

ROYAL MARSDEN HOSPITAL

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RADIUM ROOM

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REPORT TO THE KING EDWARD'S
HOSPITAL FUND FOR LONDON
ON THE EQUIPMENT OF THE
NEW RADIUM ROOM AT
THE ROYAL MARSDEN HOSPITAL

Through the generosity of the King Edward's Hospital Fund for London it has been possible to install in the Royal Marsden Hospital a fully equipped Radium Room incorporating a number of novel features.

The general design of the room has been based on two principles: that the whole radium stock shall be accessible to the work bench and that the room shall have easy access to the sterilizing room and the operating theatre. In order to achieve this a small room next to the sterilizing room in the theatre block was acquired and the necessary structural alterations carried out by the hospital. The whole of the equipment and fittings have been supplied by the King's Fund.

The radium is stored in eleven safes situated at the back of the work bench, each one let into the wall, the whole group being equipped with a ventilating system operated by an extract fan. The room is divided into the following sections:-

Centre Main Wall

Lead protected work bench with radium safes at the back and cupboards and drawers below containing all the packets, applicators and other accessories required for handling and making up the radium ready for clinical use.

To the right of this is a holding safe in which the radium as made up for individual patients can be placed, when marked and named, ready for transport to the theatre, wards or treatment room.

To the left of the main work bench is the bench designed for cleaning and sterilizing. A bin for the receipt of used sources is adjacent to this bench, and underneath there is a bin for the disposal of dirty dressings.

Opposite this on the other wall is the desk where the records, order books, and stock book are kept. Above this is the continuous reading dose-rate monitor, using a high pressure argon chamber, which records the dose-rate in the room continuously on a pen recorder.

Opposite the work bench is the display board, which has a space for writing the day's orders, a complete statement of the radium stock held, and its normal position in the eleven radium safes. The centre board shows the location of all radium sources at all times, the colour code in use for marking the radium content of tubes and needles, an indication of the whereabouts of all solid radioactive isotopes issued from the room, and a chart showing the number of radioactive sources issued from the room month by month.

At the far end of the room there is a hatch giving direct access to the sterilizing room, with a work bench underneath.

At the near end of the room is the door and wall space for hanging the handling tools.

Each of the wall radium safes is a steel encased lead box containing two adjacent columns of shelves

of various sizes in which slide lead-steel alloy drawers. Radium tubes and needles fit into holes drilled in these drawers, at the end further from the safe door. The front of each safe is covered by a lead slide, so that when the drawers are in position and the safe door closed all shelves are covered by the lead. When radium from a particular shelf is required, the slide is moved to one side but still covers the other set of shelves. Each of the eleven safes contains approximately 250 mgm. of radium, the total stock being approximately 2,600 mgm. at present. There are six spare shelves available. The dose-rate in the centre of the working bench with all radium in and all doors closed is 8 mr/hr.

The holding safe is lead lined and fitted with a set of nine sliding drawers, the front parts of which are lead filled. Small radium packets, tubes and applicators made up for individual patients are stored in these drawers ready for transport to the theatre or wards. The bench above this safe is fitted with a trap door, beneath which is a lead slide; sources are transferred to and from the four upper drawers through this trap door by means of a remote handling tool. The part of the safe beneath the shelves is protected by a lead sliding door and is used for temporary storage of large applicators. When the safe contains 1 gm. of radium, distributed equally between top and bottom drawers and the storage space, the dose-rate immediately over the hatch and in front of the doors is 20 mr/hr.; at the edge of the bench it is 5 mr/hr.

In addition to the continuous recording dose-rate monitor, the room contains other measuring

instruments. There is a portable ionisation chamber dose-rate meter, for monitoring working spaces, which is stored in a slot under the bench. Over the cleaning bench is a mains operated, movable, continuous current counter which gives visible warning on a neon lamp when the dose-rate rises above tolerance; it is also used by the operator to ensure that no radium has been left behind in either of the bins referred to above, or in any container on the bench. A similar counter is fitted on a shelf over the holding safe, and is used for checking the main bench space. The dose-rate in this region of the room is indicated continuously on a counter type dose-rate meter which is kept on the same shelf. Four quartz fibre pocket electroscopes are available for the use of radium room workers, to supplement the routine film badge service. A portable battery operated counter is also stored in the room and used by the staff in checking containers in the theatre and wards.

All benches are covered in Formica and all edges in light oak. All corners of the floor and benches are rounded so that any radium source falling will roll towards the middle of the bench or floor. The floor itself is covered with a plain grey linoleum with no pattern so that any source dropped can be seen easily by eye.

The bench lead protection is built up with lead blocks covered with light oak casing which is easily dismantled and can be put up in different positions if working conditions require this. The sink is fitted with a special safety trap device as a precaution against loss of a source, but the sink itself has a first line defence protective cover over

both the plug-hole and overflow. All working areas are well illuminated by strip lighting. In addition to the evacuation system applied directly to each individual radium safe, there is another exhaust system which sucks air from floor level, and an input fan fixed to the window fitted with a filter to keep the room free from outside dirt.

Since this is an experimental room in which an attempt has been made to try out new principles, especially that of having the whole radium stock within reach of the work bench, it has proved expensive. The hospital carried out the necessary demolition and structural work, plumbing and electrical supply. The whole of the remainder was paid by the King's Fund as follows:-

Radium Room Fittings

| | £ | s. | d. |
|---|-------------|----|----|
| 11 lead safes | 385 | - | - |
| Main lead shielding | 476 | - | - |
| Main holding safe | 329 | 15 | 6 |
| Ventilation for safes | 148 | - | - |
| Bench tops | 78 | 15 | - |
| Bench framing, cupboards, doors, desks, and other furnishings | 194 | 5 | - |
| Bench frames | 48 | 10 | - |
| Special interceptor sink trap | 12 | 7 | 6 |
| Other furnishings | 10 | 10 | - |
| <u>Equipment for Radium Room</u> (see attached list) | 780 | 10 | 11 |
| | <hr/> | | |
| | £2463 | 13 | 11 |
| | <hr/> <hr/> | | |

