

direct contact with official work and official chemists. In the forty-eight state colleges or universities, partially supported by the federal government through the land grant and Morrill acts, we have, however, practically the same number of very conveniently situated and well-equipped institutions for training, at least the locally needed, public analysts of the future. That their location is especially fortunate for this purpose is due to the fact that nearly all the experiment stations are located in the same towns and in fact are often really departments of the university or college, with a staff made up principally of members of the college faculty. Some of these public educational system extensions, Cornell University and the University of California, for examples, must of course be considered as better officered and equipped than many of the others, especially those in the far south and southwest.

All, however, if their catalogues and the Office of Experiment Stations statistics are trustworthy, have the facilities (departments, professors and laboratories) wherewith to give instruction in the subject of foods, their composition, nutritive and economic value, methods of adulteration and detection of the same, etc.; and in the senior year or as post-graduate assistants give the students an opportunity to gain an insight into and a little actual experience in food investigation work, and also if possible, in methods of rapid legal inspection work at the local experiment station, or at least from the official chemists of these stations. The preparatory subjects, which we may consider as junior year electives, would include organic chemistry and outlines of organic analytical methods (fat extractions, melting point determinations, etc.), histological botany and microscopy and physiology, especially the subjects of nutrition, digestion and assimilation. In the senior year the really special studies would be undertaken, viz., the study of foods as previously outlined; the natural composition, nutritive and economic value, utility, methods of adulteration, etc., of foods being taught by lectures, while the methods of scientific investigation and

rapid legal inspection, especially the use of the microscope and the utilization of histological botany, would be taught simultaneously in the laboratory.

Whether this senior year specialization led to a special degree, or to the ordinary bachelor's degree in science only, is immaterial. One thing is assuredly certain, however, and that is that such a comparatively simple, wholly possible and practicable course of training, especially if supplemented with actual experience in the local experiment station, would supply a national and soon to be a pressing need for competent trained 'public analysts,' similar to those regarded necessary by the smallest and least pretentious English towns and cities. Then, and then only, will our American Society of Public Analysts acquire a membership and influence sufficient to warrant its admittance as a section of the older society in the mother country or, perhaps, what is more patriotic, a similar relationship to the American Chemical Society.

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THE MISUSE OF 'FORMATION' BY ECOLOGISTS.

GEOLOGISTS, paleobotanists and a few botanists have several times called attention during the past few years to the persistent misuse by many ecologists of the word 'formation,' when referring to plant societies or associations. Regardless of the sanction of a century or more of usage for 'formation' in the geological sense, they have proceeded within the past dozen years to transplant the word, *viâ* Germany, into English botanical literature, unmindful of the fact that where employed in the German language it is little or not at all confusing, but when translated into English comes in direct competition with well-established usage in other fields. The usual reply to these protests has been that this employment of 'formation' has the sanction of the earlier writers in this 'newly discovered' field of ecology, and, moreover, is hardly likely to lead to any serious confusion with its use in geology, mineralogy or paleobotany. If those

who hold this view will take the trouble to look in the issue of *SCIENCE* for January 29, page 170, they will find enumerated a list of papers read before Section G (Botany) at the recent American Association meeting, two papers: 'Plant Formations in the Vicinity of Columbia, Mo.,' and 'The Distribution of some Iowa Plants; Formations on which they Occur.' Here, in succeeding papers, the word 'formation' is employed with two distinct meanings. The first paper, we learn from the abstract, deals with the several associations of living plants found in the locality treated of, while the second is 'A brief account of some of the more important plants found growing on the Carboniferous sandstones in eastern Iowa.' Suppose some one had read a paper, as might very appropriately have been done at the same meeting, on the 'Plants of the Potomac Formation of Maryland and Virginia,' would it be a paleobotanical, a geological or an ecological paper?

In this connection I may perhaps be pardoned for calling attention to the title of another ecological paper in the same number of *SCIENCE* (p. 169), viz., 'The Flora of the St. Peter Sandstone in Iowa.' This as it stands is calculated to cause a decided stir in paleobotanical circles when it is remembered that the St. Peter sandstone in Iowa is of Silurian age, and, so far as I know, has not thus far been found plant-bearing! It is only fair to add, however, that the second part of the title ('An Ecological Study') explains its scope, but the fact seems to remain that ecologists, aside from their misuse of terms, do not always sufficiently consider the titles for their papers.

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SPECIAL ARTICLES.

ON TITLES FOR PAPERS.

ONE of the indirect advantages of the individual card catalogue will be that of the condensation of titles, since a man who has been often called upon to fill up several lines of a 3×5 card with the title of a four-page paper will become considerate of others, and reduce the titles of his own future articles to their

lowest terms. There is in this regard the greatest disparity of usage among different authors and different schools. Thus in general it may be said that the fashion of long and ponderous titles is a characteristic of the English school, as may be seen by consulting the pages of the *Quarterly Journal* or the *Journal of Anatomy and Physiology*, in the last of which the size of the title is still farther set out by being printed entirely in large capitals. The opposite seems to be the case with Gegenbaur and his followers, as may appear by consulting the *Morphologisches Jahrbuch*, where occasionally, among others of moderate length, an exceptionally terse title meets the eye. An especially good example of this is Maurer's 'Blutgefässe im Epithel,' which another would have expanded into 'Ueber das Vorhandensein von capillaren Blutgefässe im Epithel der Mundschleimhaut bei einigen einheimischen Amphibien.' It is apparent that Gegenbaur himself set the lead in this movement, as may be seen by the titles which he employed, most of them those of masterpieces, 'Die Epiglottis,' 'Zur Morphologie des Nagels,' 'Ueber das Archipterygium,' 'Clavicula und Cleithrum,' etc.

There seem to be two main reasons for employing lengthy titles, first, the desire to show the limitations, the point of view and the treatment of the subject, giving rise to the *explanatory title*, and, secondly, the desire to appear sufficiently modest, to show how keenly one feels the vastness of the subject and how little has really been accomplished; the *modest title*.

A recent example of the first has just appeared in a leading journal, and with its twenty-four words leaves little to the imagination of the reader concerning its scope. This may well have been unavoidable in this case, but for the benefit of cataloguers it might be suggested that in such instances there might be used a title and a subtitle, the former short and for the use of the card index and general bibliographies, the other longer and more explicit, to assist the reviewers and those who have actually taken the work into their hands.

As a timely warning and to show what the outcome of this tendency may become if not