and would dip at its lowest point to 1,500 feet below sea-level. From the preliminary shaft it is proposed to explore by means of sound waves the consistency of the rock. At the same time a detailed oceanographical exploration of the straits is to be undertaken.

UNIVERSITY AND EDUCATIONAL NOTES

BY the will of the late Colonel Henry Woodward Sackett, who died on December 9, eleven twelfths of the residuary estate, which is stated to be above $1,000,000, is left to Cornell University to be used in the beautification of the campus. In addition $250,000, of which $175,000 has already been used, is to be devoted to "the proper protection, development and maintenance" of the Fall Creek Gorge and Cascadilla Glen on the north and south borders of the campus.

THE will of the late Dr. John F. B. Weaver, Manchester, provides that the University of Maryland School of Medicine shall be the residuary legatee of his $150,000 estate, and that it will be used ultimately to establish a professorship, fellowship or research fund.

DARTMOUTH COLLEGE receives in trust $185,000 and is made residuary legatee under the will of the late R. Melville Cramer, M.D. The bequest reverts to the college after the death of the first beneficiaries and is to be known as "The R. Melville Cramer Foundation." The object of the foundation is to provide fellowships, especially in genetics or other laboratory investigations.

TWO research fellowships have been endowed with $100,000 in the Hospital for Joint Diseases by Frederick Brown, who has been president of the hospital for six years. Under the terms of this gift the income of about $4,800 will be divided between two fellows chosen by the committee on award. They must be graduates of Grade A medical schools and have served internships in other hospitals.

PROFESSOR ARTHUR J. TIEJE, chairman of the department of geology at the University of Southern California, will have charge of classes in geology at Columbia University during the summer session of 1930.

DR. CHEVALIER JACKSON has resigned his professorships at Jefferson Medical College and University of Pennsylvania and his posts as head of the clinics which these institutions have named after him. The resignations become effective in June. Dr. Jackson intends to devote his time to development of a clinic at Samaritan Hospital and to his work as professor at Temple University School of Medicine. He will continue as William Potter Memorial lecturer at Jefferson.

DISCUSSION

THE POPULARIZATION OF SCIENCE

THE scientific progress of a country is dependent on the appreciation of science by an interested public as well as on the support and encouragement of wealthy men. Many of the greatest strides have been made, it is true, through the patronage of philanthropists. But a comprehensive, sound body of science can no more be built without the credence and sympathy and even the practical assistance of a large part of the population than could the Cathedral of Chartres have been erected, unaided, by the nobles of Beauce. The best science, like the greatest art, belongs to the people and must express their spirit.

In America we are witnessing to-day a nation-wide flowering of interest in science that is without precedent. A number of startling disclosures, such as radioactivity, the automobile, the aeroplane, the radio, the X-ray—all of them the results of scientific research—have forcibly impressed on every one the concrete significance of science to his own welfare. The scientist must nourish this new-born interest. The medium through which he must work to this end is primarily the press. The demand for scientific information exists; he does not have to create it. His responsibility and opportunity consist in providing accurate material in sufficient quantities and of proper quality.

In this country the literary popularization of science on a large scale is roughly coeval with the present century. Previously popular lectures were the favorite means. Among the names which shine brightest in both fields is that of Robert Kennedy Duncan (1868–1914), whose efforts to promote cooperation between science and industry found expression in the establishment of the industrial fellowship system. More lately the foremost figure has been Edwin E. Slosson, whose recent death was such a great loss to the scientific professions. Both men were remarkable for their power of translating technical achievements into simple, lucid, emphatic, correct language. The success of Slosson's Science Service is well known; this organization is now one of our chief

agencies for the popular dissemination of scientific facts.

The use of slang has been proposed by J. H. Collins[1] as a device, well in harmony with the tempo of the day, for calling attention to the results of scientific research. This suggestion is worthy of consideration; that we shall see it in operation can not be doubted, and, indeed, a trend in this direction can already be observed.

We can not but feel that Collins has taken a somewhat extreme stand in advocating the wholesale abandonment of the classics and of the standards of good English. Slang may well have its place in popularization, but by its very nature it is of only fleeting appeal. Even newspapers and magazines that make a fetish of the sensational do not go to marked lengths in the use of inelegant diction, except in their comic sections. The stylistic excellence of Collins' own writing and of the two technical works he cites as examples of good composition illustrates the fact that, though his ideas might appear to be radical, he does not intend that he should be taken too literally. Science, a dignified branch of learning, must not be treated with a levity that would invite disrespect. The difficulty of imparting popular scientific knowledge lies in the obscure and monotonous literary style of the scientist and not in a demand for slangy literature.

The newspapers that use science articles are not inclined to overlook the great educational influence they exert. The editors of such papers do not shirk their duty as educators by using coarse expressions. "Rubber-stamp" writing and "journalese" are disappearing. Some of the most successful American papers are successful because they have remained steadfast in their high educational policies and have sought constantly to bring their readers up to the same level.

In discussing the composition of popular articles, let us first examine the purely technical paper, which serves as the foundation. This document, enigma though it may be to the uninitiated, in general possesses the very important quality of being logical in arrangement. The usual order of treatment—historical introduction, theoretical background, experimental part, discussion of results and conclusions—is symbolic of the scientific method and of the savant's habits of thinking. There are, however, a multiplicity of technical polysyllables, a stereotyped phraseology, a tendency toward errors in grammar and a circuitous method of expression. The last difficulty, possibly due to the innate conservatism of the scientist, has been referred to as the use of the alternating current instead of the direct in conveying the thought. As the article must be shortened considerably in translation into every-day English, these faults should be corrected during the process. The important point to be noted is that the arrangement of the subject-matter corresponds not only to good newspaper usage but also to good literary style.

