Theoretical Psychology: Madison Bentley, Cornell, *chairman.* (6 papers.)

Character and Personality: F. H. Allport, Syracuse, *chairman.* (18 papers.)

General Intelligence: E. A. Culler, Illinois, *chairman.* (6 papers.)

Legal Psychology: Carl Murchison, Clark, *chairman.* (24 papers.)

Subdivisions:

I. *Approaches to the Field of Legal Psychology.*
II. *Juvenile Delinquency.*
III. *General Delinquency.*
IV. *Detection.*
V. *Punishment.*
VI. *Social Implications.*

Meaning and Symbolism: C. A. Ruckmick, Iowa, *chairman.* (11 papers.)

Psychophysics: S. W. Fernberger, Pennsylvania, *chairman.* (No formal papers.)

Abnormal Psychology: J. W. Bridges, McGill, *chairman.* (13 papers.)

Child Development: J. E. Anderson, Minnesota, *chairman.* (20 papers.)

Eye-Movements: W. R. Miles, Stanford, *chairman.* (4 papers.)

Laboratory and Teaching Devices: K. M. Dallenbach, Cornell, *chairman.* (16 papers.)

Memory and Learning: E. S. Robinson, Yale, *chairman.* (17 papers.)

Psychology of Music: C. E. Seashore, Iowa, *chairman.* (11 papers.)

Race Differences: Joseph Peterson, George Peabody College for Teachers, *chairman.* (5 papers.)

The Nature of G: Carl Spearman, University College, London, *chairman.* (4 papers.)

Personnel Psychology: W. V. Bingham, Personnel Research Federation, *chairman.* (7 papers.)

Physiological Psychology: R. S. Woodworth, Columbia, *chairman.* (15 papers.)

Social Psychology: William McDougall, Duke, *chairman.* (4 papers.)

Statistical Method: C. L. Hull, Yale, *chairman.* (8 papers.)

Sleep: H. M. Johnson, Simmons Investigation of Sleep, *chairman.* (9 papers.)

Esthetics: H. S. Langfeld, Princeton, *chairman.* (15 papers.)

Mental Tests: M. L. Reymert, Wittenberg, *chairman.* (28 papers.)

Motivation: H. A. Carr, Chicago, *chairman.* (5 papers.)

Reflexes: Hulsey Cason, Rochester, *chairman.* (13 papers.)

Religious Psychology: E. D. Starbuck, Institute of Character Research, *chairman.* (11 papers.)

Sensation and Perception: H. P. Weld, Cornell, *chairman.* (6 papers.)

The morning sessions and symposia were all well attended, and there was considerable discussion, especially in the symposia, which proved to be an excellent arrangement for meeting the diversified interests of so large a group of scientists.

At the business meeting of the congress, it was voted to hold the Tenth International Congress in Copenhagen in 1932. The following members were added to the standing International Committee: *Brazil,* H. deB. B. Roxo; *Canada,* E. A. Bott; *Germany,* G. Kafka, D. Katz, O. Klemm, K. Lewin, W. Wirth; *Great Britain,* F. Aveling, Beatrice Edgell, L. Wynn-Jones; *Holland,* L. Bouman, A. A. Grünbaum; *Hungary,* P. Ranschburg; *India,* M. V. Gopalaswami; *New Zealand,* T. A. Hunter; *Poland,* S. Blachowski; *Russia,* I. P. Pavlov, A. B. Salkind, I. Spielrein, V. M. Borovski; *Switzerland,* J. Piaget; *United States,* J. R. Angell, W. S. Hunter, J. Jastrow, K. S. Lashley, E. L. Thorndike, Margaret F. Washburn, R. S. Woodworth. A telegram of condolence was sent to the widow of Morton Prince, who died a few days before the opening of the congress, and greetings to Professor Carl Stumpf and Professor G. Heymans, both of them former presidents of the congress.

Before the meeting, the foreign members visited Princeton and Columbia Universities, and at the close of the session they were given the opportunity of seeing Harvard, Clark, Smith, Wellesley and the biological station at Woods Hole. While at Harvard, they were shown the Psychological Laboratory, the Psycho-Educational Clinic, the Psychological Clinic and Fatigue Laboratory, the Medical School, the Psychopathic Hospital and the Judge Baker Foundation.

