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SCIENCE SERVICE CONFERENCE[1]

By Dr. J. McKEEN CATTELL

PRESIDENT OF SCIENCE SERVICE

SCIENCE SERVICE, organized eleven years ago, is making a new departure to-day and has brought together in this conference some of the ablest scientific men of the country. As we all know, Science Service was made possible through a gift of the income from $500,000 by the late E. W. Scripps, one of the most original and fertile men with whom I have ever been personally brought in contact. But we are also under obligation to Dr. Ritter, on whose assistance Mr. Scripps relied in establishing the service. If Scripps was the Charlemagne who could do all these things with high hand, Ritter was the Alcuin who advised him. The indebtedness of Science Service in its organization is also great to the group of scientific men in California to whom science owes so much —Dr. Hale, Dr. Millikan, Dr. Noyes, Dr. MacDougal, Dr. Merriam and Dr. Kellogg. Finally, tribute should be paid to our first director, Dr. Slosson, a man of remarkable literary skill with scientific training and a high standard of accuracy.

We have gone on for eleven years with some successes and some failures. My own attitude has been to criticize Science Service severely to the other trustees and officers, to defend it and even on occasion to eulogize it to others. There are here those who will offer criticisms, but we should like also to know in what ways the service has been of use. We want this conference to be strictly informal. It was our original idea to have a round-table in the library, but we found greater interest than was anticipated and had to come into the lecture room. Now we want short and informal remarks from those who are willing to give us advice and help.

[1] Report of remarks made at the Round-table Conference held by Science Service in Washington, on April 27, 1932.

By Dr. SIMON FLEXNER

DIRECTOR OF THE ROCKEFELLER INSTITUTE FOR MEDICAL RESEARCH

IN response to your request, I am very happy to express my views regarding the manner in which

Science Service presents medical news or discoveries. But before attempting to do so, I should like to state that I read the weekly reports of the Service as given in SCIENCE with interest and profit.

Medicine, as you are aware, embraces not a single subject or science, but rather a group of subjects or sciences. No one person can judge or speak adequately for the whole. In essence, I desire to make two recommendations:

First, greater discrimination of what constitutes a discovery or a valuable news item. It happens not infrequently that a "discovery" is announced, the knowledge of which is by no means new; and it also happens that a piece of medical news is stressed, when in fact it has no great interest or importance.

Second, especially in regard to so-called medical discoveries or news, I should advise against overstatement of meaning in terms of practical significance and application. This, in my opinion, is a highly important consideration. The lay public should not be misled into false hopes by exaggerated statement.

Since medicine includes many sciences and no one person can have fair judgment about them all, I should like to ask whether some connection could not be made with a younger person on the staff of the Johns Hopkins Hospital Medical School, which is near-by, to act on Science Service in an advisory capacity. If the right person were chosen and a suitable consideration arranged, he himself would probably be in a position to give informed advice or secure it from his colleagues. Not much time need be consumed in the process. And the result would surely be a more discriminating service.

By Dr. KARL T. COMPTON

PRESIDENT OF THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

I WISH to preface my remarks perhaps with a personal touch. My young daughter is in no sense a scientist, but I have been very much delighted at the fact that the first thing for which she asks when she comes to our magazine rack is the *Science News Letter*. I have mentioned that to various of my friends and I have found that it is not an uncommon occurrence. I think it is certainly true that the *Science News Letter* is read with interest, and I think that it is one of the functions of the Science Service which is well deserving of support and well deserving of extension.

Along the line of Dr. Flexner's remarks I will say it is certainly true that things do appear from time to time which rather disturb people who are experts in the particular field with which the articles referred to are concerned, and it seems to me that Dr. Flexner's suggestion is an excellent one. There should be something like an association of consulting experts who can be reached easily and who should be consulted on things that involve such questions as priority and apparently really important discoveries. It is not very satisfactory, for example, to have announced as an important new discovery something which you happen to know has been known and worked on adequately for a number of years. That occurs once in a while. I think it is not a severe criticism of Science Service, but it seems to me that it is one minor difficulty which can be remedied by some such procedure as that suggested. I think that the efficiency of this kind of work might be increased by perhaps soliciting more cooperation among various science groups and of fitting into Science Service the things which will be of interest.

