Comments and Communications

On Structural Variation in Conifer Wood

We have noticed with great interest the comment of R. D. Preston (*Science,* **112,** 312 [1950]) about our note on x-ray investigation of the change in orientation of cellulose in sound and infected tracheids of chir (*Science,* **111,** 151 [1950]). Regarding his contention that we have not referred to his work in our note, we have to say that as his brilliant work is not directly related to our discussions we avoided referring to it in our short preliminary note; we shall refer to it in detail in our complete paper. The extreme variability of structure in conifer wood, as pointed out by him, was also mentioned in our note and therefore received our very special attention. Contiguous chips from a region in the block of the sample which looked quite homogeneous have been used in the experiment, one chip being taken for an x-ray photograph of the sound wood, and another to obtain the photograph of the infected sample. As we obtained the same result on repeating the experiment a number of times, the results cannot be spurious. We are, however, attempting to take x-ray photographs of the same sample before and after infection, but as the samples for x-ray photographs are quite thin it is difficult to avoid complete disintegration of the sample on infection.

Dr. Preston's suggestion that the observed results are due to the removal of a disordered fraction of cellulose as a result of selective enzymatic action on disordered cellulose only appears to be too premature. Attempts are being made to bring out the mechanism that produces this interesting result.

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The Earth's Origin

Harold C. Urey (*Science,* **110,** 445 [1949]) has suggested that the core of the earth was composed of "moon-like material" surrounded subsequently by a uniform mixture of stone and iron. Later this core rose to form the Pacific Basin. The composition of Earth, Venus, and Mars can be explained by chemical reactions occurring at temperatures of 1,500–1,600° A. In a personal communication Dr. Urey wrote that he believes the earth is becoming 1,000 degrees hotter per billion years, and that the solar system condensed from cold gas and dust. Some of the difficulties inherent in this hypothesis are:

a) When the original core of the earth was gathering its mantle of stone and iron, the moon, revolving around the earth, should also have acquired a similar mantle.

b) The terrestrial rarity of neon requires that the earth condensed from dust and gas, in which the concentration of this cosmically abundant element was vanishingly small, for neon could not have escaped capture unless the temperature had been from 5,000 to 8,000° A.

c) If, as Urey suggests, condensation occurred at temperatures of 1,500–1,600° A, the anhydrous atmosphere would necessitate the assumption that Mars condensed in an anhydrous region of space, for water could not have been thermally dissipated from Mars at the temperatures postulated by Urey.

d) The formation of the Pacific Basin as postulated by Urey requires that the original core, which he assumes to have been of ''moon-like material,'' should rise to the surface as a whole in order to form ''the Pacific Basin with its floor of basaltic rock.'' Even if the earth had an original core of rock, it could scarcely have bobbed up in one piece, for the tensile strength of rock, especially if hot, seems inadequate to permit the leading hemisphere to pull the following hemisphere downward past the center of the earth. Instead, the buoyancy of the core would have pulled it apart into many fragments, thus forming, not one Pacific Basin, but many basins with ''basaltic floors'' scattered over the face of the globe.

e) The expansion of the earth in becoming 1,000 degrees hotter would be expected to cause tension failure all over the earth, but nearly all the failures are due to compression.

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Undergraduate Chemical Research

To the average freshman on registration day, research and chemistry are synonymous, but in too many schools the chemistry major graduates without ever having experienced anything but regimented laboratory exercises, repeating classic experiments that he can find described in dozens of textbooks. Of course, such exercises are vital preliminaries to research, but they are not very stimulating to the chemistry majors we would like to encourage to go on to graduate school.

Some schools have tried to remedy the situation by assigning senior research problems, but commonly we lose our best students to mathematics or physics in their sophomore and junior years. Besides, a senior problem is often merely busy work, because its selection is limited by what is assumed to be undergraduate research ability and by what is available in the way of faculty supervision, laboratory space, credit hours, equipment, and chemicals. As a consequence, the average senior problem is not of sufficient importance to merit a paper and probably will not be published, even anonymously, in the proper tables of such data.

Yet each one of us has repeatedly searched the literature in vain for some simple constant that he knows one of his good juniors could determine if he only had the time. It is even probable that the par-