SCIENCE

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CONTENTS

American Association for the Advancement of Science:
Science and the Newspapers: PROFESSOR WM. E. RITTER 279
Malnutrition in Plants: PROFESSOR F. J. SIEVERS 286
Scientific Events:
Budget of the Bureau of Chemistry and the Bureau of the Biological Survey; The Giannini Foundation of the University of California; Presentation of the Charles P. Daly Gold Medal to Professor Alois Musil; National Research Fellowships in the Biological Sciences 288
Scientific Notes and News 290
University and Educational Notes 295
Discussion and Correspondence:
The Functional Nature of the Constant of Mass Action: DR. R. D. KLEEMAN. *Vegetative Propagation of the Apple by Seed:* DR. CHARLES F. SWINGLE. *Living Cells in Heart-Wood of Trees:* PROFESSOR J. H. FAULL. *A Prehistory Chart:* DR. E. A. HOOTON. *Philosophy or Irony, Which?* PROFESSOR M. M. GARVER. *The South African Station of the Harvard Observatory:* PROFESSOR HARLOW SHAPLEY. *Apparatus:* DR. WILMER SOUDER 295
Scientific Books:
Brooks' Climate through the Ages: DR. MALCOLM H. BISSELL 298
Scientific Apparatus and Laboratory Methods:
A Method for Cutting Glass Tubing: PROFESSOR I. P. TOLMACHOFF. *A Platinum Spoon for Isolating and Transferring Protozoa:* PERCY L. JOHNSON 299
Special Articles:
Statistics of Vocabulary: E. U. CONDON 300
Science News x

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SCIENCE AND THE NEWSPAPERS[1]

WHAT I bring this evening is a joint product. My partner-in-production is E. W. Scripps, the chief designer and builder of the Scripps-Howard newspaper enterprises. Of the great wealth gained by these enterprises Mr. Scripps saw fit to invest before his death a portion in such scientific ventures as the Scripps Institution of Oceanography at La Jolla, California, the Scripps Foundation for Research in Problems of Population at Miami University, Oxford, Ohio, and Science Service, Washington, D. C. The partnership lasted during the nineteen years of my incumbency of the directorship of the institution at La Jolla. Its purpose was to devote as many hours per week as possible to the personal discussion of all the problems humankind hath ever encountered or is likely ever to encounter—such having been the spiritual appetite of the senior partner.

THE NEWSPAPERS

By the popularization of science is understood in this address the promotion among people generally of that devotion to truth which is basic among the few people whose professional career is the pursuit of truth through scientific research. The scattering abroad of natural knowledge discovered by such research is regarded more in the capacity of that knowledge to promote devotion to truth than for any of the other uses to which such knowledge may be put.

To the making of our civilization many factors have contributed. Probably no two persons would agree on a list of the most important of these factors, or on a valuation of the different factors. But all would agree that among the foremost in influence are science and journalism. No phase of our life escapes the influence of both. From matches and beads to the ministry and birth-control nothing is out of reach of the penetrating gaze of science or the clatter and yell of the public press.

If evidence is wanted of the power of these factors, all that is necessary is to start something of major interest to the community. Launch a world war, or a world-wide health campaign, and note the instant and insistent appeal of the enterprise to both factors. Modern life depends vitally on both; yet its estimates

[1] Address at a general session, American Association for the Advancement of Science, Nashville, December 29, 1927.

of them, its attitudes toward them, are very different; and the estimate and attitude of each relative to the other is but a reflex of the generally prevailing estimate and attitude.

To the average member of the community and to many a newspaper man, pure science is as dry as dust and about as useful. True enough, now and then the researcher hits upon something, radium or "glands," that has a real kick in it. But this is accidental. Such lucky hits are not of the true nature of science. Indeed, the investigator is so blind to the business possibilities of the hits he occasionally makes that nothing of their real value is brought out until some practical chap—some good business man—comes along and converts them into dollars and cents.

Counterwise the typical investigator's conception of the average newspaper man, especially of the typical reporter, is that he is first and foremost "sensational." No matter how little or how much your typical scientist says in describing newspaper and newspaper men, that word, or some other containing the same meaning, must stand central in it.

On the whole, the newspaper press is sensational; some exceptions there surely are, but too few to affect the general situation. It is notorious that the occasional newspaper which is not sensational is apt to be a business failure. A daily newspaper that is not predominantly yellow is pretty sure to be predominantly red in its balance sheet.

