The Edison medal for 1935 will be presented to Dr. Lewis B. Stillwell on Wednesday evening, January 29. After the presentation, a lecture on astronomy will be given by Dr. Harlow Shapley, director of the Harvard College Observatory. In addition to the long list of technical papers, symposia are planned on magnetic materials and on the modernization of distribution systems. Friday will be devoted to inspection trips, and visits have been planned for the other days of the convention in such a way as to supplement the technical sessions.

OFFICERS for the Sixth Midwest Power Engineering Conference, which will meet from April 20 to 24 at Chicago, are the following: *President,* F. D. Chase, Chicago; J. R. Van Pelt, *chairman;* O. A. Anderson, Frank Innes, J. E. Kearns, G. E. Pfisterer and K. A. Auty, Chicago. The conference will be sponsored as before by the local sections and regional divisions of the following societies: the American Institution of Electrical Engineers, the American Society of Civil Engineers, the American Society of Mechanical Engineers, the Edison Electrical Institute, the Western Society of Engineers, the National Safety Council and the American Society of Refrigerating Engineers. Official hotel headquarters will be at the Palmer House, where the entire fourth floor has been reserved for meetings, lunches and receptions. Afternoon sessions will be held at the International Amphitheater, where the Midwest Power Show will be held. Meetings are open to all persons interested, regardless of membership in the sponsor societies, but participating members must conform to registration rules.

THE second Congress of the International Society of Microbiology will be held in London from July 25 to August 1. University College, Gower Street, London, W.C.1, will be the headquarters and all scientific sections will be held there; additional accommodations, if required, will be available in the adjacent buildings of the London School of Hygiene and Tropical Medicine and the Wellcome Research Institution. The president of the executive committee is Professor J. C. G. Ledingham; the honorary general secretary is Dr. R. St. John-Brooks, both of the Lister Institute. A preliminary program has been issued which may be obtained from the honorary general secretary, Second International Congress for Microbiology, Lister Institute, Chelsea Bridge Road, London, S.W.1, England. All those interested in microbiology may become members of the congress on payment of a subscription of five dollars. Prospective members are urged to register early. Dr. Karl Landsteiner, Rockefeller Institute for Medical Research, is president, and Dr. Malcolm H. Soule, University of Michigan, is secretary, of the American National Committee.

DISCUSSION

THE DAVID EUGENE SMITH GIFT OF HISTORICAL-MATHEMATICAL INSTRUMENTS TO COLUMBIA UNIVERSITY

THE rather wide publicity recently given by the press to my gift to Columbia University has led to a request that I give a brief summary of the items presented.

A few years ago I gave to the university my library on the history of mathematics, consisting of upwards of 20,000 items—bound volumes, manuscripts, portraits of mathematicians (about 2,700 engravings and 160 medals), catalogued monographs (2,000) and 4,000 letters, including such leaders as Newton, Descartes, Leibniz and the Bernoullis. For use in my lectures I had, over a period of more than 40 years, collected more than 275 instruments of early and medieval times for purposes of calculating, measuring (lengths, areas, volumes, weight and time) and astronomy (navigation, astrology, and the calendar). It therefore seemed appropriate that this historical-mathematical material should be placed alongside the books, many of which describe and illustrate the instruments themselves.

Among the most interesting pieces the following may be mentioned:

Representing numbers: tally sticks beginning with those of the thirteenth century; early Greek alphabetic numerals of the Ptolemaic period on an ikosahedral die; several pieces of papyrus with coptic numerals; several hundred medieval parchments containing numerals; and a few knotted cords and prayer beads from the orient.

Operations with numbers: sets of counters used on a computing table; various forms of the abacus (Chinese, Japanese, Armenian, Russian and Western European); and a cast of an early Greek computing table now in Athens.

Number games: dice of various types and periods from Etruscan, Egyptian, Greek and Roman times through the medieval period.

Measures: length (rods showing the ell, cubit and other units); weight (numerous nests of brass weights, some sealed officially and interesting as works of art; various forms of the steelyard; money-changers sets from various countries); angles (proportional compasses of the Roman period, ordinary compasses—also Roman, and various types from the renaissance

period, some with the names of prominent makers; various types of protractors.

