

parchus too had measured an autumn equinox, on 27 September 146 B.C., 278 years earlier. Newton shows that if 278 times Hipparchus's estimate of a year (which is excellent but not quite right) is added to the Hipparchus equinox, the time arrived at is within minutes of the time reported by Ptolemy for his equinox. In other words, says Newton, Ptolemy must have worked backward from the result he was trying to prove instead of making an independent observation.

Newton has assiduously collected scores of similar examples in which Ptolemy's reported result is almost identical with what the Alexandrian sage wanted to prove and greatly different from what he should have observed on the basis of back calculation from contemporary data.

Few are likely to dispute Newton up to this point: certainly Gingerich does not quarrel with Newton's figures. What is

more controversial is Newton's interpretation of what he has found. Newton is wholly convinced that the only explanation is deliberate fraud. He raises, only to dismiss, the possibility that Ptolemy was unknowingly deceived by a dishonest assistant. He suggests that Ptolemy was motivated by desire to be known as a great astronomer, a claim to which his theoretical competence, in Newton's view, did not entitle him. If Ptolemy's fraud was so glaring, why was it not discovered by his contemporaries? "The only answer that I can see is that there were no astronomers left who were able to make competent measurements in the critical period, say in the century following Ptolemy," Newton concludes.

Gingerich has a different explanation. In a paper of January 1977 examining Newton's thesis (as expressed in earlier writings, not his latest book), he suggests that the observations reported in the *Al-*

magest were just a fraction of those that Ptolemy had available to him. For pedagogical purposes, Gingerich suggests, Ptolemy selected just the data which happened to agree best with his theory. That may not conform to modern ideas of scientific reporting, but it is quite different from fraud.

Gingerich has examined various astronomical problems treated by Ptolemy and shown that although the observations he cites are few and inaccurate, the explanatory model he proposes is remarkably good. This suggests that the model must have been derived from a larger data base, with only the best fitting results being quoted in the text. It can't be ruled out that Ptolemy "simply finessed the observations," Gingerich concedes, but the purpose was for honest pedagogic reasons, not to create a scientific hoax. "I suspect that Ptolemy, like many of the brilliant theoreticians

SUNY at Albany Admits Research Violations

A second public hearing into charges that the State University of New York at Albany (SUNYA) violated federal and state regulations governing research on human beings was averted on 28 October by a final-hour settlement between the university and the New York State health department.

As part of the settlement, SUNYA officials admitted that members of the university's psychology department had violated the state's Protection of Human Subjects law in 26 named experiments (*Science*, 28 October) by:

- Not obtaining the voluntary, informed, and written consent of the research participants,
- Failing to make a fair explanation to each participant of the risks involved,
- Failing to have the experiments reviewed by an approved institutional review board, and
- Failing to supervise the experiments properly, thus "increasing the possibility of physical, psychological or social injury to the participants." Seventeen other charges were dropped because the experiments involved were "of little consequence," a health department official said.

State University officials also agreed to a 6-month period of monitoring by the health department to ensure that campuses throughout the state system are in compliance with the law, and agreed to submit a policy statement affirming that students at the school may not be compelled to participate as subjects in human research. Prior to the settlement, the university had required that introductory psychology students participate in the experiments or write a term paper—a requirement made by many universities that, according to the health department, amounts to coercion under state and federal law.

SUNYA could have been fined as much as \$975,000, but Robert Whalen, the state health commissioner, assessed

the university a suspended \$100,000 fine that will be terminated completely if the university remains in compliance throughout the monitoring period. Roger Herdman, the state's director of public health, said that a fine probably will not be levied because "It would just go back into the state treasury, from which the university draws its funds" and because "the university has demonstrated a willingness to comply with the law in the future."

Agreement on the terms of the settlement was reached less than an hour before the start of a second public hearing on the charges, which were disclosed on 23 September. Health department officials said they had been prepared to present the testimony of several witnesses at the hearing, including that Brock Kilbourne, the former SUNYA student who prompted the investigation.

Donald Chalkley, director of the Office for Protection from Research Risks at the National Institutes of Health, said that he was satisfied by the settlement, although he will seek a separate assurance from the university that the violations will not recur. He added that he hoped that other universities "will put their houses in order" as a result of the SUNYA incident. A survey conducted in 1976 for the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, a government advisory group, indicated that between 25 and 33 percent of the universities that conduct nonfederally funded research involving human subjects do not submit the proposed research for the approval of an institutional review board recognized by the Department of Health, Education, and Welfare (HEW)—a violation of HEW rules that constituted the main charge in the SUNYA case. As a result of this affair, Chalkley said "the schools that are not in compliance should be taking a hard look at their research review procedures."—R. JEFFREY SMITH