"But," say the newspaper men who make their papers business successes by making them sensational, "the fact that people buy our papers is proof positive that we are furnishing them what they want; and surely we are not responsible for the people's tastes."

We find ourselves confronted at every turn by the problem of that in human nature which makes for emotionalism, for sensationalism. The aspect of the problem which we meet here is as to whether all mankind, save only the minute fraction known as scientists, are so constituted as to make them want what the sensational press gives them. Are scientists as a class wholly apart from the rest of mankind in this? By no means. As to matters outside their special interests and work scientists are obviously not fundamentally different from their fellow mortals. But even here they are not. The popular conception of science as something utterly unemotional—as flourishing only in the frigid zone of mental life—is all a myth. Effective inquiry into the hidden things of nature is no more possible without the energizing warmth of emotion than is creative effort in poetry or music. The real psycho-biological problem is as to the way reason and emotion are compounded in science as compared with the way they are compounded in art.

The special point to be made here concerns the particular effect the emotional responses of scientists have on the problem of making scientific knowledge comprehensible and accessible to the general public. No one who is familiar with the little class of scientific investigators needs to be told of the intensity, often the bitterness of the rivalry, that may exist there not only as to institutional and positional preferment but as to discoveries, conclusions and theories. The question of who of several rival experts in the same specialty are most competent—are the best authorities—is often very perplexing for those whose function it is to teach science to people at large, whether in classroom, on lecture platform, or through the printing press.

This is merely saying that scientific investigators like all normal members of modern civilized society are persons in whom rational life and emotional life have to get on together in some way, that way determining the measure of wisdom and usefulness of such persons to themselves and to the community. Hence it happens that the utterances by investigators themselves are in some instances distinctly tinged with yellow. Such instances are especially common where certain results suggest, though in a wholly tentative way, conditions and occurrences in the future which would greatly affect human life. In other words, scientists sometimes exercise altogether too little wisdom in their use of hypotheses touching matters of great human concern, departing in so far from allegiance to the true spirit and method of science.

Is it possible, then, for two such diverse agencies to find a ground on which to work together for the common good? Many scientists have not hesitated to answer "No, such a ground can not be found because it does not exist." And seemingly many newspaper men have held the same view.

On its face the history of journalism does not encourage hopefulness that it and science may find common ground on which to work. The only reference to science I find in one volume consulted is a brief narration of how the New York *Sun* increased its circulation by a yarn about the moon written by an educated reporter and boosted by Edgar Allan Poe. The hoax consisted of a lot of buncombe about an astronomical expedition to the Cape of Good Hope under the leadership of Sir John Herschel for investigation through a gigantic telescope of the moon and its vegetable and animal life. So well did the reporter and his booster do the job that the yellow and the white press and the scientists of the day are said to have swallowed the bait.

Science is the embodiment of rational life. Journalism is chiefly dependent on the emotional in life. The view is that these two lives are so antagonistic

that it is folly to talk about bringing them onto a common ground. The kinship of journalism is held to be with art rather than with science. The newspaper is animated more by the spirit of *belles-lettres* than by that of exact, positive knowledge. A list of well-known names in the history of American journalism and another in American letters have many in common. Journalism in this country has been, as Dana, Watterson and others expressly regarded it, a form of literary art; and nobody seems to doubt that it is now an industry and a business.

No two men of the early period of our national history have actually lived through the whole of that history on into this very day more than Benjamin Franklin and Thomas Jefferson. Their continuous vital presence in the life of America is due to their having been men of learning—men of science in the broadest and best sense.

Both men were likewise giant figures in the journalism of their day. Franklin's newspaper, *The Pennsylvania Gazette,* and other journalistic and publishing enterprises (one of which was *Poor Richard's Almanac*) were his vocation for some forty years and the main source of his considerable wealth. During this period his fame as a scientific investigator was chiefly won; and his success in his vocation, his fame as a scientist and his reputation as a wise citizen were the basis and stepping-stone to his great but later career in diplomacy.

Jefferson's relation to science and to journalism was less direct and close and is much less known than Franklin's. He appears to have been the first to see clearly, as a professional statesman, the great significance of the newspaper as a factor in popular government, and of science and popular learning as factors in a democratic society.

Although he seems never to have had any connection either proprietary or editorial with any newspaper, yet he it was who could say "were it left to me to decide whether we should have a government without newspapers, or newspapers without a government, I should not hesitate a moment to prefer the latter. But I should mean that every man should receive those papers and be capable of reading them."