Equipment for Radium Room

| | £ | s. | d. |
|---|----|----|----|
| Argon filled high pressure ionisation chamber | 78 | 9 | 6 |
| Pen recorder, with fittings | 63 | - | 6 |
| 4 Mains operated dosimeters | 60 | - | - |
| Portable radiation monitor | 50 | - | - |
| 4 Pocket dosimeters and charging box | 40 | - | - |
| Valves and resistors | 4 | 3 | 2 |
| Fitting of three outlet pipes to holding safe | 34 | 2 | 6 |
| Extra lead bricks for holding safe | 23 | 12 | - |
| Formica discs for safe | 1 | 12 | 6 |
| 16 g. container with rolled top edges to fit corner | 13 | 7 | - |
| Steriliser | 26 | 5 | - |
| Forceps | 13 | 13 | 9 |
| Display system | 26 | 5 | - |

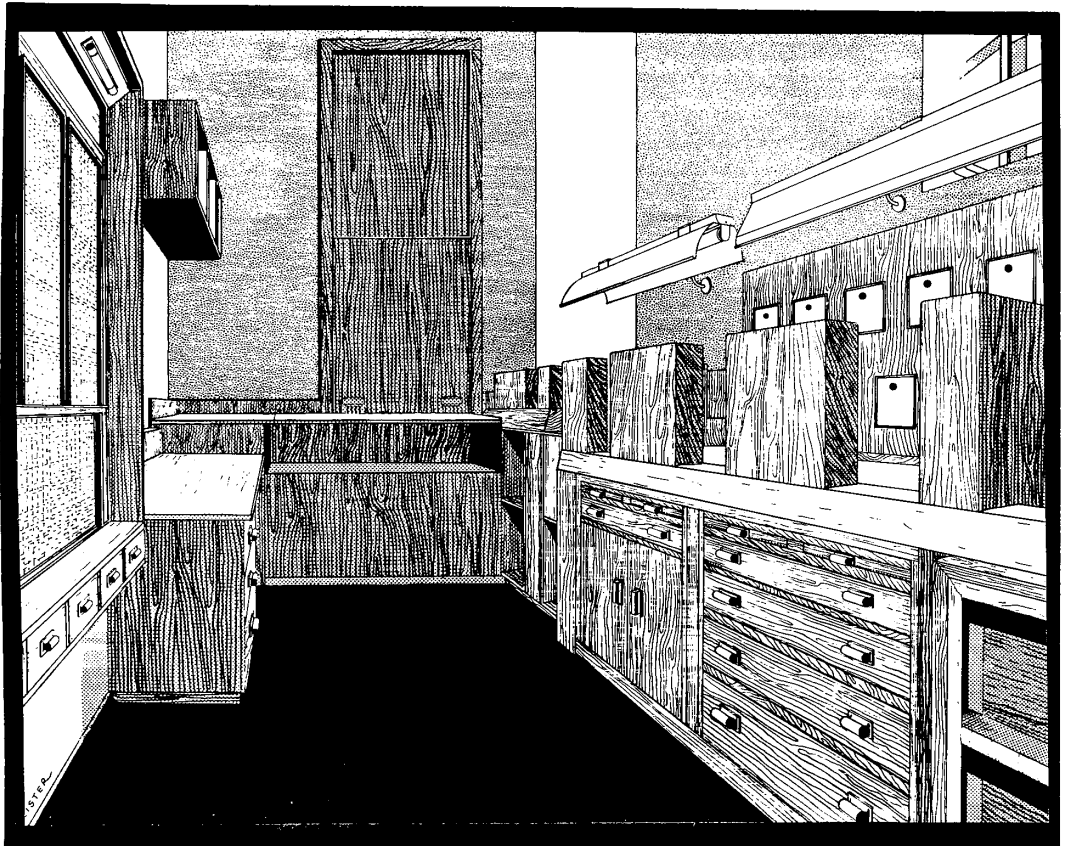
Outstanding orders

| | | | |
|--------------------------------|-------------|-----------|-----------|
| Sample measuring chamber | 150 | - | - |
| Door post monitor | 30 | - | - |
| Spare lead | 25 | - | - |
| Valves | 21 | - | - |
| Modification to cleaning bench | 20 | - | - |
| Sundries | 100 | - | - |
| | <u>£780</u> | <u>10</u> | <u>11</u> |

The Board of Governors of the Royal Marsden
Hospital wish to express to the King's Fund
their gratitude for making this venture possible.

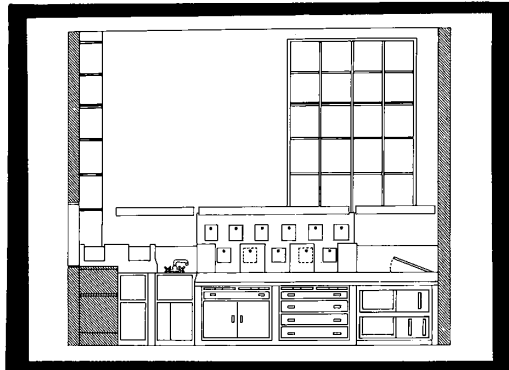
A handwritten signature in cursive script, appearing to read "J. W. Hallard". The signature is written in dark ink on a light background.

Chairman.



DRAWING OF RADIUM ROOM SEEN FROM THE DOOR.

FRONT WALL ELEVATION.