Measures of time: sundials of various countries and eras. Those of China are often works of art, being engraved with great care. Most of the various types of sundials are shown. These are in ivory, bronze, silver or wood. Two Japanese clocks of curious mechanism are included.

Instruments of surveying and navigation: These include several remarkable astrolabes beginning with one of the sixteenth century. There are also a number of early quadrants and other instruments in copper and in brass. In general they were secured in Italy, Germany, India, Austria, Iraq, Arabia and France.

Astronomical instruments, including those above mentioned and a number of brass armillary spheres (some of artistic merit) and celestial spheres of brass with the important stars inlaid in silver. These were secured in northern India about thirty years ago. One of them bears the inscription, dated 1645, stating that it is the work of the grandson of the emperor's chief astronomer.

These instruments represent the elementary and utilitarian phase of mathematics. The university already had a large collection of modern geometric models, chiefly of European origin.

DAVID EUGENE SMITH

SOURCE OF PROPULSIVE POWER USED BY FLYING FISH

SEVERAL references have appeared in recent months relative to the method of flight used by flying fishes. In all of them the consensus of opinion seems to be that the flight in itself is purely a glide, with no generation of new motive power once the fish has cleared the water. This is not strictly true.

On a recent hundred-day voyage, mainly through tropical waters, I became interested in their source of motive power and spent literally hours of my leisure time watching the take-offs and flights. Eye analysis of the motions is of course not so reliable as would be possible with a moving picture camera, but on one point the eye does not deceive. These fish, as they leave the surface of the water, do actively lash the water with their tails, and at this time there is a synchronous movement of the wings. Whether the wing movement adds impetus or is purely secondary to body movement of the tail lashing is impossible to say. The point I wish especially to contribute is that these fish, after the take-off, may again and again lower the tail into the surface of the water and lash it violently to gain impetus for continuation of their flight. The entire body does not enter the water; only the tail is lowered by a backward tilting of the whole. I watched this act of renewing impetus numberless times, often seeing it repeated four or five times in the course of a single flight. Naturally it can be observed only when the sea is quite calm.

The flying fish flight, then, is often not simply a sustained glide, but may be a series of glides interrupted by brief periods of tail lashing on the surface of the water for gaining additional impetus. The tail lowering appears to be intentionally performed when the body approaches close to the water surface.

C. A. MILLS

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THE DEPOSITS OF HAYDEN VALLEY IN YELLOWSTONE NATIONAL PARK

YELLOWSTONE RIVER flows north from Yellowstone Lake through a broad depression known as Hayden Valley. The floor of this depression, about 25 square miles in area, is covered with deposits which are mapped in the United States Geological Folio for Yellowstone Park (No. 30) as glacial drift. De Martonne accepted the material as moraine in discussing movements of ice in this area.

In a survey made during the summer of 1933 by the writer in company with Professor Douglas Johnson, of Columbia University, some doubt was raised regarding the earlier identification of the deposits. These doubts were founded on: (1) the well-integrated drainage prevailing in the supposed morainal area, coupled with the fact that the few shallow depressions which do appear are associated with a topography suggestive of slumping; (2) the presence of horizontal bedding revealed in some of the hill slopes and the exposure of laminated silts and clays in holes dug by burrowing animals; (3) the general absence of large boulders. The hills are mantled by loose cobbles and gravel which creep down the slopes and mix with wash from the underlying silt and clays. The superficial resemblance of the resulting material to till probably accounts for its earlier misidentification.

New road cuts in Hayden Valley show that the rolling moraine-like hills are composed largely of finely laminated or varved clays and clay-silts. These unquestionably lacustrine sediments pass downward into fluvial or glaciofluvial sands and gravels which form the basement deposits of the hills.

Recognition of the lacustrine origin of all but the lowest sediments has led to a new conception of the Pleistocene history of Hayden Valley. Details of the history will be discussed in a comprehensive report on the geomorphic development of the Grand Canyon of the Yellowstone River. This study represents one phase of the Big Horn-Beartooth-Yellowstone Project and is supported in part by grants from the Geological Society of America.

ARTHUR DAVID HOWARD

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