to have at least four control points in either of the two categories, Field or Supplementary. These points will normally be situated in positions 3, 4, 5 and 6 of the model area. For approximate scaling of the model refer to any two diagonally opposed points e.g. 3,6, or 4,5. To establish the identification of all these points refer first to the control definition explained in the particular L & S N 56 form within the job file then using a pocket stereoscope, and the relevant pair of photographs, view them stereoscopically.

(a) Where the mapping requires a direct tracing technique the plot scale must equal the model scale and a direct relationship between model image and a plot position for control points can be made (see fig 3). For small scale production, e.g. N.Z.M.S.1, by Multiplex a reduction pantagraph is necessary and the reduction factor between model and plot must be determined in order to place the correct ratio settings on the pantagraph.

As the required plot scale for N.Z.M.S.1 production is 1:47,520, the Wild B8 reduction pantagraph (modified to fit wide angle Multiplex) has the following settings: 3:2; 8:5; 5:3; 15:8; 2:1; 2.376:1; 5:2; 8:3; 3:1; 10:3; 4:1; 5:1 and the makers stipulation for the Williamson Wide Angle Multiplex optimumprojection distance = 14" (360mm) then the following calculations must be made:-

(a) Let H = Flying height above Mean Sea Level (M.S.L.) = 25,000'

(b) & h = 1,500' = Mean elevation

(c) .: H - h = 23,500'

(d) Optimum projection distance = (360 mm) = 14"

(e) Therefore desireable model scale for optimum projection

$$\text{distance} = \frac{14''}{23{,}500'} = \frac{14''}{282{,}000''} = \frac{1}{20143} \quad \text{(see fig 4a)}$$

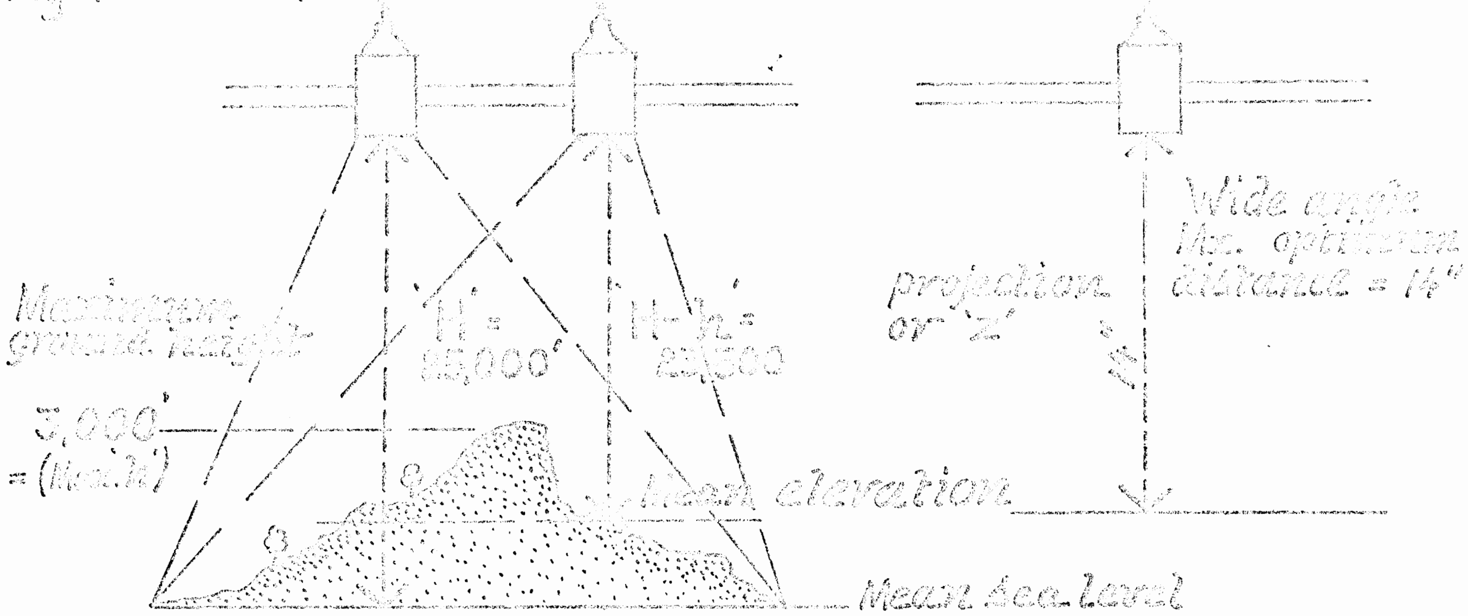
(f) Range of focus of Wide Angle Multiplex
= (280 mm) = 11.02" to (450 mm) = 17.72"

Therefore any scale which will allow for reaching maximum and minimum heights of the model and still be within range of focus could be used.