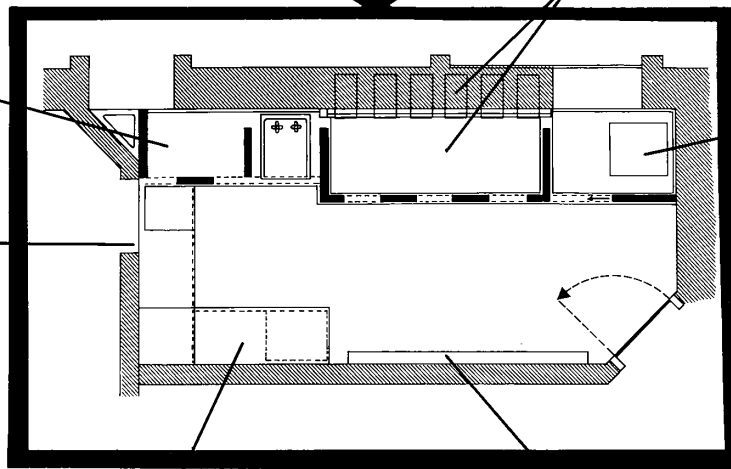


RADIUM SAFES & WORK BENCH

CLEANING
BENCH

HOLDING
SAFE

THEATRE
HATCH



DESK

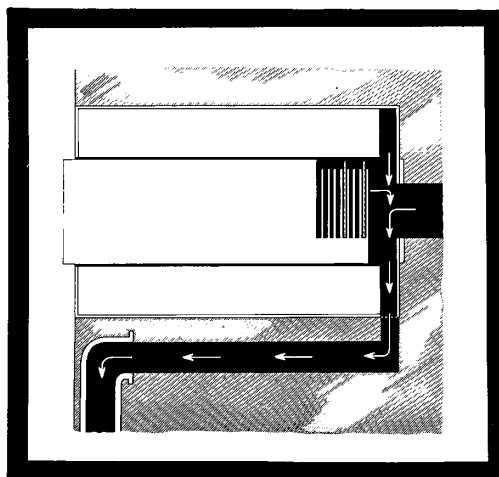
DISPLAY BOARD



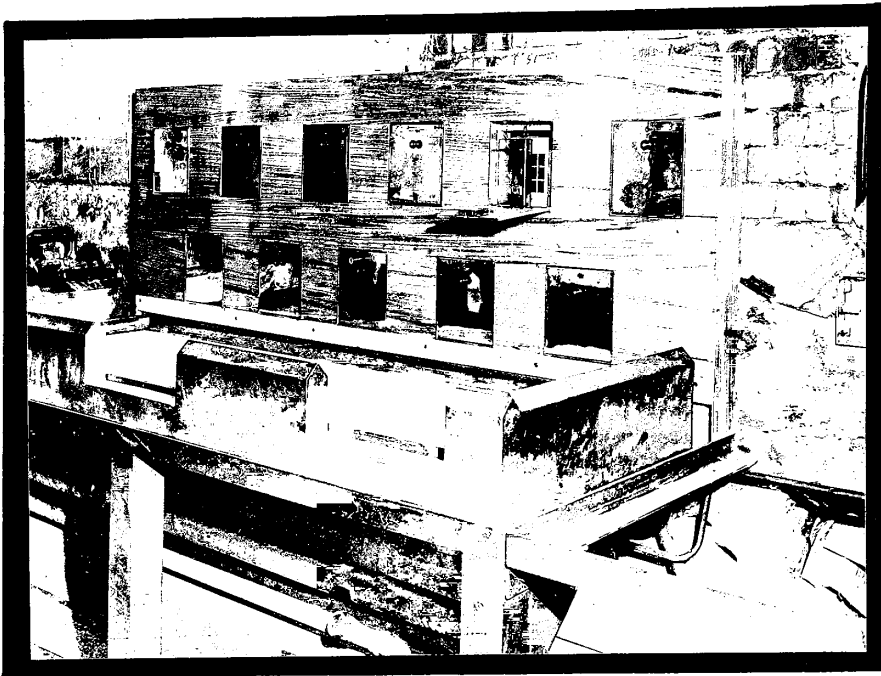
BACK WALL ELEVATION.



