width up to half a mile, and a depth averaging about twenty fathoms, still shows a broad outer belt of living pavement nullipore controlling its growth. This belt of pavement nullipore is about fifty meters wide and is extending slowly at not over a rate of one third to one fifth mm per year. The belt of living nullipore, covering at this time only about one third, if as much as that, of the surface of the barrier reef, indicates that the surface of the barrier has remained at the same level for many thousands of years. The dead surface of the barrier and the present dead surface of the now protected fringing reef within it indicate a continuation of this same level since the original fringing reef was extending outward until the rising barrier reef without it shut it off from the surge so necessary to the life of its pavement nullipore and killed it off, taking over the outward extension of the encircling reef structures of Tahiti. Earlier stages of the same process are seen on some sectors of the Tahiti coast where exposed fringing reefs are still provided with controlling pavement nullipores, while the future barrier reefs are still growing upward, but, even yet, are still several fathoms below the surface, thus allowing the waves to pass over them and to supply the vital surge to the fringing reefs within.

I realize the difficulty of making these matters clear and reenforcing them sufficiently in the time allowed, but I trust that I have justified my action in bringing before an assembly of botanists this aspect of the coral reef problem, *viz.*, that the so-called "coral" reef is a biological formation, controlled and moulded into zonal form by its plant symbionts; that the factors of light, aerated water and temperature control its dominant type of symbiont; and that depth limitation and interconvertibility, together with the assumption of the necessity for gradual and continuous subsidence, must be judged not from coral behavior, but from the relations of the controlling nullipores to their environmental factors. From such studies it seems fairly well indicated that reefs of all three physiographic types not only may, but do, develop to their full expression under still-stand conditions of ocean level.

WILLIAM ALBERT SETCHELL
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SCIENCE AND THE PRESS

(*Continued from page 100*)

THE chairman next called upon Mr. David Dietz, science editor of the Scripps-Howard newspapers, who gave the following address:

SCIENCE, THE NEWSPAPER AND PROGRESS

I regard it a great privilege to be asked to take part in this symposium to-day upon the relationship which should exist between science and the press, for I regard the spirit which has motivated the organization of this symposium as one of the most important in the world to-day. It is a spirit which makes one hopeful for the future.

It is a new spirit and the very fact that it exists betokens the existence of a new point of view both in the field of science and in the field of journalism. I doubt very much if a symposium such as this would have been possible twenty years ago. In all probability, a majority of scientists would have felt at that time that the subject was neither fit nor proper for inclusion upon the agenda of a scientific convention. They would have regarded it as unethical in all probability. Certainly, they would have regarded it as undignified. Newspaper men for the most part would have had little interest in being invited to take part in such a symposium. Those were the days when science was synonymous with ten-syllable ununderstandable words to be treated appropriately by the staff humorist and the cartoonist.

But the point of view has changed in both fields, not only to the mutual benefit of both science and journalism, but to the infinite benefit of the general public as well. The first newspaper publisher to see the necessity of this new point of view was that great far-sighted genius of the newspaper world, E. W. Scripps, the founder of the Scripps-Howard newspapers. After a number of conferences with the leading scientists of the nation, Mr. Scripps organized and endowed Science Service as an agency to gather and disseminate scientific news.

The thing which Mr. Scripps and those scientists who met with him saw was that progress would be immeasurably retarded without the quick and widespread dissemination of scientific thought.

There had been a tendency upon the part of the scientist to withdraw into the seclusion of his laboratory or his library not unlike a hermit in his cave. This action proceeded in every case from the highest and finest motives and is easy to understand. The scientist felt that in searching for the answer to his particular scientific problem he was devoting himself to the most important thing of which he knew. He felt, therefore, that nothing else mattered.

But gradually the feeling became stronger and stronger that something else did matter. This point of view that something else did matter was expressed in a clearer and more powerful way than I am capable of expressing it by Professor James Harvey Robinson in December, 1922, at a symposium at the

annual convention of this association. This other thing which Professor Robinson said was needed was, in his words, the humanization of knowledge. He said that it was not enough to find out facts and write them down in scientific treatises for other scientists. It was his feeling that scientific discovery and thought must be made the property of all people.

A somewhat similar thought was expressed in a newspaper interview a year later at the Cincinnati meeting of this association by Dr. Burton E. Livingston, the permanent secretary. Dr. Livingston said then that it was his opinion that sufficient progress had been made by the scientist and the engineer to insure the complete happiness of the whole world if every scientific discovery had been put to its best possible use. But, as he pointed out, this had not been the case. Many of the discoveries of the scientist have come under the control of others and have been put to their worst possible use. It is the realization of such things as this which has led to the new point of view upon the part of the scientist.

