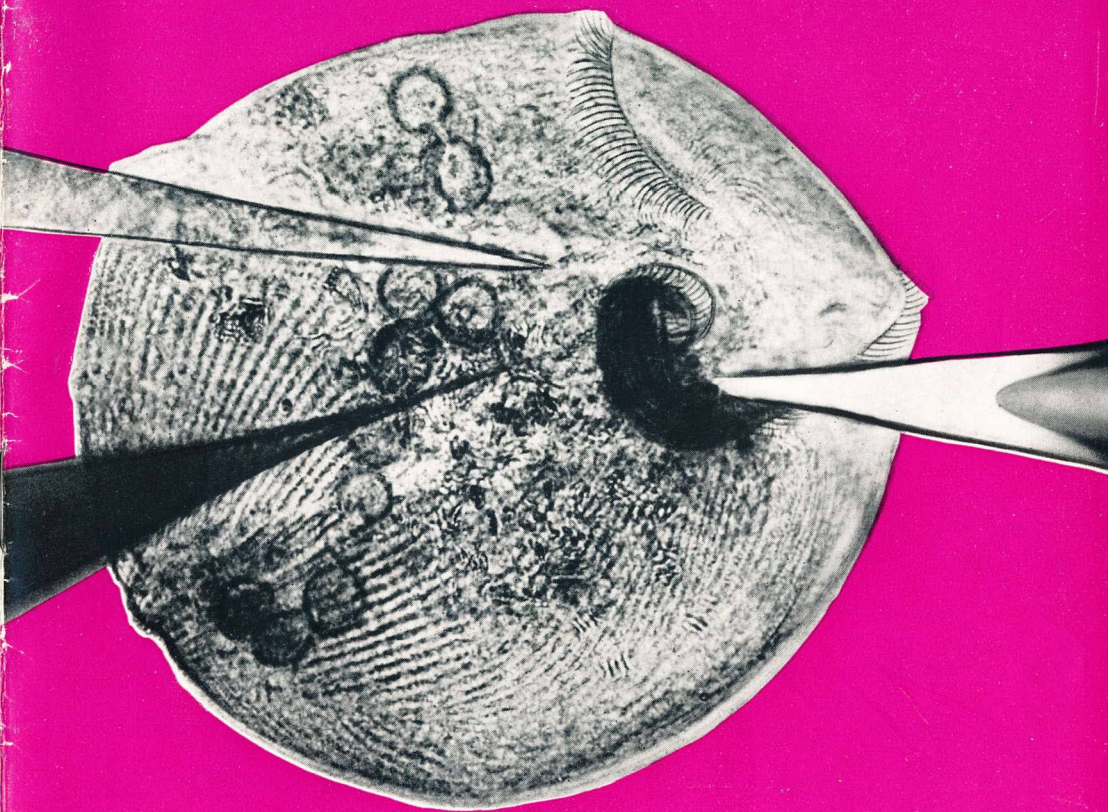
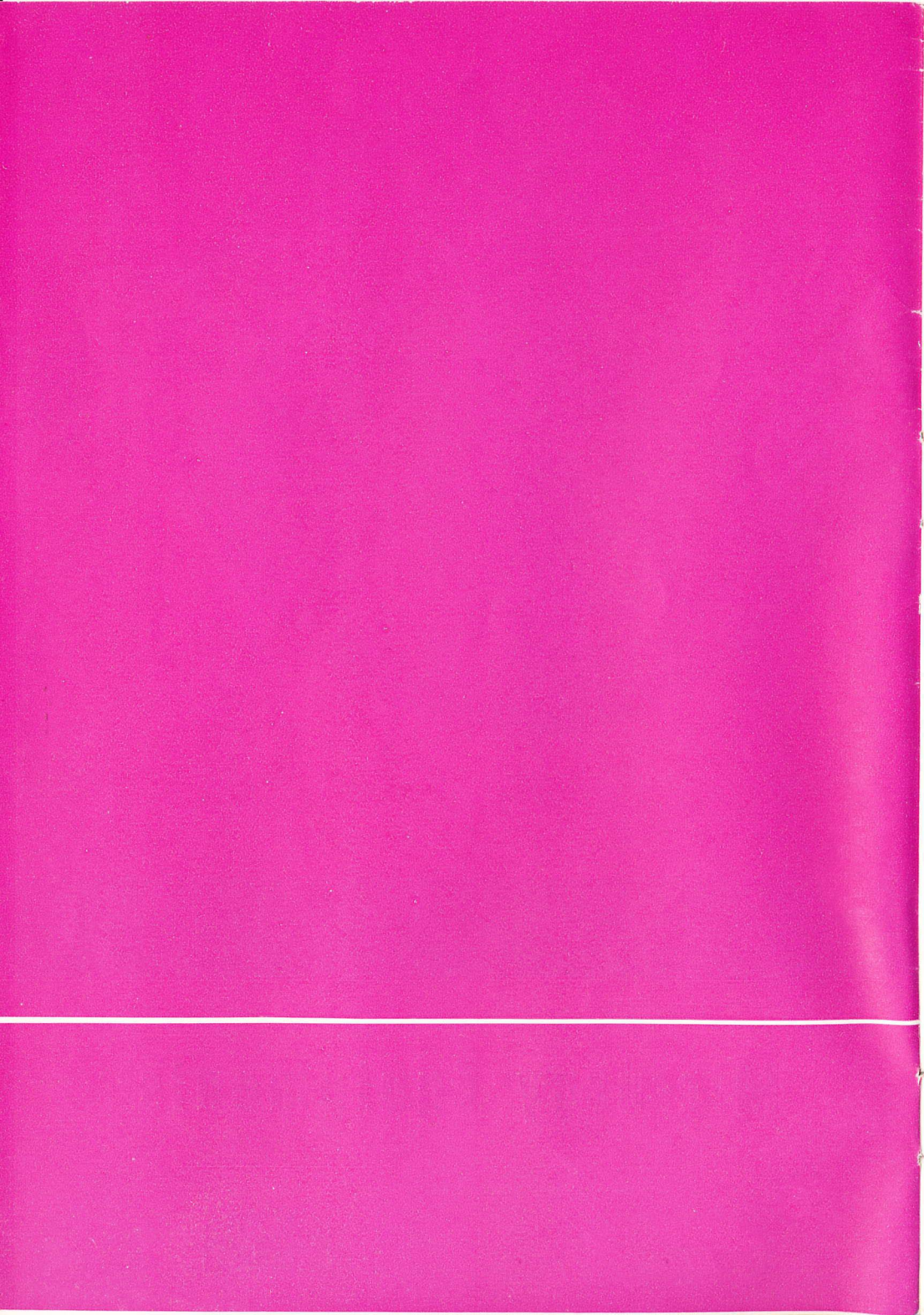