It was through the astonishing power Jefferson had of influencing other men to write for the papers that he made the press contribute so largely to the promotion of his social and political ideas.

As holders of public office it was inevitable that Franklin and Jefferson should have had to stand the lash of criticism, both fair and foul, through the press. It is consequently desirable to know what effect their experiences with this aspect of journalism had on their general views.

In an essay entitled "An Account of the Highest Court of Judicature in Pennsylvania, *viz.* the Court of the Press," Franklin gives us his views on the subject. As to the power of this court, he says, it "may judge, sentence, and condemn to infamy, not only private individuals, but public bodies, etc., with or without inquiry or hearing, at the court's discretion." Concerning the "natural support of this court," Franklin concludes that it "is founded in the depravity of such minds as have not been mended by religion, nor improved by good education." Then he goes on to ask what can be done about it.

Having convinced himself that no legislative control of the court's activities is possible that would not be "construed as an infringement of the sacred liberty of the press," he looks in other directions for the needed control. He thinks he has found an agency which will restore to the people a species of liberty of which they have been deprived by our laws. "I mean," he says, "the liberty of the cudgel."

"My proposal is to leave the liberty of the press untouched, to be exercised in its full extent, force, and vigor, but to permit the liberty of the cudgel to go with it, *pari passu.*"

Jefferson is not on record so explicitly as Franklin on the tendency of newspaper liberty to run riot. But he said enough to leave no doubt that he saw and felt this tendency. Not long after he became president, he spoke of newspapers as "a bear-garden scene into which I have made it a point to enter on no provocation." Printers, like the clery he said, "live by the zeal they can kindle, and the schisms they can create." Accordingly, they "can never leave us in a state of perfect rest and union of opinion."

As to what might be done about it, Jefferson's view was less heroic than Franklin's. He held that while Congress had no power to put the press in a strait-jacket, the individual states might do so to some extent. It does not appear, however, that he would have the states go farther than to punish slander. And he concludes: "However, the steady character of our countrymen is a rock to which we may safely moor; and notwithstanding the efforts of the papers to disseminate early discontents, I expect that a just, dispassionate and steady conduct will at length rally to a proper system the great body of our country."

A shallow dip into the history of American journalism is enough to convince one that for a long time the "bear-garden scene" of Jefferson's characterization held good and also that the "liberty of the cudgel" proposed by Franklin was a practical if not a legal reality.

The period of what might be called bellicose journalism may be roughly put as extending from the

struggle between federalists and democrats during the beginning years of our present government to about 1850. Its peak may be regarded as having been reached with the use for advertising his paper (the New York *Herald*) James Gordon Bennett made of the cudgelings he got. Although Bennett appears to have come through all his personal encounters without permanent bodily injury, and to have profited greatly from them as publicity material, it may be inferred that to newspaper men generally this seemed rather too risky a form of advertising to justify its adoption on an extensive scale. For, on the whole, the "liberty of the cudgel" as a factor in journalism seems to have lost ground from about the end of Bennett's journalistic career.

It looks as though a close study of the subject would reveal Bennett's position to have had more significance than that of simply marking high-water in the physical bellicosity of journalism. He seems to have been one of the earliest discoverers that political journalism is bad. After an especially disappointing experience in this way shortly before starting the *Herald* in 1834 he declared himself through with politics. From about that time there seems to have gone on a slow but sure disentangling of journalism from party politics, and from alliance with any and all other special organizations and interests.

On the whole the freedom of the newspaper press has suffered more in America at least, from being tied up with special interests—political, business, religious, social or what-not—than from acts of government.

Our main contention is that although science is rooted more in man's life of reason than in his life of feeling, while journalism is rooted more in his life of feeling than in his life of reason, the devotion of both to truths peculiar to its own domain should constitute a ground on which the two may work together for the common good. The pursuit and dissemination of truth is as much the life of the newspaper press as it is of the research institution. Such a news-gathering agency as the Associated Press or the United Press *is* a research institution in a very real sense. A daily newspaper is essentially a collector from the community, and a narrator for the community, of information concerning the day-to-day happenings in the community. It is a sort of minute book of the community's daily life. Regardless of the extent to which news proper may be submerged in matters which have or seem to have no relation to news, after all, the news is the heart of the thing. Exactly what "news" is has been much debated. But whatever else it may be, it must include factual information chiefly about human life. Imagine any newspaper adopting a policy of making every news item as "sensational" as possible in utter disregard of the truth. How long would such a paper survive? Even if its plant escaped wreckage at the hands of an infuriated public, it could not escape financial wreckage.

