term "upper atmosphere" is misleading, since it conveys different meanings in the various fields such as meteorology, geophysics, and aviation medicine. For the common benefit it appears expedient to coin a new term for designating the regions of the atmosphere where—in terms of manned rocket flight—the conditions of conventional aviation blend into those of actual space flight. To this end the term "aeropause" is suggested. The aeropause is defined as that region of the atmosphere where its various functions for man and craft begin to cease and space-equivalent conditions are gradually approached. The concept of the aeropause appears to be quite useful in modern aviation; it circumscribes the area characterized by certain factors of environment that are distinctly different from those found in the area of conventional aviation or of space. The aeropause encompasses approximately the region between the 20- and 200-km levels.

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Lipochondria of Living Nerve Cells

IN A recent letter to *Nature* A. J. Dalton (*1*) reports the identification of the Golgi apparatus in mammalian duodenal and liver cells by the aid of the electron microscope following their fixation and sectioning. Similarly, there has been a recent tendency to report observations of the Golgi apparatus in fixed tissues after examination with the phase-contrast microscope (*2–5*). Of the authors mentioned, Barer alone was careful to point out that, although use was made of a new observational technique, fixation artifact remained in the tissues under examination.

After a cell is killed and fixed with chemical substances, then dehydrated, embedded in wax, and sectioned, it would seem that delicate intracellular structures must inevitably be distorted to some degree, with the possible production of artifacts. Whether we then stain these sections with dyes in order to render their details visible with the ordinary microscope or, instead, view the unstained sections with the electron or phase-contrast microscope seems unimportant, since the basic objection—the possibility of fixation artifacts—remains.

Clearly, the enigma of the Golgi apparatus can only be resolved by reference to the living cell. It is unfortunate that the electron microscope cannot be used for the study of living tissues, and in this respect Dalton's observations are necessarily limited. On the other hand, the phase microscope can and has been used in an attempt to see the Golgi apparatus in freshly isolated cells suspended in indifferent media (*6–9*).

Since 1946 the writer has been concerned with the phase microscopy of nerve cells of both vertebrates and invertebrates. Ever since Golgi's original observations on the Purkinje cells of the owl, the neuron has remained the classical site for the study of the internal reticulum. Here one can observe a large, elaborate Golgi apparatus, provided one kills and fixes the cells by means of appropriate technical methods. However, intensive study with the phase microscope has failed to reveal anything corresponding to the elaborate internal reticulum in living neurons. Instead, these studies have provided strong confirmation of the existence in the living nerve cell of the bodies described by John R. Baker, of Oxford, in 1944 and since named by him "lipochondria." These bodies are clearly distinguished by their reactions to vital dyes and can be readily observed by any person possessing a compound microscope, suitable dyes, and slides and needles for teasing tissues.

As the classical Golgi apparatus fails to reveal itself in living cells, it is tempting to assume that the lipochondria form part of the living counterpart to the "apparatus" of the dead and treated cell. This suggestion is strengthened by the knowledge that the lipochondria are osmiophilic, and it seems very likely that they act together with the mitochondria as centers, or foci, for the netlike nonspecific deposition of osmium and silver within the fixed cell during the prolonged immersion of the tissues in the impregnating fluids (*8*).

Much work remains to be done on this fascinating problem, but it is questionable whether any real advance in cytoplasmic cytology is likely to come from the employment of methods such as those of Dalton and Gatenby. The fixed preparation is seldom more than a caricature of the living cell, and it does not matter much how we view it—whether by the ordinary microscope or by the electron microscope. We must study living cells instead of searching with new tools in the wreckage of the cell following death and dehydration. The fresh and novel approach to cytology that has come from Baker's laboratory has already produced many new facts concerning cell organellae and promises to continue to do so. The time may well come when the Golgi apparatus will be discussed merely as an interesting reaction that can occur in a cell when it is subjected to certain chemical and physical conditions.

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