# Micrurgy Equipments

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JENA



## Micrurgy Equipments

Micrurgy, as defined by T. Péterfi, is a field of activity, in which, in addition to the microscopy the micromanipulator is employed as the characteristic instrument. The micromanipulator is an instrument, which serves the purpose of carrying out predetermined and reproducible manipulations on an object by means of tools of correspondingly small dimensions, under constant observation through a microscope. Its principal problem is, to convey the movements of the operator's hands as free from vibrations as possible to the micrurgical tool and at such a reduction ratio that the work in question may be completed with a maximum of safety and a minimum of damage caused to the object. Micrurgical operations include e.g.: isolation of individual object parts, of a particle from a suspension, of a cell from a bacterial culture or suspension, furthermore microsurgical experiments such as injections and similar, physiological irritation tests, mechanical treatment such as extension, pressure etc.

In order to restrict the movement of the operator's hand to a degree, required for micrurgical work, our Micromanipulator (Fig. 1) exploits the special characteristics of certain grease mixtures, a very thin layer of which lies between two metal faces, machined to optical accuracy. This connection via a film of grease is particularly suitable for conveying movements in micrurgical work. After a few minutes of practice, operators will be in a position, to carry out movements in the visual field of the microscope in the order of 0.5 micron.

Further advantages of the "sliding principle" are its almost complete freedom from trouble, the absence of play in the transmission elements, joints, axles etc., as well as the practically unlimited adaptability of the sliding movements to the individual requirements of the operator. A variation of the sliding properties is obtained by altering the composition of the grease mixture.

Limitation of the visual field and microscopic magnification essentially contribute towards the operator perceiving amount and speed of his minute manipulations in more familiar proportions.

