THE EFFECT OF 1,2,5,6-DIBENZANTHRACENE ON THE GROWTH AND RESPIRATION OF YEAST

RECENT papers have reported a stimulating effect of methyl cholanthrene on the growth of yeast[1] and of methyl cholanthrene and 1,2,5,6-dibenzanthracene on the growth of *Escherichia communior*.[2] In view of these reports it seems desirable to give a preliminary account of our own experiments.

Employing the rocker-tube yeast growth technique previously used in this laboratory[3] we have found that the addition to yeast suspensions of crystals of 1,2,5,6-dibenzanthracene in the proper concentration (9×10^{-4} molar) causes an increase in yeast proliferation of approximately 50 per cent. Quantities both larger and smaller have less effect, and four times this amount is sufficiently toxic to inhibit growth. Similar quantities of non-carcinogenic anthracene were without effect.

In the respiration experiments, using the Warburg technique as previously employed by us,[3, 4] the addition of the crystalline hydrocarbon gave somewhat erratic results. Hence, a colloidal suspension prepared by the method of Boyland[5] without gelatin was substituted. Under the conditions of the experiments high concentrations (3×10^{-4} molar) of 1,2,5,6-dibenzanthracene stimulated respiration, while lower concentrations depressed it and the amount of depression increased with decreasing concentration, there being apparently an optimum inhibiting concentration. It is significant that 1,2,5,6-dibenzanthracene and 3,4-benzpyrene have been found to depress the respiration of brain, spleen and liver, and that the lower concentrations were the more effective.[6]

Owing to the difference between the growth and respiration techniques it is impossible to compare the concentrations effective in the two types of experiments, but it is apparent that concentration is important in determining the effects of 1,2,5,6-dibenzanthracene on yeast metabolism. Experiments are in progress to correlate the effective concentrations, and the work is being otherwise extended.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A PROJECTION READER FOR FILMSTATS

SINCE Seidell's articles[1] on the photographic reproduction of scientific literature have appeared, the use of 35 mm film in library service has increased: but the attendant problem of a satisfactory reading device does not seem to have been finally solved.

There are several low-cost direct readers on the market, but their field of vision is limited and their magnification is so low that they cause excessive eye strain. The projection readers that have come to the writers' attention are expensive and not always convenient to operate.

Any institution that has a Leica, Contax or other type of projector for 35 mm film can easily and cheaply build a satisfactory projection type of reader and take advantage of the valuable facilities that Science Service offers in the photographic reproduction of scientific literature. The only accessories required are a 1½ inch 45° prism (a small mirror can be substituted), a $6'' \times 8''$ plate glass mirror and a $10'' \times 12''$ ground glass plate. Any carpenter can build the necessary small table and the details of the assembly are clear from Fig. 1.

The projector, placed on a shelf under the table top, passes the light beam through the prism which directs the beam at right angles to the $6'' \times 8''$ mirror, placed near the rear edge of the shelf and fixed at an angle of about 59°. This mirror directs the image upward to the $10'' \times 12''$ ground glass reading plate, housed in a lectern-like case on top of the table, at an angle of about 45°, thus giving an easy reading inclination to the image. The rest of the table top to the right is convenient for taking notes.

The projector is near the right hand for ease in focusing and moving the film strip, while a switch is placed above the projector on the table edge.

The total light path from the front of the lens of the projector, through the prism, to the mirror and up to the ground glass reading plate, should be an inch or two longer than the shortest focal distance of the projector, thus allowing a little leeway in focusing the image. In this case, using an old model Leica projector, the minimum focal distance was 39 inches and the light path was made to equal 41 inches. The magnification is about 13 times, thus giving an image slightly larger than the original photographed page.

Without a film in the projector the reading plate can be used for retouching negatives, tinting trans-

[1] Dodge and Dodge, *Ann. Missouri Bot. Garden*, 24: 583, 1937.
[2] Goldstein, SCIENCE, 86: 176, 1937.
[3] Norris and Kreke, *Studies Inst. Divi Thomae*, 1: 137, 1937.
[4] Cook, Hart and Joly, *Proc. Soc. Exptl. Biol. Med.*, in press.
[1] Atherton Seidell, SCIENCE, 80: 70–72, July 20, 1934; *ibid.*, 184–5, August 24, 1934; *ibid.*, 174–6, February 15, 1935; *Jour. Chem. Ed.*, 12: 415–18, 1935.
[5] Boyland, *Lancet*, 223: 1108, 1932.
[6] Pourbaix, *Compt. rend. soc. biol.*, 110: 1015, 1932; 112: 1222, 1933; 113: 930, 1933; 115: 1738, 1934.