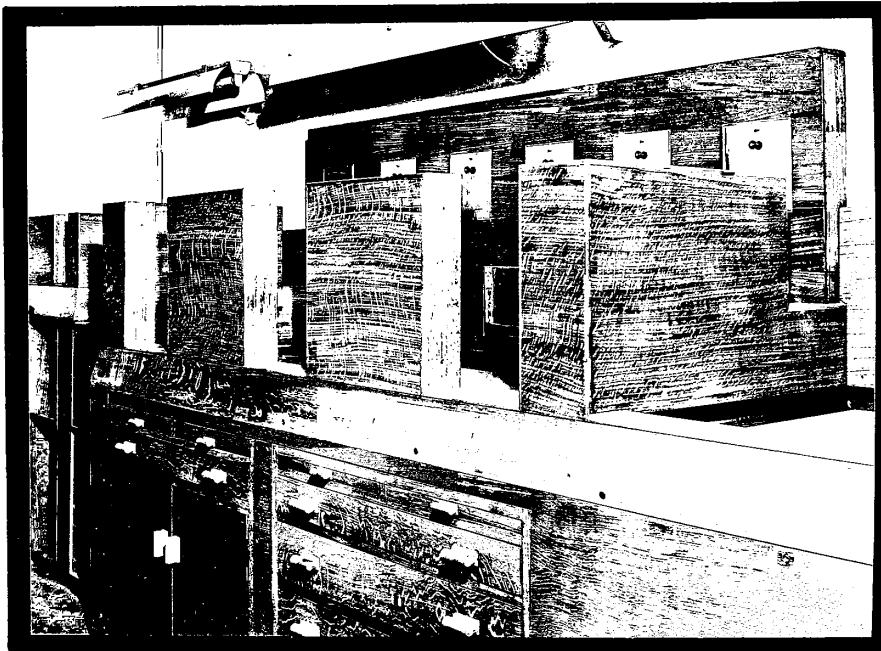
LEAD LINED STEEL BOXES WITH DRAWER HOLES & EVACUATION SYSTEM



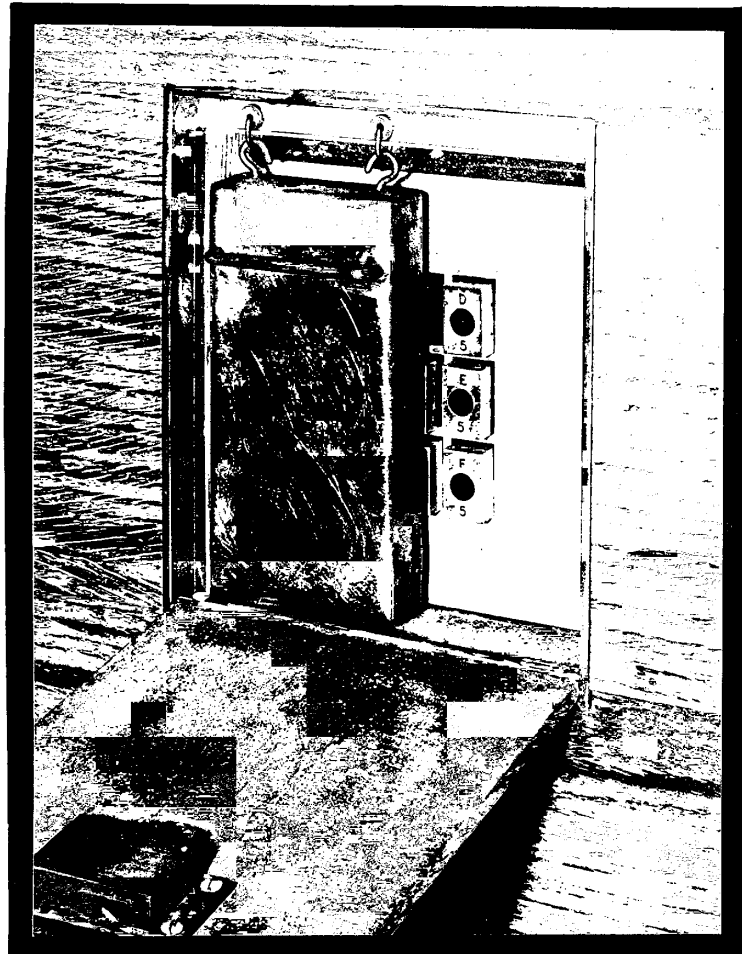
DETAIL OF EVACUATION SYSTEM



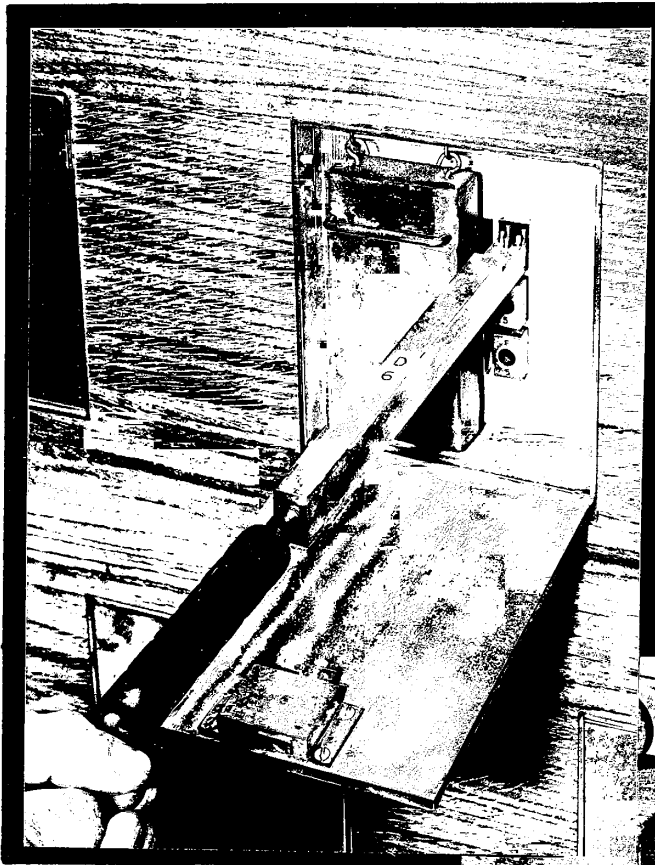
BENCH CONSTRUCTION AND LEAD PROTECTION BASES.



OAK COVERED LEAD PROTECTION AND BENCH COMPLETED.