Probably the most difficult part of popularization is the preparation of the summary "lead," the introductory paragraph that attracts the attention of the reader and arouses his interest by linking the subject-matter of the article with his personal experience. Whether or not this introduction answers all the questions of the "old time" news lead—who, what, where, when and why—it should always sound the keynote of the information to be conveyed. Unfortunately, in the hands of those untrained in science, this introduction is likely to be poorly chosen, and to emphasize some point that is merely speculative or at best of minor importance. This probability has led to an unreasonable dread of all gentlemen of the press by many scientific men. Aggravation of this fear is caused by the general newspaper practice of having headlines composed by men other than the writers of the copy; a worthy article, conservative and accurate, may have its effect ruined by a too enthusiastic headline writer. On the other hand, the scientist, inexperienced in popular psychology, is inclined to choose a lead uninteresting to the reading public. E. E. Free and Morris Fishbein, happy combinations of scientist and popular writer, never seem to have difficulty in finding good leads.

Before leaving the discussion of the introduction we wish to add that the lead is often written first. Its preparation should always be deferred, however, until after the remainder of the article is ready—a practice that will result in economy in time and in a more interesting introduction. Still another advantage of this procedure, at least from the scientist's point of view, lies in the fact that the writer will then base his lead upon the facts instead of shaping the facts to fit his lead.

The writing of the body of the translation is not difficult to the competent. As we have already said, the arrangement of the original technical paper is usually logical, and the experienced writer chooses his material from the various sections in the order in which they occur. From time to time he stresses the reader's interest by tying to his statements references to matters of common experience.

A knowledge of grammar may well be assumed for the popularizer, but it is equally important for the scientific man, particularly if he aspires to become a non-technical writer. How many important discoveries have been overlooked by journalists because they were described originally in ambiguous and unemphatic language! Sometimes this defect is over-

[1] *Chem. Met. Eng.*, 36: 619, 1929.

come through the efforts of another writer who "interprets"—by rewriting in more understandable form, that is, in more straightforward English—his predecessor's work.

Rhetoric, or artistic discourse, plays a vital rôle in reconstructing technical papers. How else can the heavy style of the scientist be translated into forceful, gracious prose if not through the application of the principles of composition? Unfortunately the scientist rarely realizes that there are rhetorical methods for securing force, rapidity, emphasis, life and the other desirable qualities of good writing. It may even be that more practiced writers also are somewhat ignorant on this subject.

Wide reading of the classics and of the best modern writing is a necessary supplement to a study of grammar and rhetoric. From such reading the budding writer derives not only a feeling for the best in literary style, but also the knowledge of human nature essential to a broad discussion of contemporary events and trends. He is then able to integrate in his compositions the experience of centuries of history. The benefits of extensive reading are apparent in the works of the masters of scientific literature, some of whose writings deserve high rank among the classics of all time.

A good translation of a scientific paper is a work of art. It is at once elevated and popular; it manifests to all that which is recondite. Science describes her accomplishments abstractly in technical language. Art reveals these facts, not aridly, but concretely, addressing itself not only to the understanding, but still more to the sentiments of the ordinary man. Like every artist, every man who writes successfully must catch the spirit of the ensemble before him. He must therefore have interested perception and enthusiasm for things scientific.

The treatment accorded scientific progress in magazine articles is generally measured and dignified, but newspaper technique is occasionally open to question. We do not mean to disparage in any way the ability and sincerity of the news reporter, but we believe it sometimes happens that his actuating enthusiasm in his object—the emphasis of the sensational and novel—leads him to exaggerate and even wrest partly out of shape, although without real intent, the main facts of technical discoveries. On the other hand, the editorial writer, skilled in sublimating news, adept at crystallizing events, has developed traits that peculiarly qualify him for the popularization of science. The broad field that he may cover, the greater time that he can devote to writing and the disinterested point of view from which he writes all tend to result in articles of accuracy, dignity and authority that are gratifying to the scientist. The feature or special writer, who is in some respects comparable with the editorial writer, may be equally successful as a popularizer of science. Finally, the usual excellence of syndicated articles should not be overlooked; the time assigned for the preparation of such material generally makes it possible for the author to obtain the constructive criticism of the scientist whose work is discussed.

A happy condition seldom realized is the literary collaboration between writer and man of science. Every newspaper interested in scientific news should have reliable sources of information who may be consulted for authoritative criticism. The statement is often made that any good writer can make of a technical paper an excellent popular article. This mistaken conception ignores the obscurity often found in scientific writing and the nice balance required by different phases of the subject. An unhappy juxtaposition of ideas, an unthinking distribution of emphasis, can do much to void the accuracy of the translation. Even the popular writer with a broad knowledge of science will not regret submitting to the judgment of the technical specialist.

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THE ZODIACAL LIGHT

ONE of the problems undertaken by the Harvard Eclipse Expedition to Malaya last May was that of the photography of the zodiacal light in connection with the photography of the corona. By standardized measures of the photometric brightness it was hoped to test for a possible connection between the illumination of the outer corona and that of the zodiacal glow.

On account of clouds in the western skies every evening while at our station it was impossible to obtain the zodiacal light photographs anticipated.

Visual observations of the zodiacal light were made, however, on shipboard while crossing the Indian Ocean. These revealed so surely a fluctuation in its brightness over a period of two or three minutes that some publication of the observation seems important. These fluctuations were corroborated by my colleague, Mr. Weld Arnold, and we checked satisfactorily the extent of its visibility from time to time by comparison with neighboring stars.

The recent issues of *Popular Astronomy* contain references to a similar observation by Chaplain George Jones, U. S. N., in 1854, and by other observers at various times, appearing to confirm the reality of the phenomenon. The rapidity of the fluctuation that we observed in 1929 suggests that we