The scientist to-day feels that his work offers the world more than the raw material out of which engineers can fashion the devices of applied science, automobiles, radios and airplanes. The scientist feels that in his work are to be found also the raw material for improving the conditions of the world, for making men happier and healthier as well as for making them more efficient.

Scientists, therefore, are eager to do what is implied in the title of to-day's symposium, bring science to the people. And, as the different papers in the symposium suggest, there are a variety of ways of doing it.

Many universities have introduced special courses, particularly for freshmen, to acquaint the students with the aims and spirit of science. Such courses are frequently termed orientation courses. The University of Chicago and many other universities now have such courses. Many universities are also introducing courses in general science with the aim of giving the student who is not intending to follow a scientific pursuit the general knowledge and background of science which every man who considers himself educated ought to have in this scientific era. At the present time, I am teaching such a course in general science at Cleveland College of Western Reserve University. Public school officials are also considering the advisability of introducing more courses into science in the high schools and junior high schools, and they are even wondering whether a beginning can not be made by the teaching of science in the grammar grades.

But important as all these things are, they are not sufficient to meet the situation. More of the population than that within college walls must be reached. And we can not wait for the present generation of children in the schools to grow up. The great body of men and women carrying on the affairs of the world must be reached.

The remaining agencies through which this can be done are the organization of colleges holding classes at night to offer opportunity of study for adults and the organization of discussion groups and other adult educational movements, and finally the printed word. The field of the printed word might be divided into that of the book, the magazine and the newspaper.

Of these, I sincerely believe that the newspaper is the most important. Perhaps you will smile and say that as a newspaper man I might have been expected to say that. But I shall try to give you my reasons for that belief.

It is first of all the fact that the newspaper reaches so many more people and with such greater regularity. A college may number its students in the thousands. A magazine may have thousands of readers. But a metropolitan newspaper will have a hundred thousand readers or perhaps double that number. Two years ago, I wrote a series of articles based on a month's visit to the Mt. Wilson Observatory in California and the Desert Laboratory in Arizona. The series was syndicated to approximately two thousand newspapers. Their combined circulation was forty-one million readers.

I do not mean to detract from the influence of the other agencies which I have mentioned. They are agencies with which the better grade of newspaper feels honored to cooperate. I believe, in fact, that one of the things which will happen in every city where the newspaper rightly fulfils the function as a disseminator of scientific news will be an increase in the subscriptions to scientific magazines, an increase in the sale of books on scientific subjects and an increase in the popularity of adult education movements.

I said at the beginning of this paper that there was a changed point of view on the part of both the scientist and the newspaper man. It should be added that the last ten years has also brought about a decided change upon the part of the public. Never in the history of the world has the public been so eager for scientific information as it is to-day.

The rapid development in recent years of the application of scientific principles has brought this about. The average man to-day rides in an auto, uses the long distance telephone, has a home equipped with a radio. He is surrounded by a host of twentieth century marvels, the airplane, television, gigantic skyscrapers, and so on. He has a new interest in his personal health and in the problems of public health.

His mind has been stimulated by all these things and as a result he wants knowledge. He wants to know what makes the radio work, what keeps the airplane up in the air, what the secret of television is. He wants to know all about vitamins and ultra-violet radiation and the other discoveries of science which affect his life and his health.

The important question from the practical standpoint then is how are the scientist and the newspaperman to cooperate most efficiently in order that the public may get the scientific information which it wants and which it ought to have. As a newspaperman, I am going to tell you what as scientists you ought to do. I am also going to try to tell you what you have a right to expect in return from the newspapers.

As regards the annual meeting of the American Association for the Advancement of Science, I have no suggestion to make concerning the press arrangements for the meeting other than that you continue to handle the situation exactly as you are doing it. I know that the other newspaper men who have attended these meetings will agree with me that Mr. Austin H. Clark has done an admirable job of managing the press bureau and I know that they will join with me when I say that I hope you will persuade him to continue in charge of the bureau.

Further than that, I can only repeat the plea which your own officers have made to you that you cooperate with the press bureau to the utmost, particularly by sending in copies of papers which you intend to present at the meeting as far in advance as possible.

The fact that newspapers have generally given the meetings of this society such full coverage is the direct result of your efficient press bureau. I wonder if you have ever attempted to visualize the task of the newspaperman at one of these meetings. There are twenty or more section meetings in progress at one time. Some of them are more than a half a mile apart. Frequently, three or four of the papers which the newspaperman is most eager to report upon will be delivered all at the same time. Obviously, the newspaperman could only do an inadequate job if copies of papers were not available for his perusal at the press bureau.