(g) Required plot scale = 1:47,520

(h) Calculate model scale = 1: 20143

Fig.4a



Model / Plot relationship

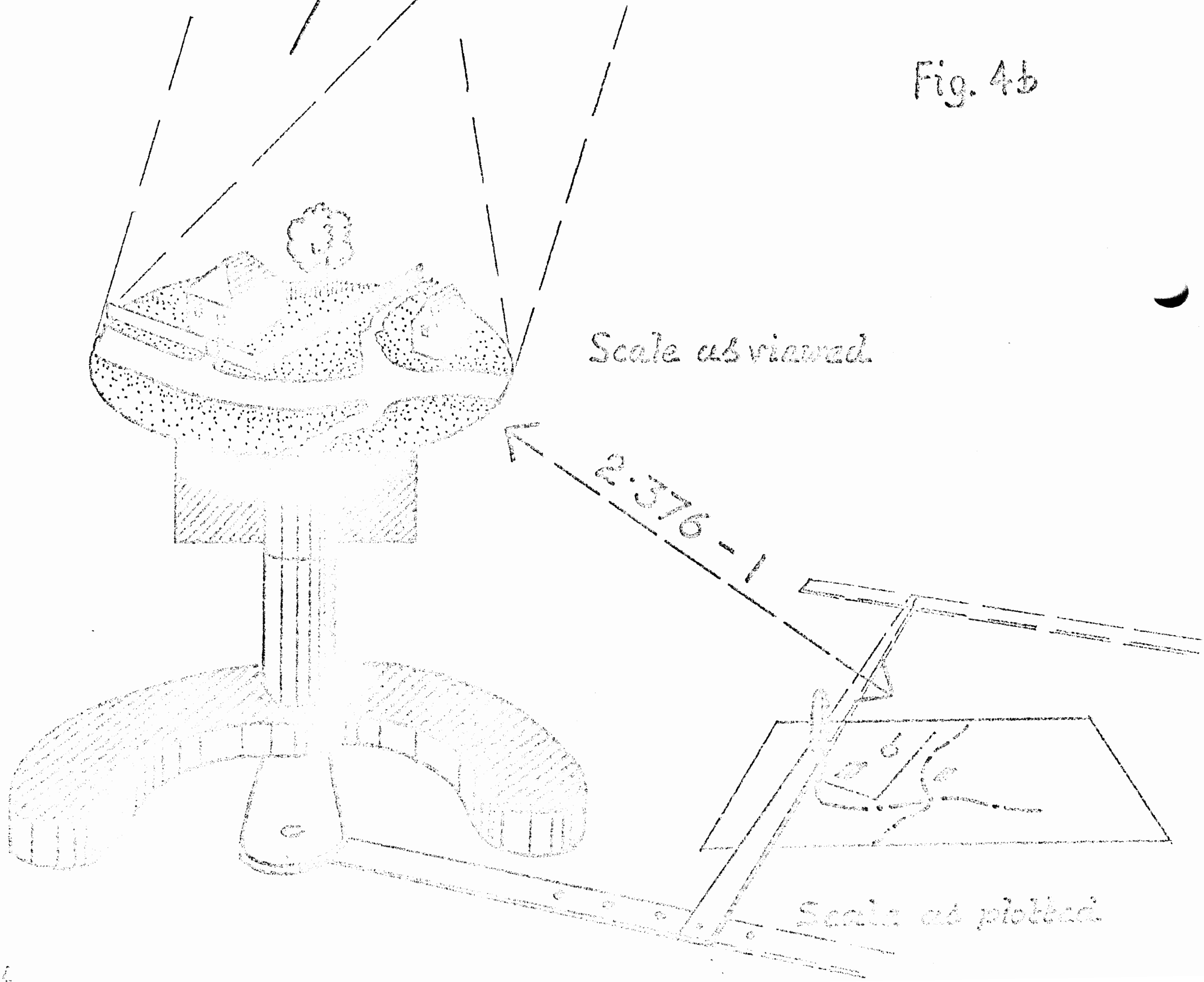


Fig. 4b

(i) Model: Plot ratio = $\frac{1}{20143} : \frac{1}{47,520} = \frac{47,520}{20143}$

$= \frac{2.359}{1}$

$= 2.359$ (approx) : 1

(j) As there is no pantagraph to suit select nearest ratio
= 2.376 : 1 (see fig. 4b)

(k) Therefore model scale = $\frac{2.376}{1} \times \frac{1}{47,520} = \frac{1}{20,000}$

(l) As horizontal and vertical scales must be the same it will be necessary to obtain a 1:20,000 height scale reading direct in feet.

(m) Should there be no height scale available reading direct in feet use a metric scale and convert feet to millimetres at scale. e.g. Scale = 1:20,000

1' = 304.8 mm

$\therefore$ 1' @ 1:20,000 = $\frac{304.8}{1} \times \frac{1}{20,000} = 0.01524$ mm

(n) Convert all control point heights to millimetres as well as contour values using the above constant.

(b) Having made the calculations for pantagraph ratio settings, set these on the pantagraph arms. Connect the pantagraph to the tracing table and wearing the coloured spectacles supplied, move the tracing table to any one of the pair of control points selected then adjust the floating mark of the tracing table to coincide with the model image of the model at this point. Using a steel point in a clutch pencil unit, insert this unit into the pencil holder of the pantagraph. Place the instrument plot on the table matt side up and under the pantagraph. Move the plot until the pricked position of the same point referred to in the model falls directly under the steel point. Tape the plot to the table temporarily.