The reversed image of the microscope, which is most disturbing for micrurgical work, is eliminated by an image-erecting angle tube to be attached to L and N-microscopes and to be equipped with either monocular or binocular tubes.

In order to provide for as relaxed and comfortable a position of the operator

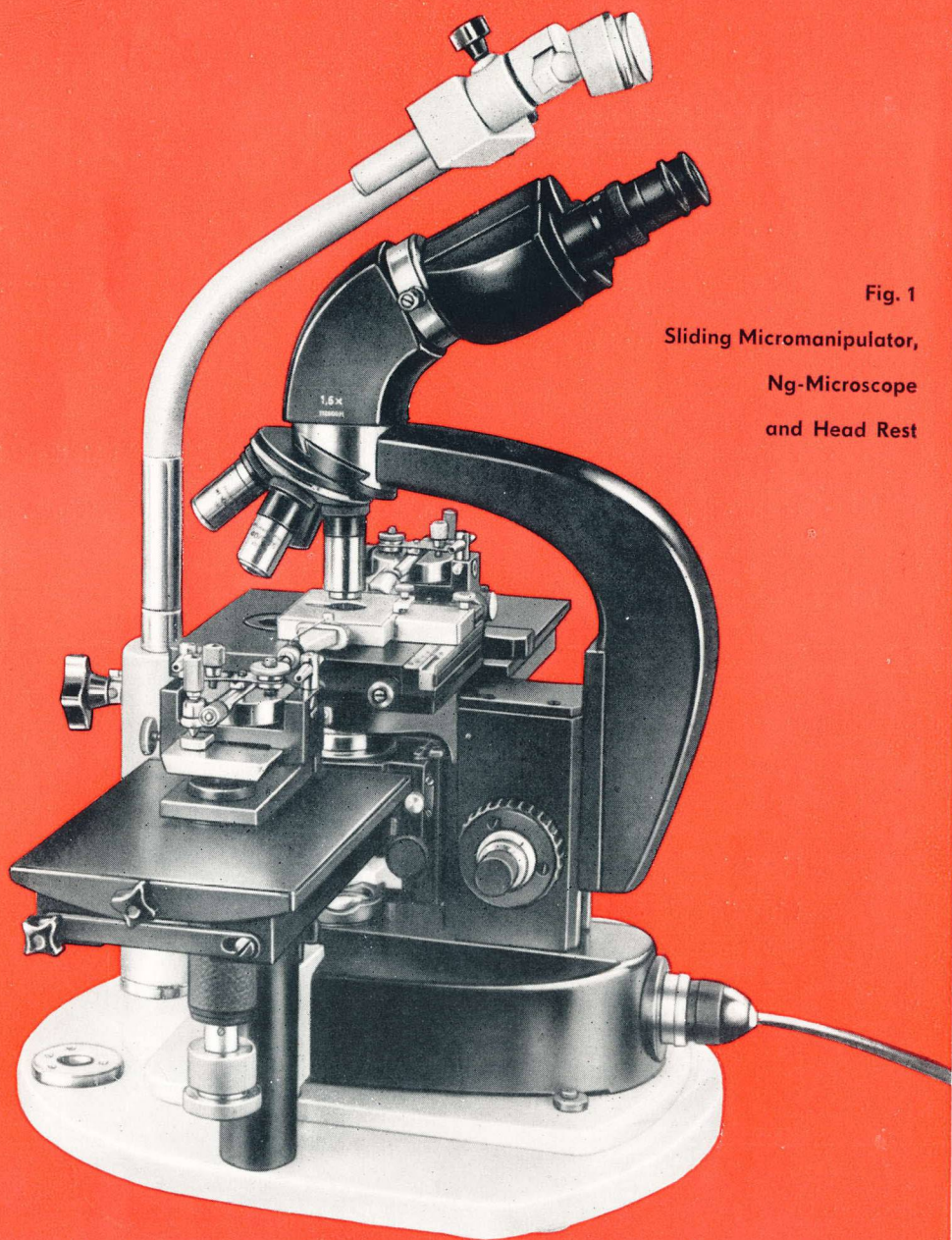


Fig. 1  
Sliding Micromanipulator,  
Ng-Microscope  
and Head Rest

as possible, an adjustable head rest can be fixed to the Sliding Micromanipulator. It is primarily intended to keep the operator's head in its correct position relative to the exit pupil of the microscope.

