# Ten Million Scientists

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IN 1948 the American Association for the Advancement of Science celebrated the completion of its first century. During that period the triumphs of science in technology have become so conspicuous, and the multitudinous products of its discoveries, from television to atomic bombs, hold now such promise and such peril for us all that one can hardly blame a layman for regarding the sciences as primarily a sort of glorified gadgeteering, chiefly important for their contributions to the physical requirements of mankind. It is also easy to understand the frequently expressed opinion that most of the troubles of our sorry world have come, directly or indirectly, from the advancement of science, which has not only given us machines beyond our moral ability to control but has pulled down ancient pillars of belief upon which so much of western civilization was supported. There is far too little popular understanding, however, of the true spirit and significance of science. The many beneficent influences which it has, or ought to have, not only on our physical welfare but on the higher levels of the life of man, are too often undervalued. Science may break down, but it can also build. This theme has often been discussed and is too vast for the space of a short address, and I shall try to explore only a corner of it here.

One of the serious problems of our day arises from the fact that certain high qualities in human life, much treasured in the past, are slowly breaking down, and that to replace their values men are turning to substitutes which are often fraught with peril. The ancient virtues of tolerance and open-mindedness, for example, tend easily to degenerate into a tepid neutrality; and to restore the spiritual motive power thus lost as convictions evaporate, we are tempted to revert to dogmatism and authority again. Among the graver dilemmas which we face, one thus has as its two horns the twin evils of indifference and intolerance. I shall try to show the beneficent effects in resolving this dilemma that would follow from a better understanding of the spirit of science and especially from a wider participation in its actual practices.

Just why does this dilemma now confront us?

In the confusion that followed the irruption of modern dictatorships, both of right and of left, the first reaction of free peoples was astonishment. Here are nations, we said, who seem to be turning back the clock of civilization; who have given up the hard-won privileges of freedom; who no longer respect the dignity of the individual but yield it up to an all-devouring state; who have discarded so many of the spiritual traditions of mankind but yet abase themselves before a Führer or a commissar almost as before a deity. Such men must have found something which to them seems very precious. For the first time in modern history democracy is thus on the defensive. We have so long assumed that freedom and the democratic way are ideals toward which any civilized society must inevitably move that we are shocked to find that millions deny their desirability. Democracy must have failed these men at some vital point, must have been unable to satisfy some deep human need. We must frankly face the uncongenial task of finding where this failure has been and what we can do to remedy it. Surely there is no other question that the free peoples of the world so urgently need to have answered. I believe that the difficulty lies deeper than in economic and political factors and that its solution will not come from novel social mechanisms but in a renewed vitality of the human spirit itself. And here is the argument:

Freedom suffers from the defects of its virtues. There has slowly grown among the free peoples of the world that ideal of tolerance (often too poorly realized in practice) which we admire as the fine flower of civilization—tolerance of differences in race, in habits of life, in religion, in all the many ways through which the biological and social divergencies of our kind express themselves. Indeed, democracy is the compromise that freedom makes with human diversity. It is here that a weakness begins to be evident. Lovers of tolerance have learned to find truth in such unexpected places that they are suspicious of the distinctions so long drawn between truth and error, beauty and ugliness, right and wrong. Does not truth, they say, depend chiefly on one's point of view? Will not a robust sympathy with everything human emancipate us from dogmas which so often have kept man's spirit in chains? There is beauty in the Parthenon, but one can find it in Epstein, too. Shakespeare and Milton are great poets, but Ezra Pound is worth a prize today. Moral codes are bound to change, and nothing is surer than that the heterodoxies of one generation will be the orthodoxies of another. Every religion has some good in it, and

we should not thrust ours on the rest of the world. So goes the argument to the pragmatic climax that truth is whatever we like to believe and that for free men absolute standards no longer exist.