Dr. Cattell has impressed upon me from time to time that, as a representative of physical science on the executive committee of the Academy of Sciences, it is my duty to see that physical papers are submitted from time to time to SCIENCE. I think in some way all of us who are interested in the development of public interest in science have an obligation to see to it that our organ for informing the public is used to the best advantage.

After all, it is certain that we are all enabled to carry on our work, in the last analysis, because of public interest, and we can not afford for any reason to overlook the necessity of obtaining public interest. I think it is a duty we have—sometimes a duty which to an individual may be unpleasant because of his retiring disposition—it is his duty to keep the public interested and informed of what is going on.

As to the various lines of work which Science Service does, there is one that disturbs me, and this is the function of Science Service as a news agency for the papers, which, in a considerable sense, is in competition with the Associated Press and the other press services. I am not well enough acquainted with the original idea to know whether that is an essential activity of Science Service or not. I think it is largely as a result of the work of Science Service—at least Science Service has largely contributed to it—that the public has become very much more interested in scientific news and that the newspapers are eager to get scientific news. These papers and the Associated Press now have some excellent science editors who are very anxious to get scientific news. The doubt in my mind is whether or not it is wise to maintain a competing agency. Science Service, as I see it, is not an end in itself; it is a means to an end. I would like to raise the question as to whether or not this particular end might be achieved more effectively, not by maintaining a competing service, but by maintain-

ing this service as a cooperating agency to cooperate essentially with the Associated Press and the other press agencies, covering perhaps those scientific subjects which the Associated and other press services are not covering and treating the material itself, rather than distributing it as an independent organization. I am not at all sure but that we would get more effective scientific publicity of the right type by making this essentially a cooperating rather than a competing agency. Even if this is done, there are a great many things which Science Service can do. It is a unique service because of its connection with the Academy and the American Association for the Advancement of Science. This association is a unique approach to scientific people, and I think that it opens avenues of service which no other organization can possibly have.

By Dr. FRANK B. JEWETT

PRESIDENT OF THE BELL TELEPHONE LABORATORIES

I DOUBT if the few remarks I am going to make will be very instructive or will necessarily commend themselves to the approval of this group. However, they may be provocative of thought and discussion which may in the end be helpful to an enlarged and more effective Science Service.

I am not particularly interested in the further development of Science Service simply to amplify it as a means of adding to the stream of interesting scientific information, particularly with regard to new things. Including the present Science Service, we have plenty of agencies doing that job already. No doubt there is a great interest in that sort of thing, and because we are all curious about such matters that interest will continue and in some way continue to be satisfied.

The thing that I am most interested in and the thing I think Science Service may be peculiarly in a position to further, because of its connection with the National Academy and the National Research Council, is so to amplify or modify its present machinery as to give those who use its service, whether they be newspapers, magazines or individuals, a better understanding of the part which science and new knowledge in science can and must play in our every-day lives. We are living in a mechanized age, and yet we have been and are trying to operate these new things of science under the rules developed for an entirely different period. Further, these rules are made, not by scientific people but by people whose primary interests in life are essentially not scientific and who with the best of intentions know little of science. For this reason it seems to me highly important that, just so far as it is possible, we who do know something of science ought to see to it that information concerning the fundamentals of science and of how it may affect the daily operation of our lives is both fully, accurately and widely disseminated. In no other way can we expect the great mass of human beings properly to understand that which is fundamental to their well-being or to act sanely on the basis of that understanding.

It is a hard and difficult problem, but until we do sense the thing and get a better understanding of the ways in which science and the things of science are entering into our lives, just so long, it seems to me, are we going to be confronted with all kinds of legislation which seeks to control by fiat things which, in the last analysis, can not be controlled by mere human desires. It does seem to me that because of its past and present achievements and its unique relationship to the fountain heads of accurate scientific knowledge possibly Science Service, while still carrying on whatever may be best of its present activities, can perform the service I have outlined and thus give to the country, through whatever media are most suitable as outlets, that helpful guidance it so much needs. I know of no other agency so strategically situated.