The tendency to wholesale condemnation of the daily newspapers as "sensational" and "lying" ignores a great part of the most essential make-up of any given day's issue. The hundred-and-one notices of things that have happened and are scheduled to happen at home and abroad, in public affairs, in society, in school, in church, in sport, in business, in finance, in health, and so forth, concerning which there is no room for accusation of sensationalism, are forgotten when such condemnatory pronouncements are made. Except as legitimate interest is a form of sensation—of what is felt as contrasted with what is factually known—the basic substance of the newspaper is as true to life as is the basic substance of the most scientific treatise on human physiology or pathology, or on economics or sociology or politics.

Even as touching the most vital interests, that is to say, the most sensation-inducing interests, we find as emphatic expressions of allegiance to truth from journalism as from any calling whatever. Joseph Pulitzer's instructions to the editorial writers of the *Evening World* in connection with an election candidacy to the New York judiciary could hardly be surpassed in fidelity to truth.

> I want you to go into the Maynard case with an absolutely unprejudiced mind. We hold no briefs for or against him, as you know. I want you to get together all the documents in the case. I want you to take them home and study them as minutely as if you were preparing yourself for an examination. I want you to regard yourself as a judicial officer, oath-bound to justice, and when you shall have mastered the facts and the law in the case, I want you to set them forth in a four-column editorial that every reader of the *World* can easily understand.

Did a judge from the bench or scientist from the laboratory ever show more intelligent and determined effort in behalf of truth than that?

If the essence of journalism is the gathering and dissemination of truth in the form of news, and if the essence of science is the discovery and dissemination of truth concerning nature, then truth furnishes ample meeting ground for the two.

A single illustration of what this statement means, practically, must suffice. The extensive, though by no means universal support given to science by the newspaper in the Scopes' trial needs interpreting from two directions. Looked at journalistically it was a telling exhibition of that championship of freedom of speech and of the press for which journalism has always been famous. The attitude of many of the papers was primarily this: Regardless of whether

the theory of evolution has been fully established or not, it is supported by a great number of incontestable facts and is believed by many persons specially qualified to speak on the subject. The rank and file of the community are therefore entitled to have it presented to them by all competent agencies of education, whether the school, the press, or any other. The right and freedom of the general public to learn is as vital as is the right and freedom of individuals to speak.

Then there was the genuine effort by many papers to get and publish data on the merits of the controversy. A considerable study by Science Service and by myself personally of the part the newspapers took in the affair suggests that scientists have not fully appraised the case as evidence of the possibilities there are of the usefulness journalism may have to science.

And unquestionably journalism has worked cooperatively with science in many other cases. This can not, however, blind us to the fact that in some situations newspaper practice is diametrically opposed to that of science. For instance, the apparent deliberateness with which some newspapers will publish almost anything about sex that is lascivious but almost nothing about it that is scientific, astonishes scientifically minded people and undoubtedly tends to moral havoc for great numbers of people.

At the same time it must be recognized that scientific research has as yet achieved little in the fields which involve human interest and welfare and hence emotion at its greatest intensity that is comparable in trustworthiness with what it has achieved in other fields. For instance biological investigation has enlarged knowledge enormously concerning those reproductive and sexual phenomena which are remote from immediate, personal human interest. Their manifestation in lower organisms, plant and animal, and their cellular aspects in higher organisms, have received wonderful illumination at the hands of investigators. Furthermore, medical science has penetrated deeply into certain of these phenomena. But such of them as implicate with greatest intensity the lives of men and women in their relations with one another are only now beginning to have the searchlights of rigid investigation turned upon them.

Hence there is ample justification for hesitancy on the part of teachers of the public whether in school or press to give adherence and general publicity to the fragmentary and tentative findings of science in these matters. All that can be properly desired is that just so far as the results of investigations become trustworthy as evidenced by being generally agreed upon by those devoting themselves to the special inquiries concerned, the essentials of the results shall be given adequate place in educational effort.

