LETTERS

Stanford's stand on Themis

In the interview with Chalmers W. Sherwin, which appeared in the September issue of PHYSICS TODAY, there are some serious misstatements. Possibly they are misquotations, but they should be corrected.

In particular, in a discussion of the Themis program, there is mention of "beautiful general-relativity-gyroscope-precession experiments conducted at Stanford." Themis does not support this work. This important experiment was first proposed by Leonard I. Schiff in 1960 in the course of his theoretical-physics research supported by the Air Force Office of Scientific Research. The experiment was then undertaken by William M. Fairbank, with support initially from AFOSR, and then from NASA and from the Air Force, Wright Field. This support is provided jointly with programs in the aeronautics and astronautics department. Thus pure physics and engineering are financed together, and in this respect only there is a resemblance to Themis.

However the Themis program is specifically designed so that universities like Stanford, which have already demonstrated excellence in research, are not eligible. It was originally intended that Themis would not interfere with project research chosen for its scientific or engineering importance. In fact, Themis is being expanded at a time when the overall research budgets are stationary or being reduced. Implementation of Themis in this way is bringing about a drastic reduction of university research programs and an almost complete stop to new directions in fundamental research.

Meanwhile, fortunately, some fundamental research projects such as the superconducting orbiting gyroscope are continuing. To accomplish the experiment on general relativity Stanford physicists must make, and are making, really major advances in technology. A precision of 0.01 sec of arc per year is expected. This sort of precision certainly would be useful in long space journeys or in satellites placed for long periods on station. Incidental technological achievements permit maintaining other cryogenic devices for long periods in space. Methods for producing and measuring extremely small magnetic fields are also greatly advanced. In turn, the possibility of zero-field regions prompted Stanford physicists to begin research on free-precession helium 3 gyros that may give a precise gyro usable on earth.

Who else needs such precision and is willing to go to so much trouble for it? Probably nobody else now. But what becomes possible will eventually be practical, and from a basic-research program will arise a whole new realm of technology. Themis will do well if it can match it.

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Free or mission research?

The interview with Chalmers Sherwin contains statements that greatly disturb me. I realize that statements in such an interview cannot be elaborated, and that if they were so qualified with detailed explanations and examples they might convey an impression opposite to that which one first experiences. My comments on this interview pertain to my first impression and hence are subject to change through better understanding.

The following statements particularly disturbed me: (1) ". . . the real strategy for research should be one of coupling long-range scientific work to short-range practical results . . ." (2) "Hindsight showed a broad lack of coupling between basic and applied research during the previous 20 years, which the country will no longer permit." (3) "If you want research funds, couple your request to an understandable need and justify the relevant long-range work by short-range practical results." (4) "In the future we must do only those experiments that are crucial to theoretical issues. Some scientists seem to want to do research only if it is useless."

If the above criteria had been applied by each investigator to determine whether he should start or continue his own research project, our greatest advances in understanding and mastering nature would still be in the hands of fate. How could a man like Paul Herget, who in the mid-thirties had a passion for calculating the orbits of asteroids and minor planets, justify his work on any of the above grounds?