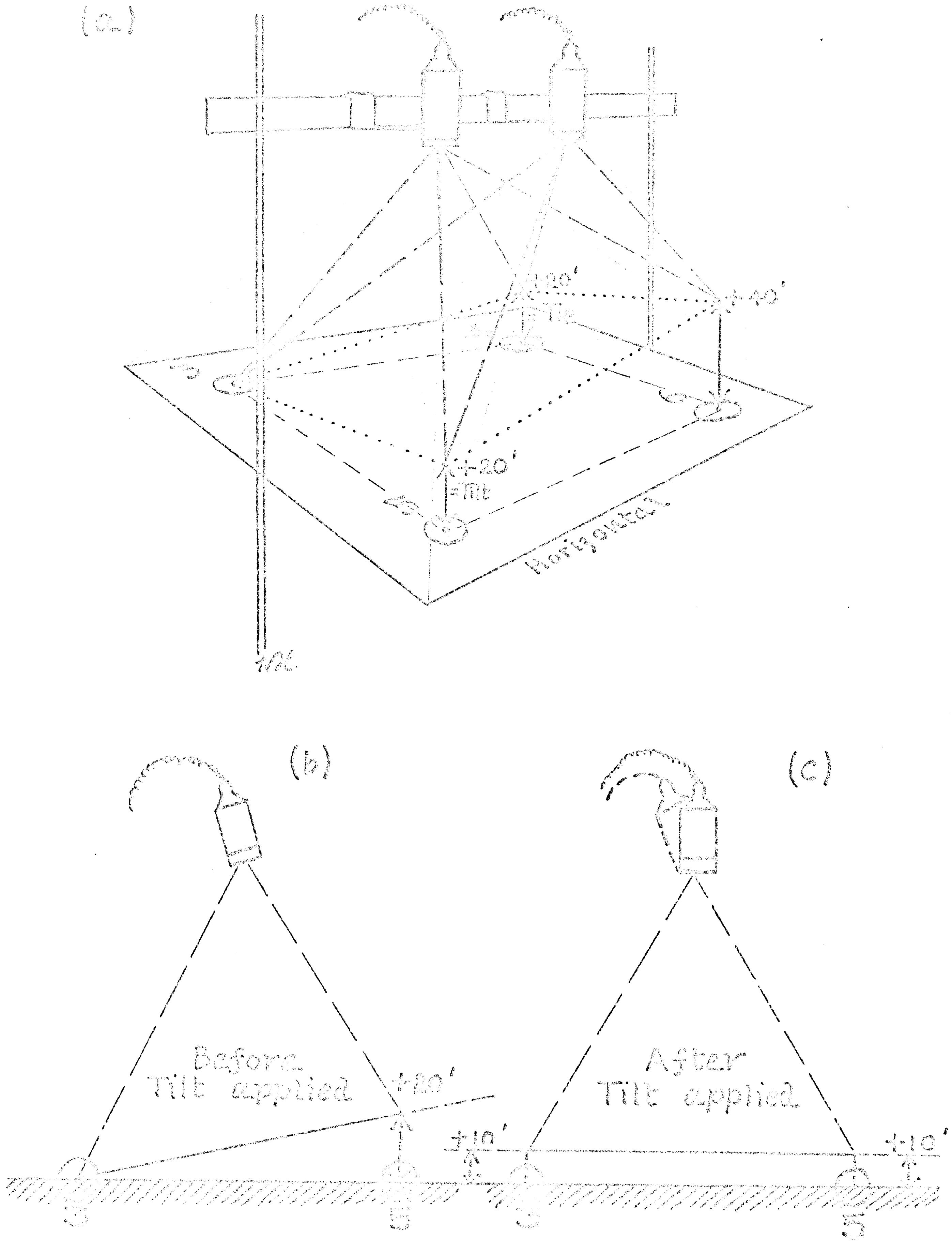
(c) Move the tracing table to the identified image of the diagonally opposite control point. Place the floating mark on the model at this point then unfasten the instrument plot from the table. Placing a finger firmly on the initial control point referred to, swing the plot until the point under observation coincides with or is in line with the steel point in the pantagraph.

(d) If the steel point falls inside the plotted position then the model scale is too small. Conversely if the steel point falls outside, the model scale is too large. To correct the scale, place the steel point half way between the plot and model positions of the control point being referred to, then increase or decrease the distance between the projectors (bx) according to whether the model scale is too large or too small until the steel point and plotted position coincide. It will be necessary after respacing projectors (bx) to raise or lower the floating mark to meet the model at the required points. Also check the relative orientation positions 1 and 2 correcting py for swing 'k' if necessary. Check positions 3,4,5, &6 for py correcting with bz if necessary.

(e) Repeat actions as for sections 5.2.2.1. (b)(c)&(d). If the image point coincides with the plotted point then the model can be considered 'approximately' scaled. Make a quick-check on all other control points - these should be reasonably in sympathy.

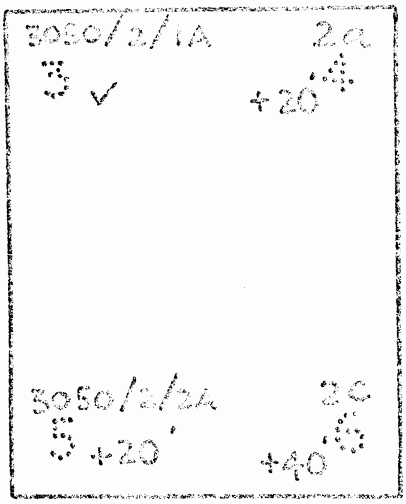
Operator may now continue with the levelling procedure.

Fig 5


(a)
+20'
+10'
+20'
Tilt
Horizontal
Vert.
(b)
Before
Tilt applied
+20'
(c)
After
Tilt applied
+10'
+10'

5.2.2.2. LEVELLING OF MODEL

Model area diagram.



Level across the tilt axis first. Prior to this the following procedures must be carried out.

(a) On a scrap pad draw a diagram of the relative positions of all the control for the model. Give the points their annotations and their heights.

(b) Move the tracing table to either of the control points at positions (3) or (4) whichever is the better point to read and drop the floating mark to ground level, read and record the height from the height scale. Do this at least three times and average the readings. Set the floating mark at the average of these readings and adjust the height scale to the reading indicated on the plot.

(c) Move the tracing table to all remaining control points in turn, averaging no less than three readings for each point and recording the difference between these averaged readings and the plot heights, on the scrap pad set aside with the control point arrangement marked on. (see model area diagram & fig5a opposite)

5.2.2.2.1. TILT LEVEL CORRECTION

If the original control point was at position(3) then the difference between the plot height and the model height of the control point at position (5) +20' is known as 'TILT' (fig 5b) and is removed by driving the floating mark to half the difference read and making a combined movement with the tilt screws of both projectors in the same direction. The combined tilt movement is continued until the floating mark appears to rest on the ground at this particular control point. Relative orientation must be maintained and any want of correspondence which has developed must be removed with the tilt movement of either projector.

As depicted in diagram (fig 5c) opposite after the combined tilt movement there is a constant error remaining in both sides. This is removed by placing the floating mark on the ground at the original control point referred to and adjusting the height scale to read the correct height.

Check again for tilt misclose.

Points (4) & (6) may be used instead of (3) & (5) if desired or where only three points occur , including (4) & (6) on land mass.

