lengths. Instead, it may be seen that the 200 mμ curve approaches linearity only at absorbance values up to about 1.4, the 205 mμ curve up to about 1.8, and the 210 mμ curve up to about 1.9. Absorbances below these values may be corrected; those above must be rejected. In this region where the solvent absorbs appreciably, it is advisable to read and correct solution and solvent absorbances separately.

To make corrections, it is necessary first to estimate stray radiation. This can be done by making use of the expression $A = \log \frac{I_{o\lambda} + I_{ox}}{I_\lambda + I_x}$, where A is the observed absorbance, $I_{o\lambda}$ is the intensity of the incident monochromatic radiation, I_{ox} is the intensity of the incident stray radiation, I_λ is the intensity of the transmitted monochromatic radiation, and I_x is the intensity of the transmitted stray radiation. The nearly horizontal portion of the curves in Fig. 2 represents a condition where the concentration of the absorbing substance, i.e., glycine, is so great that the transmitted monochromatic radiation is effectively zero, $I_\lambda = 0$, whereas the stray radiation, which comes from higher wavelengths, is almost completely transmitted, $I_{ox} = I_x$. Therefore, over this portion of the curve, approximately, $A = \log \frac{I_{o\lambda} + I_{ox}}{I_{ox}}$, from which it is apparent that the ratio of incident stray radiation to total incident radiation, $\alpha = \frac{I_{ox}}{I_{o\lambda} + I_{ox}} = \text{antilog } (-A)$, where A is best taken as the intercept of this portion of the curve with the ordinate. Thus, at 200 mμ $\alpha = 0.014$; at 205 mμ $\alpha = 0.007$; and at 210 mμ $\alpha = 0.005$. The values have been found to vary from instrument to instrument and from time to time, depending on several factors, among which are the condition of the mirrors and the intensity of the hydrogen discharge lamp.

It is evident that the stray radiation increases with decreasing wavelength. It is this property of the instrument which, in spite of such very small amounts of stray radiation, produces the dip in the absorption curve in a region where it should be rising. For, with the monochromatic light almost completely absorbed, the instrument essentially records only the increase in stray radiation with decreasing wavelength.

Once α has been determined, corrections may be made by means of a table (*5*) or the following equation: $A' = \log \frac{1 - \alpha}{T - \alpha}$, where A' is the corrected absorbance and T is the experimentally observed transmittance = antilog $(-A)$.

The above considerations have permitted the safe extension of the working range of the Beckman spectrophotometer down to 200 mμ. Because so many different compounds have an appreciable and characteristic extinction coefficient around 200 mμ, it is believed that the region has important analytical possibilities that have been almost completely neglected thus far. Studies on proteins, peptides, amino acids, and related compounds have already been initiated with interesting and useful results to be published soon.

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Electron Microscope Study of Epidermal Fibers[1]

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For many years the status of intracellular fibrils in the stratum spinosum of human skin has been much debated. Their appearance has been sketched by Rio Hortega (*1*) who represented them as extensions of the intercellular bridges. Chambers and Renyi (*2*), however, working with living material and a micromanipulator, found no evidence of intracellular fibrils and concluded that the fibrils were an artifact of fixation.

The present results were derived from normal human skin, preliminary to a study of pathological changes. Samples were obtained by punch-biopsies, the punch used being 1 mm in diameter. The samples, approximately 1 mm × 1 mm, were immediately put into 2% osmic acid and fixed for 24 hr. After washing and conventional alcohol dehydration, they were double-embedded in celloidin and hard paraffin. The celloidin was gradually increased in concentration to 12% and finally hardened in chloroform. Conventional paraffin immersion completed the embedding. The samples were oriented in plastic blocks so that cutting would be at right angles to the skin surface. Thin sections (0.1 μ) were cut on a modified Spencer microtome (*3*) and mounted on 200-mesh copper screens after extracting the paraffin and most of the collodion.

The results of many views of the stratum spinosum from a number of independent samples taken mostly from the upper arm are typified in Fig. 1. Intercellular bridges are clearly evident and appear to terminate at the cell boundaries, although no definite conclusions can be drawn as to whether they are protoplasmic in structure. On close view the precipitated cytoplasm also exhibits a fine feltwork of fibers, but they are of a different order of size than the intracellular fibers which have been described and furthermore are laid down in a random manner hav-

[1] Reviewed in the Veterans Administration and published with the approval of the Chief Medical Director. The statements and conclusions published by the authors are the result of their own study and do not necessarily reflect the opinion or policy of the Veterans Administration.