This tolerant attitude, if pressed far enough, leads to the degeneration of something precious in human nature, *convictions*. If *anything* may be beautiful or right or true, are these qualities worth much anxious thought? Our ancestors believed they knew at least part of a body of absolute and eternal truth, and this belief was of the utmost moment in their lives. Our generation, however, hardly knows where it stands on issues which still are vital ones. In many of them we are no longer even interested. Such indifference and the moral flabbiness that follows it are among the chief dangers in modern life. The drive and enthusiasm that bring things to pass are the gift of those who are convinced, not those who are indifferent and uncertain. Tolerance breeds few martyrs. It is the zealot, the enthusiast, the dedicated man, who leads the crusades and slays the dragons. Without convictions, men and nations suffer in competition with others who have more spiritual motive power. This motive power totalitarianism knows well how to use. For a generation tired of moral insipidity and yearning for a great cause to which it can give itself, the dictators have offered one. The master race, or the rebirth of imperial Rome, or the dictatorship of the proletariat—these are such proffered causes. In each there has been a supreme prophet, a body of infallible dogma, and a rallying cry for a host of single-minded believers. Men of every station here march proudly together. The truth they hold in common becomes a holy cause which they are eager to serve. The inconsistencies, the cruelties, and the blind intolerance that are demanded of them they ignore. Something precious outweighs all these, and to underestimate its tremendous appeal to troubled and uncertain men is blindness. Today, when easygoing tolerance so often is the ideal attitude, and security is commonly reckoned the highest blessing, we may well forget man's tremendous capacity for dedication, his eagerness to nourish convictions, his persistent quest for certainty. The significance brought into his life by a cause and a creed often seems to him compensation enough for loss of freedom. Thus we are drifting toward the unhappy choice between indifference and intolerance. Unless we can resolve this dilemma, unless we can keep the human spirit free and at the same time restore to it the certainty that it has laid hold of some great truths about the way that men should live together, the future of democracy is dark indeed.

A similar dilemma, on a somewhat less exalted but perhaps equally important level, has boredom for one horn and hysteria for the other. One must admit, I think, that in our western world the enormous advances in knowledge and in our ability to use it for the greater safety and comfort of mankind have made life for most people much less interesting and stimulating than it used to be. Until recent times man was confronted by wide areas of the geographically unknown. The thoughts of youth indeed were long, long thoughts as it looked out over the mysterious ocean and wondered about the undiscovered reaches of the South Seas, as it thought of central Asia and darkest Africa and read the adventures of Captain Cook and of Lewis and Clarke. Whalers from New Bedford and Nantucket lost themselves for months in the unknown and came back with fabulous tales. No wonder boys ran away to sea. Adventurous and restless spirits from Daniel Boone to Kit Carson were always dreaming of "something lost behind the ranges." The existence of frontiers everywhere was a constant challenge. Their social and economic significance has often been stressed, but their stimulus to the imagination should not be forgotten. The Blue Ridge was more than a barrier to our West; it was a symbol of the mystery and excitement of the unknown.

Even the task of keeping body and soul together was more adventurous then than now. The dangers and vicissitudes of life made it a more arduous but a more exciting experience, for it was a daily contest with the elements and involved hazards now unknown. Monotony there often was, but rarely boredom.

Life is very different today. Most of the frontiers have disappeared. The blank spots on the map are nearly all filled in, and there are few challenges remaining to adventurous geographical explorers. Life itself is safer and less exciting. Gadgets of every kind lighten our labors and minister to our comfort, so that existence has become a routine of thermostats and switches and gears. Much labor has become monotonous repetition, lacking the variety and interest of craftsmanship. Fewer physical dangers impend. Someone has said that if medicine advances much further there soon will be nothing for us to die of save atomic bombs and boredom! I do not contend that the "good old days" were better than ours. Most of us would never willingly go back to them. But it must be admitted, I think, that life *has* lost some of its flavor, some of its exhilarating and exciting quality. It is tamer and more artificial than it used to be. Leisure has very greatly increased, but instead of being treasured and enjoyed it is too often something to be spent as painlessly as possible. Boredom for many has indeed become a real problem, and is one of the penalties of that indifference which so often distinguishes modern life.

