cent. A low potency preparation containing 1.3 Florey units of penicillin per mg and a sample of crystalline penicillin were used. Typical results are shown in Table 1.

TABLE 1

Urease concentration	Experiment	Mgs NH_3 liberated
0.1 per cent.	Control	0.42
	Crude penicillin (130 units)	0.21
	Crystalline penicillin (1.739 mgs 1650 units per mg)	0.39
0.5 per cent.	Control	2.60
	Crude penicillin (65 units)	0.89
	Crystalline penicillin (1.442 mgs)	2.55

It is clear from the data shown that crude penicillin preparations do, in fact, inhibit urease, but pure samples of the drug do not. It may thus be concluded that the reactions observed by Turner, Heath and Magasanik were produced by the impurities in the comparatively crude preparations of penicillin available to them at the time when they performed their experiments. Since there is no significant inhibition of urease in the presence of as much as 1 to 2 mgs of crystalline penicillin, this approach does not appear to afford a basis for the assay of penicillin.

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ON THE EFFECT OF CONTRAST IN MAKING VISUAL STAR COLOR ESTIMATES

THE writer, at present, is engaged in rechecking visually star colors for all stars visible from latitude 39° N. down to 6th. mag., using low-power, wide-field binoculars and the Yale Catalogue of Bright Stars as reference. The method is to observe a given number of stars, estimating the colors visually; later the list is compared with the Yale Catalogue of spectral classifications and any error in estimates is thus discovered. The writer's color sense, recently tested by the Ishihara method, is a trifle better than normal; and this has been reflected in the accuracy of comparisons, generally running from 80 per cent. to 100 per cent., observing in the heart of the city (Baltimore).

Nevertheless peculiar anomalies occur. On the night of August 19, 1944, at 11h 37 m E.S.T., the color of ψ Capricorni, mag. 4.26, spectral class F_8, was estimated as pale yellow—which was correct. However, the color of ω Capricorni, mag. 4.24, spectral class M_a, also appeared yellow. This star is in the same binocular field with ψ.

Observation of A Capricorni (24 Cap.) mag. 4.6, spectral class M_a, gave a normal, orange-red, Antarean color for this star. Although A Capricorni and ω Capricorni are of the same spectral class, of closely comparable magnitude, and in all visual aspects essentially similar, ω had appeared distinctly yellowish. Reference to an old observation of this star, August 1, 1940, 11 h 35 m E.S.T., showed that at that time the writer had seen the true color without difficulty; but observation then had been with a 2-inch refractor.

Following the suggestion of the earlier observation, ω was re-observed, with a 3-inch refractor. The color now came out quite clearly, the star being like a miniature Antares. It was apparent that the normal color of A Capricorni had been estimated correctly with binoculars because this star stood alone, with no star of comparable magnitude in the same field. When ω was similarly isolated in a telescopic field the true color came out easily. On the other hand, the presence of the yellow star, ψ Capricorni, in the same binocular field with ω, had seriously affected the color estimate of the latter.

This suggests a possible cause, apart from the personal equations, for the widely differing color estimates given for close doubles by the older observers.

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CONSTRUCTIVE MEDICINE

THE recent thought-provoking article by Smith and Evans,[1] attempting to define preventive medicine, reveals how inadequate this term is in modern medical thinking. Though in hearty agreement with the concept of expanding the significance and application of medical practice beyond treatment and prevention of specific diseases, I feel that it might be wiser to apply a new term, rather than to attempt to expand the definition of an old one. As pointed out by Galdston,[2] the term "preventive medicine" will always be limited by the meaning of the word "prevention."

Preventive medicine was a vast step forward in the days when health was defined as that state of being existing in the absence of disease. But medicine has outgrown this older definition of health. Health is more than the absence of demonstrable disease. Health is always relative. It is no more absolute than freedom, slavery, beauty, poverty or wealth. Yet these terms, and many others with similar abstract connotations, are used habitually so loosely that implication of absolute values has crept into our thinking. Health has quantitative attributes involving functional reserve capacities. There are degrees of health. Perfection can be only an ideal abstraction. Perfect health is probably unattainable, though it may be approached. Optimum health implies a maximum reserve capacity for every organ and function of the organism.

[1] G. Smith and L. G. Evans, SCIENCE, 100: 39, July 21, 1944.
[2] I. Galdston, SCIENCE, 100: 76, July 28, 1944.

