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Physical Science

CLOUDS AS INDICATORS OF WEATHER CONDITIONS

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ABSTRACT

The forecasting of weather by various types of clouds has a special advantage in that an observer may follow quick, short-time changes not always anticipated by the weather man. There are so many different factors combining to form our weather that quite pronounced changes often occur between the regular forecasting periods. When an air mass from one part of the continent or world having certain meteorological values encounters an air mass from another part having other meteorological values, the resultant effect on these meteorological elements such as temperature, barometric pressure, humidity, wind velocity and direction, form the condition in the space about us which we call weather. It is the water vapor in the air masses which gives many varieties of cloud forms according to the physical condition of that water vapor. The principal types of clouds are cirrus, cirrocumulus, cirrostratus — called high clouds; altocumulus, altostratus — middle height; and stratocumulus, stratus, nimbostratus, cumulus, and cumulonimbus — known as low clouds. There are many intermediate or modified forms resulting from topographical effects or from the manner in which various parts of air masses encounter each other. These encounters may break up into very irregular forms and unexpected changes or turbulences. It is in this capacity that clouds serve especially well to indicate weather trends if one knows cloud forms and has had enough observational experience.

When two different air masses meet in regular form, as for example a warm air mass from the south riding up and over a cold air mass from the north, there is generally a regular succession of these cloud forms as cited above, indicating the successive stages of this encounter. Thus we may pass from a state of clear fair weather accompanied by cirrus clouds into one of stormy weather marked by nimbus cloud types. Black and white slides often fail to distinguish between blue and gray areas. It is for this reason that several years ago this study of clouds was started with color films.*

* The lecture was illustrated by many color slides.

DISCOVERY AND IMPORTANCE OF WHITE DWARFS

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ABSORPTION SPECTRA OF STRAIGHT CHAIN
HYDROCARBONS IN THE VACUUM
ULTRA VIOLET *

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ABSTRACT

A search for a suitable solvent for extending the absorption curves of some organic compounds into the vacuum ultraviolet has led to the discovery that purified n-hexane and n-heptane give satisfactory transmission to 1700A., in 0.3 mm. cells. The transmission limits of several solvents are given. Absorption curves are shown for some alcohols, some ethers, an aldehyde, some ketones, an octene, and some fatty acids, saturated and unsaturated. The uniqueness of the shape of the curves for each type of absorbing chromophore is demonstrated; and a series of curves shows the effect on the fatty acid absorption of different methods of preparation, of cis-trans isomerism, of esterification, of increasing chain length, and of increasing numbers of conjugated and unconjugated double bonds. The absorption coefficients are believed accurate in absolute value to about 20%, and it is hoped that improved methods of recording and measuring the spectra will lead to improved accuracy, possibly sufficient for industrial hydrocarbon analysis and control. The Cario-Schmidt-Ott fluorite spectrograph used was found to be fast and convenient to use in such studies and is therefore well suited to routine quantitative analysis in this region (2500-1700A) when low dispersion (20A/mm) is acceptable.

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ABSORPTION SPECTRA OF THE FATTY ACIDS
IN THE VACUUM ULTRA VIOLET **

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THE GEOLOGY OF THE JAMESBURG QUADRANGLE,
CALIFORNIA

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ABSTRACT

The Jamesburg Quadrangle lies in the Santa Lucia Range of the Central California Coast Range System. The lithologic units which have been mapped are, in order from oldest to youngest: Sur Series of unknown age and comprised chiefly of meta-sedimentary quartzose schists and gneisses with some quartzite, marble and meta-basic igneous rocks; Santa Lucia formation of granitic intrusives ranging from acid to basic in composition, probably pre-Jurassic in age; serpentinized ultra basic plugs and dikes doubtfully correlated with the Jurassic Franciscan; Uncle Sam sandstone, middle Eocene; Vaqueros-Temblor sandstone with minor siltstones and conglomerates, lower-middle Miocene; Monterey formation, chiefly organic and chemical cherts and shales, middle-upper Miocene; San Pablo sandstone, upper Miocene; and Quaternary deposits, terrace gravels, stream alluvium, alluvial fans and landslide accumulations. Volcanics have been recognized in both the Vaqueros-Temblor and the Monterey formations.

The metamorphism of the Sur Series is chiefly regional, but with superposed thermal effects related to the emplacement of the Santa Lucia batholithic mass which is made up of a series of smaller intrusive bodies of differing composition. Minor regressive and dynamic metamorphism is evidenced in all of the crystalline rocks. The Sur Series was subjected to open folding and faulting in pre-Jurassic time and the structures then formed may have guided the major Plio-Pleistocene deformation.

Both structurally and physiographically the area can be divided into three major northwest-southeast trending belts; the mountainous Santa Lucia belt to the south; the low, open Tularcitos belt crossing the center of the area; and the rugged Sierra de Salinas to the north. A small part of Salinas valley is also included within the limits of the quadrangle. Tertiary sediments are most abundant in the Tularcitos belt where they have been compressed into broad open folds complicated by later faulting. In the Santa Lucia belt isolated blocks of sediment have been faulted down into the basement rocks along northwest-southeast trending faults which are the major structures throughout the entire quadrangle. These are cut and displaced by smaller cross faults. Crystalline rocks make up the entire Sierra de Salinas belt in which few structures have been recognized.

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SKIN TEMPERATURES OF THE EXTREMITIES UNDER VARIOUS PHYSICAL AND PHYSIO- LOGICAL CONDITIONS *

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ABRIDGMENT

It is to be emphasized that, in a consideration of the surface temperatures in the thermal regulation of the body, the total area of the skin is important. Hence attention should not be focused alone on the lower portions of the extremities or on the fingers and toes, which are a relatively small part of the whole surface. Thus a study of average skin temperature is of more vital interest to the physiologist, metabolist and physicist than to the clinician. During the past decade there has been an awakening of interest in the subject of peripheral vascular disease. Clinicians have become increasingly interested in skin temperature, particularly of the extremities. It is probable, however, that the clinician seldom has occasion to utilize the average skin temperature, as developed by Hardy and DuBois, Burton and Bazett, and Winslow, Herrington and Gagge, and others. In conditions of peripheral vascular disease the clinician is concerned chiefly with the supply of blood to the extremities and digits. He uses surface temperature (and often inaccurately and incorrectly unless he has controlled conditions of both patient and environment) as an index of supply of blood to the skin. When an occlusive arterial disease is present, preservation of the extremity depends on an adequate supply of blood to the diseased part. Gangrene, when it develops, begins in the skin and not in the deeper tissues, and it invariably begins in the area of the skin which has the poorest blood supply. The significance of skin temperatures of the digits thus becomes obvious.

My colleagues and I have studied the surface temperatures of the extremities of numerous subjects with normal blood circulation as well as of patients with peripheral vascular disease under controlled environmental conditions with the subjects in the basal metabolic state. Such investigations have clarified many previous vague conceptions concerning the significance of changes in skin temperature and resulting blood flow in the extremities. This work

* For a review of the literature and important investigations on "Skin temperatures and thermal regulation of the body with special reference to the extremities," the reader is referred to an article by the author in *Medical Physics*, Chicago, Year Book Publishers, 1944, pp. 1523-1555.