

possible bearing on field studies during the present season.

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#### THE RELATION OF THE HORSEPOWER TO THE KILOWATT<sup>1</sup>

THERE was, before 1911, no precise definition of the horsepower that was generally accepted and authoritative, and different equivalents of this unit in watts are given by various books. The most frequently used equivalent in watts, both in the United States and England, has been the round number, 746 watts; and in 1911 the American Institute of Electrical Engineers adopted this as the exact value of the horsepower. It is obviously desirable that a unit of power should not vary from place to place, and the horsepower thus defined as a fixed number of watts does indeed represent the same rate of work at all places. Inasmuch as the "pound" weight, as a unit of force, varies in value as  $g$  the acceleration of gravity varies, the number of foot-pounds per second in a horsepower accordingly varies with the latitude and altitude. It is equal to 550 foot-pounds per second at 50° latitude and sea level, approximately the location of London, where the original experiments were made by James Watt to determine the magnitude of the horsepower.

The "continental horsepower," which is used on the continent of Europe, differs from the English and American horsepower by more than 1 per cent., its usual equivalent in watts being 736. This difference is historically due to the confusion existing in weights and measures about a hundred years ago. After the metric system had come into use in Europe, the various values of the horsepower in terms of local feet and pounds were reduced to metric units and were rounded off to 75 kilogram-meters per second, although the original English value was equivalent to 76.041 kilogram-meters per second. Since a unit of power should represent the same rate

of work at all places, the "continental horsepower" is best defined as 736 watts; this is equivalent to 75 kilogram-meters per second at latitude 52° 30', or Berlin. The circular gives tables showing the variation with latitude and altitude of the number of foot-pounds per second and of kilogram-meters per second in the two different horsepowers.

These values, 746 and 736 watts, were adopted as early as 1873 by a committee of the British Association for the Advancement of Science. The value, 0.746 kilowatt, will be used in future publications of the Bureau of Standards as the exact equivalent of the English and American horsepower. It is recognized, however, that modern engineering practise is constantly tending away from the horsepower and toward the kilowatt. The Bureau of Standards and the Standards Committee of the American Institute of Electrical Engineers recommend the kilowatt for use generally instead of the horsepower as the unit of power.

#### THE IMPERIAL UNIVERSITIES CONGRESS

THE Imperial Universities Congress was opened by Lord Rosebery on July 2, at the University of London, South Kensington. As we learn from the reports in the *London Times* the question of the division of work and specialization among universities was dealt with in a paper by Sir Alfred Hopkinson, and Sir Arthur Rücker and Sir Charles Waldstein spoke on the same subject. Principal Peterson, of McGill University, introduced a discussion on inter-university arrangements for post-graduate and research students.

On July 3 there were two sessions of the congress, Lord Curzon of Kedleston presiding in the morning and Mr. Balfour in the afternoon. Papers were read on the relation of the universities to technical and professional education, the interchange of university teachers, and the problem of universities in the east. The speakers and readers of papers included Sir Frederick Lugard, Sir Isambard Owen, Dr. A. E. Shipley, Sir Thomas Raleigh and

<sup>1</sup> Abstract of Circular of the Bureau of Standards, No. 34; June, 1912.

Professor Patrick Geddes. Lord Rayleigh and Lord Haldane presided on July 4, and among others Principal W. H. Hadow, Sir Edward Busk and Sir George Gibb were on the program. On Friday, when Lord Strathcona presided, Dr. G. R. Parkin and Sir Alfred Keogh dealt with the question of the establishment of a central bureau, Mrs. Sophie Bryant, Mrs. Sidgwick, and others with the position of women in universities, and Sir James Donaldson and Mr. Michael Sadler with the representation of teachers and graduates on the governing body of a university. The entertainments included a luncheon at the invitation of the government, a reception of delegates by Prince Arthur of Connaught at the University of London, dinners at the halls of several city companies and an "At Home" at the Mansion House.

#### SCIENTIFIC NOTES AND NEWS

CAMBRIDGE UNIVERSITY has conferred the degree of doctor of science upon Edwin Brant Frost, director of the Yerkes Observatory.

AMONG newly created doctors of laws of the University of Edinburgh are Dr. J. S. Phelps, of the Geological Survey, and Professor J. Theodore Cash, F.R.S., professor of materia medica, University of Aberdeen.

DURHAM UNIVERSITY has conferred its doctorate of science on Professor Prafulla Chandra Ray, dean of the faculty of science in the University of Calcutta; Professor L. P. Anderson Stuart, professor of physiology and dean of the faculty of medicine in the University of Sydney.

CAMBRIDGE UNIVERSITY will confer the degree of doctor of science on Dr. Howard Marsh, professor of human anatomy in the university and master of Downing College.

DR. R. T. GLAZEBROOK, F.R.S., director of the National Physical Laboratory, has been elected president of the Faraday Society.

At the seventy-eighth annual general meeting of the Royal Statistical Society, Professor F. Y. Edgeworth was elected president.

THE *Journal* of the American Medical Association states that the friends, the pupils and ophthalmologists of many countries united recently in celebrating the seventy-seventh birthday of Professor Henri Dor, by presenting him with a portrait medal. The reverse of the medal typifies Dor's life-work, as it represents science pushing back the clouds that the light can fall on the child beside it. The background shows Dor's home on the banks of the Rhone at Lyons where he has been professor of ophthalmology since 1876. He was a pupil of both Graefe and Donders, and founded thirty years ago the *Revue Générale d'Ophthalmologie*.

A NEW office, that of administrative geologist, has been created on the U. S. Geological Survey, and Dr. George H. Ashley, Ph.D. (Stanford, '94), chosen to fill it. This position is virtually vice-director of the survey, placing the incumbent in complete charge of the organization during the absence of the director, and in addition giving him charge of certain functions of the organization the whole time. Dr. Ashley has been a geologist of the survey since 1901 except for the years 1910 and 1911, when he was state geologist of Tennessee.

THE following promotions to the rank of geologist of the U. S. Geological Survey have been made: Robert Anderson, B. S. Butler, Adolph Knopf, F. H. Moffit, G. B. Richardson and A. R. Schultz.

DR. CHESTER A. REEDS, for the past four years lecturer and associate in geology at Bryn Mawr College, has been appointed assistant curator of the department of geology and invertebrate paleontology of the American Museum of Natural History. He enters upon his new duties August first, after spending some weeks in Europe visiting museums.

MR. F. W. JONES, has been appointed chief chemist of the purification works of the Fitchburg, Massachusetts, Sewer Department. Mr. Jones was for some time instructor in chemistry at the Worcester Polytechnic Institute. During the past year he has been assistant