At the close of the congress, there was a general impression that never before had there been such a profitable exchange of views among psychologists from almost every country of the world, and the optimistic opinion was expressed that a real advance had been made in an international cooperation for the study of behavior.

PREACHING THE GOSPEL OF SCIENCE

By Dr. RALPH C. BENEDICT

BROOKLYN BOTANIC GARDEN AND HAAREN HIGH SCHOOL

Readers of Science are accustomed to have their attention focused mainly on exploratory work, investigation, as the most important means by which the advancement of science may be furthered. The pages of this journal are chiefly occupied with news relating to the scientists of the colleges and those of

research institutions, or with publication of articles by members of these groups. It is the purpose of this communication, however, to ask consideration for a different point of view: *viz.*, the problem of the broad diffusion of the facts of scientific discovery, old and new, and of the inculcation of habits of scientific thinking as a problem coordinate in importance with research. Indeed, the question might be raised whether, in a democratic government, the problem of diffusion is not at times the more important. Will it not be accepted as a truism that if a small fraction of the present body of knowledge were really apprehended by the mass of our citizens, progress in health and in economic status to an undreamed of degree would ensue? Is there any doubt, furthermore, that if the practice of dispassionate, unprejudiced thinking could be widely extended our social and international relations would be immeasurably improved?

The theses of this article are two: Diffusion of science, both content and method, can best be promoted through the multitudes of pupils in the secondary schools of the country. High-school teachers of science are the best agents for this diffusion. Is there any parent of a child, even in lower elementary grades, who has never experienced the shock of disputed authority—"My teacher says thus and so." With children in the high-school grades, the proportion of times when the teacher's contribution is better than the parent's is greatly increased.

There are four and a half million children in schools of high-school rank in the United States. This estimate is based on figures for 1926, furnished by the Bureau of Education, Department of the Interior, which reports 4,232,125 as the exact figure for that year, with an estimate of a 5 per cent. increase since then. A query put to a class in hygiene at Haaren High School, New York City, recently showed that the home population was over five times the school register for that particular class. That multiple would give the figure of over twenty-two million of our total population as "represented" in our secondary schools. Even if it is recognized that the multiple for the country as a whole is likely to be smaller, not more than four, it is still obvious that anything of importance which is accepted as valid by these millions of high-school pupils will in turn exert a constructive influence on many more in the homes, and that this will constitute an immense general influence.

The figures for the number of science teachers and of pupils in the science classes of the country are not available, but may be given in detail for New York City, thanks to a recent study and report made by John L. Tildsley.[1] The public senior high-school population comprises a total of approximately one hundred and fifty thousand. To this may be added the twenty-five thousand enrolled in the last year of the junior high school, which corresponds to the first year of the senior schools. Over ninety thousand of the total one hundred and seventy-five thousand are taking work in regular five-period-a-week science classes with a distribution in round numbers as follows: biology, 50,000; general science, 14,000; chemistry, 15,000; physics, 9,000, and physiography, 2,000. In addition, there are numerous thousands in hygiene classes, meeting once a week, and partly taught by biology teachers. When the health education plans of the state requirements are fully realized, these hygiene classes will at all times include half the total registry, *i.e.*, nearly ninety thousand.

The science classes are at present taught by a corps of nearly six hundred specially licensed teachers, distributed approximately as follows: biology, 320; general science, 80; chemistry, 105; physics, 60; physiography, 20. Exactly ninety-nine of the biology teachers are in the junior high-school division, figures for which are not covered by the Tildsley report. All but six of the senior high teachers are reported as having received at least a bachelor's degree, while over two hundred have M.A.'s and thirty have Ph.D.'s. In addition the same teachers reported additional graduate hours averaging two hundred and fourteen apiece, a total of 108,531 hours credit.