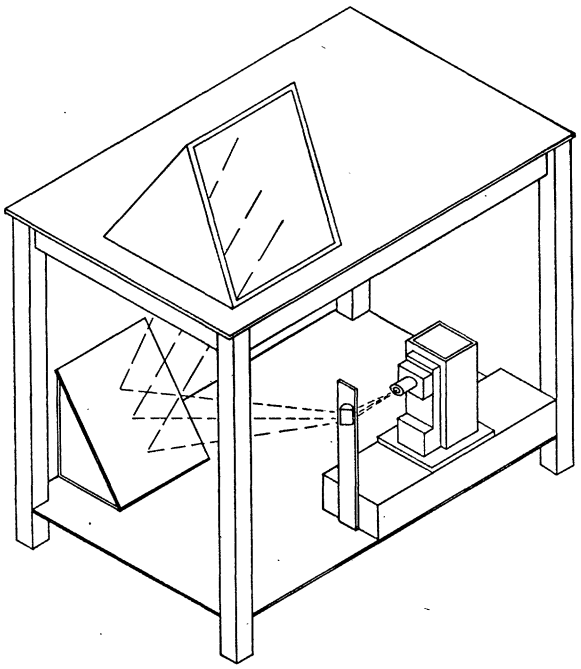

FIG. 1

parences or examining x-ray films. The device has given satisfactory service, and the image is bright enough ordinarily to be read in a lighted room.

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SCHOOL OF TROPICAL MEDICINE
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A METHOD OF DETERMINING ASCORBIC ACID IN SKIN[1]

SKIN is unsuitable for treatment by the customary procedures for the extraction of vitamin C from tissues.[2] A method has been devised based upon the ability of collagen to soften and swell when heated in acid solutions. The samples of skin are weighed, minced with scissors and placed in large test-tubes with 10 cc of a solution containing 8 per cent. acetic[3] and 2 per cent. metaphosphoric acid. The tubes are drawn out with a blast lamp and sealed after evacuation of the air. They are then placed in boiling water for twenty minutes, opened immediately upon removal, and the contents transferred to a second tube for centrifugalization. After the supernatant fluid has been decanted, the sediment, consisting of softened pieces of skin, is broken up in the tube with a glass rod and washed with 2 cc of 8 per cent. trichloroacetic- and 2 per cent. metaphosphoric-acid mixture and again centrifugalized. This procedure is twice repeated. The pooled supernatant fluids are then titrated with 0.05 per cent. 2,6-dichlorophenolindophenol solution according to the method of Bessey and King. The tables illustrate the agreement between samples and the recovery of added vitamin C.

TABLE I

GUINEA-PIG SKIN MINCED AND SAMPLED IN TRIPLICATE FOR DETERMINATION OF VITAMIN C

Sample of skin	Ascorbic acid
1.0 gm	mg/gm
1	0.0397
2	0.0404
3	0.0404
1*	0.0007
2*	0.0007
3*	0.0000

* 4th washing.

TABLE II

GUINEA-PIG SKIN MINCED AND SAMPLED IN QUADRUPLICATE FOR THE DETERMINATION OF VITAMIN C IN THE PRESENCE OF ADDED ASCORBIC ACID

Sample of skin	Ascorbic acid added	Ascorbic acid determined	Added ascorbic acid recovered
0.5 gm	mg	mg	mg
1	0	0.0235	0
2	0	0.0235	0
3	0.100	0.1134	0.0899
4	0.100	0.1098	0.0863
–	0.100	0.0915	0.0915

The method has been in constant use for the past year and has given consistent and reproducible results.

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[1] From the Division of Laboratories and Research, New York State Department of Health, Albany.

[2] O. A. Bessey and C. G. King, *Jour. Biol. Chem.*, 103: 687–698, 1933.

[3] Trichloroacetic acid is broken up on heating and can not be used at this step. The digested skin is later washed with trichloroacetic acid to precipitate the proteins.

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