

What Do Other Specialists Do?

To fill the frightening and uncomfortable gap that publications leave between one specialist's knowledge and another's, the New York State Section of APS holds successful tutorial symposia. Costs are moderate; management is relatively easy, and speakers and audience have a good time while they learn physics.

by Dale T. Teaney

AMONG MATTERS OF PRIVATE and professional concern to physicists today are problems that arise from our increasing specialization. One of the most important of these certainly is the way we specialists tend to get so absorbed in our own work that we lose touch with discoveries and developments of colleagues in fields not immediately related to our own. The stimulation to be found in our short-range intellectual interactions is something we would not want to give up or weaken with dilettantism; still, most of us feel that a constant effort to broaden our general understanding is a professional responsibility, as well as a good in itself.

The question then is: How can we specialists, while necessarily involved in the rigors of our own work, manage to increase and deepen our understanding of the current work of specialists in widely differing areas? Let us review the conventional ap-

proaches available to the individual and then consider a promising collective effort undertaken by the New York State Section of the American Physical Society that might well be duplicated by other groups.

Finally, I will make a proposal for extending the effectiveness of the New York effort.

Present inadequate avenues

It may as well be recognized from the outset that the readily available avenues of self-education for the busy specialists are fairly inadequate. Suppose, for example, we attend an APS meeting. Naturally we avoid the ten-minute talks in foreign fields, knowing they will be incomprehensible to us. We do go hopefully to hear the invited papers. But because the sessions are so crowded, any tutorial introduction is limited to about five minutes; in the remaining time 15 or 20 slides flash past, and we are left, at best, with a heightened curiosity. The broader general understanding is certainly not to be had here.

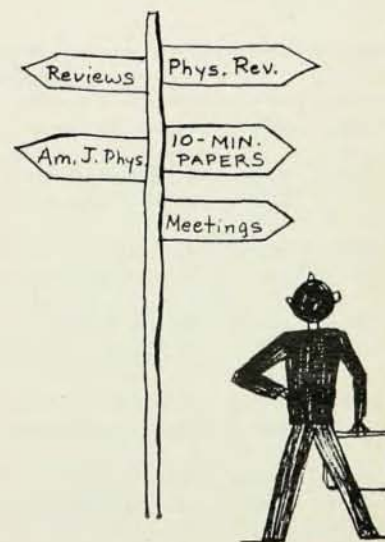
Or we may turn to a review article (which we necessarily select at random unless we are lucky enough to have an AAPT resource letter on the subject). The introduction may implicitly reveal some history by the order in which the first 20 references are listed, but by the end of the third paragraph we find that the review article is the essence of specialization;

its purpose is to make available to people in the immediate field a compact and unified description of work to date. Again, this does little for us.

Next, we look up one of the original sources in *The Physical Review*; alas, we find we can't read it at all without putting in a really onerous and even wasteful amount of time and effort—if *The Physical Review* were readable we wouldn't have felt so ignorant in the first place.

Changing pace again, we check *PHYSICS TODAY* or the *American Journal of Physics*, and here, if we are fortunate enough to find a relevant ar-

The author, who got his PhD at Berkeley and then spent two years at Harwell, is now at the IBM Watson Research Center, Yorktown Heights, N.Y., where he works in magnetism and looks for dynamical effects and critical-point phenomena and ways to learn other subjects.



ILLUSTRATIONS BY HELEN HERMAN

avenues of self-education

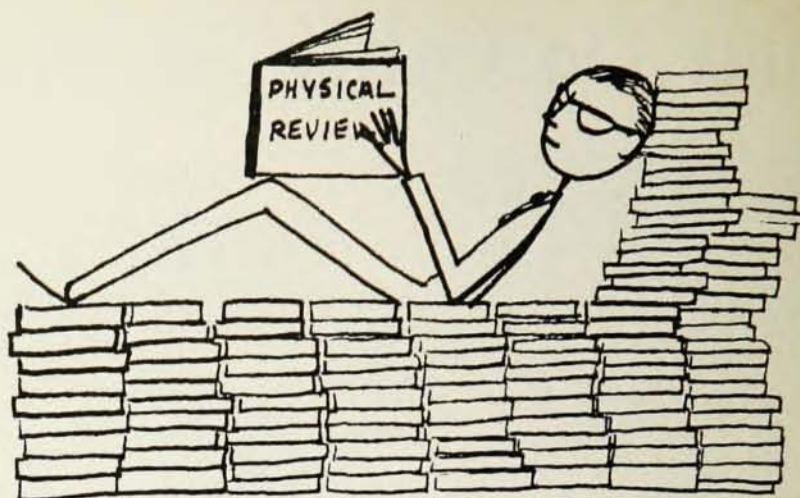
ticle, it is likely to be very much the kind of thing we are looking for. One facet of a given subject, at least, will be accurately defined and carefully described; the article will be pleasantly readable and the author will have included enough details, formulas and references to satisfy an exacting reader. But the scope of a single article is necessarily limited. The author, intent on precision, is not inclined to make broad generalizations and far-reaching comparisons. Yet comparisons and generalizations are necessary in establishing some grasp of the whole pattern of contemporary work. Musing further we are inevitably led to wonder whether an ideal solution to our problem might be a little collection of PHYSICS TODAY-type articles, each article on an aspect of a common field. Such a volume could present a broad view without sacrificing completeness and detail. But in point of fact such readable little books on special topics are only too rare. Certainly there is at present nothing like a comprehensive library of them available.

