



Strobe drum

65976.00

## Operating Instructions



Fig. 1

### 1 PURPOSE AND DESCRIPTION

The strobe drum (Fig. 1) is used to produce moving stimuli with which the image resolution capacity of the eye is determined. The unit can also be used for testing human response capacity and as a type of centrifuge for investigating the effects of mass acceleration on plants and animals (and thus investigating their static sense organs).

The equipment (Fig. 2) consists of a drum 1 (diameter 32 cm, circumference 100 cm, 20 cm high) mounted on a support rod 2 which can be rotated. A pattern 3 is stuck on to the inside of the drum. This is composed of black and white stripes of the same width, and there are 180 stripes per drum revolution, i.e. the experimental animal (roughly in the middle of the drum) sees each stripe at an angle of  $1^\circ$ . At the base of the drum is a fixed specimen stage 4 of dia. 30 cm to take the subjects. A holder for insects can be attached to rod 5 screwed into the specimen stage near its edge. The equipment also includes a screen 6 with slit for response experiments and a drive belt 7, 115 cm long.

### 2 SETTING UP

The basic set-up of the strobe drum is shown in Fig. 3; its components are listed in the Equipment List. The strobe drum is driven by a geared motor which is fitted at the side: the drum is placed on a support base and the motor secured to the bench with a bench clamp, support rod and right angle clamp. A support rod with M 10 threaded insert is also screwed into the support base (after the screw has been removed), the other end of this rod being secured into another right angle clamp on the motor rod. This arrangement serves to ensure that the distance between the drum and

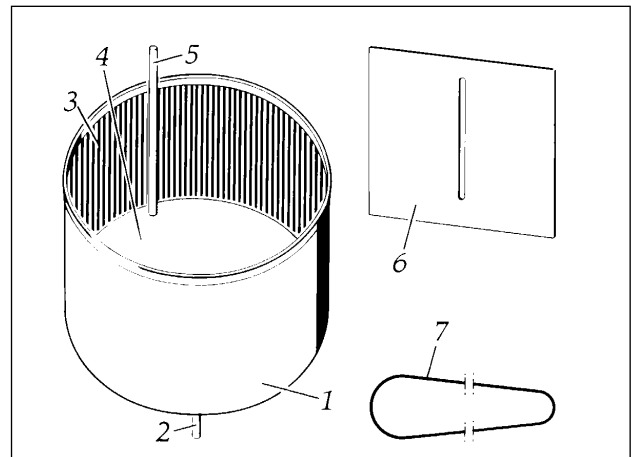


Fig. 2

the motor is that at which the drive belt, running between the bottom edge of the drum and the motor pulley, is correctly tensioned. The drum and motor should also be set up in such a way that the belt is horizontal.

Varying the power supply to the motor between 0 and 12 V d.c. sets the speed of rotation of the drum between 0 and 150 r.p.m. The exact speed is calculated from the number of revolutions in a given period of time (10 seconds is enough, for example, at fairly high speeds). A tag stuck to the edge of the drum, or a piece of cord which catches the hand every time one revolution is completed, makes counting easier.