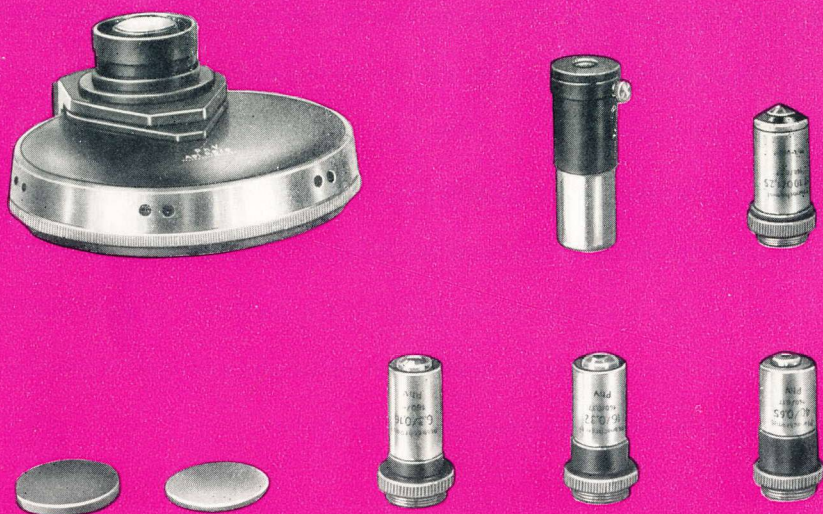
The observation of preferably biological specimens will be possible with the aid of our moist chamber of 9 mm effective depth, commercially available cover glasses being used in conjunction.

Perfect illumination of the specimens in such chambers is obtained with the aid of the dissecting change-over condenser of 11 mm focal intercept (Fig. 2).

**Fig. 2**

**Dissecting Change-Over Condenser**





**Fig. 3. Micrurgical Condenser**

By swinging in or out an annular stop into the path of rays, this special-type condenser enables an easy transition from bright field to dark-ground illumination to be made. In addition to these two possibilities, phase-contrast observations will be possible by using our micrurgical condenser (Fig. 3) which is in the course of preparation.

The manufacture of the required tools is of particular importance to the micrurgist and the result of the problem to be solved depends to a great extent

on his skill and practice. Decades of experience have shown that glass is the material preferably to be used for the manufacture of such tools.

For making needles, hooks, probes, pipettes etc. by hand from glass up to a diameter of the points of 15 microns, the microburner (Fig. 4) is at the operator's disposal. It is an ordinary Bunsenburner with a protruding conically-shaped flame tube, to which injection needles with flat-ground end may be attached. They act as nozzle for producing smallest gas flames.

When producing glass tools with diameters of the points up to 1.0 microns, it will be appropriate to use the needle-drawing apparatus (Fig. 5). This is an image-erecting horizontal microscope for unilateral oblique incident-light illumination, in the visual field of which the glass material and a platinum heating wire may be moved with the aid of respective appliances.

The glass tube or rod is vertically and laterally displaced by means of coaxially-arranged rack and pinion controls and, in addition, tilted by  $60^\circ$  to the left and by  $30^\circ$  to the right relative to the vertical line. The glowing wire may be handled with an operating stand, an accessory of the Micromanipulator. Heating of the glowing wires, two of which are supplied with different thickness, is effected via a regulating transformer installed in the base of the instrument.