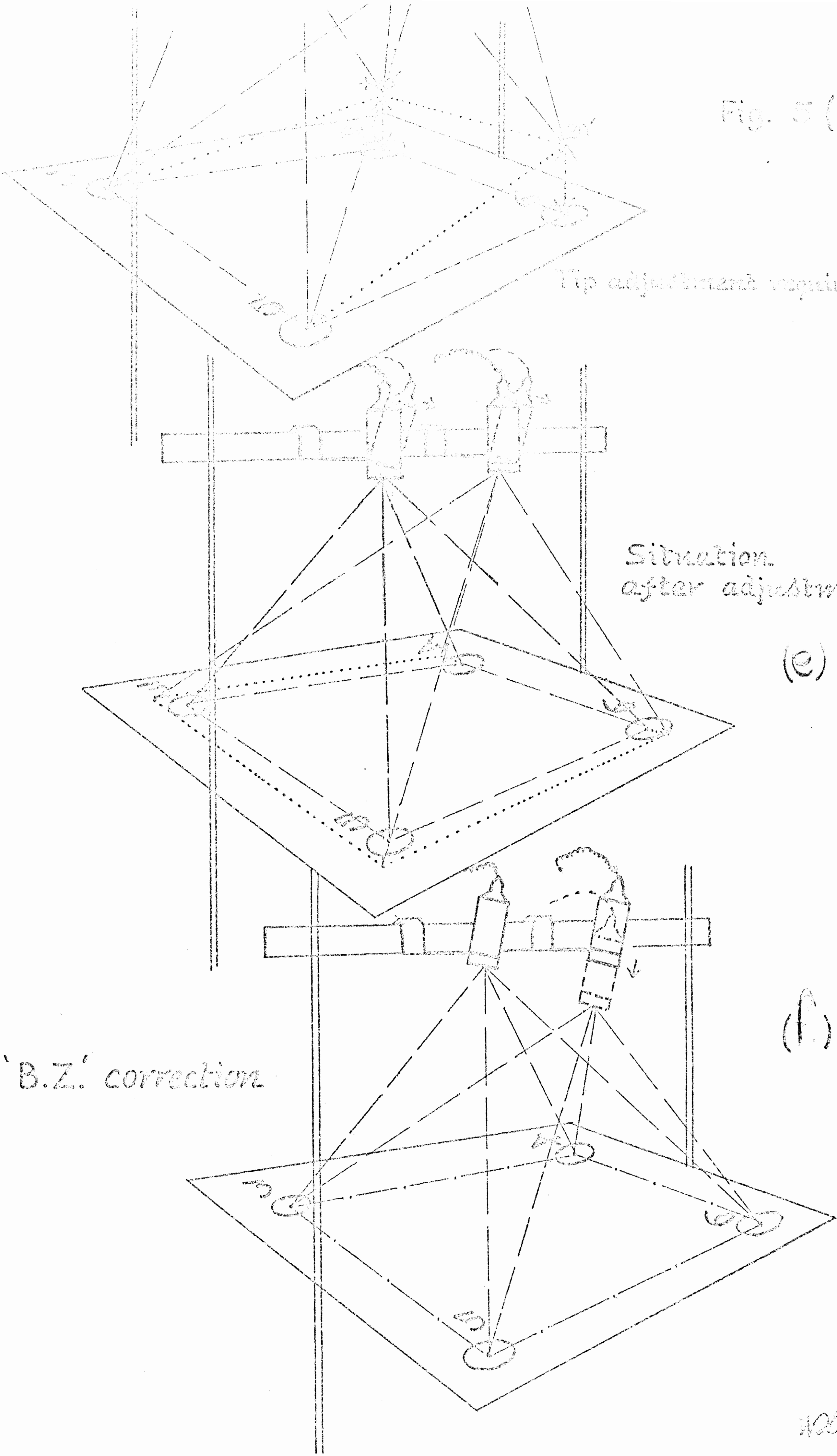
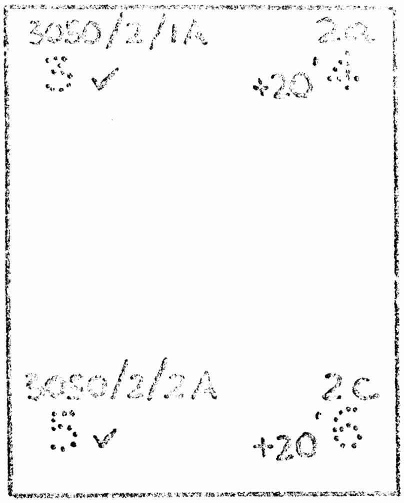


Fig. 5 (d)
Tip adjustment required
Situation after adjustment
(e)
'B.Z.' correction
(f)

5.2.2.2.2. TIP LEVEL CORRECTION

Having levelled correctly across the tilt axis there remains only the necessary correction across the tip axis. The height discrepancies having been read at positions (4) & (6) indicate tip error. The model picture now appears as follows:

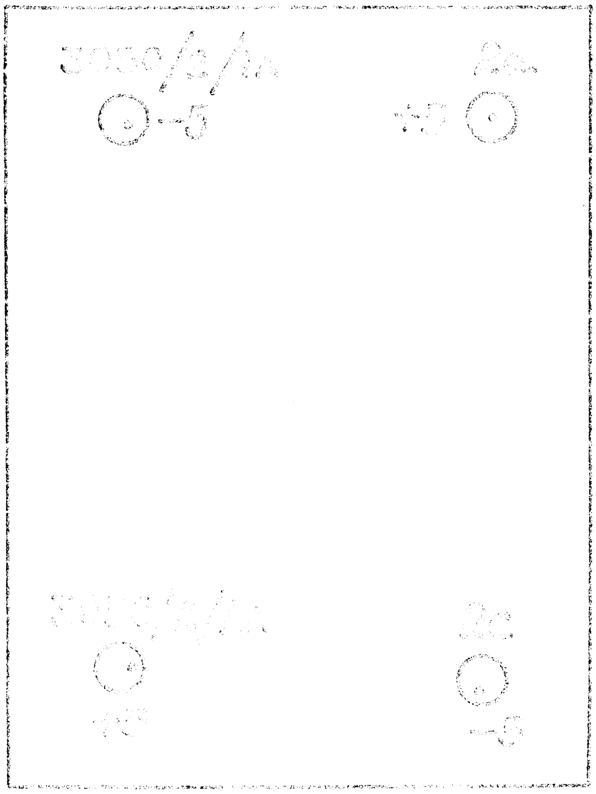
Model area diagram.



The difference between plot heights and image heights at positions (4) & (6) +20' (known as tip, fig 5d) should be sympathetic and thus require correction by common amounts of individual tip movements plus an accompanying adjustment for want of correspondence ('y' parallax) with the bz movement, this is done as follows:-
Diagram, fig 5d, opposite indicates the present position where only -20' tip correction is required. Lower the floating mark by the full amount of the misclose leaving it in the vicinity of the particular control point being referred to. Apply the same amount of tip correction to both projectors by recording the original settings of the tip screws and adding or subtracting common amounts. In this case corrections will have to be subtracted in order that projectors move from left to right.

