and Berea College, Berea, Ky., one per cent. A separate fund will be in trust for each of these institutions. It is provided that sixty per cent. at least of all disbursements be made in the State of Ohio.

IT is reported in *The Times*, London, that a new organization, the Council for the Promotion of Field Studies, was formed at a recent meeting, held at the British Museum (Natural History) South Kensington, attended by representatives of universities, scientific societies and other bodies in many parts of the country. Professor F. E. Fritsch presided, and the proposal for the establishment of the council was put forward by F. H. C. Butler, who explained that support for the scheme had been promised by the Board of Education and the Scottish Education Department as well as by a number of learned societies. He suggested that the existing facilities for the study of natural history at first hand needed to be much improved, and that the best method of doing this would be to create a certain number of hostels for field studies in appropriate localities, each under a trained warden.

ACCORDING to *Nature* at the sixth meeting of the Conference of Ministers of Education of the Allied Governments held at the offices of the Board of Education last October, it was agreed to establish an Inter-Allied Bureau to carry out the practical steps needed to restore educational services in the countries concerned. This bureau will be the executive body of the conference. The work to be undertaken by the bureau includes the purchase and distribution of books and periodicals, the preparation of films and other visual aids and the supply of scientific equipment. These matters are at present being considered by commissions of the conference. The bureau was also asked to consider financial needs and methods of contribution by governments and the establishment of an inter-allied secretariat.

The Times, London, under date of December 16, writes: "Mr. Attlee, who was accompanied by the Chancellor of the Exchequer, Sir William Jowitt, and Lord Cherwell, received an influential deputation from the Parliamentary and Scientific Committee. The purpose of this deputation, which was led by Lord Samuel, was to urge the government to give more direct encouragement to scientific and technical training and research as an essential part of the plans for promoting industrial reconstruction after the war. E. W. Salt, chairman of the committee, specifically asked that the universities should be given an additional grant of £1,000,000 for the extension of research and training facilities; and that the Government should allot a day for a House of Commons debate on science and the future of industry." Mr. Attlee, replying, said that, although he could not anticipate the budget, he believed the Treasury was "sympathetically inclined," and that plans for science, both fundamental and applied, held a high place in the minds of all members of the Government.

DISCUSSION

THE DIRECTION OF ROTATION IN SPIRAL NEBULAE

IN SCIENCE for May 9, 1941, appeared a noteworthy abstract of a paper given before the National Academy of Sciences, under the above title, by the joint authors, Drs. Hubble and Mayall. Because of my early work on the radial velocity and the rotation of spiral nebulae I quite naturally have since been keenly interested in later observations in this field.

Their paper itself seems not to have been published and this abstract unfortunately lets the work appear something of a tour de force in science and could give the reader the impression that in astronomy we are drawing broad conclusions from narrow premises. In particular, the authors' statements that this is ". . . the first unambiguous determination of the direction of rotation of a spiral nebula" and that ". . . of the 1,000 brightest nebulae . . . only one system, NGC 3190," was found suitable to decide the direction of rotation, are too enthusiastic and too sweeping in their implications.

This "first unambiguous determination" is not the first, for it only confirms the winding-spring-like rotation of spirals that was well established twenty-six years ago, at Lowell Observatory, with a more powerful spectrograph;[1] a determination based upon the observation not of one but of several selected nebulae, some of which are among the best known and most suitable in the sky; and included a particularly searching study of the great Andromeda nebula because of its supreme fitness for affording decisive evidence on the direction of spiral rotation. Moreover, this early study of rotation of spiral nebulae followed a decade of similar work of mine on the rotations of the planets which had developed effective means and methods—not yet superseded—that have been advantageous in the study of rotation in the spirals.

In his more recent extended paper in the *Astrophysical Journal* for March, 1943, Hubble includes four of my early nebulae among the first eight of his list of "Well-observed Nebulae," and confirms and ac-

[1] *Proc. Am. Phil. Soc.*, 56: 403, 1917; and *Lowell Obs. Bull.* No. 80, 1917, etc.

cepts the judgment made by me in 1917, namely, that the spiral nebulae rotate in the direction of the arbor of a spiral spring that is being wound up; in his new words "they trail their arms."