What is said about scientific knowledge of reproductive and sexual phenomena, and the general dissemination of such knowledge, would be essentially applicable to various other blocks of phenomena which involve mankind's interests and emotions almost if not quite equally closely. For instance, so much of economic science as deals with, or by rights should deal with, those phenomena which have given rise to the familiar dictum "self-preservation is the first law of life" seems to be almost as backward from the standpoint of scientific research as are the aspects referred to of reproduction and sex. And religious phenomena are in similar state.

Our study to this point has brought out that the problem of the relation between journalism and science is in large measure the problem of the relation between man's life of reason and his life of emotion. It is thus only an aspect of the problem by which humankind is confronted in every major concern of its existence.

SCIENCE

Early in this discussion the conviction was expressed that we now have enough scientific knowledge of the nature of man and of the world generally to justify the belief that truth as newspapers conceive and pursue it, and truth as science conceives and pursues it, is sufficiently the same to constitute a common ground on which journalism and science might work together for the common good.

Such a union of interests and efforts may be greatly facilitated by the broadened and deepened understanding of himself man is now gaining through the great advances of science.

Many sciences have contributed to this enhancement of man's self-understanding. But, as should be expected, the sciences of living nature, in which the sciences of man are of course included, have contributed most.

The advances in biology particularly are bringing about a transformation in our conception of the origin and nature of living beings. The theory of evolution is passing into a new and radically different phase from those it has before passed through. This phase will concern man as he actually lives from day to day much more particularly than have the phases through which the theory has been passing during the last half century and more. Once the character of the new phase catches the newspaper eye (more properly, I suppose, the newspaper "nose for news"), it is a safe guess that one of the most spacious and inviting common grounds for journalism and science will have been discovered.

What is this ground stated in language that might pass muster as journalistic science?

First, as to the name of the theory in its new phase: emergent evolution has already been applied to it so widely, especially since C. L. Morgan's book by that name, that this christening seems likely to stick. But it appears that the thing itself has been expounded by a number of biologists in quite different terminologies, the expounders not having been fully aware until recently that they were expounding essentially the same thing. Workers in widely separated subdivisions of the biological realm have come to essentially the same conclusion as to the general nature of the reinterpretation to which the phenomena of organic development must be subjected. H. S. Jennings has long championed the idea under the name "radical experimentalism"; and the small group, including C. M. Child and C. J. Herrick, have been whaling away at it for years under the name "the organismic conception." Under essentially this caption I have spoken in my own peculiar way for the idea rather extensively during more than a decade.

From the side of traditional philosophy the naturalism of John Dewey has much in common with the world view implied by emergent evolution; and the "evolutionary naturalism" of Roy Wood Sellars is perhaps as close to that view as it is practicable for a strictly philosophical treatment of a subject to approach a scientific treatment of the same subject. Furthermore, A. N. Whitehead's theory of "organic mechanism," coming from mathematical physics, is surely a close relative.

Three points concerning this new phase of the evolution theory may be presumed to interest everybody because recognizable as likely to bear upon everybody's personal well-being.

1. Living individuals of organic nature, including individual men and women, boys and girls, adolescents, young children and just-born babies, are going to loom much larger in biological science than they have heretofore. A period of scientific interest in individuals is impending. The scientific-poetic doctrine of nature's great care for the species and great carelessness for the individual is nearing the sunset of its long, somber day.

The idea of emergence traced to its physicochemical foundation finds a peculiar form of organized individual to be indispensable to the occurrence of phenomena which characterize bodies as being alive, or living. The conception of "living matter" as if it were something unindividuated or only secondarily individuated must be abandoned.

This coming of the individual organism more prominently into the field of scientific attention will shift the major theoretic interest for a time at least from *evolution* in the racial and species sense to *development* in the individual sense. We may anticipate that before long the present vogue in many aspects of modern life of the great place accorded the individual will be traced to its connection with this element in the revised theory of evolution. Under the caption "personality" the individual is gaining special prominence in education, in industry, in medicine and in social intercourse.

2. The second point of general human interest in regard to "emergent evolution" may be stated with reference to the doctrine of the fundamental independence and separableness of body and mind. Fix your attention on the individual as growing in the sense of *emerging* through its various stages, fertilized egg, early and late embryo, just-born infant, childhood, and the rest, and you fail to find a trace of evidence of such a thing as a body independent of a mind or a mind independent of a body. Could man's knowledge of himself have begun with a knowledge of the egg and various embryonic stages of his individual development, such a theory as that of the independence of his body and his mind would never have occurred to him.

