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ABSTRACT

A new method was developed for displaying a wide range of size of specimens and other visual materials in anatomy classes via closed circuit television. The system is contained in two desk units and permits presentation of lecturer, microscopic specimens, microscopic slides, 35mm transparencies, 3 x 4 lantern slides or X-rays, as well as electronic superinpositions and split field viewing. The method does not require heavy equipment expenditure, complex switching systems, special training for the lecturer or additional technical help. A step-by-step procedure is included along with three detailed drawings. (SK)

A CLOSED CIRCUIT TEACHING SYSTEM

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The range of size in specimens that may be presented during the course of a lecture and the diversity of format of additional visual material imposes limitations on the effectiveness of closed-circuit television as an educational medium in the teaching of anatomy. Although individual equipment systems are available for presentation of, say, microscope slides, 35 mm color transparencies, etc., the use of such equipment entails heavy equipment expenditure, complex switching systems and the impossibility of the lecturer, even with special training, of operating the total system without additional help.

The solution of the problem, which has evolved in the division of Television Services at the Medical College of Georgia in two years of teaching experience, is described in this paper.

The system was designed for the presentation of lecturer, macroscopic specimens, microscopic slides, 35 mm transparencies, 3 x 4 inch lantern slides or X-rays, and with facilities for electronic superimposition or split field viewing of the images.

The total system is contained in two desk units, placed in parallel fashion such that the lecturer seated between the units can conveniently reach all operating components of the system and thus operate it as a hands-on system. (Fig. 1)

Field Camera And Audio Feedback (Fig. 2)

A field camera is placed outside the desk unit and is focused on the lecturer.

The lecturer can maintain contact with the class via this camera and an audio talk back system, which makes possible 2-way audio conversation between any of the classrooms and/or the lecturer.

Macroscopic Specimens (Fig. 3)

Large specimens are viewed via an inclined mirror mounted above a specimen platform. The mirror and specimen platform are built into a reflex viewing box, mounted on a track, and can be moved within a few inches of the camera lens.

The specimen platform, which can be illuminated from a lamp mounted above the camera lens or "back-lit" from a fluorescent tube within the platform, is mounted on a friction collar which can be slid up and down a pole in the reflex box, thereby extending the range of viewing distance.

The lens mount for the color T.V. camera has been specially designed to enable rapid changes of focus for viewing distances down to a few inches.

This focusing feature, together with the flexibility in choice of effective viewing distance, enables full screen display of any width images of specimens ranging in size from three inches to fourteen inches across. Since changes in viewing distances and focus can be rapidly made, the showing of detail in macroscopic specimens is facilitated.

Printed material, drawings or photographs can also be viewed.

Microscope Slides (Fig. 3)

A projection fitting is used to deflect the image from the microscope into the color T.V. camera. The microscope, with its integral light source, is mounted on a sliding track placed at right angles to the desk so that the whole assembly can be moved out of the way when macroscopic specimens are being displayed.

The problem of limiting the intensity of light from the microscope reaching the T.V. camera without altering color temperature was solved by mounting a rotary gray wedge below the substage condenser assembly.

35 mm Transparencies And Lantern Slides (Fig. 3)

The front surfaces mirror, contained in the reflex viewing box is mounted on a hinged plate and can be swung up and latched into the top of the box.

In the back of the reflex box is a rear projection screen on which images from an automatic 35 mm slide projector or a 3 x 4 inch slide projector can be presented.

X-Ray Films (Fig. 2)

An X-ray viewing box is mounted in the top of the second desk unit. X-ray images are viewed by a black and white camera, equipped with a "zoom" lens, through an angled mirror. The image from the camera can be reversed in polarity.

Special Effects Generator (Fig. 2)

The special effects generator is mounted in the cabinet below the desk top, within easy reach of the operator, together with the controls for the audio system.

The special effects generator offers the facility of superimposition of images, or split field viewing. Thus an X-ray image from the black and white camera can be superimposed on the image of a text book drawing of the same tissues from the color camera.

The most frequent use of this effect is to show the hand on the X-ray box superimposed over a microscopic slide on the color camera. In this way, the lecturer can point to different parts of the microscopic slide or even (with the use of a water soluble marking pen), draw or write on the microscopic image.

Controls And Monitoring Facilities (Fig. 2)

All lighting, primary video signal switching and the controls of the slide projectors, are available on the top of the secondary desk unit.

A 21 inch color monitor presents the outgoing image. A 10 inch monitor presents the image generated by the black and white camera.

A waveform monitor of the outgoing signal affords a convenient means of adjusting lighting conditions and optimum lens diaphragm settings.

The monitor group includes the speaker for classroom audio feedback.

From September 1972 until the spring of 1973, the system was used and evaluated by the department of Anatomy for classroom instruction.

During the summer of 1973 the system was once more modified and refined by Television Service and Bio-Medical Engineering, to correct any bugs and rough spots encountered during the past school year.

The product of this system is broadcast on the CATV network of Television Service, so that anyone at any of over 300 locations on campus in any of thirteen buildings (including all student dormitory rooms) can monitor the class presentation. However, four classrooms in our largest research and education building are equipped with a talk back system so that conversation can take place between any of the classrooms and the instructor.