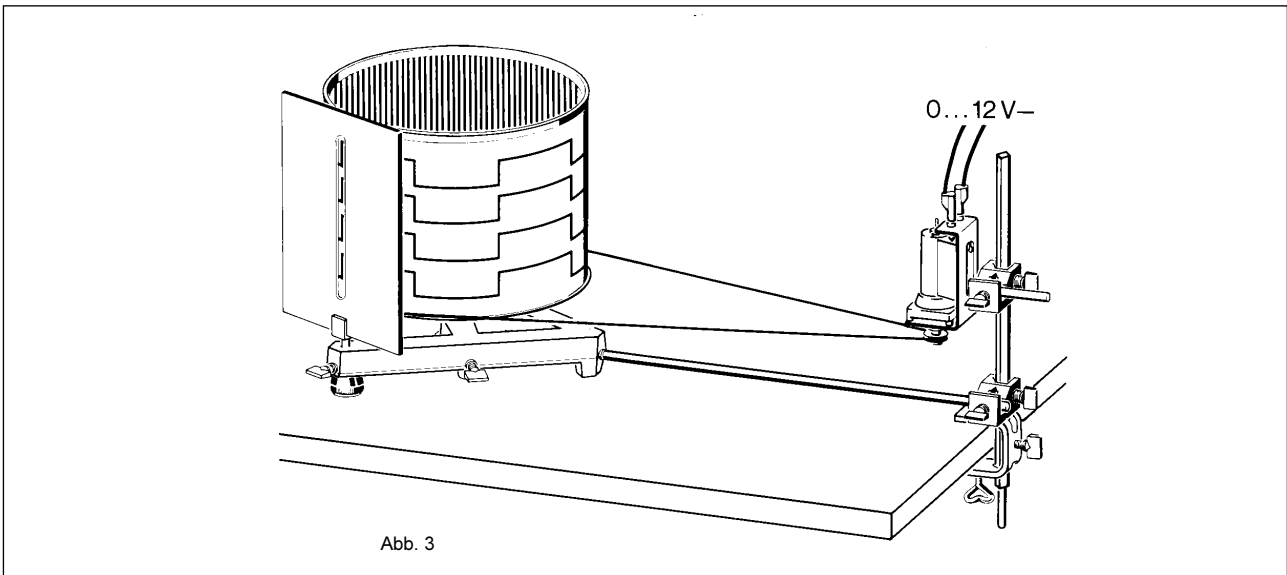


Abb. 3

### 3 EXPERIMENTS

The experiments which are described briefly in this leaflet are covered in greater detail in the Laboratory Experiments Physiology (00151.72)

#### 3.1 Testing human response capacity (Fig. 3)

For this experiment we secure a response test sheet (65976.02) to the outside of the drum and then attach a screen with slit to the support base, using plateholder 02062.00, so the observer's view of the drum is obstructed by the screen. The observer should follow the rectangular pattern on the paper on the drum (which is rotating slowly) with a felt pin inserted through the slit. Two different phases are clearly discernible here: the response time (delay) between the stimulus (steps in the rectangular pattern) and the start of the response, and the time taken until the new line has finally been attained. The transient responses occurring in the second phase can be explained with the aid of a control loop diagram.

#### 3.2. The effect of mass acceleration on plants (Fig. 4)

The main stem of a plant grows vertically upwards from the centre of the earth (negative geotropism), and the main root vertically downwards (positive geotropism). As plants perceive gravitational force and the centrifugal force produced by rotation in the same way (both cause mass acceleration), the position of stems and roots can be influenced by continuously moving the plants in a horizontal orbit. To do this we convert the strobe drum into a centrifuge apparatus by fitting the centrifuge attachment 65976.10 (first remove rod 5 from specimen stage 4). The centrifuge attachment is a disc with eight holes near the edge into which the 50 ml glass beakers (to hold the plants) can be placed. Young sunflower plants make suitable specimens.

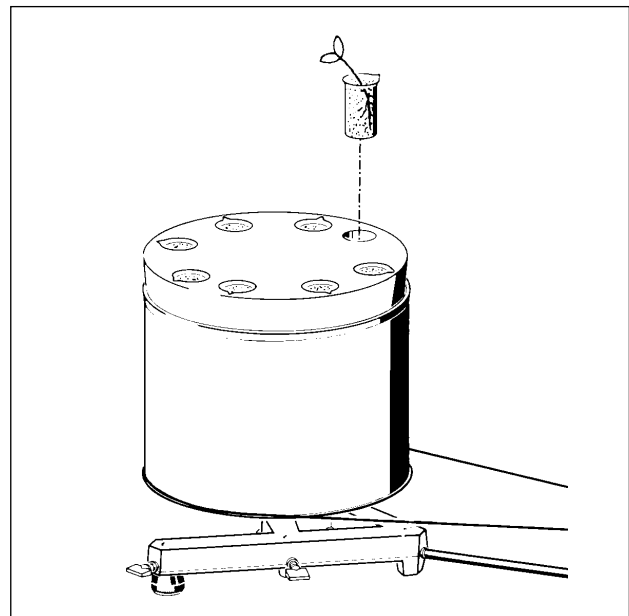


Abb. 4

### 4 EQUIPMENT LIST

The following items are used in conjunction with the strobe drum:

*Additional accessories:*

Response test sheets, set of 20	65976.02
Centrifuge attachment	65976.10

*Equipment for basic set-up as shown in Fig. 3:*

Support base, „PASS“	02005.55
Right angle clamp, „PASS“	02040.55
Support rod, „PASS“, square, $l = 400$ mm	02026.55
Bench clamp, „PASS“, small	03948.55
Support rod, $l = 500$ mm, with threaded insert	02022.05
Plateholder	02062.00
Motor with gearing, 12 V d.c.	11614.00*
Power supply 0.....12 V d.c.	13505.93*

\*these two items can be replaced by the following if required:

Laboratory motor, 230 V a.c.	11030.93
Gearing, 10:1, for 11030.93	11028.00