work in agricultural subjects gives promise of very sound and rapid growth in agricultural research.

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THE WRITING OF POPULAR SCIENCE

TO THE EDITOR OF SCIENCE: The letters of Dr. Dorsey and Dr. Slosson, which have appeared in SCIENCE, raise questions that have perplexed both scientists and editors of popular scientific magazines. Neither Dr. Dorsey nor Dr. Slosson, in my opinion, has struck at the root of the matter.

So long as the standards of American journalism are what they are, it will be difficult to enlist the whole-hearted cooperation of scientific men in popularizing the results of their researches. A distinguished biologist put the matter thus to me a few years ago: "We do not mind being popularized, but *we do mind being made ridiculous!*"

And there we have the whole truth in a nut-shell. Consider these facts which have come under my notice:

In the basement of the Bureau of Standards is an electric furnace used for conducting experiments at high temperatures. A Washington reporter, in quest of good red journalistic meat, was permitted to see that furnace in operation. On the following day there appeared an article from his pen in a Washington newspaper under the title, "Bureau of Standards Has Little Hell in Basement." Is it any wonder that the men in the Bureau of Standards look at him askance now?

During the days when Halley's comet was the subject of almost daily newspaper articles, about twenty Chicago reporters camped on the grounds of the Yerkes Observatory. Fearing complete misrepresentation of the work that they were doing, the members of the observatory staff granted no interviews. Finally, one ingenious reporter suggested that he be permitted to photograph the entire staff on the steps of the observatory. Inasmuch as all the reporters had been treated rather haughtily, it seemed as if this harmless request might be granted. Accordingly, the staff posed. Two days later, there appeared in a Chicago newspaper a photograph of one of the astronomers —a distinguished telescopic observer—seated at the eye piece of the huge Yerkes refractor, but in a position outrageously absurd. His photograph had been cut out of that made on the observatory steps, pasted upon a lifeless picture of the refractor, and the whole reproduced, with results that astonished every astronomical observer who saw the newspaper. The observatory staff was kept busy explaining to its colleagues all over the country how this absurdity was perpetrated.

Washington scientists surely have not forgotten the great injustice done to Samuel P. Langley at the time when his historically important experiments with his man-carrying airplane were conducted. If ever a scientist's life was embittered and shortened by gross newspaper misrepresentation, it was Langley's.

Our newspapers and magazines are right in demanding what they call "human interest." It is what science does for mankind that is interesting. The best popularizers of science have always been humanly interesting—particularly the men who have had theories to propound which were not readily accepted by their colleagues.

The campaign waged by Darwin and his colleagues was a conspicuous example of sound popularization. But our newspapers and magazines ride human interest too hard. The one thing that seemed to strike our reporters about Einstein was the fact that he smoked a pipe and that his hair was disheveled. At the moment, I do not recall more than two articles on Einstein in the newspapers that pointed out the tremendous practical significance of his theory of relativity—the fact that chemists, physicists, engineers and astronomers must henceforth reckon with time, space and motion in a new way. What Edison eats for breakfast seems to be of more importance than what Edison has actually achieved. So long as our newspapers publish simply gossip and the news of death and destruction, we have little to hope from them. If anyone were to write a history of the United States one hundred years hence, with no other information before him than that contained in current newspapers, he would inevitably draw the conclusion that Americans of our day led scandalous private lives and

were savagely addicted to killing one another. Curiously enough, only the advertisements would save him from presenting an utterly distorted picture of present day life and manners.

Since these are the editorial standards of the day, is it any wonder that scientists hold aloof from the reporter? Is it any wonder that they *do not wish to be made ridiculous?*

In Europe it is otherwise. I have never had any difficulty in securing whole-hearted co-operation from English, French and German scientists. They send their portraits on request—something that American scientists hesitate to do. They write delightful scientific *feuilletons,* many of them models of simplicity and clarity. They recognize their journalistic obligation to the public at large. But when they come to this country, they soon learn the wisdom of withdrawing into their shells.

The newspaper and magazine editor constantly uses the stock argument that he "gives the public what it wants." But does he really know what the public wants? Would any magazine or newspaper editor have predicted that Wells' *Outlines of History* or Van Loon's *Story of Mankind* would have sold in editions of one hundred thousand and more?

The *Saturday Evening Post,* with a circulation of over two million, publishes articles on economics and industry which are, in the main, excellent examples of what the popularization of technical subjects should be. It has its standards of human interest, but it does not forget that the *facts,* simply, humanly, and interestingly presented are "what the public wants."

It is possible that the schools of journalism which have been established in various parts of the country may bring about a reformation of editorial standards through their graduates. Not much is hoped for from the publishers themselves.