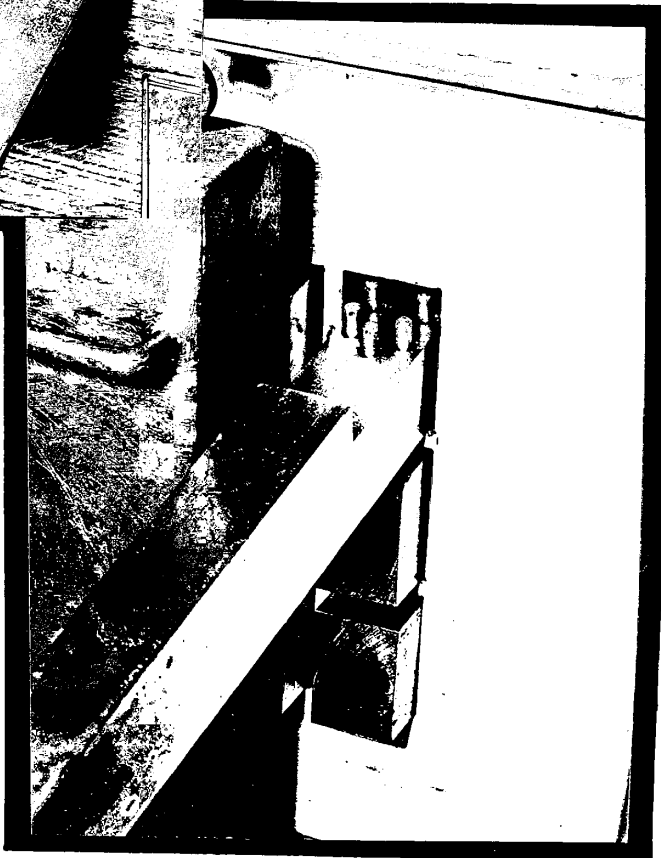


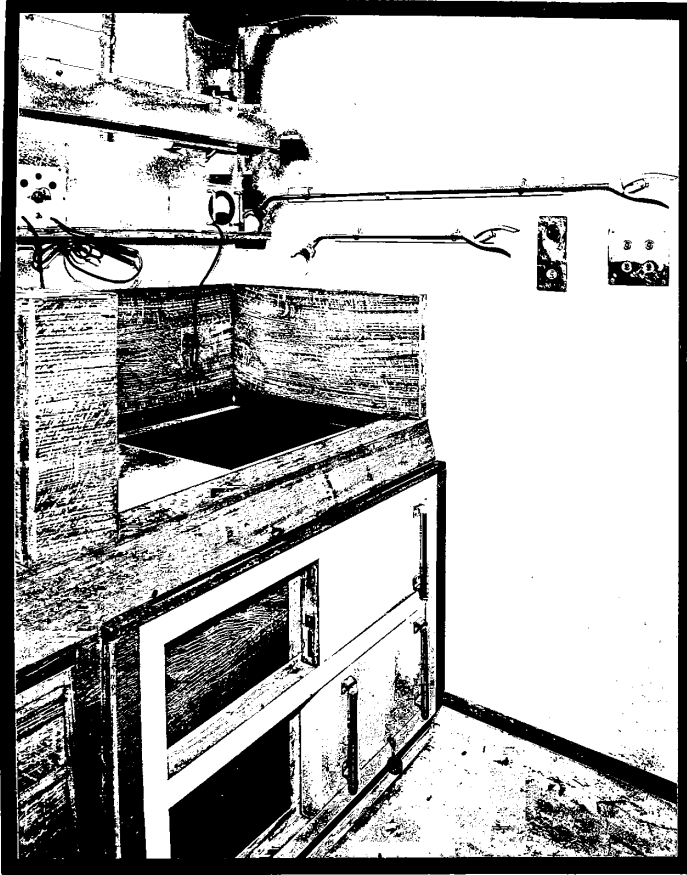
FRONT DETAIL OF ONE RADIUM SAFE WITH DOOR OPEN &
LEAD SLIDE PUSHED TO ONE SIDE



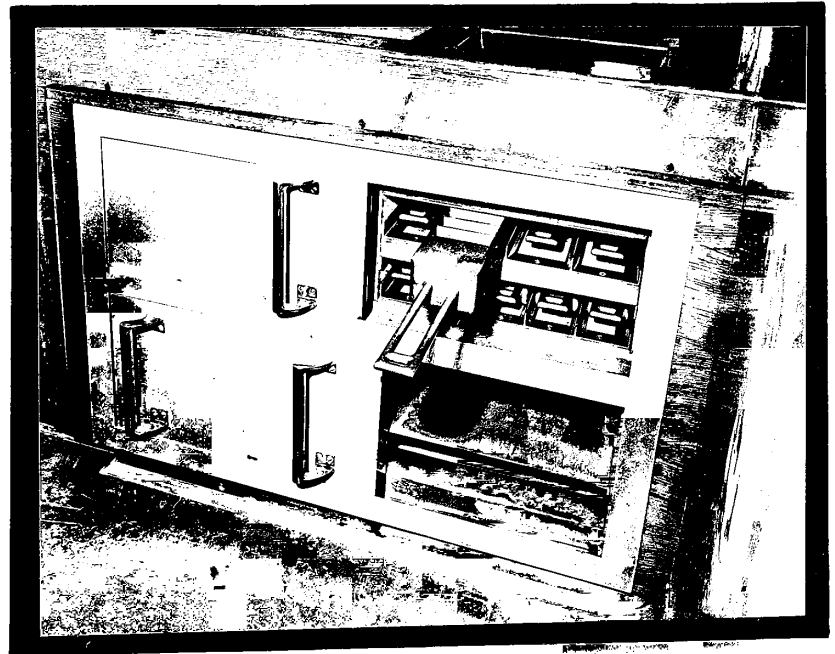
ONE DRAWER PARTLY
WITHDRAWN BY HANDLING
TOOL SHOWING RADIUM
NEEDLES.

CLOSE UP OF RADIUM
BEING WITHDRAWN FOR
USE.