Historically viewed all forms of the idea of mind as independent of body are genetically kindred to the numberless varieties of ghost ideas of primitive man. The theory of psychophysical parallelism can be traced to the dualism manifested in these terrific mental aberrations of our savage ancestors. This theory recognizes that man has a mind and also a body, but, it says, the phenomena which constitute mind and those which constitute body are so different that they can not have any causal relation with each other.

Viewed from the standpoint of common adult experience in broad daylight this is an astonishing theory. When it became linked with the theory of man's derivative origin revived by Darwin, the conclusion was almost inevitable that while the origin of man's body could be causally explained, the origin of his mind could not be so explained. It was first surmised, then dogmatically held, that since it is impossible to explain mind, its existence is only an illusion. Hence consciousness became an epiphenomenon, if it exists at all; ethical and esthetic feeling and action became by-products of mechanical processes; and religion became a trait of childhood to be outgrown by every normal individual, and, finally, by the whole race.

With the moral monstrosity of these speculations we are only secondarily concerned. It is their scientific monstrosity that concerns us. The most distinctive attributes of the human species as compared with all other species are those on the basis of which this

species has produced agencies for human betterment and justice, science, art and religion. Yet here is a group of pre-scientific speculations espoused, elaborated and defended by science, that would deny the reality of these attributes, or reduce them to insignificance!

The theory of psychophysical parallelism, coupled with the mechanical theory of man's origin and fundamental nature, has infected man with the spiritual disease of misanthropy, cynicism and loss of self-respect. The contribution of the revised evolution theory to the cure of this affliction may be counted as one of the best fruits of the revision.

3. The last of the three points to be considered in connection with the new phase of the evolution theory concerns a probable shift of interest from the problems of when and how and where man originated to those of what he is, conceived as a *natural,* rather than in any part a *supernatural* being.

The conception of every individual organism as an emergent means that the degree of uniqueness, and the unifiedness which characterize the human organism, leaves no room for doubt of the objective reality of those attributes of man which make him a rational, a social, a moral, an esthetic and a religious animal, nor of the adequacy of the creative power of the natural order to produce man with all his physical and his spiritual attributes.

Man has arrived at a supremely critical stage in his millenniums of effort to make his positive knowledge of himself and of the world contribute in the highest measure to his own good. That stage is marked by the necessity of displacing the legendary, mythical and merely authoritarian knowledge which has constituted his theology by his verified and verifiable experiential knowledge of himself and the world, and of accomplishing this without impairing anything essential and valuable to the emotional aspect of his religion.

The chief lack of ability of both science and journalism (as of all other educational agencies) to face this tremendous situation is lack of preparedness to grapple rationally with three of man's attributes in which his emotional nature is most mightily involved. These attributes are his basic economic needs, his sexual impulsions, and his religious desires, hopes and fears.

Probably the most vital spot in this whole situation is the perception that religion is a response to the natural order; that it does not depend on a supernatural order or even a belief in such an order, as has been generally supposed. Man's belief in the supernatural seems to have resulted from his efforts toward a rational explanation of the peculiar form of his emotion here involved. The natural order to which this emotion is a response so vastly out-distances his factual knowledge and his scientific generalizations concerning it, that it is not surprising man should make hypotheses of the existence of bodies and powers quite outside of and above the natural order.

The contention that belief in the supernatural is a gigantic error into which man has been led in his effort to find a rational basis for the peculiar type of emotional response foundational to religion implies a change of attitude toward the natural order more deep and wide-reaching than any he has before had to undergo in his whole cultural history. It surpasses in human significance the change of attitude necessitated by the transition from the Ptolemaic to the Copernican astronomy because it implicates human life more directly.

Two considerations have impelled me to touch this ticklish subject. One is the composite nature of this production: My partner held, as a practical man, essentially the same views that I have sketched as a scientist. He would insist, were he with us, that once in the midst of such a treatment of our topic as that entered upon, we go through to the logical end, no matter how inadequately.

But the consideration that has pushed me hardest is the nature of the situation itself. That situation is, as previously indicated, before anything else, the problem of man's reaching a livable adjustment between his life of emotion and his life of reason.