Regarding every other scientific society and association in the United States, I would urge upon them that they adopt the policy of the American Association for the Advancement of Science in this matter. You might at first think that in the case of a small society where only a single session is held this would not be important. But it is. Frequently the most important paper of a session will come near the close of a session. Let us say that such an important paper is read at 11 A. M. The reporter for an afternoon newspaper where the edition goes to press at noon is at a decided disadvantage in attempting to report that paper. If a copy of it had been available to him at 9 A. M., that difficulty would have been obviated. The scientist ought also be interested in making his paper available for the newspaperman, for the danger of being misquoted is completely eliminated in such a case.

I would also like to say a word about the preparation of abstracts for the publicity bureau. An abstract should in all cases be a statement of the material in the paper itself, not an outline telling the type of material which the paper discusses. For example, an abstract which says, "This paper deals with some phases of the relationship between sunspots and the weather," is of no value to the newspaperman. The abstract should say, "This paper details a series of experiments from which the writer concludes that there is no direct relation between sunspots and the weather. The experiments were as follows, etc., etc." In other words, the abstract must be definite and must express the conclusions of the scientist to be of any help to the newspaper man.

Turning now from scientific associations and societies to such organizations as universities and scientific institutions, I would say that every such organization ought to have a person on its staff whose duty it is to deal with the newspapers. This publicity secretary, or whatever title is given him, ought to be a person with a clear understanding of newspaper methods and a sympathetic attitude toward the newspaper.

The publicity secretary should not get the idea that his sole duty is to prepare written statements for the newspapers to publish. In fact, he will fulfil his duties completely only when he acts as the agent through which frequent interviews between the newspaper men and the scientists are arranged.

The individual scientist in universities and other scientific organizations should consider the granting of newspaper interviews, when the occasion warrants them, as one of his important duties to the public. I think a majority of the leading scientists have this point of view to-day.

There are some, of course, who do not. Some months ago, I was told of the head of an important scientific department in a big university who refused to see newspaper men. I made it a point to find out his reasons. He said that he had given out an interview twenty years ago and had been misquoted and consequently had refused to see all newspapermen since. I wonder what this scientist would say if one of his assistants came in to him and said that he had discovered a marvelous new cure for all disease and that he knew his preparation was right because

twenty years ago he had tried it out in one experiment. The scientist who draws into a shell because of something that happened twenty years ago is not acting in a scientific manner, to put the case mildly.

And now, finally, what has the scientist to expect from the newspaper man if he gives that individual the consideration and courtesy which I have suggested?

He has the right to expect precisely the same sort of consideration and courtesy in return.

First of all, the scientist has the right to expect that the newspaper editor will assign a reporter to cover the meeting or obtain the interview who has some understanding of the fundamentals of science and who is sympathetic to science.

He has the right to expect that the reporter will report what he says accurately, intelligently and fairly.

On this score, however, I do not think that the scientist need have any particular concern. As I said at the start, the best newspapers of the nation already realize this. They are eager to report science accurately and intelligently. Many of them now have reporters who specialize in the reporting of scientific news.

I believe that with the passage of time all newspapers will come to this point of view.

I believe that in any city where a scientific institution or university feels that a particular newspaper has the wrong point of view, a friendly conference between the heads of the institution and the editor of the paper will do much to right the situation. Nothing leads more quickly to cooperation than first-hand acquaintanceship.

The things which I have enumerated are all relatively simple things. It is important, however, that they be done well. And I believe that they are things exceptionally well worth doing well. For I believe that they are the most effective means by which scientific knowledge and the spirit of science can be diffused throughout the nation.

At the conclusion of Mr. Dietz's address, the chairman called upon the science editors of the Associated Press, and Mr. Coleman B. Jones presented the following paper, prepared jointly by himself and Mr. John L. Cooley.

SCIENCE AND THE PRESS ASSOCIATION

This is an instructive occasion. It is a pleasure to sit in at the first symposium of scientists and newspaper men, and a privilege to participate.

A few years ago the organization of such a conference as this would have been extremely difficult, if not impossible. A few months ago it would have been clearly impossible for us to take part because the great organization of newspapers which we represent had not then undertaken to extend its vast resources and facilities to an intensive investigation of the activities of science.

The Science News Service of the Associated Press was introduced six weeks ago through the Associated Press feature service in response to the growing demand of the public for more complete knowledge of the interesting and vital accomplishments of the scientific world.

When it was organized, a few weeks earlier, the question naturally arose whether to place its development in the hands of men trained in the sciences or of men trained primarily in writing for the public. The latter course was determined upon, so we were called in and given the assignment, our chief qualifications being that we knew that science was interesting and that we did not know too much about it.

In announcing the new service to the twelve hundred newspapers which are members of the association, Mr. Kent Cooper, the general manager, and Mr. Lloyd C. Stratton, the general feature editor, expressed their recognition of the field of science as an absorbingly interesting and increasingly important ally of human and industrial progress.