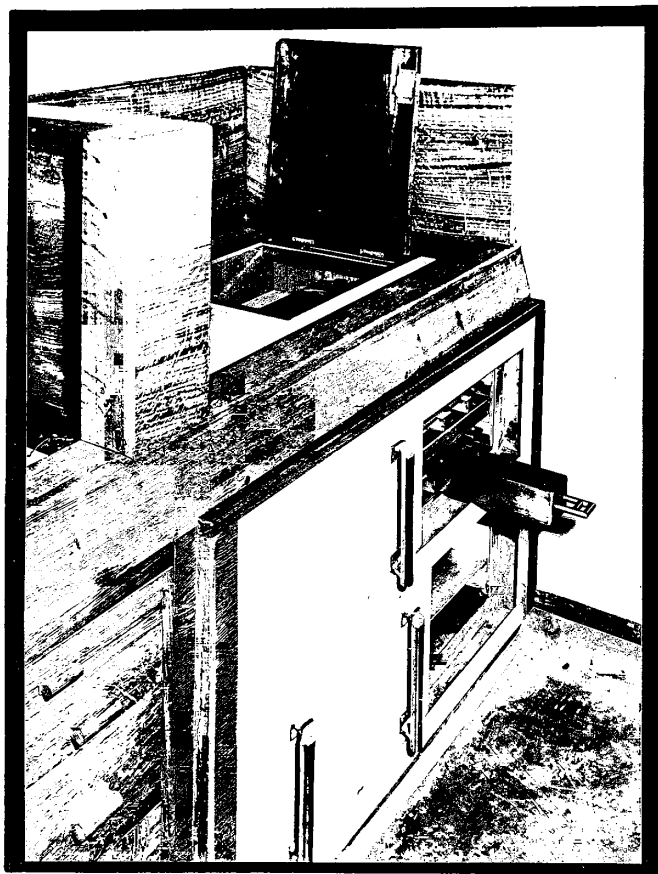




GENERAL VIEW OVER
RADIUM HOLDING SAFE

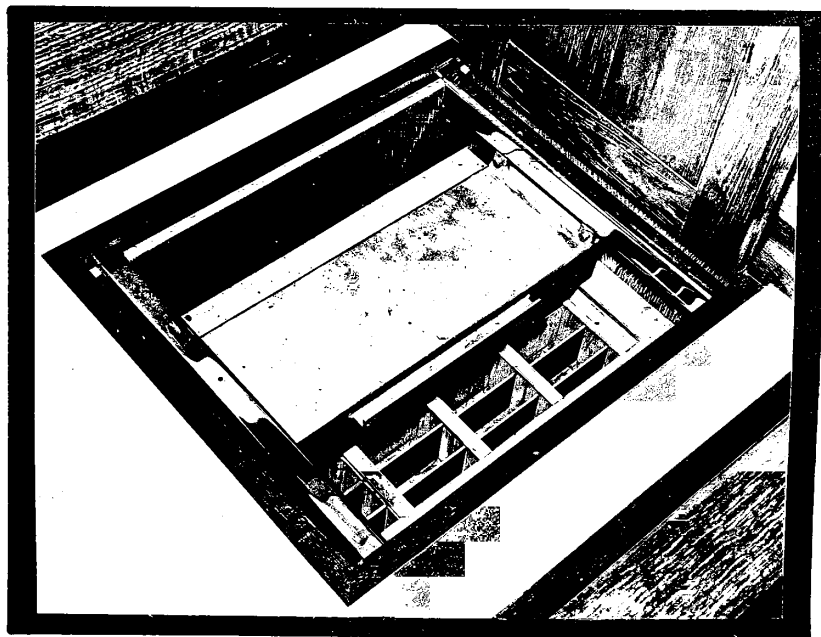


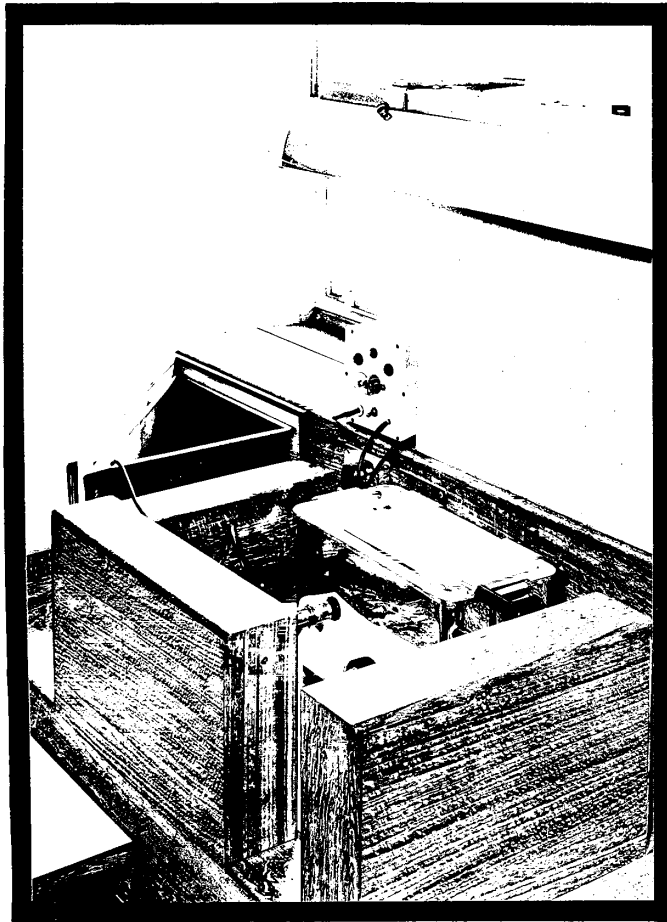
DETAIL OF FRONT
OF
HOLDING SAFE



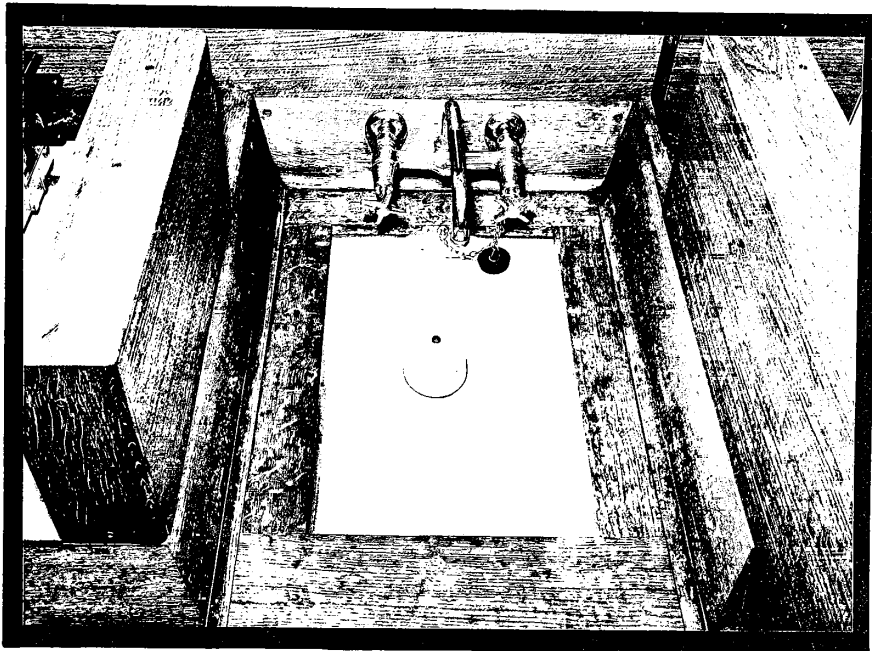
HOLDING SAFE

DETAIL OF TOP
DRAWERS IN
HOLDING SAFE

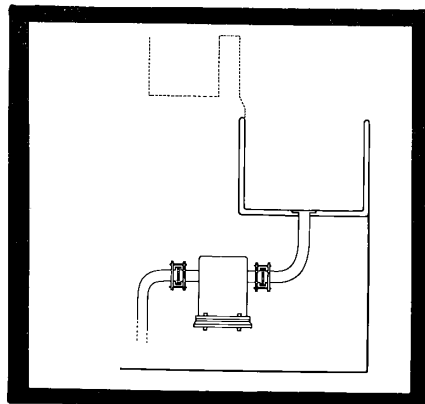




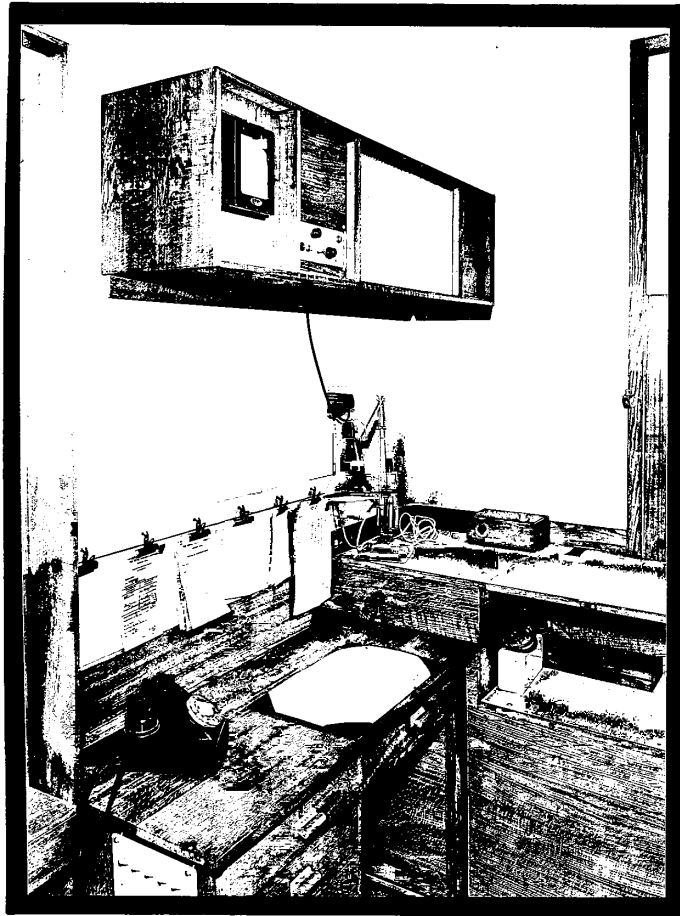
CLEANING BENCH AREA



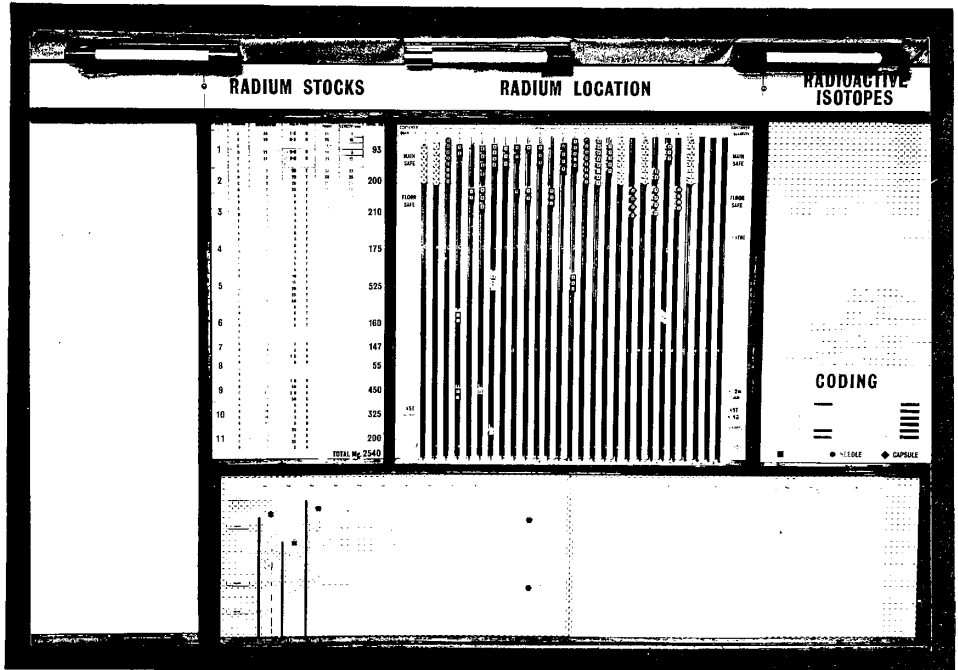
SINK



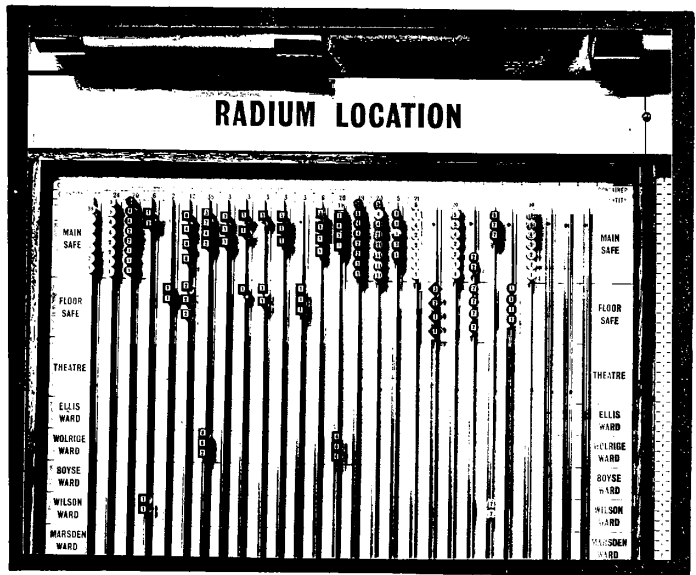
DETAIL OF SAFETY FILTER ON SINK

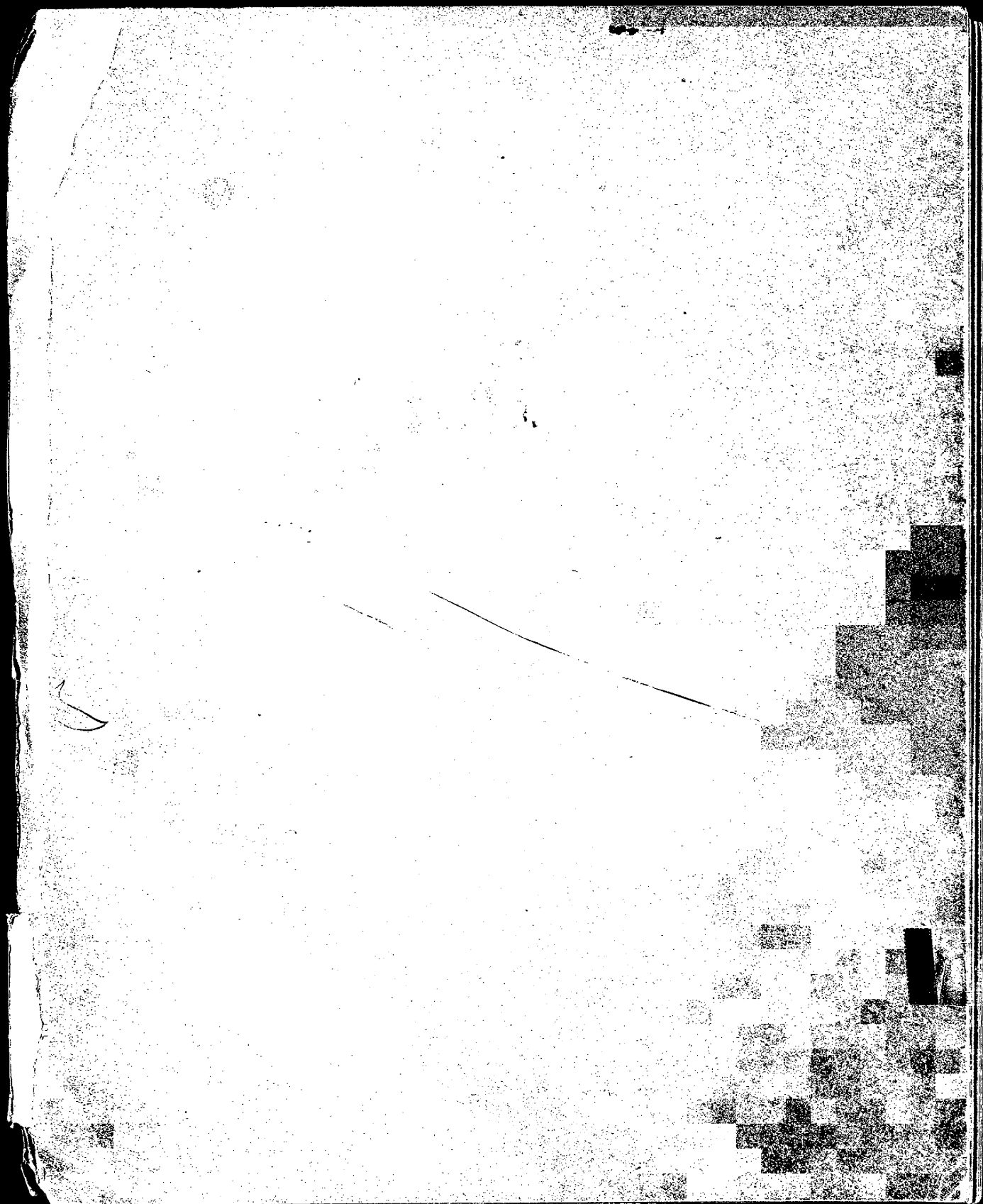


DESK AND CONTINUOUS RECORDING RADIATION MONITOR



DISPLAY BOARD