By A. H. KIRCHHOFER

MANAGING EDITOR OF THE BUFFALO EVENING NEWS

I SHALL speak strictly from the standpoint of the newspaper man, and do so frankly because without candor there can be no common approach to the problem for which we seek a solution.

The first thing we must recognize is that, in spite of the progress which has been made in more accurate reporting of scientific, educational and allied activities, there are many in these fields who give little or no credit to the newspapers for what has been accomplished, and by their critical attitude toward newspapers as a whole, without being specific in their objections, make for misunderstanding rather than the cooperation which is essential to a still more accurate and sympathetic reflection of the view-points of the specialists.

It is equally true that, under the sting of some of this lament and criticism, there are newspaper men who demonstrate their impatience by an aloof attitude, so that the net result is to create an atmosphere in which it is impossible to carry on constructive work. We must have tolerance, patience and understanding on each side. I am certain that you will find newspaper men ready to respond to any reasonable overtures. I think there is work to be done in both fields to bring about a clearer understanding of our respective view-points and aspirations, as well as limitations.

Many, if not most, newspaper men are socially minded; they sympathize keenly with the scientist

who wants his work and that of his associates intelligently interpreted to the public, but in making that possible the scientific group must come out of their shells; they must take a human as well as a scientific view-point; they should have some insight into the newspaper outlook and at least give the newspaper man credit, until he proves otherwise, for knowing something about his own job.

The scientist frequently would appear just as ridiculous if he attempted either to write a newspaper story or operate a paper as the newspaper man often appears to him, when he attempts to explain for the benefit of the lay reader some of the things which even scientists occasionally do not understand or about which they disagree. Nevertheless, I observe that some scientists think they know all about newspaper work as well as their own. My experience has indicated that the man who is willing to take time and patience to explain a story to a reporter, who is not a specialist in the same field, usually fares very well in having it reported as he would like to have it presented to the public.

Too often the scientific man thinks wholly in terms unrelated to those in which he is approached by a reporter who wants a story about the matter in hand. The problem is to reconcile divergent view-points; to force both from a high-horse attitude; to bring about mutual respect. Surely, the scientist knows his subject better than the reporter. On the other hand, the reporter knows the limitations of time and space under which he must work, and should have a clearer idea of how to explain what he has learned to the public.

Real progress has been made in all forms of reporting and interpretation of news, and especially in reporting scientific news. Newspaper standards are becoming more strict, and even now there are large numbers of papers outside the metropolitan areas which have on their staffs men whose duty it is to specialize in reporting various forms of news. On the smaller papers obviously it is not possible to specialize to such an extent, but many unknown but among the best reporters in the country report for such papers.

The fact that these advances have been made; the fact that this conference is held; the fact that many other efforts are under way, some of them in newspaper circles, to bring about more effective reporting is the surest indication that we shall continue to make substantial progress in accurate reporting.

I know it will come about more quickly if all those who feel that their special fields are not interpreted to the public with the precision they believe should exist will join with the newspaper workers to envisage this as a problem to be approached from a mutual standpoint rather than from the unfair view that the specialist is always right and the newspaper always wrong. And some of this feeling is due, we must remember, to the fact that newspapers can not and will not surrender to any group the right to say what shall or what shall not be printed.

This brings me to Science Service, which since its organization has been the most pronounced factor in the country for promulgating accurate scientific information, in terms understandable to the layman and average newspaper reader. It has made it necessary for other news services to engage qualified experts to handle scientific news, and it has set a standard of interpretation and evaluation that makes it an almost indispensable adjunct to the newspapers which publish its articles.

This has been accomplished, I think, because Science Service has been able to speak authoritatively in terms comprehensible to all. It has been accomplished because Science Service, without in any degree sacrificing what every scientist stands for, has had the newspaper view-point. It has met the newspaper needs, both in writing and distribution. It has not done what is a bane to newspaper offices, to wit, become a press agent for any one or any thing. It has avoided all suspicion of propaganda. It has maintained a fine sense of balance in relation to scientific news.

