

were teaching flight some 90 hours per month and were well known personally to their commander from months of association. We, in turn, rated these men entirely from their urine data putting the lowest excreter of stress 17-ketosteroids at the top of the list. On matching the two rating tables we were impressed with the correspondence. Our numbers 1, 13, 14, 15 and 16 men agreed on both listings. There were many discrepancies for men in between but with, none the less, a tendency to agreement as indicated by a correlation coefficient of 0.676 with a P value of < 0.01 between our urinary index and the commander's subjective evaluation of his men's ability "to take it."

From what has been said it appears that marked variations in the abilities of men to withstand fatiguing ordeals is related to their adrenal cortical functions and it was natural to ask if the administration of suitable steroids might increase one's ability to withstand the type of measurable stress we were investigating. We have accordingly tested several steroid substances and have found one in particular, Δ^5 pregnenolone, a synthetic compound supplied to us by the Schering Corporation, that has improved and prolonged scoring ability on our pursuitmeters without having any deleterious after effects. We have compared the action of this substance to that of placebo pills that look and taste just like it but which contain no active principle. From 356 experiments on 21 healthy young men we have found, in most cases, marked improvement in target meter performance when they orally took 50 mg per day of pregnenolone.⁵ In addition, comparable experiments on a group of over 100 volunteer industrial workers in two industrial war industries engaged in a variety of operations involving incentive piece work pay have shown statistically significant improvement in production rates and in waste saving when taking pregnenolone as contrasted to placebos (unpublished).

Objectively measured antifatigue effects of pregnenolone are variable from person to person. Some show no improvement and report no subjective symptoms from its use but a substantial number have reported feeling less fatigued and better able to cope

with their jobs when they were taking it as contrasted to periods when they were taking placebos. That pregnenolone when given orally is absorbed and transformed in the body into a variety of hormonally active steroid substances has been demonstrated in our laboratory (unpublished). From urine analyses of aviators who took pregnenolone during actual flight tests their curve of percent time in air vs. stress 17-ketosteroids rises at only approximately half the rate of the curve when not on pregnenolone. This we believe indicates a sparing action of hormone secretion on the adrenal cortex when pregnenolone is administered. But just how or why this substance should alleviate fatigue remains for future investigations to demonstrate.

Other steroids may prove to be as efficacious in counteracting psychomotor fatigue as is pregnenolone. We obtained negative results with adrenal cortical extract and progesterone in a series of tests, but these do not rule out the possibility that these substances may counteract fatigue since the amounts we used in our preliminary tests and the number of our experiments may have been inadequate to show possible effects.

We are convinced that pregnenolone is most effective in combatting fatigue where motivation is high and where men are working under really trying conditions. Our hard worked pilots who were professionally interested in making high scores on the target meter showed more improvement on pregnenolone (average 25 per cent.) than did our paid civilian subjects (average 10 per cent.) who were not under as much working stress and whose interest in the experiments was less. In a third industrial group that we investigated in which there was no incentive pay pregnenolone did not increase production over placebo levels.

We believe that these findings to date are of a preliminary nature. The increase of human working efficiency without evidence of artificial overstimulation and untoward side effects is a desirable objective. We hope that others will be able to confirm us and advance this aspect of the field of biological engineering.

OBITUARY

HARRY FIELDING REID

DR. HARRY FIELDING REID, emeritus professor of dynamical geology and geography of the Johns Hopkins University, died on Sunday, June 18, just one month after his 85th birthday. Born in Baltimore, he took his A.B. and Ph.D. degrees at the Hopkins.

⁵ G. Pineus and H. Hoagland, *Jour. Aviation Med.*, 15: 98, 1944.

After graduation he served successively as professor of mathematics and then of physics at Case School, returning to his alma mater in 1894 as lecturer, then as professor of geological physics, retiring in 1929.

