

We conclude, first, that the new method yields reliable data; second, that the buffer action of the tissues studied, particularly the malignant tumors, can be overcome by injection of relatively large doses of certain natural sugars and that the acid-base equilibrium is therefore a function of carbohydrate metabolism.

As to the possible significance of these results, it may be pointed out that the pH controls many important biochemical reactions, such as the action of proteolytic, glycolytic and other enzymes; oxidation-reduction; the state of tissue colloids, etc. The work of Jacobs and others, furthermore, suggests that lactic acid, being an organic acid, may have a peculiar action owing to its ease of penetration into cells. We have found that there is an acidity gradient: tumor-surrounding tissue-normal tissue. We therefore may well ask the question whether the excessive local production and accumulation of lactic acid represents an important factor in the destructive action of malignant tumors upon the surrounding normal tissue and upon the tumor cells themselves. Work along this line is under way.

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SOLAR VARIATIONS AND ATMOSPHERIC PRESSURE¹

THE Smithsonian Institution has been measuring for 20 years, or more, the amount of solar radiation reaching the earth and computing from the observed data the value outside the atmosphere. These values prove to be variable, and it was deemed worth while to compare these variations with variations of atmospheric pressure on the earth in order to ascertain what relationships, if any, might be disclosed. For this purpose the formulas of correlation were used such as is now the custom to use in the comparison of variables.

The Smithsonian Astrophysical Observatory recently published a table giving the monthly means of the preferred solar values from three widely separated observatories for the interval 1921-1930. The monthly means for the 120 months included were compared with the monthly means of pressure for the same interval at 162 stations scattered over the earth's surface. These data were obtained from the various weather services of the world for publication in "World Weather Records" and were supplemented by means derived from daily charts of pressure for the North Pacific and North Atlantic Oceans.

¹ Read before the National Academy of Sciences, Washington, D. C., April, 1933.

The computed correlations disclosed the following relationships:

(1) With an increase of solar radiation the pressure increases in regions of the earth where the pressure is normally high and decreases in regions where it is normally low. In other words, the normal pressure gradients are increased and the normal circulation speeded up. It has been shown by previous investigations that with high solar radiation the low pressure band at the equator widens and the high pressure belts and centers in middle latitudes move nearer the pole, this displacement being proportional to the intensity of the solar radiation increase.

(2) The centers of greatest minus correlation are in regions of high vapor content and plus correlations in regions of low vapor content, indicating that the absorption of solar heat by water vapor plays an important part in determining the effect of increased solar radiation on the atmosphere.

(3) The centers of greatest minus and plus correlations change positions with the seasons, following the change in position of the areas of high and low water vapor; thus further proving the intimate relation between these conditions.

(4) In the regions of greatest minus correlation of pressure with increased solar radiation, the temperature and rainfall show plus correlations at least for solar radiation changes of short period.

(5) The computed amount of change of pressure and of temperature agree with expectancy.

(6) In considering the effect of solar radiation changes on the atmosphere there are evidently three factors to be considered, namely, intensity of the solar change, the seasonal changes in the atmosphere and progressive movements similar to atmospheric waves. It is possible also that temporary shifts in ocean currents and changes in water temperatures influence the results.

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BOOKS RECEIVED

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