letters

This announcement has been requested by seminar leaders, who include M. Azbel and A. Voronel. They are urgently in need of contacts with visiting scientists, having been denied normal routes of information exchange as well as professional employment.

GREGG DASH
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EARL CALLEN
Committee of Concerned Scientists
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More on Sherwood

I enjoyed reading about the origin of "Project Sherwood" in your October issue (page 78) and wanted to share with your readers an "alternative explanation" given to me by Charles Nomand. Nomand worked with E. O. Lawrence at Berkeley and later developed the vacuum systems for the calutron magnetic separators at Oak Ridge. When I arrived at Oak Ridge in 1954, I asked Nomand about the meaning of "Project Sherwood." He explained to me that it was a project to control thermonuclear fusion and told me all about Robin Hood and Friar Tuck. But then, he added, ". . . Project Sherwood really means that it 'sure would' be nice if it would work!" We certainly have a lot of reason for increased optimism for this possibility in 1974 than we did in 1954. However, in view of Charlie Nomand's interpretation, I vote that "Project Sherwood" be retained as a relevant and fitting title.

JOHN H. GIBBONS
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Knoxville, Tennessee

Birth of radioastronomy

I feel that I must correct an inaccurate statement, made by Victor Weisskopf, which you have quoted on page 28 of the November issue. Radioastronomy was not born in Holland, although his story about Oort is correct as regards the first radio observations of a spectral line. While several unsuccessful attempts to measure radio emission from the Sun were indeed first made in Europe at the turn of the century, the first actual detection of extraterrestrial radio radiation was made by Karl Jansky in 1931–32 at the Bell Telephone Laboratories in Holmdel, N.J. The only other significant pre-war observations were done by another American, Grote Reber. During and shortly after World War II, however, the Europeans, in particular the English, and the Australians very soon took the initiative away from this country and dominated the field for over a decade.

As Weisskopf also mentioned, the US is today once again being outclassed by the new radiotelescopes in England, Holland, and Germany. Unless the funding situation dramatically changes in the near future, I fear that American radioastronomy will remain "second fiddle" for a long time to come.

WOODRUFF T. SULLIVAN, III
University of Washington
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THE AUTHOR REPLIES: I agree very much with Woodruff Sullivan's statement and I regret that I have not been accurate enough in my interview about European science. Surely the credit for having made the first detection of radio emissions from outer space goes to Karl Jansky. It would have been perhaps more accurate if I said radioastronomy was not born, but was "raised" in Holland.

VICTOR F. WEISSKOPF
MIT
Cambridge, Massachusetts

No crystals in biology?

The impact of quantum concepts on biological systems is currently being felt. In particular, your May issue (page 9) contains a quantum-mechanical formulation by Charles Lumsden and Melvin Silverman of membrane processes. In the majority of biological systems, it is questionable if there is sufficient regularity to carry out quantum-mechanical calculations of electron states based on crystalline-lattice derived methods. Crystallinity is a precise mathematical concept, and although there is a great deal of organization in the molecular sense and some biological materials can be crystallized, the incidence of *in-vivo* crystallinity (as opposed to order) is probably rare. A review of the literature will turn up very few diffraction patterns, or other evidence, showing what is accepted to be crystallinity.[1] Thus, the quantum-mechanical formulation of most biological systems requires the application of quantum mechanics for disordered systems. Until recently, this has presented a virtually intractable problem.

The discovery of amorphous semiconductor switching in melanins, by J. E. McGinness, P. Corry, and P. Proctor[2] represents data that identify the melanins as amorphous semiconductors. This prototype system makes it clear that the direction of formulation is away from crystallinity and into the concepts of conductivity through disordered systems. As a further example, G. Kemeny and R. Rosenberg[3] have shown that conduction through proteins and many biological materials may be of a polaron nature. This discovery is interesting because, in amorphous ma-