

petent geologists, but the physicists were presently able to give convincing reasons for increasing these estimates about tenfold, and these results have been meekly accepted by the geologists and biologists. Superimposed, or perhaps I should say underlying, all these observations, direct and indirect—the material of science—is the body of overbeliefs, resulting from tradition, and fed by the emotions. We cannot escape from these, or abandon our sense of human values. A great dilemma of modern life results from the fact that some or many of the ancient beliefs do not accord with the findings of science, and people live, as it were, in two worlds, one of practical realities, and one of the emotions. The reconciliation of these discrepancies is one of the great tasks for the future. What have the psychologists to say about this? What has science to say about it? What is the verdict of religion?

The great tasks of education are twofold: to educate the mind, or the senses, so that the findings of science may be available to all, not as rigid dogma but as reasonable approximation to truth, certain to be largely extended and modified in the future; to educate the feelings, the social senses, so that the welfare of all mankind becomes in a measure that of every individual, the happiness of all the happiness of each.

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Water Loss From the Respiratory Tract in the Subtropics

The interpretation of Dr. Burch's valuable data (*Science*, 1945, 102, 619–620) on water loss from lungs, in so far as this is a function of the temperature and humidity of the inspired air, would be facilitated, I believe, had he used values of humidity in terms of physiological saturation deficit rather than of relative humidity. Physiological saturation deficit, a term I am now inventing or reinventing, is the difference between the absolute humidity of the air and what the absolute humidity would be at saturation at body temperature. Since it would be impossible for the lungs to evaporate any moisture into air already saturated at body temperature, the PSD represents the opportunity for evaporation from the lungs.

I have derived the PSD's for the temperature and humidity conditions presented by Dr. Burch, with the following results. It is convenient to work in terms of the deficit of the vapor pressure of the air relative to that at saturation at body temperature, 6.2 mb. The PSD's for the conditions under which most of the measurements were made (20.0 to 21.1° C. and rel. hum. 55 to 60 per cent) were 4.7 to 4.9 mb. The PSD for the cool, foggy air (15° C., 97 per cent rel. hum.) was 4.6 mb, and of cool, dry room air (15° C., 60 per cent rel. hum.) 5.2 mb. Since these humidity conditions differ by only 4 to 8 per cent from the standard test conditions it is natural that they influenced the rate of water loss relatively little.

The hot dry air (50° C., 18 per cent rel. hum.), though its PSD was, at 4.0, less than under the standard con-

ditions, increased the rate of water loss. Perhaps this was owing to increased heart action and respiration to be expected in such a high temperature, for the expired air had a PSD of 1.0 mb, or 3.0 mb lower than the inhaled air, which was the same as the reduction in PSD from the 4.7 to 4.9 of inspired air to the 1.7 mean of exhaled air in the general test. The hot moist air (50° C., 49 per cent rel. hum.), with a PSD of only 0.2, naturally, reduced the rate of water loss considerably. Indeed, it appears, from the fact that the expired air (at 39.4° C. and 74 per cent rel. hum.) had a PSD of 1.0 mb, that there was condensation of vapor in the body!

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Rediscovery in the Vitamin A Field

It is becoming increasingly troublesome to verify whether or not one has made a discovery, or merely a rediscovery. However, if the matter seems worth publishing, courtesy surely demands the admission that no thorough literature search has been made when this is so.

According to recent communications to this journal (*Science*, 1945, 101, 585; 102, 158) the blue colour developed on treating vitamin A with various acid earths has been independently discovered three times, by Lowman, by Meunier, and by Emmerie and Engels. [For references, see *Science*, 1946, 103, 175.] It is possible to add a fourth and probably the original discoverer to the list, namely Takahashi (K. Takahashi and K. Kawakami. *J. chem. Soc. Japan*, 1923, 44, 590), who published the observation no less than 16 years before the earliest reference previously quoted.

Similarly, the fact that the greater part of the vitamin A of fish-liver oils is present as fatty acid esters has been independently discovered at least three times. K. Hickman (*Ind. eng. Chem.*, 1937, 29, 1107) confirmed the observation by analytical molecular distillation but referred to no earlier work. In a recent paper from the same laboratories (H. Koscher and J. Barter. *Ind. eng. Chem. (Anal. ed.)*, 1945, 17, 499), priority is accorded to L. Reti (*C.R. soc. Biol.*, 1935, 120, 577), who used partition methods. The original observation, also using partition, was published by A. L. Bacharach and myself seven years earlier (*Quart. J. Pharm.*, 1928, 1, 539).

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Freedom of Science in Soviet Union

We followed with great interest the exchange of views between Dr. Karl Sax, of Harvard University (*Science*, 1944, 99, 298–299; 1945, 102, 649) and Dr. Anton R. Zhebrak of Timiriazev Agricultural Academy, USSR (*Science*, 1945, 102, 357–358).

K. Sax wisely leaves unchallenged some purely political questions raised by A. Zhebrak. If a one-party state with a system of election when the population has