His was a long and distinguished career as a scientist as evinced by his early election to the National Academy of Sciences. He was devoted to the precise thinking and rigid demands of proof which doubtless

grew out of his mathematical training and exercised a very salutary influence by both example and precept in the field of geology which is, to such a large degree, an eclectic science. Early in his career he devoted much time to the study of glaciers, his investigations taking him to the Swiss Alps and on several trips to Alaska, where he discovered and named several glaciers as the Gilman and Johns Hopkins. Several valuable papers on the measurement and movement resulted. Dr. Reid was president of the Seismological Society of America from 1912 to 1914 and of the Geophysical Union from 1924 to 1926. For many years until the university moved to Homewood he ran the seismograph at the Hopkins, serving on many important committees of the Seismological Society and serving as special expert of earthquake records for the U. S. Geological Survey. He was appointed by President Wilson a member of the committee to investigate the slides that were so bothersome in the construction of the Panama Canal and a few years afterward to a second distinguished committee to study the great California earthquake that originated along the San Andreas fault. During the latter study Dr. Reid developed the slip theory of the origin of earthquakes. He was interested in all the aspects of dynamical geology, publishing fundamental papers on the mechanics of faulting. He was a consistent critic of the planetesimal hypothesis and of the many phases of orogenies and contributed much to establishing the dictum that the folding of rock masses is merely an early step in the formation of mountains which are primarily due to epeirogenic forces and erosion.

Dr. Reid was Hitchcock lecturer at the University of California in 1911. Along with the late Dr. Joseph S. Ames he was sent abroad by Woodrow Wilson to report on the war effort of British science in World War I. He was a member of many learned societies at home and abroad, including the International Geodetic and Geophysical Union, the American Philosophical Society, Geological Society of America, Academies of Sciences of Washington and Philadelphia, Société Helvétique des Sciences Naturelles, International Seismological Association, etc.

In 1898 when the Maryland Geological Survey inaugurated the good roads movement in Maryland, Dr. Reid served as chief of the highway division of the survey for seven years.

He was a life-long Democrat until the advent of the New Deal, a close friend of Woodrow Wilson and took a lively interest in Baltimore affairs. Personally he was rather reserved; consequently those who held him in high and affectionate regard were distinguished by their quality rather than their quantity. We, who were closely associated with him for so many years,

are happy to remember him as a very great gentleman and scholar.

Survivors are his widow, the author of intimate biographies of Dr. William Osler and Woodrow Wilson, a son Francis and a daughter Doris.

EDWARD W. BERRY

DAYTON STONER

SEIZED by an almost fatal heart attack in April, 1943, Dr. Stoner, after great apparent improvement and on a day when his cheerful disposition had been especially manifest, died of coronary occlusion on May 8, 1944. Funeral services were held at both his latest, and an earlier, home-town—Albany, N. Y., and Iowa City, Iowa, respectively—and interment was at North Liberty, Iowa, his boyhood home. He is survived by his wife, whom he married as Lillian R. Christianson at Iowa City in 1912, and by a sister, Miss Nellie D. Stoner, of Denver, Colorado.

Stoner was born on November 26, 1883, son of Marcus and Nancy (Koser) Stoner. From the public schools he went to the University of Iowa where as a student and member of the faculty he remained until 1928. He took the degrees: A.B. in 1907, M.S. in 1909 and Ph.D. in 1919. Beginning as instructor in zoology the year after graduation, he advanced to the grade of assistant professor. About 1912 he engaged in summer studies of insect biology and control for the State College of Iowa. The summer of 1916 was taken up by teaching at the Okoboji Lakeside Laboratory of the University of Iowa and those of 1919 and 1920 at the Douglas Lake Biological Station of the University of Michigan. He was a field assistant in the Federal Bureau of Entomology from 1928 to 1931, during which years he also had summer employment as a field ornithologist for the Roosevelt Wildlife Station in New York. From 1932 until his death, he was state zoologist of the New York State Museum. He was an affiliate of the American Association for the Advancement of Science, American Society of Mammalogists (charter member), American Ornithologists' Union (member class), National Audubon Society, Wildlife Society, Wilson Ornithological Club, Northeastern Bird Banding Association, Iowa Academy of Sciences (fellow), Iowa Ornithologists' Union and Sigma Xi.

Stoner was fortunate in accompanying the Iowa State College expedition to Vancouver Island in 1913, and those of the University of Iowa to Barbados and Antigua in 1918, and Fiji and New Zealand in 1922. Some ten to twelve of his papers reported on traveling and collecting experiences on these trips. His interests in the earlier years of his publishing career tended to center about insects and in the later ones