This is a serious matter. "Without adventure," says Professor Whitehead, "civilization is in full decay."

Man at heart *is* an adventurer. He craves something to stir his pulses and lift him out of routine. He seeks a moral equivalent of the active, questing life of his ancestors, but to gain it he too often resorts to harmful expedients, to the hysterical stimulation of speed or alcohol or hectic, restless living. He gets his thrills at second hand by watching games or movies or the television screen. How to make life healthily interesting is therefore something our mechanical and gadget-ridden society is trying hard to learn. Hobbies, sports, intellectual interests—these are useful and important, but a major problem is to find means to employ one's leisure not only pleasantly but so that it shall be productive of that high satisfaction which comes from a vivid interest in something, from a sense of adventure. There are many fortunate men who do have this sense and whose lives are full and happy, but it must be admitted that all too often modern life is a pretty pedestrian affair.

Here again the dictator recognizes a growing psychological defect of our times and has moved to remedy it. His regimes always devote much attention to great spectacles, to magnificent shows. Organizations of every sort are set up to absorb the time and enthusiasm of many and are made attractive by uniforms and medals. Men and women everywhere are marching and singing, and underneath it all is the tense, often hysterical, enthusiasm that it is the business of a dictator to maintain. All this doubtless makes life more exciting and interesting for the citizen and helps bind him to the cause, but its artificiality is obvious. Whipped-up enthusiasm is no sound substitute for the rich stimulation life can know if its highest possibilities are fulfilled.

Such, then, is the dilemma we face—on the one hand that indifference, drifting into boredom, which has come with the tolerant, secure, and easy life of today; on the other the intolerance, restlessness, and hectic search for stimulation that are the all too common reactions to such an existence. This is by no means all that is wrong with our world, but if the dilemma I have described could be avoided if men could travel a sane middle way, which would combine freedom and tolerance with the conviction and enthusiasm necessary to give life its driving force and the flavor to make it the great experience that it should be, the world would surely be a safer and a happier place.

It is precisely here that science has something more valuable than its material gifts to offer our generation for, in its own field, it *has* resolved this dilemma. If the spirit of the true scientist could animate men everywhere, if they could share in the attitude that science at its best inspires in its practitioners, the unhappy alternatives that have been mentioned would be avoided.

I need not describe the scientific attitude here. The very basis of it must obviously be complete open-mindedness. Science can have no dogma, no arbitrary authority, no "party line." Every highway that may lead to truth must be kept open. When science capitulates to authority, as it now seems to be doing in Soviet Russia, little hope remains for other kinds of freedom. Nor do I need to mention the tolerant spirit of science or its enmity to prejudice—national, racial, or religious. It makes no difference whether a discovery is made by a German, a Chinese, or an American, a negro, a Jew, a Communist, or a Republican. The only criterion is whether the discovery is sound or not. Frontiers to science are unimportant. Research goes on everywhere, and journals published in one country are widely read in others. Most of us have correspondents and colleagues in other lands, and many of them have become our warm personal friends. The rational and friendly attitude science inspires is a sound antidote for the passion and hysteria that threaten the peace of the world. If the good will men of science normally feel toward each other were universal, wars would be much less likely.

But what of the other horn of the dilemma? Can science nourish those convictions and enthusiasms free men must have if their cause is to survive? I am sure it can. Science is by no means completely tolerant. Its goal is to seek out the truth, and its history has been one of steady progress toward this end. If truth could not be disentangled from error, science would have no meaning. So long as a particular element of truth has not been discovered or is only imperfectly known, the seeker's mind must be completely open to help from other quarters; but once a portion of the truth has been found, has been separated from error and become a part of the intellectual capital of mankind, then the conception of tolerance to ideas incompatible with it quite loses meaning. Tolerance of what has been proved to be untrue is manifestly absurd. Thus science builds an ever growing body of certainty, of assured and proved truth.