"All phases of scientific endeavor," they said, "will come under the scrutiny of these scientific assignment writers, who each week will give members of the feature service a page of live, interesting and popularly prepared news features concerning the latest developments and discoveries of the scientific workroom.

"When noted scientists gather for their meetings and conventions, A. P. men will be on the spot to report the messages. They likewise will cover any of the noteworthy experiments in current scientific circles.

"The Science News Service of the Associated Press expects to take readers behind the scenes that are daily being shifted in the laboratories of the large educational, endowed and industrial plants of the country. Whatever may be the branch of science or whatever may be the story, it will be the purpose of this service to inform newspaper readers of the experiments and proven facts in the growth of science."

So here we are.

We are here to help the public reach a clearer and broader understanding of the efforts of science to make life easier and safer and more comfortable for mankind. We are here to help science carry its amazingly interesting message to the public which, more and more, is becoming its main support. It is a pleasant task.

Mechanically, we have to help us in the spreading of the news of science a vast network of leased tele-

graph wires and a full eight-column page distributed each week by mail throughout the country in the illustrated feature service of the organization.

The Associated Press has been recognized for many years as the most successful cooperative organization in the world. It is an association of newspapers having individual and frequently conflicting editorial policies but banded together for the exchange of news by wire and mail so that each may give its readers, as nearly as possible, a complete record of the significant events of each day.

Accuracy has become, perhaps, the most widely known of the characteristics of the Associated Press. There have been times when it was accused of dullness —whether justly or unjustly depends upon the individual critic's opinion as to what is dull and what is interesting. At any rate, such times when the accusation might have had a touch of justice in it are definitely past. For it has long since been recognized that news and feature stories can be written with a view to bringing out their full flavor of human, dramatic or humorous qualities without sacrificing anything of accuracy and dignity. It is, of course, possible to write interestingly of any subject without being accurate, but it is not possible to get that desired effect without dignity, which, in writing, means *verisimilitude* and embraces the qualities of poise and insight. Possibly, however, it might be well to call upon the science of psychology for an accurate definition of dignity, and to qualify the one just given by saying that it is our definition of the word and leave it at that until we can know more about it.

With the traditions of the Associated Press for our foundation, we who have been assigned the task of covering the news of science are building up what, if we were scientists instead of newspaper men, we might call a special technic. Of course, it is not especially new, but its elements appear to require greater emphasis in this field, where we are dealing with the nation's most thoughtful men and women.

The fundamental elements of that "special technic" are, after all, precisely the same as are the fundamental elements of all sound news writing: brevity and lucidity, as well as accuracy and dignity. Jazz writing, commonly associated with tabloid journalism, is not merely absent, but repugnant. Brevity is essential because the average newspaper could not, even if it were wise to do so, provide space for all details of every event it records. Without lucidity, a story might as well be left unwritten, for its purpose is to reach the undertsanding of readers. An account of a scientific experiment or achievement, for instance, may be written in technical terms and still be perfectly lucid if it is to be published in a journal circulating only among readers who understand its terms. But for a newspaper, it would not be lucid until translated into the common language. It is our function to put the facts of science into the common language with just as much accuracy as if they were written in the symbols of science and to show that they are just as interesting as the public love affairs of more or less psychopathic ladies.

Possibly in the past the reporter has misunderstood and misrepresented the scientist, and perhaps the scientist has been too suspicious of the news gatherer. The one may have antagonized the other.

Thanks to the rapprochement effected between them —due in no small part to the splendid work of Mr. Austin H. Clark, news manager of the American Association for the Advancement of Science, and his associates—the scientist who says "What I am doing is none of the public's business" is seldom encountered to-day. Instead, he is sitting down with the reporter and explaining his work to the public, whose welfare is his ultimate concern. Likewise, the newspaper man of to-day is less likely than many of his predecessors to view science as the source of funny, freak stories.

The newspaper is the diary of the race, and the press association, through its far-flung contacts, makes most of the major entries in that journal. Its responsibility is tremendous, for unless the record is truthful, it might better not be kept.

We have assumed our small share of the work of scientific news reporting with the knowledge that we have the support of the newspapers and that they want us to give them an accurate reflection of what is being done by the men and women who are giving their lives to search for the ultimate truth. We assure you that we are approaching the task before us with a full sense of its importance to the scientist and to the public, and we trust that we shall have your cooperation in carrying the messages of the laboratory to the homes of our country.

The chairman then called upon Mr. Frank Parker Stockbridge, who spoke informally on the collection of scientific material and its presentation from the point of view of the feature writer.

Dr. William E. Ritter, of Science Service, gave his impressions of some of the difficulties attending the popular exposition of scientific material and suggested ways by which these could be overcome.

The remarks of the several speakers gave rise to considerable discussion, which at times became quite animated.

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