The equipment for the Radiotherapy Department Workshop and Mould Room was also supplied through the courtesy of the King Edward's Hospital fund for London. A good room was made available in the basement by the hospital and necessary structural work carried out. The room was divided into a small office, a mould room and a workshop proper.

The list of items purchased with King's Fund money is as follows:-

Mould Room

| | £ | s. | d. |
|---|----|----|----|
| Thermostatically controlled oven, spatulas, tongs, time-clock, &c. | 52 | 15 | 9 |
| Cellulose acetate sheet | 23 | 4 | - |
| Perspex rod and sheet | 40 | 3 | 5 |
| Plastic mixing bowls, dental impression trays, and various components | 17 | 6 | 7 |

Workshop

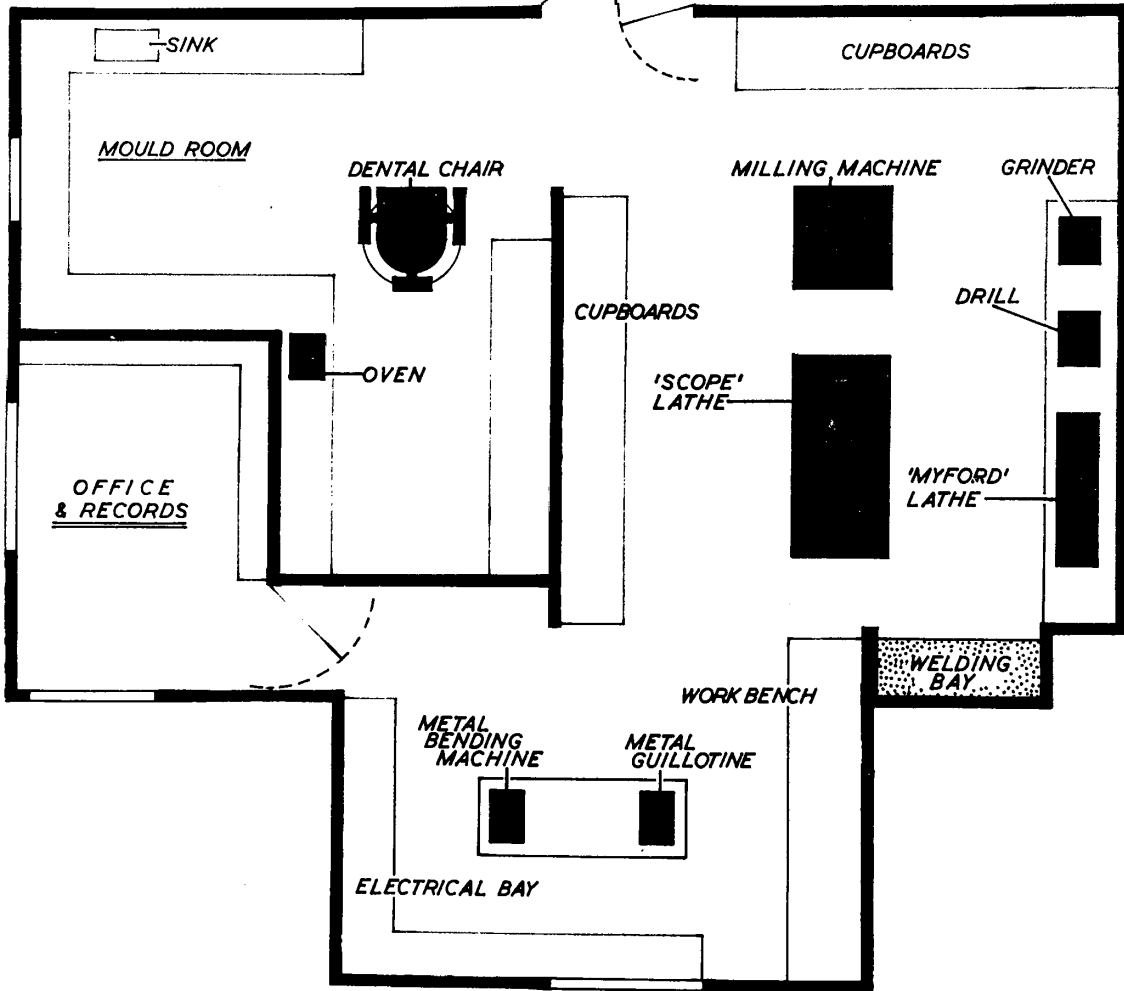
| | | | |
|-------------------------------------|-----|----|---|
| Scope Lathe | 256 | 11 | 6 |
| Metal bending machine | 44 | 11 | - |
| Miller and accessories | 365 | - | - |
| Machine accessories and bench tools | 247 | - | 1 |

Outstanding orders

| | | | |
|-------------------------------|-------------|----|---|
| Small tools and miscellaneous | 159 | 13 | 9 |
| | <hr/> | | |
| | £1206 | 6 | 1 |
| | <hr/> <hr/> | | |

RADIOTHERAPY DEPARTMENT WORKSHOP AND MOULD ROOM

SCALE OF FEET 0 1 2 3 4 5 6



King's Fund



54001000513302