£3,500 which it has collected; £263 have been sent direct by contributors; approximately £100 yet remain in the hands of the treasurer, Mr. W. J. Matheson. Professor Baskerville, the chairman, hopes that the total American contribution which is £3,863, may be raised to £4,000, and that the American subscriptions may then be closed. The total fund now amounts to £51,274. Professor H. Kamerlingh Onnes reports contributions of £1,571 given or promised by donors in Holland.

Robert W. Lawson writes to *Nature* from the Physics Laboratory, the University of Sheffield, quoting a letter of Professor Einstein as follows: "Zwei junge Physiker in Bonn haben nun die Rot-Verschiebung der Spektral-Linien bei der Sonne so gut wie sicher nachgewiesen und die Gründe des bisherigen Misslingens aufgeklärt."

Mr. Theodore W. Robinson, of Chicago, has given $500 to be used in purchasing museum material for the Oriental Institute of the University of Chicago; and a donor whose name is withheld gives $25,000 for the same purposes. These funds will be used by Professor James Henry Breasted, who is now in Egypt on his way to Mesopotamia.

The National Research Council has received a gift from the Southern Pine Association of $10,000 to pay for the incidental expenses of a coordinated scientific study by a number of investigators of the re-growth of trees or cut-over forest lands with the aim of determining the best forestry methods for obtaining the highest productivity. The investigation will be conducted under the advice of the Research Council's special committee on forestry and will not duplicate any present government or other undertakings along similar lines.

On the invitation of the council of the senate of the University of Cambridge, the chancellor, the vice-chancellor, Mr. Rawlinson, Professor Sir Joseph Larmor, Professor Sir J. J. Thomson (master of Trinity), Dr. Hobson, and Professor Sir Ernest Rutherford, have consented to serve as representatives of the university on a joint committee of the Royal Society and university for the purpose of taking steps to secure an appropriate memorial to the late Lord Rayleigh.

UNIVERSITY AND EDUCATIONAL NEWS

Professor William H. Walker, chairman of the administrative committee of the Massachusetts Institute of Technology, since the death of President Maclaurin, has resigned to devote his time to the division of industrial cooperation and research. The new chairman is Professor H. P. Talbot, chairman of the faculty. Professor E. B. Wilson, of the physics department has been appointed a member of the committee, on which is also Professor Edward Miller, of the department of mechanical engineering. Professor Walker is succeeded as head of the course of chemical engineering by Professor Warren K. Lewis. As has been already noted here, Professor Arthur A. Noyes, head of the research department, has handed in his resignation as of January 1, to go to the California Institute of Technology.

After thirteen years of service as professor of medicine and ten years as dean of the Yale School of Medicine, Dr. George Blumer has resigned to resume consultation practise, but he will not wholly sever his connection with the school and the hospital.

Dr. Arthur B. Lamb has been promoted to a professorship of chemistry at Harvard University.

Dr. Adolph Knopf, of the U. S. Geological Survey, has been appointed lecturer in geology in Yale University for the second term of the present academic year. He has in charge the undergraduate and graduate courses in petrology formerly taught by the late Professor Pirsson. Additional appointments in the geological department are those of Dr. Carl O. Dunbar (B.A. Kansas 1913, Ph.D. Yale 1917) as assistant professor of historical geology, and Mr. Chester R. Longwell (B.A. Missouri 1915, M.A. 1916) as assistant professor of geology.

THE trustees of Cooper Union, New York City, have authorized the organization of a four-year day course in industrial chemistry to be started in September of the present year. This course will aim to train men as analysts, research chemists, foremen and superintendents in manufacturing plants, and sales agents. Mr. Maximilian Toch, has been appointed adjunct professor of industrial chemistry.

DR. H. E. ROAF has been appointed to the university chair of physiology tenable at the London Hospital Medical College, and Professor T. Swale Vincent to the university chair of physiology tenable at the Middlesex Hospital Medical School.

DISCUSSION AND CORRESPONDENCE

AN ODD PROBLEM IN MECHANICS

TO THE EDITOR OF SCIENCE: The following statements are intended to throw light on the questions raised by Dr. Hering in his letter entitled "An odd problem in mechanics" in SCIENCE for January 9, 1920.

The statements in the second paragraph of the letter are correct: a body travelling eastward on the ground along the equator will exert less pressure on the ground than one at rest relative to the earth's surface, and still less pressure than a body travelling westward. The correctness of this statement was verified experimentally in connection with observations to determine the intensity of gravity at sea by determinations of the boiling point compared with readings of the mercury barometer. In the spring of 1909 the Russian government placed a war ship at the disposal of Professor Hecker, who was engaged in this work, and tests were made in the Black Sea by comparing the gravity obtained when the ship was running east with gravity at the same point when the ship was running west. The correction in question is of the order of 0.100 dyne for a vessel of fair speed, and the reality of the expected effect and the necessity of applying a correction for it were, of course, verified. It should be mentioned that the rolling, pitching and lifting of the ship, which occur on all courses, were such that the total effect of the ship's motion did not necessarily reverse in sign when the ship's course was reversed.

In the third paragraph it is assumed that the "gyroscopic tendency (of a rotating horizontal flywheel) to get into the vertical plane has been counteracted and may be neglected." But the forces Dr. Hering has been describing in this paragraph are exactly the gyroscopic forces themselves that tend to make the axis of the flywheel parallel to the earth's axis. At the equator, since the celestial pole is in horizon, the plane of the flywheel would tend to become vertical. If the gyroscopic tendency is counteracted, there is, of course, no shifting of the axis of rotation.

In the cases supposed in the fourth paragraph, there are gyroscopic forces arising from the earth's rotation that Dr. Hering has not considered. When the plane of rotation is north and south, that side of the disk which is descending will tend to move eastward, and the side that is ascending will tend to move westward, thus tending to turn the plane of the disk out of the meridian into the prime vertical, so that its axis shall be parallel to the axis of the earth. The apparatus will therefore not be dynamically balanced as Dr. Hering states. At the equator there is no twisting effect due to the horizontal motion of the particles on the edge of the disk, for this effect varies as the sine of the latitude. At the equator, when the plane of the disk is east and west, its axis is parallel to the earth's axis, and the apparatus is dynamically balanced.

The nature of the general question raised may be stated in a few words as follows. For a body at rest on the earth, it is sufficient to consider only the attraction of the earth and the centrifugal force due to the earth's rotation. For a body in motion relative to the earth, there are additional apparent forces to be considered, the so-called gyroscopic forces, or compound centrifugal forces. These apparent forces arise from the fact that our axes of reference are not fixed in direction in space, but are rotating. These forces are all proportional to the product of the earth's angular velocity of rotation by a component velocity