On completion of the tip movements the model remains as in diagram (fig 5e) opposite, where the overlapping projection from projector 1 is smaller than that of projector 2 by a constant amount and recognised by the obvious want of correspondence in the 'y' direction. It is now necessary to correct this 'y' parallax by lowering the projector with the larger image(bz projector 2)or raising the projector with the smaller image (bz projector 1) If after tip correction, dot does not appear on the ground at point being referred to, check tip misclose and if obvious repeat tip level procedure.

Control Accuracy Diagram



Hand drawn representation of the ○ = 1mm circle as seen on the ground glass screen of the pantagraph microscope.

⊙ = Position of plotted point in relation to 1mm. circle as seen on the ground glass screen of the pantagraph microscope.

+5 = Model height is 5' more than plot height.

-5 = " " " 5' less " " "

NOTE :

Diagram should be drawn at the side of the plot to a size no larger than 1" × ½" except in rare cases where the contents of the diagram make this impracticable.

[illegible] the [illegible] 1 mm circle on the [illegible].

([illegible] of [illegible] on a [illegible] used in [illegible] in order to give sufficient [illegible] point. Operators must attempt to scale as accurately as possible and the control position tolerance is to have the plotted point within the confines of the 1 mm circle).

Repeat levelling procedure as for 5.2.2.2.1 & 2. All control points on the model must be read with Field control carrying more weight for position and height.

A diagram showing the relationship between model and plot positions together with the height misclose must be drawn on the plot in some suitable area. Refer to diagram opposite for example.

POINTS TO CHECK WHEN SCALE/LEVEL APPEAR UNSATISFACTORY

1. Check Interior and Relative Orientation
2. Check Scale.
3. Check Level.
4. Check for correct transcription of control information from L & S N 56 forms in Job file to Master Grid to Instrument plot.
5. Check for correct plotting of points from co-ordinates on L & S N.56 form in Job file.
6. Check interpretation of the control points from the stereoscopic pair of photographs. For interpretation of Field control check control diagrams on the rear of the particular photograph.