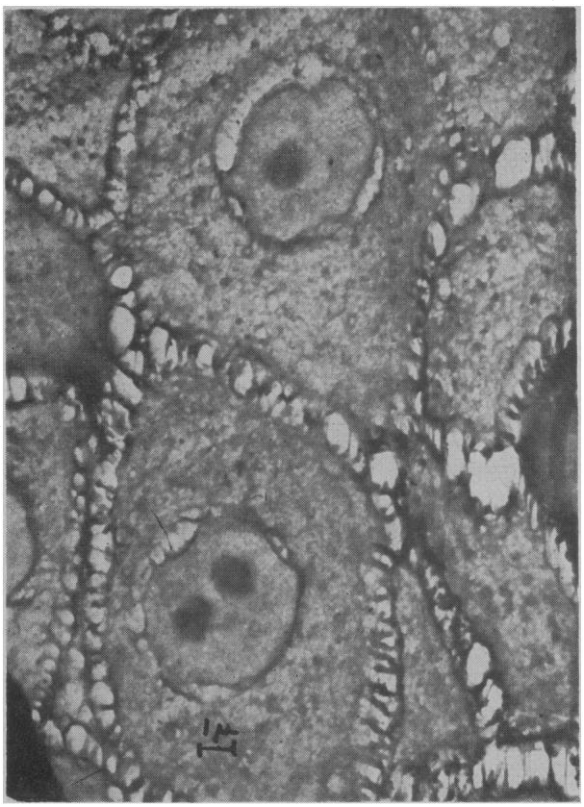

FIG. 1. Electron micrograph of 0.1-μ section of human epidermis (× 3540).

ing no apparent relation to the intercellular bridges. The diameter of these fine fibrils in the cytoplasm is more than likely a function of the fixative used, and is at a minimum for osmic acid.

Two interpretations of the intracellular fibers seen in light-microscope preparations suggest themselves.

Experience with fixatives other than osmic acid indicates that the size of the precipitated proteins (meshwork) is often of the same order of magnitude as the fibrils that have been described, and the general visual effect when viewing an ordinary stained section at one focal level would correspond to an appearance of fibrils against a smooth out-of-focus background. But the most likely interpretation is that in any section containing more than a single layer of cells one gets a very definite impression of fibrils as a result of intercellular bridges lying just above or below the plane of focus. Such artifacts arising from the limited depth of field of the light microscope are probably more numerous than is commonly realized. The use of very thin sections with the electron microscope has the disadvantage that it becomes difficult to follow structures that do not lie exactly in the plane of the section, but the large depth of field in the object space, which is characteristic of electron optics, serves to counterbalance this disadvantage to a great extent.

It must be added that preliminary work with pathological material has confirmed a previously recognized fact; namely, that there is a great proliferation of fibers throughout the epidermis. Only with such preparations have intracellular fibers been seen in thin sections.

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Effect of Hibernation upon Survival Time following Whole-Body Irradiation in the Marmot (*Marmota monax*)

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The relationships between reduced body temperature, lowered metabolism, and rate of development of the toxic effects of radiation have hitherto been little studied among mammals. The rate of development of the lethal processes following irradiation is reduced by lowered environmental temperature in frogs (*1*). Similar results have been obtained with chick embryos (*2*) and amphibian eggs (*3*). The reduced metabolic rate that resulted from chilling the irradiated frogs was accompanied by an increased survival time, but no reduction in mortality was observed. Increased metabolic rate resulting from thyroid administration has been found to coincide with an increased mortality in mice following irradiation (*4*). On the other hand, the administration of antithyroid substances, which reduce the metabolic rate, does not alter radiation lethality nor increase the survival time in irradiated mice (*5*).

The metabolic rate in the hibernating marmot averages only about one third that found in the nonhibernator (*6,7*). Marmots were selected for the experiments reported here in order to find out whether sensitivity to radiation would be lower in the hibernator than in the nonhibernator.

Two groups of marmots, equally matched as nearly as possible with respect to number, age,[1] and sex were used for the experiment. The animals of one group were allowed to hibernate in a constant-temperature room held at 3.5° C ± 0.5° C and were irradiated 3 weeks after the onset of deep hibernation. The other group was maintained at room temperature and served as nonhibernating, irradiated controls. The nonhibernating marmots were given 550 r, which was previously found to be approximately the LD_{100}. Higher doses, 650 r and, in one case, 800 r, were given to the hibernating marmots to accentuate a possible decreased radiation sensitivity in the hibernating phase.

[1] Roy Grizell, in a personal communication, kindly provided information, accumulated from several seasons of trapping, indicating that up to about 4 kg these animals increase in weight at a rate roughly equivalent to 1 kg/yr.