Extracting further from the Tildsley report, it may be noted that three hundred and twenty-two of the senior high teachers are members of one or more scientific societies, while one hundred and seventy-four are not members of any organization. It should be noted, however, that most of the memberships indicated are with the local physics, chemistry or biology teachers' organizations. Four hundred regularly read some scientific journal (including *Nature*, and other popular types); ninety-nine read none. As Tildsley remarks, these ninety-nine "are hardly likely to be welling springs of inspiration to their pupils," but he doubts "that the teachers of any other subject would excel this science group in training and professional attitude." It may be wondered how this group of science teachers would compare with a similar group of practicing physicians. It is clear that it is equally important for both groups to maintain close contact with the progress of science in their particular fields.

At present, the prospects for science progress in the New York schools are excellent. The central high-school administration is sympathetic and appreciative of the importance of science in the curriculum. The report of Dr. Tildsley, which was entitled "Teaching Science as a Way of Life," is already a most constructive influence. The New York public and the

[1] *High Points in the Work of the High Schools of New York*, 10: 1–186. October, 1928.

press are generally liberal, open-minded and interested in science. If the persisting obstacles of college-entrance preferences for languages could be surmounted, the prospects for an even wider diffusion of science as a body of fact and as a method would be greatly enhanced.

The professional interests of the science teachers are served locally by three principal organizations: the Chemistry Teachers' Club, the Physics Club of New York and the New York Association of Biology Teachers. The last mentioned has a paid membership of nearly four hundred, with a mailing list of nearly seven hundred. For several years the association has followed the policy of keeping on its mailing list every local science teacher or prospective teacher whose name could be obtained. To this list there are sent notices of the monthly meetings, together with occasional book reviews, etc. The purpose of the large list was to aid in the diffusion of science, but the policy has had the effect of nearly doubling the membership of five years ago.

The writer is chairman of a special committee of the Biology Association assigned to study the work of the various national scientific organizations with a view to advising local teachers of their aims, scope and publications. This committee includes as advisory members Professor R. A. Harper, of Columbia, and Professor E. W. Sinnott, of Barnard College. In this connection, a letter has recently been addressed to the presidents of the organizations relating to biology and science education and affiliated with the American Association for the Advancement of Science, asking information regarding conditions of membership, periodicals, etc. Of thirty letters sent out, answers have been received to all but four, and the material is in process of preparation for report to the local teachers.

This committee is urging that all New York science teachers should become members of the American Association and of as many others of the more specialized science societies as possible. It is recommended that for any given department, these memberships be scattered to cover a diverse group of organizations, thus bringing to each common departmental library a comprehensive series of periodicals.

The high school science teacher, whether in physics, chemistry, biology, general science or hygiene, has a continuing, unremitting responsibility for keeping abreast of current research. Scarcely a day passes without newspaper notice of some new discovery. Many of the stories are premature, often reportorially garbled through the desire to play up sensational "news." The fact that science is finding increasing space in the daily press places an especial responsibility on the science teacher to be prepared, either to give a prompt, well-founded judgment regarding any current item, or else to know certainly where to turn to find the basis for such a judgment. . . .

The high school science teacher is the intermediary through which these new contributions must find their most effective interpretation. Upon the attitude of the science teacher—whether broad-minded, progressive, well-balanced, of eager curiosity—will depend the attitude engendered in the minds of millions of high school pupils, and through them, in millions of homes. The diffusion of the stream of new discoveries, with all the hoped-for gains in the way of the health of the individual and community, of social betterment, and of race improvement, must take place through the secondary school system.[2]

Since the Tildsley survey of science teaching was made last June, there has been a considerable increase in the number of teachers enrolled in national scientific societies. During December, 1928, some thirty local biology teachers joined the Torrey Botanical Club, making a total of fifty local teachers enrolled in that organization. Probably most of these and some others became members of the American Association in anticipation of the New York meeting. More recently, in March, over thirty more have joined the American Genetic Association.

In Newtown High School, located in the borough of Queens and in the outskirts of the city, the biology department consists of seven teachers, all of whom are members of the American Association. In Haaren High School, half a block from Times Square, in the science department of ten teachers, comprising one in physics, four in general science and five in biology, the scientific affiliations are as follows:

Association	No. of members
American Association	5
Torrey Botanical Club	3
Botanical Society of America	1
American Genetic Association	2
American Fern Society	2
Ecological Society of America	1
American Eugenics Society	1
American Society of Mammalogists	1
American Geographic Society	3
American Nature Association	2
American Museum of Natural History	1
Brooklyn Academy of Arts and Sciences	1
Brooklyn Botanic Garden	1
National Education Association	1
National Audubon Society	1
N. Y. Ass'n. of Biology Teachers	8
Total	34

[2] Quoted from an article in the *Bulletin of High Points, etc.*, for March, 1929.