Here, then, is an example of a scientific news service performing genuinely worth-while work for the newspapers, their readers and for both the worker in science and the scientific idea. Science Service must constantly, as must all newspaper and press associations, keep abreast of the swiftly moving march of progress. It should, in my opinion, continue to interpret scientific developments in newspaper terms along rational lines. It should contribute to the understanding of the editor quite as much as to the education of the reader, so that the former may know more clearly what of authentic scientific news to print as well as what of pseudo scientific news to discard.

Please keep in mind that in the work Science Service has been doing it has performed an excellent job of reporting factual material, as developed in the laboratory or under laboratory methods. It would be easy for one, who has the wish to see more intelligent exposition of the social sciences and their great influence upon our lives and affairs, glibly to say that Science Service should enter this field in the hope that it can interpret it as well as it has explained the exact sciences. Such a venture should not be embarked upon without a full and clear realization of the difficulties it would encounter.

First and foremost, in attempting to interpret the

social sciences, particularly history, economics, psychology and sociology, you must avoid any and all semblance of what some might call propaganda for either an idea or a cause. To do so will not be so easy as it is to avoid that in discussing exact science. The subjects frequently are controversial; too often inter-connected with political theories. Such matters can be handled as news, but you have to be careful in doing it for the reason, frankly, that you come into conflict with some accepted ideas. These accepted ideas may be right or wrong; I am not attempting to say; I am pointing out a state of facts.

If you decide to interpret the social sciences, you absolutely must avoid any justification for the view that propaganda is being presented. If you don't, you will endanger the reputation Science Service now merits and enjoys. Such an extension of your service also must be considered in relation to the views of newspaper editors on various matters of policy. They all are willing to publish news; they all are skeptical of publicity.

In closing, may I offer a word of caution about expanding a service to newspapers which at the moment isn't essential, even if offered at merely nominal cost.

By Dr. JOHN C. MERRIAM

PRESIDENT OF THE CARNEGIE INSTITUTION OF WASHINGTON

THESE few minutes I wish to devote to what might be called the art of stating scientific truth. This is in considerable measure the function of Science Service. The limit has not yet been reached in development of scientific literature. I recognize literature as perhaps the greatest of all arts, the most human and also the most picturesque.

Nearly everything that comes within the range of science has existed for a long time. I am not sure that mere discovery makes anything more important than other things. I have known cases in which reporters mistakenly brought out old things as if entirely new, and with great success. It depends upon the form of statement and the human interest.

I wish to suggest, but not for Science Service alone, that there is a zone of difficulty and of danger precisely at the point where the press would like to secure new material. I presided yesterday in a meeting where four men presented extremely important statements on the results of scientific research. Among these papers there was considerable difference of opinion. That was the reason for the conference. It was because men see problems from different points of view. When the investigator begins his task he is trying to advance a fraction of an inch further than any one else has gone. A stage is passed through in nearly every investigation where the result is not clear and therefore can not be stated clearly and simply. If this were possible, it would not be necessary for the investigator to concentrate on this problem.

The fact that the press desires to have new material is extremely important in development of scientific research because it stimulates the investigator to attempt a clear statement of the thing he is trying to do. Not infrequently the fact that the public desires to know what the man is attempting acts as a stimulus to the investigator and helps to clarify his thought. It helps the researcher himself to secure a clearer idea of what is attempted. Beyond this there is a further stage at which the problem is seen clearly. It is then necessary to formulate it in terms which represent application of the art of stating scientific truth.

The best form in literature is based first upon accurate statement, second upon logic and third upon artistic presentation. If a fact is to be stated clearly, it must stand in striking contrast to its background and yet be related to that background. It is essential also that the element of human interest be included in the picture.

There is an art in use of thought and language in presentation of scientific truths. This art may well challenge the interest of any scientific man. There is always opportunity for improvement. I congratulate Science Service on its success to date.

