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MARIHUANA

By Professor ROGER ADAMS

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THE term "marihuana" is commonly used to represent any part of the hemp plant or extract therefrom which induces somatic and psychic changes in man.

The hemp plant has been known since remote antiquity, having originated in central Asia and spread into practically all countries of the world. For centuries, the fiber of the plant has been used for clothing and rope; the seed have been pressed for oil. The oldest known reference to the hemp plant is in a Chinese treatise, "Rh-ya," written in the fifteenth century B.C. That hemp contains an intoxicating principle has also been known for centuries and records of this fact date back to 1000 to 1500 B.C. The medicinal action is mentioned in Sanscrit, Hindu and Chinese medical treatises published about the beginning of the Christian era. Hundreds of other references during the past nineteen hundred years discuss the physiological action of this plant.

Hemp is an herbaceous annual growing three to eighteen feet in height, depending on soil and climate. Botanically it belongs to the genus *Cannabis,* of which there is only a single species, *Cannabis sativa,* occurring in a few varieties; *Cannabis indica* is one of these. When the female plant is about to flower, the tops, which have large quantities of hairs, become covered with a multitude of pluricellular glandulose hairs. These appear as minute glistening points and are so numerous that the tops appear to be shining with dew. The tops are very sticky and when pressed emit a strong mint-like smell. The resin often spreads to the surface of the leaves or branches. It is largest in amount when flowers begin to appear and continues

its thermoregulator is open; there is thereby no electrical connection between points A and B, and the control grid of the type 25L6 tube is at approximately the same potential as the cathode. Under this condition the tube has a low plate resistance, the plate current is very large and the relay (Dunco, Catalogue No. ABTX1) is energized, causing the relay contacts to close. The closed contacts permit current to flow through the heater in the thermostat, thus raising its

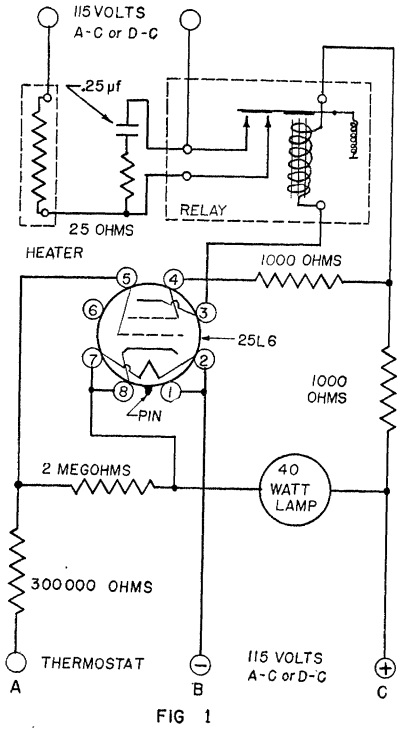

FIG 1

temperature. When the temperature has been increased sufficiently, the contacts in the thermoregulator close the electrical connection between points A and B and thereby make the control grid about 25 volts negative with respect to the cathode. Under this condition the tube has a very high plate resistance, causing the plate current to fall to practically zero. The relay is thus de-energized, its contacts open, and the heating current is interrupted.

The 0.25 μf capacitor is rated for 400 volts d-c and the resistors for two watts. The 25L6-GT tube and its octal socket are sketched as viewed from the tube. The numbers are added to aid in assembling the apparatus simply by reference to the pin fixing the position of the tube in the socket whose No. 6 prong is not used. If it is possible, the point B and the thermostat should be grounded. The current through the heater may be controlled by inserting lamp bulbs or other resistors in series with it. The relay contacts are rated to carry six amperes.

When the device is put into operation and the line voltage applied, the filaments of the tube will require about a minute to reach their operating temperature. The relay will then close if the contact between A and B is open and the tension in the relay spring has been properly adjusted. It is probable that the spring tension will have to be adjusted when the relay is first put into operation, and readjusted if the source is changed from a-c to d-c. Except for a semi-monthly check, the relay needs no attention after this initial adjustment.

The first 25L6 tube lasted nearly two years. The remainder of the apparatus is still in use after operating almost continuously for over three years.

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INEXPENSIVE MICROPHOTOGRAPHIC RECORDS

IN a recent issue of SCIENCE[1] it is suggested that a nail be driven through the lens of a Univex camera in order to obtain a focus with a microscope. I have been using a Univex camera without destroying the lens and without using up the entire film for one picture. If the camera is placed in the same position as the eye after focussing the microscope the camera will be in focus. By pasting a paper or tin tube on the front of the camera it may be placed in position by sliding this tube down over the eye end of the microscope. It is necessary to remove the back of the camera and use ground glass only while pasting on the tube, in order to center it. The tube may be pasted on with so-called "liquid solder" or any other quick-drying nitrocellulose adhesive. If the tube is painted black inside the camera may be used to take pictures of apparatus or experimental animals as well as for photomicrographs.

A label in lead pencil is photographed with the specimen. The time of exposure is usually about 1 second, and about 5 seconds is all that is required to place the camera, make the exposure and remove the camera.

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[1] E. M. Abrahamson, SCIENCE, 91: 510, 1940.

BOOKS RECEIVED

American Philosophical Society. Proceedings. Vol. 83, No. 1, July 20, 1940. *Post-Natal Development of the Head.* CHARLES B. DAVENPORT. Pp. 215. Illustrated. The Society, Philadelphia.

CAMERON, GEORGE M. *Bacteriology of Public Health.* Pp. 451. 35 figures. Mosby.

DEGENER, OTTO. *Flora Hawaiiensis.* Book 4. Loose-leaf. Illustrated. Author, Waialua, T. H.

GARARD, IRA D. *An Introduction to Organic Chemistry.* Second edition. Pp. xi + 389. Illustrated. Wiley. $3.00.