You may object that this certainty, well buttressed though it may be, is but a cold-blooded thing, and that the convictions it nourishes are not dynamic enough. Science may be a strong ally of freedom and tolerance, but its success as a stimulant of enthusiasm, as a substitute for the heroic marching songs of the totalitarians, seems most unlikely. Who will go to the barricades in defense of an equation? Faith and conviction have ever been more concerned with emotion than with intellect; but we should remember that the enthusiasm of the scientist, which burns with a much cooler flame than that of the fanatic, may well endure when passion and hysteria have run their course. The scientist does not goose-step behind a band to prove

his zeal, but his ears are listening to marching music of a subtler kind. His conviction of the truth of the laws he has discovered, though not shouted so loudly in the streets, is a deeper one than belief in the infallibility of Marx or the superiority of the Aryan race. And beneath it all, the foundation of every other human faith, is his supreme conviction that the universe is the abode of law, an orderly and dependable place.

As for boredom, that is one ill that surely no true scientist can ever suffer. To one who has felt the excitement—even the exaltation—of research and discovery, all other thrills seem tame. The man of science is the modern explorer, the spiritual descendant of Marco Polo and Magellan and Captain Cook. He pushes out across a wide frontier beyond which lies not simply an unknown wilderness but an unknown universe, undiscovered territory which is as full of surprise and adventure as the western ocean or the Indies ever were. He needs no artificial stimulation, but would rather be about his work than doing anything else in the whole world.

Thus the spirit of science, if it truly takes possession of a man, can carry him along the middle way which leads both to that freedom and tolerance so necessary for the democratic way of life and to the convictions and enthusiasms that keep life from growing flabby and stale. We well know that scientists are frail and fallible and that not all of them lead lives that are models for mankind to follow; but we must admit, I think, that if men everywhere could catch a glimpse of the spirit that science engenders in those who practice it—friendly, honest, tolerant, rational, adventurous—and if they could capture a little of it for their own lives, the future of the world today would look much brighter. I am not suggesting that all men should be scientists—Heaven forbid!—or that other agencies cannot be greatly effective toward the salvation of society. Surely an appeal to the high traditions of the past, to the lofty ideals that are the birthright of civilization, will much avail. The poet and the artist and the man of faith, all who cultivate the nobler emotions of mankind, these too are needed. But to aid them there are powerful resources at hand in the scientific spirit, all too little recognized, which can strongly combat those degenerative and divisive tendencies in modern life that we fear so much. Science should be far more than a gadgeteer for mankind, giving him tools he is often not wise enough to use. It should be a teacher, a restorer of minds distracted by clamorous falsehood and hate, a missionary of reason and good will.

There are few, I am sure, who would disagree with all this. The great problem is how to use these resources of the scientific spirit, how to make them effective and more readily available for the service of man. This is surely a question worthy of consideration by our great Association, and I want to turn your attention to the practical problem of how such a goal may be approached.

It is not easy. Obviously, more widespread and much better scientific education is one end for which we should strive. It is gratifying that teaching problems are occupying an ever larger place in our meetings and that among our affiliated societies are some that are concerned primarily with such questions, but much more needs to be done. We should endeavor not only to impart scientific knowledge but to give our students a true understanding of what the scientific method and spirit really are. Learning *about* science, even from inspired teachers, is to get it at second hand. This is useful and will lead the student to follow intelligently the progress of the sciences and, as a citizen, to form sound opinions about those human problems that science touches; but nothing can give the intimacy of understanding, the true feeling for science, like actually participating in its work. Here at first hand one catches its real flavor, knows the heady excitement of discovery, and learns what science really is like. One who has had this experience knows that there is no substitute for it.