By Dr. ARTHUR A. NOYES

DIRECTOR OF THE GATES CHEMICAL LABORATORY, CALIFORNIA INSTITUTE OF TECHNOLOGY

I HAVE only two points of view to present. We all realize that the information that Science Service gives to the public must be reliable, but something more than that is necessary. The great defect in the scientific information that is disseminated through newspapers is that there is nothing to show whether it is accurate or not. In three cases out of four it is not reliable and is therefore misleading. It seems to me very important that an agency like Science Service be careful to make clear, so far as it is possible, the evidential status of the information that is submitted. Where there is uncertainty as to the results, the evidence should be brought before the public. For, as I have said, one of the greatest defects of popular scientific publication is that one does not know whether it means anything whatever.

The other point I would make is one of procedure. This I hesitate to suggest, because I realize that Science Service has used almost every available means. But I believe that at the different universities which are centers of research, there could be secured at relatively small expense able science students with

literary skill to collect news of scientific advances and turn it into the central office. This would make reliable statements more quickly available and would amplify the material from which Science Service could prepare its digest of scientific news.

By ROBERT P. SCRIPPS

THE SCRIPPS-HOWARD NEWSPAPERS

I WAS an instigator of this general meeting. But it was not my feeling, then, that any large part of the program should be speeches by myself and fellow Science Service trustees. We have been talking together about our problems for a number of years, and of course have made some progress. But what we seek is a larger and an accelerated progress. As I see it, the purpose of this meeting, and of that tonight, is to receive criticism and suggestions on the functioning of Science Service from outside sources—from men interested, as we are, in the state of civilization in America, who are not identified with our organization, and who are in a special position to help us just because they can bring to our meetings a fresh, detached view.

I also took part in the first discussions of the project which has developed into what you see to-day—Science Service, a going concern, dedicated to the proposition that, for the masses as well as for the classes, knowledge is power; but dedicated also to the further proposition that knowledge must be considerably more than half-baked to merit that description. As a member of those early conferences, I think I may be allowed one historical reference.

And that is that the name first thought of for this organization was not "Science Service" at all, but "American Association for the Dissemination of Science." In spite of its length and possible suggestion of the ponderous, I have always thought it a more truly descriptive title than the present one.

Anyway, its logic was sound. For the promotion of study and research in the exact sciences, this country was already supplied with the three great organized bodies by whom the majority of our board of trustees are nominated. But in spite of the real interest of a democracy as such in these achievements, so far as the layman, the voter, the real arbiter of American destinies, was concerned, these great agencies functioned each within its ivory tower.

The need, it was felt, was for a new agency, especially organized and equipped to tell the millions outside the laboratories and lecture halls what was going on inside.

The purpose was to make possible application of the facts and methods of science to the affairs of common social and political life—from such elementary aspects of this life as public education and hygiene, to the psychological problems involved in legal procedure, or the economic ones of a tariff bill.

It is all very well to say scientific research will go on, whether any one outside the laboratories knows about it or not; or that the scientist can not take too much time off to consider the end result—the effect on humanity—of his labors. I challenge both positions.

In the first place, the direct influence of the multitude can not be underestimated. It is the man in the street, whom you have not reached, who is ultimately responsible for incidents like the Dayton, Tennessee, trial, and state laws which make such trials possible. It is the man in the street, and his attitude, that is also ultimately responsible for appropriations to great state and national institutions, where much of the world's scientific work is carried on.

As to the disinterest of the scientist himself in humanitarian effects, I have known intimately too many fine, sympathetic gentlemen who were great scientists to believe it even exists.

It is, perhaps, largely influenced by the idea of further challenging the interest of the multitude that some of us feel there should be greater cooperation between Science Service, an organization deliberately planned for domination by workers in the so-called exact sciences, and already existing organizations in the so-called humanistic sciences and professions—economics, sociology, medicine, the law, etc. I for one feel that any reasonable means of increasing this popular interest merits most serious consideration. Certainly, the economic field alone is one where chaos exists to-day, on a most unscientific basis, and where light from scientists—I think from Science Service—may well be looked for.

Gentlemen, one great problem of our day is to make the millions feel, before they perhaps lose their patience, that all our facts and all our scientific theories *can* be made to have bearing upon such vital matters as war, poverty, insecurity, unemployment, disease—even political misrepresentation.