7. Refer to Divisional Officer.
8. S C R E A M ! ! ! ! ! * * * & @ * * !

PJHS:MJL

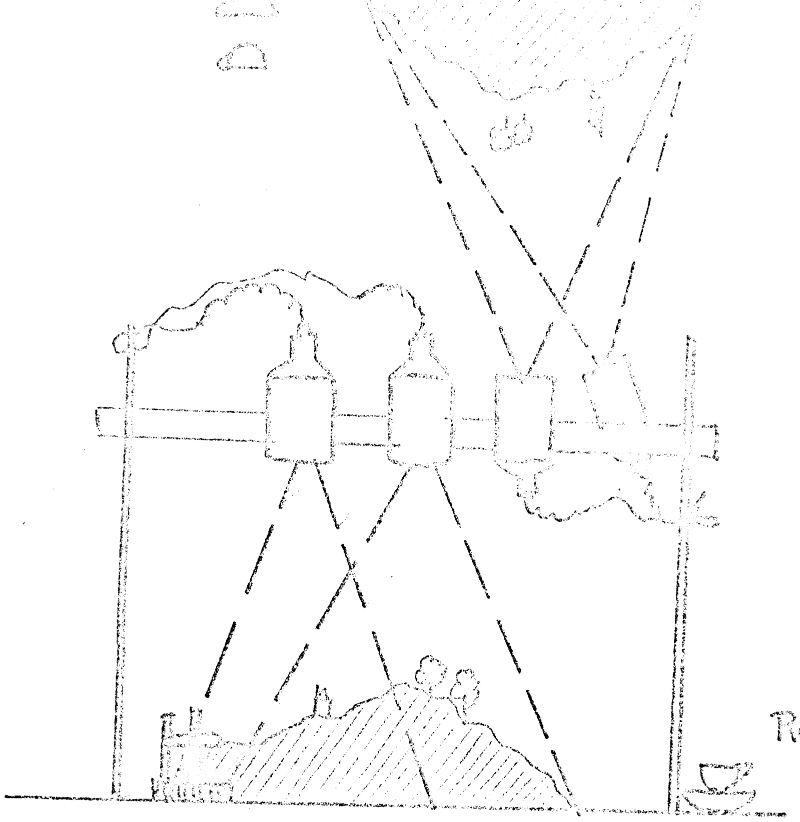


Fig 4c

Relative gravitation

Fig 4d

Breaking Model

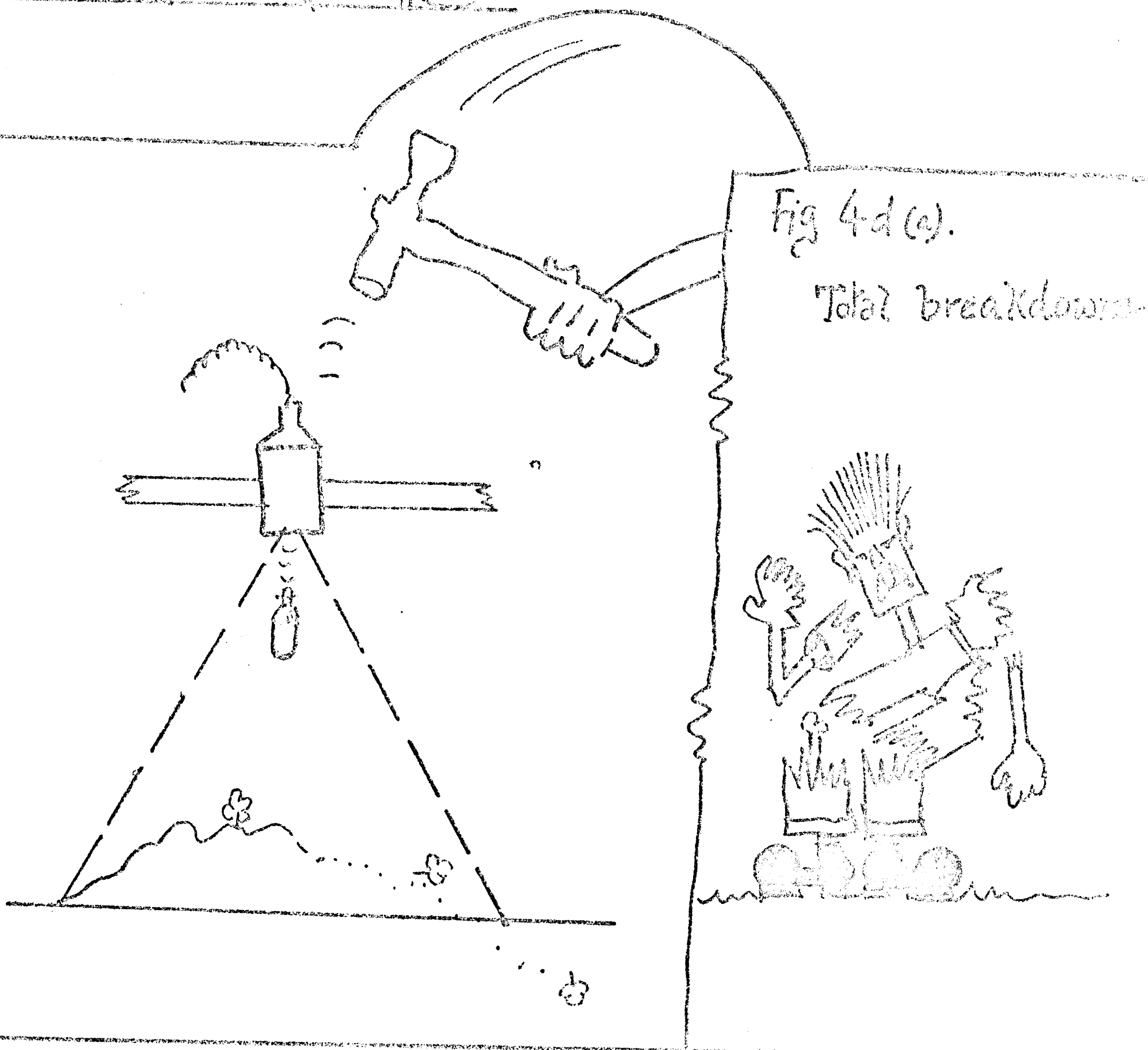
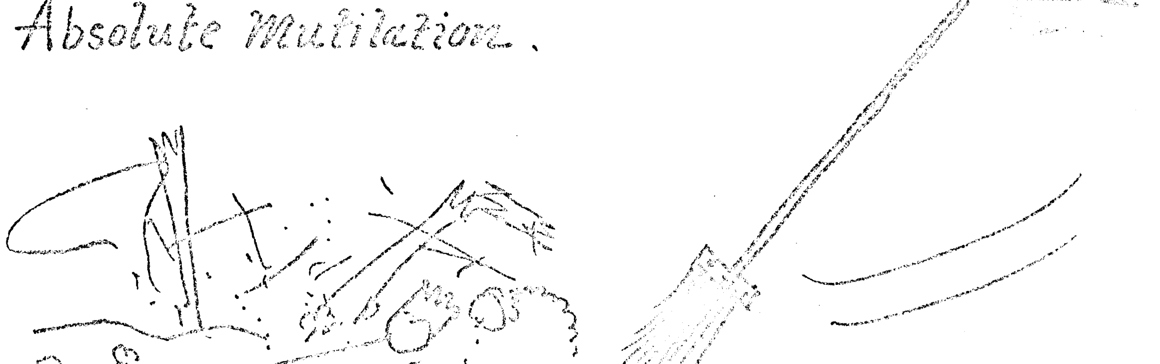


Fig 4d(a). Total breakdown

Fig 4e. Absolute Mutilation.



6.2. CONTOURS

6.2.1. Excepting index contours all contours are to be drawn in black. Index contours will be shown in a different colour as specified in Technical Manual No 3. An index contour for N.Z.M.S. 1 specifications is every fifth contour, e.g. 500' 1000'; 100 metres, 200 metres etc. Intermediate contours = 100' or 20 metres.

6.2.2. Find the lowest point on the model and commence with the nearest contour up, lock the tracing table platen in place and attempt to move boldly with the floating mark in constant contact with the surface of the model.

When in doubt of the floating mark being in contact with the model move the mark into space then test the original plan position by replacing it onto the model surface then checking your new plan position. Do this as frequently as desired until satisfied. An alternative would be to take several spot heights on or about the drawn contour.

6.2.3. On completion of the lowest contour proceed to the next one by unlocking the platen and raising by 100' or 20 metres (N.Z.M.S.1 specifications), relock platen,

6.2.4. On completion of the second contour check the space between the two contours for possible isolations, (i.e. contours detached from the main pattern) Continue with additional contours checking for isolations, as above.

6.2.5. Whenever possible a minimum interior measurement of 1/25" or 1 mm is to be established for isolated contours. Under these circimstances no cross section of the contour will show a space of less than 1/25" or 1 mm. All measurements refer to the minimum clear space between the closest opposing points on the contour. In the case of isolations greater than 1/30" (.8 mm) and less than 1/25" (1 mm) the isolation will be increased to 1/25" (1 mm).

In the case of isolations less than 1/30" (.8 mm) a relevant spot height will be substituted. Where a series of two or more closely adjacent isolations occur of less than 1/25" (1 mm) these may be joined together to show a ridge where the intervening terrian is within 25' (8 metres) of the isolation contours.

6.3. [illegible]

6.3.1. Spot heights are to be shown on all main peaks or other critical elevations provided the ruling on isolation contours does not cover the situation. All spot elevations on N.Z.M.S. 1 instrument plots are to be given to the nearest foot or metre and followed by the symbol $\pm$.

6.3.2. Guaranteed trig heights will be shown in black ink on the instrument plot where as trig heights not guaranteed will be shown in blue pencil.