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THE PERFUSION OF RAT LIVERS

J. SCHILLER and G. PINCUS report in the November 5 issue of SCIENCE on the "perfusion of rat livers with estrogen in vitro."

In Table 1, page 412, they present data which they interpret as controverting the findings of Heller and Zondek. Upon analyzing their data, however, we find them to be entirely in accord with our concepts of estrogen inactivation as set forth in *Endocrinology*, 32: 64, 1943, and *Endocrinology*, 26: 619, 1940.

(1) Their failure to find hepatic conjugation of estrogens is wholly in agreement with our findings that this mechanism for metabolizing estrogens plays an insignificant role in estrogenic inactivation.

(2) They find that amounts of α-estradiol as large as 208 r. u. are completely inactivated by perfusion through the liver in a period of 3 hours. Only a small percentage was recovered when as much as 300 r. u. was perfused through the liver, whereas 90 per cent. was recovered when 300 r. u. was perfused through the heart for a similar period of time. If the 208 r. u. of α-estradiol had been converted to estrone or estriol by the liver, as postulated by these authors, measurable activity should have been obtained from the perfusate. The fact that they found none beyond the amount found in control perfusate experiments to which no estrogen had been added is in keeping with our data that α-estradiol is destroyed by the liver when present in small or physiological quantities. Our own experiments indicate that the destruction is accomplished with the aid of an oxidative enzyme system.

(3) When they used very large amounts (3200 r. u. in the perfusate) one third of the activity was recovered. Their data obtained through fractionation experiments are unclear, since calculation of the estrogen fractions in terms of weight shows a recovery of 650 γ (50 γ as estradiol, 400 γ as estrone and 200 γ as estriol) when only 400 γ of α-estradiol had been added to the perfusate originally. However, their biological data, showing recovery of one third of a massive dose of 3200 r. u., fit in with our concept that "the liver and kidneys have a definite threshold capacity for oxidizing α-estradiol. Any amount above the threshold will escape oxidation. . . . At least two mechanisms for dealing with estrogen occur in the body, (*a*) an oxidative mechanism which inactivates the greater part of *physiologically* circulating estrogens, and (*b*) an overflow mechanism which operates mainly after liver oxidative capacity is reached. . . ." We also conceded that this overflow mechanism involved conjugation of free estrogens or transformation of one estrogen into another.

The data these authors present thus confirm the results of our experiments, although the conclusions they reach from their own data "controvert" our findings.

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ANTHRACITE COAL ASHES FOR ROOTING CUTTINGS

A NOTE in SCIENCE,[1] of a few months ago, suggested to victory gardeners the use of sifted anthracite coal ashes to improve the texture of heavy clay soils. May I suggest another use for this material?

My father, who operated a successful wholesale cut flower business for many years in New York City, found during his later years that sifted hard coal ashes from the furnaces used to heat his greenhouse were excellent for the propagation of cuttings of chrysanthemums, roses, bouvardia, etc. Damping off was unknown in his cutting beds and mortality from other causes was very low. In addition, cuttings developed a fine ball of roots, and showed an exceptional vigor which the plants retained to maturity. No soil treatment was ever found necessary, water retention was adequate and aeration was excellent.

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JOULE AGAIN

LETTERS covering three fourths of p. 602 in the November 20, 1943, issue of *Nature* make desirable a restatement of what was said in SCIENCE in the issue of January 20, 1933: In the summer of 1897, while being conducted through the Physics Laboratory of the University of Edinburgh by Professor P. G. Tait, I chanced to ask him how we should pronounce the name of the physicist Joule. He smiled and said, "Well, I used to work with him and I can only say that he always called himself Joule," sounding the *ou* as in *you*.

Soon after the publication of this communication of mine in SCIENCE, Sir D'Arcy W. Thompson, of the University of Aberdeen, wrote me a letter from which I take the liberty of quoting: "You are perfectly right. The matter is not in doubt. *Joule* (*ou* as in *you*) is the great man's name, and every English physicist from Kelvin and Tait downwards—or onwards—has always called him so."

[1] SCIENCE, January 8, 1943.