If it is true that these conflicting aspects of man's nature are strictly natural phenomena and that the theory of evolution, especially in the phase now being entered, is the right approach to the great human problems involved, then it follows that the unified study and treatment of man in every aspect of his being is fundamental. We are faced with the necessity of bringing under one point of view for both research and practical treatment what are usually classed as "anthropology" and the "humanistic sciences," medicine, hygiene, human psychology and education ranging themselves within these two classes. Scientific research is already making considerable headway in some of the problems belonging to these intensely vital and hence equally emotion-manifesting domains of human life, and it is certain to push the efforts with more zeal and efficiency than ever in the future. But science must undergo a great renewal of self-illumination concerning its place in human life and its meaning for human welfare before it can achieve its greatest victories in such research.

A grave charge often made against science is that many of its devotees are disregardful of the sensibilities of persons who hold what the specialists know or believe to be erroneous ideas on points of vital human concern. In some instances this disregard has been

heartless, even to brutality. The psychologist who could tell his class to "park their souls out of doors" when they came to his class room, had at some time somehow suffered a bad twist to his mental and moral make-up. When and how the twisting happened, it may be impossible to tell exactly. But an important factor in it may be confidently supposed to be failure to recognize one of the most important differences between the physical sciences and the sciences of man. The difference referred to inheres in the different relation held by the investigator to what is investigated. The physical sciences are motivated entirely in the gaining of knowledge of, and control over, the objects and processes investigated. The well-being of what is investigated is considered not at all by the investigator. He may exploit his experimental materials without let or hindrance so far as their rights are concerned.

Quite otherwise is it in the sciences of man. In all these, knowing and controlling the objects and processes investigated are and must be subordinate, speaking broadly, to the wellbeing of the objects studied. The surgeon at the operating table may be taken to typify the essential relation between investigator and investigated in the whole group of sciences of man. Technical knowledge of investigator and skill of operator are here dedicated wholly to the purpose for which they primarily exist, namely, human welfare in the form of restoration to health of individual human beings. Obviously not in all these sciences can the objects studied become the beneficiaries of knowledge in such immediate personal way as in the case of the patient needing operative treatment.

How, then, are the benefits to be extended? Undoubtedly in many different ways, but most importantly through the increased intelligence of the public concerning the knowledge gained by the researches.

But again, how is such extension of intelligence to be accomplished? To illustrate, what part should school education play in making people at large effectively acquainted with the established results of investigations into the relation between the human sexes? What part should the newspapers play? What part should be taken care of in the home?

The evidence of the intellectual decadence of New England, so startlingly emphasized by Dr. Cattell's just-published résumé of his study of the distribution of scientific men in the United States, is too obvious in its sinister bearing on the future of our country to be missed by anybody who becomes acquainted with the facts. Is this study to be followed up so as to learn what factors are responsible for the decay, whether it affects all aspects of New England's cultural life, whether the disease is likely to extend to the entire nation? Suppose science should get certain or highly probable answers to these questions, how is the truth to be so brought home to the general public as to make it effective in the national life?

Because of the nature and complexity of the situation, I am going to do no more than make a suggestion which, if carried out, might do much to promote the desired end so far as journalism and science are concerned.

I suggest that the special efforts made at this meeting of the American Association toward increasing the dissemination of science to the public be the beginning of efforts in this direction that shall go much farther than anything of the sort this country has ever seen.

I suggest that the symposium held yesterday on publicity for science be repeated, perhaps many times, either under the auspices of this association or some equally competent agency, but extended in scope so as to secure the joint discussion between the very foremost representatives of the sciences and of the newspapers of the almost numberless points at which they impinge on each other, sometimes in friendliness, but sometimes in hostility.

Do not the indications of growing desire by newspapers for scientific news and opinions justify the belief that the time is favorable for such a move? It seems to me the results of the study just reported by the Permanent Secretary of the American Association of the space given by newspapers to the scientific proceedings of recent meetings of the association may be interpreted in this way. This instance by no means stands alone on the side of journalism itself in affording like encouragement. Is it possible that journalism is more ready than science for such a move?

We are all patriotic Americans. As men of science we may claim more. We may claim that our patriotism embodies knowledge of, and devotion to, the best ideals and traditions of Americanism. A few critics of America, some foreign and some of our own number, are saying that American ideals as held by the founders of the Republic have gone by the board. I would like this partnership address, as I have called it, to be viewed as an attempt by one journalist, E. W. Scripps, and one scientist, myself, to join forces in support of the basic ideas of journalism, of science, and of Americanism that were held by those two master builders of our Nation, Benjamin Franklin and Thomas Jefferson.

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MALNUTRITION IN PLANTS

NUTRITION problems are quite as common in plant as they are in animal life, and in both cases these problems become most evident where the living organ-