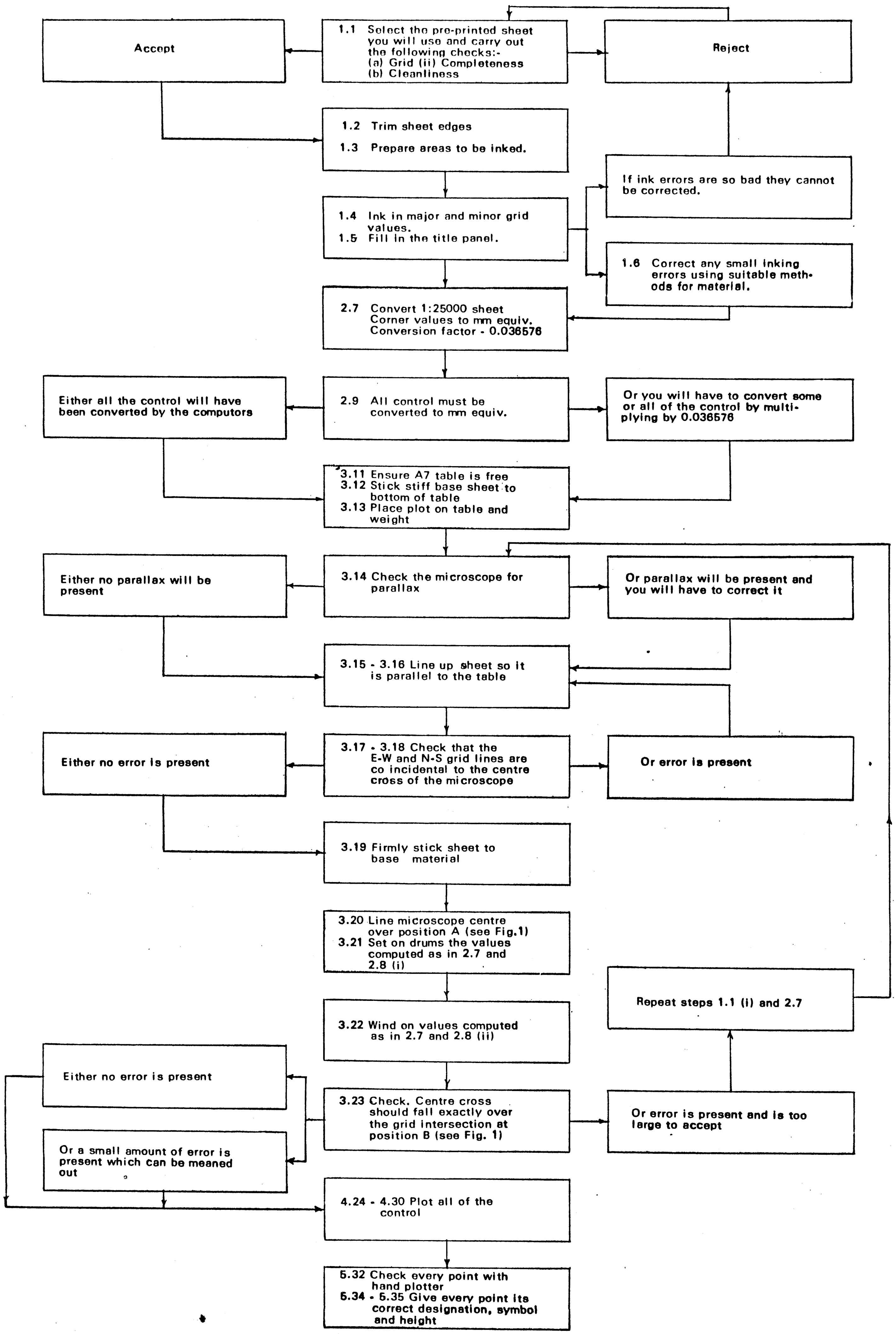
6.3.3. Trigs whose heights have been guaranteed by the Chief Computer will be annotated by a asterisk, 'L' or 'V' on the 1:25,000 Trig Card or List.

6.3.4. Heights of all Trigs must be read to the nearest foot or metre and listed in some convenient blank space on the instrument plot, by the operator.

6.3.5. All lakes or large bodies of water should have heights supplied by the Aerial Triangulation Division. Should this not be so, the operator is to supply an instrument height to the nearest foot on metre followed by the symbol $\pm$. See Technical Manual No 3 items 152 - 153.

PHJS:MJL

HOW TO PREPARE A 1:2500 INST PLOT WITH A 1000 YARD GRID.



HOW TO PREPARE A 1:25000 INSTRUMENT PLOT WITH A 1000 YARD GRID

SECTION 1:

1.1. Select a pre-printed sheet from stock and carry out the following checks:-

i. Grid : the grid must be checked for accuracy. Do this by laying it over a master, lining up the grid lines and comparing. If all lines are not coincidental, the sheet should be rejected, and the Division Officer informed.

ii. Completeness : pre-printed grid and title panel should be checked to ensure that nothing has been lost during printing.

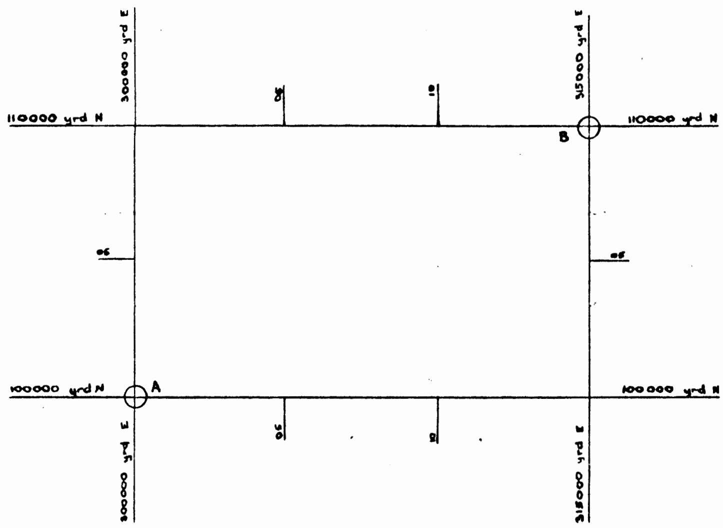
iii. Cleanliness : all grease, dirt and ink marks should be cleaned off using erasing methods suited to the drawing material.