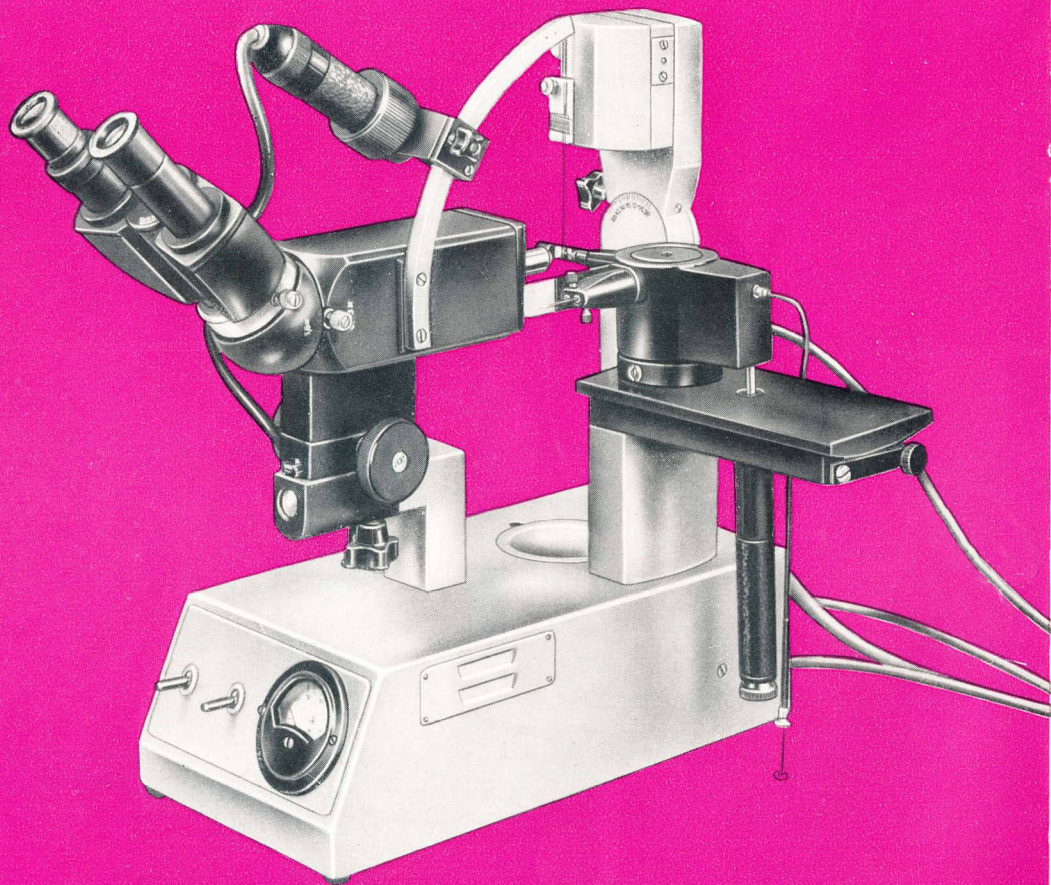
By turning a change-over device, an appliance can be brought into the visual field, which permits the cutting-off of the finished glass tools at the required place. With the aid of a graticule for the determination of the diameters, mounted in the eyepiece of the binocular tube, cutting-off will be possible at that part of the tool, the diameter of which has been previously determined with ample accuracy.

**Fig. 4**

**Microburner**



Fig. 5. Needle-Drawing Apparatus



In the case of photomicrographs being required during micrurgical examination work, an "MF" Adapter for Micrurgy may be supplied, which is mounted to a pillar stand positioned adjacent to the Micromanipulator.

The separate arrangement between "MF" Adapter and Micromanipulator prevents shocks and vibrations accruing from manipulating the camera to be conveyed to the Micromanipulator.

A special-type "MF"-basic body for micrurgy with inclined observation tube and image-erecting tube offer an opportunity, to operate the Micromanipulator under permanent observation through the focusing telescope of the basic body and to take photomicrographs of interesting phenomena a any time that appears to be adequate. In conjunction, please cf. brochure 30-605.

## Specifications

### Designation

### Catalogue No.

#### Outfit for micrurgy (Lg)

consisting of:

|                                                           |                |
|-----------------------------------------------------------|----------------|
| Micromanipulator Lg                                       | 30 58 33 C     |
| 2 stand clamps A                                          | 31 11 14 A     |
| Intermediate plate Lg/M                                   | 30 58 01 D     |
| 2 tool carriers                                           | 30 58 10 C     |
| 2 tool holders                                            | 30 58 11       |
| Tool carrier with double tool holder                      | 30 58 12 B     |
| Storage container for                                     |                |
| Micromanipulator accessories                              | 30 96 55 B     |
| Transport container for Micromanipulator                  | 30 93 05 D     |
| Above equipment                                           | 30 - 0 - 017 E |
| Monocular image-erecting inclined tube L,<br>factor 1.5 x | 30 50 24       |