But, one may object, such direct participation is limited to the small minority of practising scientists, men who have spent years in specialized training for their profession, and there is small place in it for others. Perhaps, however, we should take a somewhat less exalted view of scientific research. We are so familiar with its highly technical aspects—the use of electron microscopes, mass spectrometers, radioactive isotopes, and the scores of other elaborate tools of our profession, together with the mathematical subtleties necessary for an interpretation of the results obtained with these—that we sometimes forget the still vast areas where facts and principles of great scientific value may be discovered with no more complex tools or techniques than are at the command of any intelligent layman. Even to list all these would be impossible here. The exact distribution of plant and animal species, the records of flowering dates, the analysis of tree-ring chronology, the variability of wild species, bird censuses and the records of bird and insect migrations, the study of peat borings, the collection and identification of fossils, the distribution of minerals, detailed local weather observations, records of meteorites and of variable stars, time-lapse photography, problems of radio transmission—these are but a few of the many fields open to study by the amateur scientist. Let us not disparage such work as "anecdotal," as "mere natural history," simply because experiment and complex apparatus play a relatively minor part in it. Intelligent observation is at the bot-

tom of all research, and opportunities for this are almost limitless. There is ample room in science for the efforts of a vast body of enthusiastic laymen.

Science has much to gain from such a mass participation in its work. Consider the great contributions to astronomy made by that indefatigable band of men and women who form the American Association of Variable Star Observers, or of the revolution in our knowledge of bird migration resulting from the work of hundreds of devoted amateur bird-banders in recent years. The broad base on which such studies can be pursued through lay participation is far beyond the possibilities of any small professional group and constitutes a resource which is too often neglected. The amateur can also contribute in other ways. His fresh viewpoint and freedom from bias have often led to discoveries that his more inhibited professional brother had overlooked. Let us not forget that many whose names stand high in the history of science were largely self-trained amateurs.

But though science would gain much from a wider participation of laymen in its work, the gain to the laymen themselves would be much greater still. Science for everyone is a liberating experience. The very word *amateur* indicates that such a man loves what he is doing. One of the happiest persons I ever knew was an amateur botanist whose ambition it was to obtain a specimen of every species of the genus *Potamogeton* and to learn its distribution. This led him on extensive collecting trips and to correspondence and exchange with friends the world around. It added not a little to our knowledge of aquatic plants, but to him it was also an absorbing adventure. How stimulating it would be if such an experience could be duplicated many thousand fold! To a jaded generation, feverishly seeking distraction in so many artificial ways, such activities would be healing and invigorating, a means to that sane and rational attitude which will help avoid the dilemma we have been discussing. If this could be shared by a host of men and women, less intensively prepared than we are but no less truly explorers along the frontier of scientific adventure, mankind would be far better for it.

Aside from these advantages, to science and to the amateur, there is another important one. The practice of research by laymen would bring them much closer in spirit to professional scientists and thus help narrow the widening gap between these two portions of our society. The place of the scientist today, both in technology and as a leader of thought, has grown to be so important that he is often looked upon almost with awe by other men. His techniques are so complicated and little understood and his accomplishments so marvelous that many regard him as a sort of magician, set apart from the rest of mankind. This is unfortunate for all concerned. If science is to develop vigorously and to serve the world as it ought to, it should not be wrapped in mystery but must be understood, at least as to its spirit and methods, by those ordinary citizens upon whom it has to depend for support. The best possible means for bringing this about is a widespread participation of laymen in scientific work.

A not inconsiderable beginning toward such an end has already been made, and many amateurs are now industriously at work in the front lines of science. For mutual stimulation and exchange of ideas they are gathered into a host of organizations, ranging from the most unpretentious bird and nature clubs to societies essentially professional in character. An important function of many of these groups is to bring professionals and laymen together and thus to give the amateur the benefit of the wisdom of his more experienced colleagues. Our own Association and most of its affiliated societies include many amateurs in their membership. How many of these lay scientists there are in this country we have no means of knowing, but ten years ago W. Stephen Thomas estimated their numbers at over 150,000.

In 1938 the Carnegie Corporation and the American Philosophical Society set up a Committee on Education and Participation in Science which surveyed the activity of more than 700 amateur scientists in the Philadelphia region and helped organize a number of research projects in which very many more participated. Out of this came *The Amateur Scientist,* a book written by the secretary of the committee, W. Stephen Thomas. At about this time, too, a Committee on Private Research, also supported by the Carnegie Corporation, was set up at Western Reserve University for work in the Cleveland area. Many of the studies of amateurs with which it was concerned were in the sciences. The activities of this committee are described in a book by its director, William S. Dix, entitled *The Amateur Spirit in Scholarship.* The war unfortunately prevented an extension of these promising experiments.