CAPTIONS:

Fig 1) General View of System

Fig 2) View of Black and White Portion Showing Positions of Special Effects and Audio

Fig 3) View of Color Portion Showing Position of Projectors

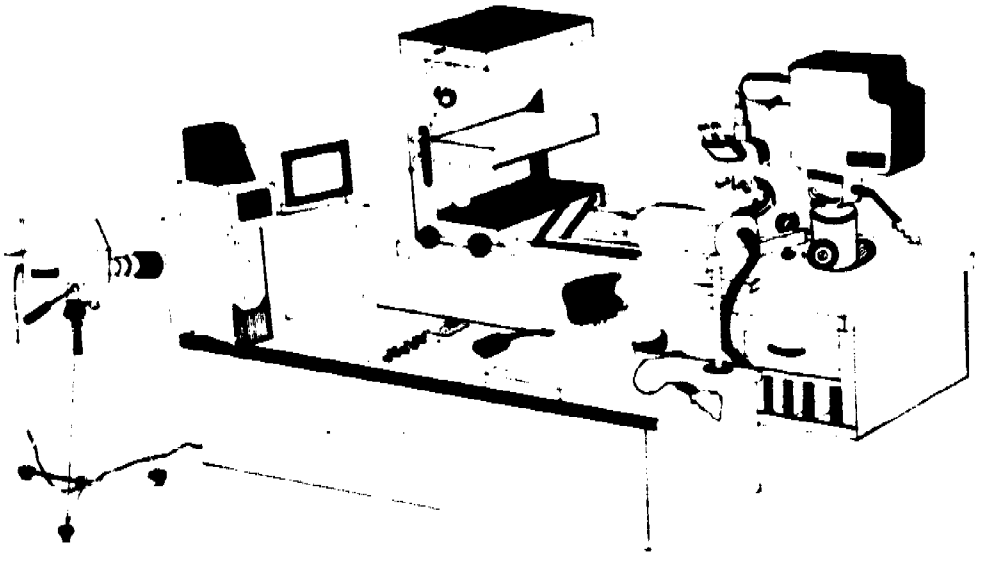

Figure 1

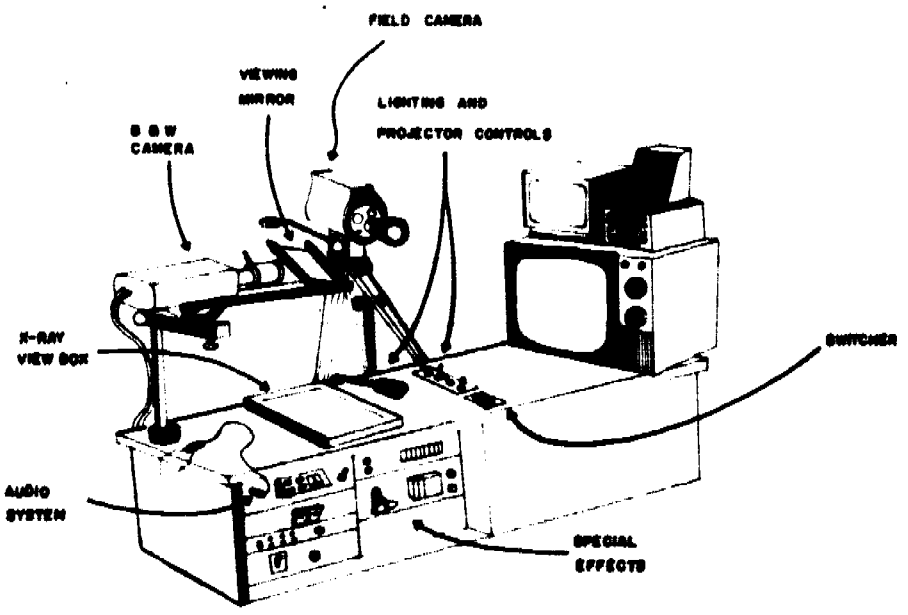

Figure 2

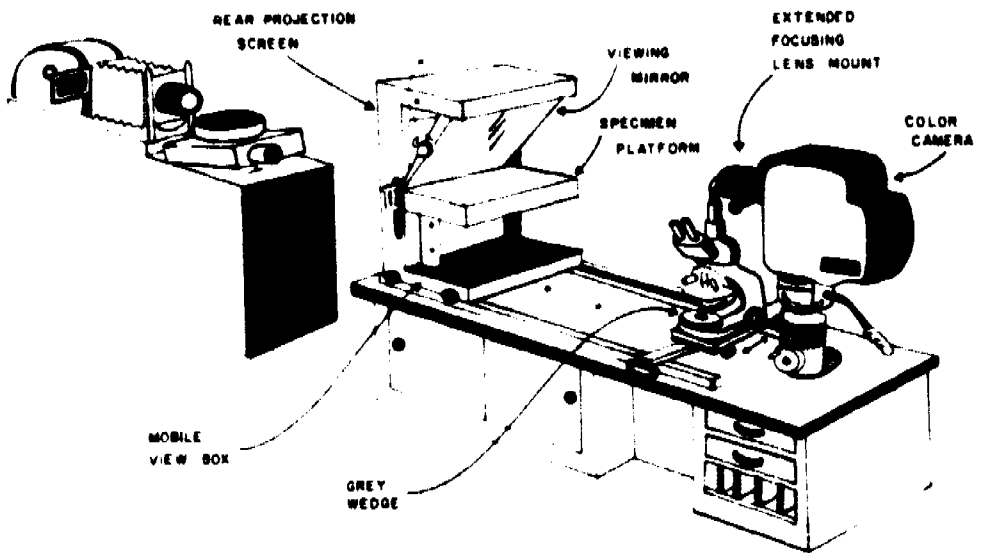

Figure 3