WALDEMAR KAEMPFFERT

MR. SLOSSON'S indictment of American scientists, in your issue of May 5, for their failure to write interestingly and attractively about their work is all too true. As a teacher of English, I have observed the same failure throughout our universities. Among both faculty and students an opinion prevails that there are but two general ways of writing: a so-called literary and polished style fit only for esthetes and poets; and a crude, inchoate style that marks the profound researcher and busy technician. The scientific man generally thinks that he hasn't time to "polish" and "adorn" his sentences; therefore he slips into the slovenly jargon that he sees is customary among his colleagues. He fails to notice that there is a middle ground of simple, clear English that can be made interesting and attractive without his becoming a poet or an esthete. Mr. Slosson's English is an example. Another example of a scientific man who taught himself to write excellent English was Professor John W. Draper, of New York University. His volume of "Scientific Memoirs" is a model of clear, incisive prose.

Professor Draper won the Rumford medals and was the first president of the American Chemical Society. But look at the accounts of chemical research as published to-day, and see what they have become from the point of view of English or readableness. Look at the tiresome, too-modest statements, phrased in passives and circumlocutions to avoid saying "I" or "me." Pick a sentence at random and try to tell what it means without reading it several times. Such a style is supposed to indicate the scientific, objective researcher. The awkward sentences and confused transitions are supposed to connote the profound scholar intent on his specialty. The curious thing is that many chemists can write well if they choose. But when they begin to explain their work, they drop into professional jargon, which disguises their real ability. Such jargon is the custom. It makes all the articles alike, looks technical, dulls the interest, eliminates the personal element, and discourages discussion.

Mr. Slosson hints that he would like to see the great events in the history of science described in their proper dramatic significance. So should I, and if such descriptions could be included in a text-book on the history of science for use in colleges, it would be a great benefit to teachers.

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TO THE EDITOR OF SCIENCE: There is one point in Dr. Allen's letter of April 28 that I think will bear further emphasis. As he points out, most editors will print sound scientific "stuff" which they can get for nothing. But they won't pay a living wage to the man who writes it.

I have been doing this sort of work, off and on, for a quarter century. In fact, for some years I actually supported myself—at about the clerical level. Those were the days when "the Old Man" edited McClure's and cared more for the permanent repute of his magazine than for selling out any single issue. Newspaper work paid decently. One could occasionally make a short story of a scientific item. Even the women's publications used to buy semi-scientific articles on diet and child training.

Now all this is past; I haven't tried to sell anything since the war. It takes about as long to verify all the statements in one article as it does to write another. The verification is a labor of love, for which no editor will pay. The writer with an unhampered imagination can turn out stuff that the public prefers; and he can do twice as much of it in a day. My old market is absolutely dead. In the present day market, I can compete neither with the men who are selling their product, nor with those who are giving it away.

Dr. Allen's solution, I heartily agree, is for the moment the only practical one—though I doubt whether, in the long run, the public will get much good out of anything that it isn't willing to pay for. Nevertheless, I cannot help thinking that the condition which Drs. Allen and Slosson are trying to cure is only a symptom, not the real disease. For the fact is that the world just now is being simply drowned in a vast wave of superstition, that is bringing in every sort of pre-scientific opinion that the nineteenth century thought disposed of for good and all. My own town, for example, makes education its leading industry. But our public library has to buy books, just off the press, on palmistry, handwriting, character reading and fifty-seven other varieties of nonsense; while, significantly, it owns no old volumes on any such topics. The current number of the *Atlantic Monthly* carries the advertisement of a professional astrologer!

Here then lies the real trouble: The reading public does not know good science from bad; but if it did, it would certainly choose the bad.

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NOTES ON METEOROLOGY AND CLIMATOLOGY

THE STREAMFLOW EXPERIMENT AT WAGON WHEEL GAP, COLORADO

STUDENTS of hydrology have always had a keen interest in the relation of run-off to the forestation of watersheds, and there has been much theorizing as to the probable relation. But there are so many factors involved—evaporation, transpiration, interception, etc., these, in turn, being influenced by the geological, phenological, and meteorological character of the watershed,—that it is difficult, if not impossible, to estimate correctly the degree of influence of each. It has been the purpose of the Forest Service and the Weather Bureau to conduct an actual experiment in order to obtain quantitative measures of these influences and, in general, the response of streamflow to a forested and denuded watershed. The site selected for this large-scale experiment is near the railroad station of Wagon Wheel Gap, Colorado, the station having an elevation of 8,437 feet above sea-level. The plan was to select two contiguous watersheds of similar character, make extensive meteorological and hydrological observations on each, and, after the lapse of a certain number of years, denude one watershed of its trees and continue observations for a sufficient number of years to determine in what manner the streamflow is influenced.

On June 30, 1919, an eight-year continuous series of stream-flow observations and a nine-year meteorological record had been obtained, and, after a general survey of the results, it was decided that the trees could properly be removed from one watershed. The denudation was completed in the autumn of 1920. This, therefore, marked the completion of the first stage of the experiment. Observations are being continued, and will continue for several