It is my feeling that the question now before us is simply that of the fuller and freer functioning and leadership of Science Service in this cause. It is for their aid on this point, particularly, that we will have to thank our guests on this occasion.

By Dr. EDWIN BIDWELL WILSON

PROFESSOR OF VITAL STATISTICS AT THE HARVARD UNIVERSITY SCHOOL OF PUBLIC HEALTH

MOST of the complaints that I have heard about Science Service are in respect to its accuracy. I say we might do well to consider accuracy as a relative term. I have seen a great many bright young Ph.D.s destroy their instruction to freshmen by trying to guard themselves with all the qualifications that they

knew, some of which were not very well established, with respect to every statement they made. I don't call that accuracy. That is precision, but it is not accuracy. When you are talking about accuracy in newspaper work, it seems to me the criterion must be whether or not you get across to the person who reads it the thing it is important for him to get out of the item and not the thing important from the view-point of the man who does original research. I have not found Science Service particularly inaccurate. I have not found the newspaper work particularly inaccurate.

When I was last in Toronto as president of the Science Research Council, a couple of young men turned up to interview me, and the next morning my friends tried to "josh" me about the interview which had appeared. I thought it was done pretty well. I did not think I had been misrepresented. The reporters did not put the things just as I would, but if they had been put that way nobody would have read them. I find the press reasonable and accurate.

If you want examples of gross inaccuracies, I can refer you to articles written by scientific men and published at leisure in scientific journals. There are plenty of such, which won't average any more accurate for their audience than the press averages for its audience, if you have the right criteria with respect to the audience.

I would like to say one word about this question of the social sciences, if there is time. The difficulty with the social sciences is, as I see it, that we are too far removed from sound scientific criteria to make it at all safe to give out as scientific knowledge anything in these fields. There are many more qualifications needed, and what is more troublesome is that there are so many factors involved as to make it difficult to give the qualifications, or to have them heeded if given.

Even relative accuracy within any proper meaning of those words can hardly be defined in the social field, and although I sympathize entirely with what Mr. Scripps has said as to what we should like to do, I do not think we are able to do it without getting ourselves into a good deal of trouble. We have had a good many expert opinions in this field in the last three or four years, and I do not think they have stood up very well.

By Dr. C. G. ABBOT

SECRETARY OF THE SMITHSONIAN INSTITUTION

I HAVE been impressed very favorably with the phonograph records which have been gotten out lately. I have loaned those which were sent me to gentlemen very active in educational affairs, and they have been exceedingly interested in them. It occurs to me that what is news to the scientists and the world which keeps up with the last final thing need not concern us altogether. There is a new generation being born all the time, and they have no means of knowing a great many interesting things that were found out a long time ago. In these records the eminent gentlemen who make them oftentimes call attention to older things which are very well worth knowing, and which, I presume, people in general do not know anything about.

I have been very much interested in recent times to read the lives of certain of those pioneers of science, industry and engineering, who lived in the last part of the nineteenth century and the early part of the twentieth century, like Eastman, Carnegie and others. Inspiring talks could come from such subjects. There has been a great deal done in science in the last one hundred years that the new generation, I presume, knows very little about. My contact with young people leads me to believe that a great deal might be done by the method of those records, which are being gotten out now by Science Service, to give a fair and reasonable basis in the minds of the young as to things which some of us know very well, if they fall within our own specialty. Yet even some of us, who regard ourselves as research men, do not know about these admitted results in other branches of service with which we have not had close connection. I feel very strongly that this record business is highly promising and perhaps will be a very useful thing to promote the objects of Science Service. These, as I understand them, are to give the public an intelligent, well-rounded, correct and useful view of science as it is. I feel that it is not so much the newest speculations, and partly verified observations, as the results most surely believed among us, that the public needs most to know.