The treatment of disease is essentially an attempt at the reconstruction of health. As health is relative there is always room for improvement, even though obvious disease is absent. It should be possible to make apparently well people healthier. That healthy babies can be made healthier has been demonstrated by the pediatricians. Such guidance can, and should, be applied to adults. For this type of medical science and service, the name "constructive medicine" has been suggested.[3]

Galdston proposed the term "eubiotic medicine" for the same general concept. It is our feeling that constructive medicine is a preferable term because it will be understood by more people, and because it more simply portrays the objective of approaching an optimal state of health.

Constructive medicine attempts to improve the intrinsic vigor, resistance, and endurance of an individual. It must be applied individually, for it involves direct effort on the part of the patient and something more than the mere control of the environment. One significant aspect of this idea is that it should reduce the great human inertia against preventive activities. To the average individual prevention has a negative connotation. It suggests rules and prohibitions and long series of "don'ts." Furthermore, the actual accomplishments of prophylaxis are demonstrable only statistically. Statistics have little emotional appeal to the average man or woman. We can not prove that this or that measure actually prevented a disaster befalling this or that person. Most people, if left to their own devices, prefer to gamble rather than take the trouble to protect themselves. Therein lies the strength of public health control of the environment; no effort is involved on the part of the individual in obtaining clean, safe food and water.

Constructive medicine, on the other hand, can produce results clearly demonstrable to the individual patient. Improved vigor from better nutrition and raised hemoglobin levels, greater work efficiency[4] and euphoria aided by properly applied mental hygiene are notable to the patient. Constructive medicine is not a panacea which can prevent all ills and quickly make us into a race of supermen. One of the major limitations of good constructive medicine is that it is expensive, for, to be properly applied, it must be individualized. With older persons individualizaton becomes increasingly imperative. Nevertheless, the potential benefits are valuable at almost any price. Though the hope of avoiding all illness or injury is a vain and unobtainable wish, we must not forget that if a man be in really good health prior to an acute infection, or injury, his chances of survival and his speed of recovery are greatly augmented. It is a fundamental principle of geriatric medicine that in mature adults the prognosis in an acute illness is profoundly affected by the condition of the patient before the acute disorder.[5] Lastly, it is possible that all medical therapy could be improved by an attitude which stresses the reconstruction of health, rather than limiting itself to the treatment of disease. We need to be less concerned with the disease and more with the patient.

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[3] E. J. Stieglitz, *Annals Int. Med.*, 18: 89, January, 1943.

SPECIAL ARTICLES

THE FAILURE OF PURIFIED PENICILLIN TO RETARD THE GROWTH OF GRAFTS OF SARCOMA IN MICE[1, 2]

THIRTY-FOUR Bagg albino inbred mice, weighing 19 to 20.5 grams, were implanted with a small graft of a sarcoma native in this strain. During the ten years that this tumor has been transplanted the grafts have grown and brought about the death of every one of the implanted mice of this strain.

Two of the implanted mice were not treated, but were kept as controls. Thirty-two were injected hourly with a solution of Merck's purified salt of penicillin dissolved in normal salt solution. They received doses equivalent by weight to those listed by Merck as most favorable for human beings. The ampules, Merck Lot 193, contained 10,000 Oxford units. The material was stored at 4° C and each ampule was opened as needed.

During the first 72 hours following the implantation of the tumor graft the 32 mice received 120,000 units of penicillin in graded doses as follows: 8 received 8,000 Oxford units each; 8 received 4,000 units each; 8 received 2,000 units each and 8 received 1,000 units each. At the end of this time four mice from each lot were selected for further treatment, and the others received no more injections. The sixteen mice

[1] Aided by a grant made to Dr. Warren H. Lewis from the International Cancer Research Foundation.

[2] The purified Merck's penicillin was supplied by the Office of Scientific Research and Development; the Squibb penicillin was obtained from Lieutenant-Colonel Lind and Captain Romansky, of the Walter Reed General Hospital, and the calcium salt of penicillin was obtained from Dr. Lockwood, of the University of Pennsylvania.

[4] E. J. Stieglitz, Proceedings 8th annual meeting Industrial Hygiene Foundation of America, November 11, 1943.

[5] E. J. Stieglitz, editor, "Geriatric Medicine: Diagnosis and Management of Disease in the Aging and the Aged." Philadelphia: W. B. Saunders Company. 1943.