

make it available to any one interested. It is hoped that a large amount of duplication of effort can be avoided in this way.

UNIVERSITY AND EDUCATIONAL NOTES

THE will of the late John McMullen, of Norwalk, Conn., and New York, was upheld by a jury in the Superior Court on February 7. A compromise was reached, but no details were given out. Under the will the bulk of the \$2,000,000 estate goes to Cornell University.

MR. DAN RADCLIFFE, the shipowner, of Cardiff, has promised to give £50,000 in 3½ per cents. for the benefit of the University of Wales in honor of the Prince of Wales.

DR. THOMAS STOCKHAM BAKER, formerly professor of German in the Johns Hopkins University and director of the Jacob Tome Institute, has been elected president of the Carnegie Institute of Technology, where he has been since 1919 secretary of the institute and acting president since the resignation a year ago of Dr. A. A. Hamerschlag.

DR. OTTO M. SMITH, formerly in charge of research for the Roseville Chemical Company, Roseville, Indiana, has been appointed assistant professor in quantitative chemistry at Iowa State College.

PROFESSOR F. TRENDELENBURG, of Tübingen, has refused a call to the University of Berlin to serve as the successor of Rubner for the chair of physiology. A call has been sent to Dr. Franz Hofmann, of Bonn.

PROFESSOR H. POLL, of the University of Berlin, has been appointed professor of general biology and the theory of heredity.

DR. POTTEVAN, senator, has been elected professor of general hygiene in its relations to industry in the Paris Conservatoire National des Arts et Métiers.

DISCUSSION AND CORRESPONDENCE

REACTION TIME AND FATIGUE

THE personal equation in star transits is due to the coordination of eye, hand and brain of the observer. Its absolute amount is difficult to determine, as artificial transits must always lack some features of the usual observing con-

ditions. Fortunately it does not affect most of our right ascension results, since they are derived from the differences of transits, in which the effect is eliminated, if it is constant. In longitude campaigns, also, the difference of personal equations can be eliminated by exchanging stations.

We can not determine absolute clock corrections, nor absolute clock rates without taking account of personal equation and its constancy. For the mean daily rate of a clock, derived from successive observations of the same stars, the equation eliminates, if it is constant. For hourly rates, derived from successive clock corrections during a night, the question of variability of personal equation needs consideration. Variation might be produced by fatigue or other physical conditions.

There are traditional stories in astronomical practice of observers who indulged in the excessive use of strong stimulants, such as coffee, in excessive smoking and, possibly, taking into account the origin of these stories, in *Pilsener* for the contrary reflex, and then proceeded to determine the effects upon observations. Large accidental variations would be anticipated, rather than systematic changes, with such abnormal deviations from the habits of rational observing.

In the series of observations recently completed here for the purpose of testing a possible diurnal periodic term in clock performance, the test of change in personal equation emerges as a by-product. The test is a delicate one, and it is only by assembling a relatively large mass of material that a reliable conclusion can be reached.

Six hours of continuous observing have been included on each of twenty-four nights during a complete year, nearly two thousand transits in all. For the usual night of about four hours' interval no sensible amount of physical or mental fatigue is commonly experienced. Perhaps it is the consequence of more than forty years of observing that renders an observer sensitive to real fatigue at the close of six hours of work. Ordinarily it would not be considered wise to continue work when the precision of the results might be affected by physical conditions, but the requirements of this special problem made it advisable to use these long periods.