By Dr. W. F. G. SWANN

DIRECTOR OF THE BARTOL RESEARCH FOUNDATION OF THE FRANKLIN INSTITUTE

I WAS very much interested in Professor Wilson's remarks, particularly those concerning the ultimate effect on the reader. I think the account of a subject which is given should be such as to produce the maximum of accuracy of information, in the mind of one who subsequently reads the account, and it should not necessarily aim at a maximum accuracy expression in the absolute sense. I think that in weighing the difficulties arising between the investigator's account of his work and the press account, both parties are somewhat at fault, although I must say that my experience with the press, particularly during the last few years, has been such as to make

me feel very grateful for the effort they make in the reporting of rather difficult matters.

If we trace the whole history of the subject, from the mind of the man who is working on it through his writings to the mind of the person who reads it, I think that, as a rule, the last lap of that journey is better seen by the professional press man than by the man himself who does the work.

There are two types of difficulty which arise. The investigator himself frequently starts with the feeling that his subject is a very difficult one. He does not see how it is possible to put it to the laymen at all, and endeavors to give a technical account of it, or a terribly simplified and forced analogy, to the great confusion of the reader. One of the best illustrations of this is to be found in the many discussions upon the theory of relativity. The things which we start to emphasize are four-dimensional space, curved space, and things of that kind which are not really related to the fundamental concepts which make the theory work. As regards its working content, the theory does not involve any of those things in the sense in which the reader would understand them. When the writer uses the word "space" the reader tries to get a picture of something which he thinks is in the mind of the writer and which is really not there at all. The harder he tries, the more he will get from the view which the writer intended to convey.

Then another thing: sometimes the writer, I think, is at fault in this matter by endowing the reader with too little intelligence. Thus referring again to relativity, it is impossible for the man in the street to understand what I might call the technique of the procedure, just as it is impossible for the man in the street to play the violin, although it is possible for him to get pleasure from the performance.

The thing of importance is to seek out the part of a theory which really matters and try to explain that to the reader. I believe that frequently this is possible. Personally, I would very much rather talk to an intelligent lawyer or clergyman upon the theory of relativity than I would to talk on this subject to a bad physicist. In my conversations with such individuals there would not be a single line of algebra. Turning to the press man, my criticism would be to the effect that I think there is a danger of his emphasizing matters which are irrelevant.

I think one should seek what there is of value to be said, and try to make that the central story, and not try to adorn the story with some things which are irrelevant simply because they are spectacular. There may be a certain piece of apparatus that we wish to write a story about. It may be very heavy, but the weight may have nothing to do with its performance. It is useless to try to introduce the weight as an essential feature. Let us omit all irrelevant adornment from the main subject which it is desired to discuss.

(To be concluded)

THE NEW HARVARD BIOLOGICAL LABORATORIES

By Professor G. H. PARKER

HARVARD UNIVERSITY, CAMBRIDGE, MASS.

BOTANY and zoology in the last hundred years have undergone as profound a change as their sister sciences, physics and chemistry. Early in this period, workers in the organic fields were occupied chiefly with the description of plant and of animal species. At that time the study of organic processes attracted relatively little attention. But with the advent of the theory of evolution, and particularly after the appearance of Darwin's "Origin of Species," an intense interest sprang up in the operation of organic nature, and the earlier kinds of work were supplemented by a study of the activities of organisms. Reproduction and development, and a multitude of other processes, were the subjects of keen investigation. In the solution of problems in these new fields the methods of physics and of chemistry, with their accompanying mathematics, became a part of biological procedure, and attempts were made to elucidate organic operations in terms of basal conceptions. As a result, biology became permeated with the experimental spirit. The physiology of the medical schools had already taken this step and the biological sciences were quick to follow. Thus arose the functional approach to biological questions, an approach which eventually led to the fields of comparative and of general physiology. All this new expansion, with its increased scientific contacts, enriched and unified the biological sciences as had never happened before.

In the early days at Harvard, as elsewhere, botany and zoology were essentially unconnected subjects. There seemed to be no particular reason why those who were concerned with the description of new species of plants should carry on their work under the same roof as that which sheltered the describers of animal species. The activities at the Herbarium were in no intimate way associated with those at the Zoological Museum. These two institutions were separated by a considerable distance, and their work