#### Additional units

|                                                                                            |            |
|--------------------------------------------------------------------------------------------|------------|
| Dissecting change-over condenser N. A. 0.5<br>for bright field and dark-ground observation | 30 43 15   |
| Moist chamber                                                                              | 30 58 14 A |
| Intermediate piece for moist chamber<br>and G-stage                                        | 30 58 23   |
| Microburner                                                                                | 30 58 21 A |
| Pipette holder                                                                             | 30 58 16   |

| Specifications                                               | Catalogue No.  |
|--------------------------------------------------------------|----------------|
| Designation                                                  |                |
| <b>Outfit for micrurgy (Nf)</b>                              |                |
| consisting of:                                               |                |
| Micromanipulator Ng Nf                                       | 30 58 33 A     |
| 2 stand clamps A                                             | 31 11 14 A     |
| 2 tool carriers                                              | 30 58 10 C     |
| 2 tool holders                                               | 30 58 11       |
| Tool carrier with double tool holder                         | 30 58 12 B     |
| Head rest A                                                  | 30 54 11 A     |
| Angle tube 30°, factor 1.6, image-erecting                   | 30 50 30 C     |
| Storage container for Micromanipulator accessories           | 30 96 55 B     |
| Transport container for Micromanipulator                     | 30 93 05 D     |
| Above equipment                                              | 30 - 0 - 017 F |
| <b>Additional units</b>                                      |                |
| Dissecting change-over condenser nz                          | 30 43 87 A     |
| Condenser support nz                                         | 30 10 80 H     |
| Moist chamber                                                | 30 58 14 A     |
| Intermediate piece for moist chamber<br>and specimen stage K | 30 58 23       |
| Pipette holder                                               | 30 58 16       |
| Microburner                                                  | 30 58 21 A     |
| Illumination mirror (with quick-changing<br>arrangement)     | 30 55 02 C     |

## Specifications

Designation

Catalogue No.

### Outfit for micrurgy (Ng)

consisting of:

|                                                    |                |
|----------------------------------------------------|----------------|
| Micromanipulator Ng Nf                             | 30 58 33 A     |
| 2 stand clamps A                                   | 31 11 14 A     |
| 2 tool carriers                                    | 30 58 10 C     |
| 2 tool holders                                     | 30 58 11       |
| Tool carrier with double tool holder               | 30 58 12 B     |
| Head rest A                                        | 30 54 11 A     |
| Angle tube 30°, factor 1.6, image-erecting         | 30 50 30 C     |
| Storage container for Micromanipulator accessories | 30 96 55 B     |
| Transport container for Micromanipulator           | 30 93 05 D     |
| Above equipment                                    | 30 - 0 - 017 H |
| Intermediate plate Ng M                            | 30 58 01 C     |

### Additional units

|                                                           |            |
|-----------------------------------------------------------|------------|
| Dissecting change-over condenser nz                       | 30 43 87 A |
| Condenser support nz                                      | 30 10 80 H |
| Moist chamber                                             | 30 58 14 A |
| Intermediate piece for moist chamber and specimen stage K | 30 58 23   |
| Pipette holder                                            | 30 58 16   |
| Microburner                                               | 30 58 21 A |
| Illumination mirror (on foot 35 mm Ø)                     | 30 55 02 B |

## Production Programme

### Microscopes

"Lg"-Microscopes • "Ng"-Microscopes • Research Microscope "Nf" and Large Universal Research Microscope "Nu" for Incident and Transmitted Light • Travelling Microscope "LrO" • Polarization Microscope "Polmi A" • Polarizing Equipments • Phase-Contrast Equipments • Microscope Illuminants • Photomicrographic Equipments "MF" • "MF-Standard" and "Standard  $9 \times 12$ " • Small Microprojector • Projection Microscope "Lanameter" • Fluorescence Equipment • Micrurgy Equipments • Stereomicroscope "SM XX B" • Stereomicroscope "SM XX" • Incident-Light Microscope "Epignost" • Incident, Light Microscope "Epityp 2" • Test-Strip Attachment • Large incident-Light Camera Microscope "Neophot" • Microhardness Tester • Electrolytic Polisher • Nuclear Track Measuring Microscope "KSM 1".

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