Among the nearly six hundred science teachers of New York's public high schools, distributed among some thirty-eight senior high and fifty-two junior high schools, membership in the American Association and in other scientific organizations is not generally as large as shown by the two schools cited above. However, there is good reason to believe that much of the apparent indifference has been due more to lack of information about scientific affiliations than to the lack of interest and professional attitude, and the two schools just cited are evidence to this effect. So far, the committee mentioned above has been chiefly concerned to promote membership in the American Association and its affiliated societies. It will be glad, now, to bring to the attention of the biology teachers any publications which have interest and pertinency in the fields of botany, zoology, human biology and hygiene. Furthermore, a copy of the most recent mailing list will be sent to the secretary of any biological organization or the editor of any biological periodical who would be interested to send sample copies or prospectuses of their work.

Finally the interest of the professional scientists of the country is asked in the problems of high-school science as a challenging opportunity and obligation. Too often the attitude of the college science teacher has even been obstructive and unsympathetic, especially with respect to college requirements. Promote the work of the high-school science teacher by welcoming him into your societies, by offering courses at times when he can take them, by speaking to the meetings of his special organizations.

Advances in science knowledge, in exploratory work, must naturally remain for the pioneer work of the few in the universities and research institutions, but the application of their discoveries in daily life, their extension among our one hundred and twenty million citizens, can best be attained by seeing to it that the four and a half million in the secondary schools receive a thorough training in the basic sciences. What does it matter that the scientist more and more effectively uses the methods of dispassionate analysis and synthetic constructive thought in discovering new facts if the general run of folk continue to think of disease and evolution, for example, so far as they think at all, in terms of ideas hundreds of years out-dated?

At present, high-school science must struggle for effective representation in high-school curricula with all the older subjects which hold their position tenaciously, mainly because of tradition. In an era in which science plays the important part that it does to-day, it would seem not unreasonable to suggest that a carefully determined sequence of science subjects be made the required core of the six years of the junior-senior high-school years, and that even English, as a mode of improving expression and appreciation, be relegated to a secondary position, in favor of science as the means of acquiring judgment and ideas to express. Is it not reasonable to forecast a future when men will look back at our time with wonder that young people could finish twelve years of public training with little or no real training in science courses?

SCIENTIFIC EVENTS

REPORT OF THE BRITISH COMMISSION OF FORESTRY

THE ninth annual report of the Forestry Commissioners says, according to the London *Times*, that the balance remaining in the Forestry Fund at September 30, 1927, was £406,103. Payments into the fund amounted to £627,092, and out of the fund to £648,936. Land acquisition during the year amounted to 43,953 acres, of which 32,056 acres were classified as plantable. Disposals amounted to 993 acres (981 acres plantable), thus reducing the net acquisition of plantable land to 31,075 acres. The total area of plantable land acquired to September 30, 1928, amounted to 275,913 acres, or 57,287 acres less than the proposed area. The area of state forests planted with conifers during the year was 21,496 acres, compared with 26,700 acres under the Acland Program, and 26,800 acres under the commissioners' revised program. The total to the end of the year was 110,910 acres, compared with 120,000 acres for the Acland Program and 119,700 for the revised program. The total area planted to September 30, 1928, was 116,676 acres. The planting program for the current season is 23,000 acres, and should this be fully completed, the total area planted by the commissioners in the ten years will amount to 139,676 acres.

The area proposed, under the Acland Report, to be afforested or replanted by local authorities and private owners with state assistance during the ten years was 110,000 acres, or an average of 11,000 acres per annum. By means of grants, 47,373 acres have been planted, 20,571 prepared for planting and 9,451 cleared of shrub. The systematic formation of forest workers' holdings was begun in the summer of 1924, and had therefore been running for four years at the end of the year under review. Up to September 30, 1928, 490 holdings had been completed (133 in the year under review), and 282 were in process of formation.