The great programs of adult education are important means of stimulating amateur science, and one of the major tasks of the various state academies of science, affiliated with our Association, is to promote such education. But to gain a far wider participation by laymen in scientific work we shall doubtless have to begin with children and young people rather than adults. To this end the hundreds of science clubs, organized under the auspices of Science Service, are of great value in stimulating young people to an active interest in the sciences as a supplement to their classroom work. The nation-wide Science Talent Search is another important means of attracting into

science some of the best of our youngsters. It is a hopeful sign, too, that science teaching is gaining more attention than ever before. At this convention there is being held a very important series of meetings of organizations whose members are interested in problems of teaching.

We should not forget other means of educating laymen, young and old, than these more formal ones. The modern museum serves more and more as a center to awaken interest in science and to disseminate knowledge about it. Newspapers and magazines are also a most important source of popular scientific information, and the science news writer is therefore assuming a particularly serious responsibility in this matter, for much of what laymen learn about science now comes through his hands. The Westinghouse Award for Science Writers, administered by our Association, is proving an important means of raising the quality of their contributions.

But only a small beginning has been made, after all. Amateur scientists still are few and are often regarded with bewilderment by the unregenerate. Much missionary work must be done before a rabid Dodger fan will buy a vasculum and set out to collect the flora of Flatbush! Certainly most people will continue to find their relaxation and stimulus in other ways than ours, but I am sure there is a respectable minority who, if they could be introduced to one of those fields where the amateur scientists are working so well, if they could once savor the delight of learning at first hand something new about nature, would forsake the lesser satisfactions which now they seek. Surely if a small fraction of the enthusiasm and intellectual effort now devoted to the game of bridge, for example, could be mobilized for scientific work, what important results might follow! Is it too much to expect that in this wide land ten million men and women—one person out of every fifteen—might thus learn to devote a share of their leisure to the actual practice of the absorbing arts of the amateur scientist? You may think this an altogether unrealistic proposal, but if it could be attained, or even approached, I believe that the change it could accomplish would profoundly influence us all for good. We recognize our many grievous deficiencies. We need more tolerance, more good will to our neighbors near and far, more sturdy convictions, even a deeper love of freedom. We need to meet our problems with reason and sanity. We need a mental tonic in days of depression and despair. These goals are preached and plead for by our most devoted and enlightened leaders everywhere. We try in many ways, through school and church and public exhortation, to arouse our fellows to the need for a new spirit in the world. Such efforts accomplish much and should be pressed far, but they often seem discouragingly inadequate. Where a frontal attack of this sort may fail, however, perhaps more can be accomplished by indirection. If a great host of our fellows could once become deeply concerned, even in a humble way, with that vocation which is ours; if they could once share the absorbing interest that comes from dealing with nature at first hand and pushing out even a little way into the unknown; if they could learn the delight of comradeship in that high adventure, then those qualities so greatly desired and so needful for us all would come of themselves. They would appear as natural by-products of scientific activity and not solely as a result of persuasion and propaganda. One would cultivate a distant friend not simply as a dutiful gesture of international good will but for the very practical purpose of exchanging specimens of Coleoptera or records of meteorite showers. In the excitement of a joint project to explore a new fossil bed, the question of whether one's colleagues were of a different race or creed would lose its significance. Good will would come in full measure as a necessary consequence of working together. A man absorbed in the problems of bird banding or tree-ring analysis does not have to be preached to about the value of a hobby as a means of keeping him out of the hands of a psychiatrist. Anyone who has had the experience of marshalling scientific data and rigorously drawing sound conclusions from them will not easily fall a victim to wishful thinking or clamorous falsehood.

