prepared. A limited number of copies are available for general distribution, and may be obtained without charge from the Secretary of the American Association of Anatomists, Professor George W. Corner, The University of Rochester School of Medicine and Dentistry, Rochester, N. Y.

DISCUSSION

COAL AND NATURAL OIL IN THE PITTSBURGH REGION

ATTENTION should perhaps be called to a statement in an article by Dr. Berl, entitled "The Origin of Natural Oil,"[1] in which the author says: "The presence of bituminous coal and oil in the same localities, but in different strata, for instance near Pittsburgh, forces one to the point of view that both substances were formed from the same material."

The horizons in which coal and oil, respectively, are found in the Pittsburgh region are so far removed from each other geologically that their geographical agreement must be viewed as irrelevant in any discussion of their origin.

The various coal seams lie in the Lower and Upper Coal Measures (Pennsylvanian), and the Upper Barren Series (Permian), whereas the oil-bearing sands are in the Subcarboniferous (Mississippian), and the Upper Devonian. The conditions under which the material of the coal beds accumulated, the origin of which is obvious, were very different from those which prevailed throughout the Upper Devonian and Mississippian, in the Pittsburgh region. There is total absence of evidence of swamps, such as contributed material for the coal seams, in the deeper-lying strata where natural oil is stored.

Whatever may have been the origin of natural oil, the fact that oil and coal happen to occur in the latitude and longitude of the Pittsburgh region has no bearing on the question.

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DISTRIBUTION OF PAPERS IN BIOLOGICAL SCIENCES FOR THE PAST EIGHT YEARS

THE summaries of researches in biology that appear in *Biological Abstracts* make it possible to determine fairly well the degree of research activity in various divisions of biology. While the editors of *Biological Abstracts* warn that it is not yet possible to cover all biological research papers published the world over and that a group of journals known to contain biological research can not yet, for one reason or another, be covered, this probably does not substantially affect the numerical relations between the various subjects discussed below.

My class in theoretic biology was assigned the job of determining the number of papers reviewed in *Biological Abstracts* during the entire period of its publication since 1927, *i.e.*, about eight years. The total number enumerated by us was 169,744. Of all the categories of papers classified in the table of contents we chose twenty-two groups. We did omit a few sorts of papers. We listed in one group all papers concerning animal physiology which is made up of twenty sub-groups. We similarly combined sub-groups of papers having to do with economic entomology and treated others likewise. We combined plant and animal paleontology into one group. This last named grouping might be criticized because the reviews in paleozoology in the *Abstracts* are general papers only, since systematic and morphological papers appear elsewhere.

We determined the number of papers in each of the twenty-two groups; found the total for each year, and then the percentage of each group of the total for that year. We then charted the variation in numbers of papers in each group for the entire eight years, but the results of this charting are not presented at this time. We also averaged the percentages of each group for the entire eight years. The results of this computation are graphically represented in Fig. 1, which also includes the percentage averages just referred to.

It should be remembered that, due to at present unavoidable difficulties, abstracts of papers are published a number of months after original publication. Systematic zoology holds first place in numbers of papers abstracted and indicates greatest activity, the total being about 38,000. Thus one of the oldest and most fundamental of biological sciences is still very much alive. Next in degree of activity is animal physiology. Nearly half of all papers reviewed are more or less directly related to the well-being of man. These groups are animal physiology, animal pathology, bacteriology, economic entomology, immunology and pharmacology. May this be interpreted as indicative of the practical tendency of pure science?

We did not attempt to weight the scientific value or importance of the papers, since we did not consider ourselves wise enough to do so. After all, would it be possible to appoint a board of judges who would give a worth-while verdict as to the relative value of this or that investigation? Would an endocrinologist regard work in systematic botany as important as his own? Some might view investigations in physiology that would reduce the mortality of babies as of great value. Others, thinking of difficulties that await the same babies when grown to adult life, might

[1] SCIENCE, 81: 2088, 18, January 4, 1935.