1.2. Trim the excess material off from the sheet edges.

1.3. Prepare the areas to be inked by rubbing down with an "Art Gum" rubber.

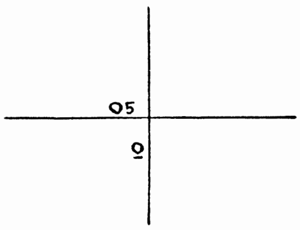
1.4. Ink in the major grid values in full and the last two figures of the minor values.

Fig. 1.



Each grid value should be placed slightly above the grid line.

Fig. 2.



All grid values should be placed one grid square out from the 1:25000 sheet boundary to leave room for mapping and abuttals.

1.5. Fill in the title panel.

1.6. Should any inking errors be made, carefully correct using suitable materials, without destroying the surface of the sheet.

SECTION 2:

2.7. See Fig. 1. Convert grid values of A & B to mm equivalent, by:-

$$\text{mm equivalent} = \frac{\text{Co-ord} \times 914.4}{25000} \qquad 914.4 \text{ mm} = 1 \text{ yard}$$

$$= \text{Co-ord} \times 0.036576$$

2.8. See Fig. 1. Write the conversions in groups of two e.g.

i.	N	100	000	y	03	65	76	. 00
	E	300	000	x	10	97	28	. 00
ii.	N	110	000	y	04	02	33	. 60
	E	315	000	x	11	52	14	. 40

Each group of two corresponds to a drum on the A7 table.

2.9. All control must be converted to mm. equivalent before it can be plotted.

Either : the control will have been converted by the Computing Branch, in which case no further work is required.

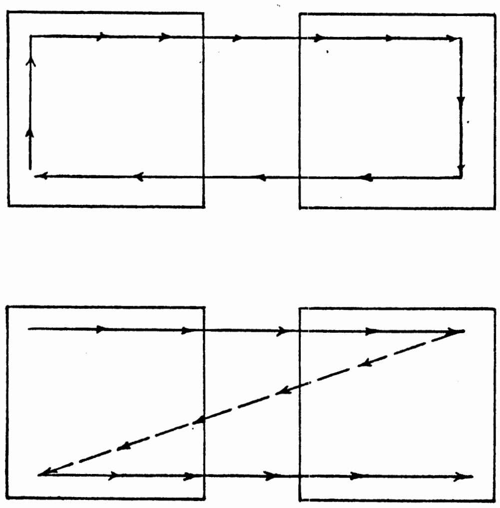
Or : you will have to convert some,or all of the control to mm. Equivalent by using :-

$$\text{mm. equiv.} = \text{co-ord} \times 0.036576$$

2.10. Before writing out your conversions lay the photos out in front of you and decide the way you will wind around the table. Consider a way which will reduce the amount of winding to a minimum.

Two suggestions are:-

Fig. 3.



Again write the conversions in groups of two.

SECTION 3:

3.11. Arrange to use the A.7. table.

3.12. Stick any stiff base sheet to the front left corner of the table.

3.13. Place the plot on the table and weight down.

3.14. Check the microscope for parallax. Do this by looking into it and moving your eye from side to side. If the centre of the cross moves, parallax is present. This can be rectified by raising or lowering the collar on the side until centre of cross no longer moves.

3.15. The sheet must now be lined up parallel to the table. Move to the left side of the sheet and select a grid line running E-W. Line microscope up so that centre of cross falls exactly over the centre of the line.

3.16. Move microscope, using free motion, to the right side of the sheet, and carry out the following:-

a. note the difference between microscope centre and line centre.

b. place thumb on position used in 3.15.

c. swing right side of sheet until microscope centre and grid line centre coincide.

3.17. Return microscope to position used in 3.15. and check. If the microscope centre does not fall exactly over the grid line centre repeat 3.15 - 3.17. until all error is eliminated.

3.18. Move microscope to a line running N-S and align. Check from one side to the other, if microscope centre does not fall exactly over grid line centre, at all positions, repeat 3.15. - 3.18.

3.19. Firmly cellotape 1:25000 sheet to base sheet.

3.20. See Fig. 1. Line up microscope centre so it falls exactly over the grid intersection centre at position A.

3.21. Set on the drums the values computed as in 2.7. and 2.8. i.

3.22. Using the handles wind on the values computed as in 2.7. and 2.8. ii. This will move the arm and microscope to position B in Fig. 1.

3.23. Look into microscope and check. Centre of cross should fall exactly over the centre of the grid intersection. Should it miss by a small amount (not more than 1 gird line width) The error can be spread using the microscope adjusting screws. Always wind against the spring.

If the error is larger than this repeat steps 1.1. i., 2.7., 2.8., 3.14., - 3.23. until all is eliminated.

The importance of eliminating all the sources of error in Section 3 cannot be too heavily stressed.

SECTION 4:

4.24. Using the hadles wind onto the drums your first contol point conversion. Proceed around the sheet in the order you have decided on until all points are plotted. Ensure that you always wind onto each point in the same direction. This will mean that you will have to wind past some points and then come back onto them.

4.25. Before pricking each point check twice, that you have wound the correct values onto the drum.

4.26. Before pricking any points check that the steel point is sharp and that the point is concentric.

4.27. Prick each point using either the special pricker provided with the A.7. table or a steel point in a pencil holder.

4.28. Draw a blue circle around each point using an eccentrically sharpened lead.

4.29. Unless you are very confident that you can write neatly on the table, do not annotate any of the control. This can be easily found at a latter stage and written in when you are sitting in a comfortable position at your own desk.

4.30. All control should be plotted including that from adjoining sheets. This can be checked by overlaying surrounding sheets.

SECTION 5:

5.31. Lift plot, tidy table and cover it up.

5.32. Check every point on the plot using a hand plotter.

5.33. Turn sheet over, rub red chinagraph into prick holes, rub off excess.

5.34. Give each point it's correct designation and symbol. See items 126 - 128 N.Z.M.S. 270 specifications.

5.35. Give the correct height for each point. To convert from imperial to metric multiply by 0.3048.

5.36. Clean up any dirt or grease marks on sheet.