I do not maintain that all that is needed to make anyone an angel of light is for him to get a scientific hobby, but there are few therapeutic measures one can think of that would be better restoratives, physically and mentally, for the ills of today. Has not the time come when as professional scientists and good citizens we should turn our attention more vigorously to this problem? Our great Association has been dedicated for more than a century to the advancement of science. In the past this has been thought of chiefly in terms of research carried on by professional scientists. Should we not recognize more fully than we have done the immense possibilities for progress that are open in many fields of science if we can enlist a host of new colleagues to help explore them? And especially is it not our duty to exploit the great resources of the sciences not only for the discovery of truth and the increase of human comfort and safety but as a means for enriching and strengthening the spirits of men and breaking down barriers which now divide them? Science, like most human activities, has wrought many ills, but it has within it qualities of beneficence which, once understood and widely practiced, can greatly help the world. I commend to my successors in this high office the task of giving our Association a continuing leadership in this ministry of science to man-

kind. For such a campaign the regular professional army is not enough. We need volunteers, too, and many of them. Let us undertake, for our good and theirs, to mobilize a great body of such recruits. Let us aid in directing their energies into the high adventure with the universe which science is. Let us help, through the brotherhood of science, to promote the brotherhood of man.

*Address of the Retiring President of the AAAS, delivered on the evening of December 28, 1949, at the 116th Meeting of the Association, in New York City.*

# The 102nd Year of the AAAS

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AT THE MIDPOINT of the 20th century, the American Association for the Advancement of Science can look back upon its achievements and remarkable growth. In the early days of its existence, it was a society whose divisions represented the chief organization for each science and at its meetings all scientists gathered together to present the results of recent research in each of their respective branches. As the number of scientists in particular fields increased, it was natural for independent societies to grow and new ones to be created which had meetings apart from those of the AAAS. There are now national organizations representing practically every division of the Association. The great growth of science in the United States has necessitated this cleavage and made imperative the formation of such societies. Few cities can provide adequate facilities for the meeting of as many as ten thousand scientists. Moreover, much smaller groups lend themselves more effectively to the widening of acquaintanceship and to technical discussions. Nevertheless, the old divisions of the AAAS are still actively functioning and have attractive programs at each meeting. The Association, as it did in the early days, provides opportunities for scientists in different fields to meet each other.

While these larger groups of scientists have been establishing societies of their own, many new smaller scientific organizations, often in specialized fields, have joined the Association as associated societies or as affiliates. The AAAS offers to these organizations a service which they could not maintain independently.

Today, upon entering its 102nd year, the Association is stronger than ever before, with its fifteen divisions, 87 associated societies, and 128 affiliates. It has not succumbed to the vicissitudes of the war and postwar years. A nominal advance in dues, a big increase in the membership, economies in the Washington office, and a larger advertising revenue have made it possible to operate with effectiveness and without a deficit, even though more income would permit merited additional functions. The membership is in the neighborhood of 45,000. The journals are successful and the symposia volumes have filled a need, besides proving profitable.

What may be expected in the future? The Association may look forward with optimism. Every effort will be made to improve *Science* to the point where it is in demand by all scientists. It is anticipated that the *Scientific Monthly* may eventually reach many more readers among the general public. The potentialities of these two journals are great.

Among the current functions of the Association may be mentioned the sponsorship for many years of the Gordon Research Conferences in Chemistry. Six to ten conferences have been held each summer with extraordinary success, and in the summer of 1950 the number will be increased to 15. Attendance is limited in order that the meetings may be kept strictly discussional. There is demand by chemists all over the country for invitations to these meetings and the conferences have had a far-reaching influence. For the Westinghouse Company, the AAAS has administered the annual Science Writing Awards, for excellence in science writing and distinguished science journalism. Since 1944, it has sponsored the Cooperative Committee on Science Teaching, of which a member of the Executive Committee, Karl Lark-Horovitz, has been chairman. Junior academies of science, composed of high school students, have been formed in about half the states of the union under the leadership of the AAAS, the state academies, and the public