Finally we can search the popular literature. Here if we find any account at all, and if that account is not an insult to our literacy, it is likely to suffer from the lack of zest and precision that so often marks the effort to popularize physics. If the subject is very new the account tends to be vague and rather incorrect; if the subject is mature, the treatment tends to be hackneyed and, worse, out of

date. But the real difficulty here is a systematic one: popular writing is for the layman, and we are seeking an understanding that is appropriate to our professional training and experience.

Successful tutorial symposia

The foregoing may be an overly gloomy picture; nevertheless it has been tacitly agreed by most specialists that they have no very good way, operating as individuals, to inform themselves widely about the work of fellow scientists. What is necessary, in fact, is a much larger-scale organized attack on the problem. Six years ago the New York State Section of APS recognized the need for such a systematic program, and since then its semiannual meetings have been devoted to tutorial symposia. The success of this program in terms of en-



a really onerous amount of time and effort

thusiasm and attendance has been so great as to suggest that the program might serve as a pattern for other groups.

Twice a year some three or four hundred New York physicists meet for a day and a half to listen to a series of lectures on a topic of major contemporary interest. The topic itself is chosen by the executive committee, and as can be seen from the list of topics on this page, importance and timeliness are the two main criteria. A good example of the responsiveness of the program to new developments is shown in the 1961 symposium on stimulated emission, a subject that is even now in its technological adolescence. Furthermore chosen topics often elucidate the connections between the work of specialists in traditionally separate disciplines: a title like "Resonance Physics" clearly indicates the current emphasis and recognizes the existence of a conceptual matrix that contains a variety of specializations. The symposium might in fact be likened to the "good little book" of articles we wished for earlier, and it has the additional advantage, for those who attend it, of being "live."

A specialist in any of the fields covered by the symposia can easily see the intent of the program committee by glancing through the list of topics and speakers. The talks are planned to cover as wide a range as possible without leaving broad gaps. The speakers are all specialists, and they speak on their specialties; but as their major purpose is pedagogical, they place a good deal of emphasis on relation-

Seminar Subjects

1959	fall	Modern Advances in the Useful Conversion of Energy
1960	spring	Modern Advances in Radio Astronomy
	fall	Modern Advances in Physical Computers
1961	spring	A Survey of Amplification by Stimulated Emission of Radiation
	fall	The Physics of Surfaces
1962	spring	Plasma Physics
	fall	The Physics of Solar Space
1963	spring	Biophysics
	fall	Elementary Particles and the Nucleus
1964	spring	Modern Aspects of Resonance Physics
	fall	Current Trends in Optical Physics
1965	spring	Modern Developments in Magnetism
	fall	Selected Topics in Space Physics

ships between their particular work and the topic as a whole and on comparisons and cross references. And while endeavoring to expound the basic physics involved, they do not hesitate to present elegant and sophisticated material. Indeed they are likely to structure their talks so as to finish with a description of their own most recent results. Mathematical detail is kept to a minimum, but the use of cogent mathematics is not restricted; clarity, not necessarily simplicity, is the speakers' goal.

Also serving the cause of clarity is a prepared list of relevant definitions and terminology for each symposium, to which the speakers try to conform. It is sent out to the members ahead of time in the form of a conveniently pocketed bookmark like the one reproduced on the right. The density and precision of information they convey provides an excellent example of the way specialists explain things to each other. J. E. Kouvel, who spoke at the magnetism symposium, dubbed that issue quite appropriately the "magnetism catechism."

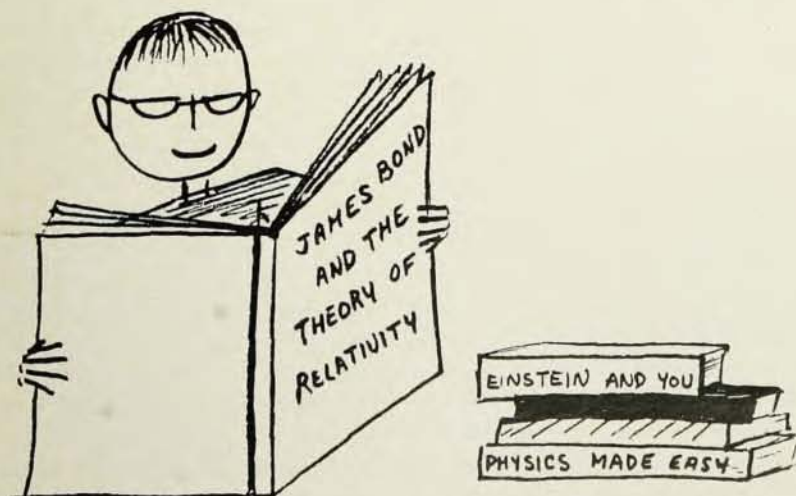
In contrast: the "short course"

A clearer picture of what the New York program is might be gained by contrasting it with the series of lectures, or the "short course," that occasionally pops up at larger graduate schools and industrial laboratories. First of all such short courses are infrequent because preparation of ten or so lectures by one individual repre-

sents a considerable investment of time. The symposium, on the other hand, has been a regular semiannual affair now for six years; evidently people are glad to prepare a single lecture on their specialty. Then the subject of the short course, though usually timely, is generally fortuitous. It depends, most likely, on what big-name specialist is visiting the laboratory that season. The New York symposia, on the other hand, are devoted to subjects considered by an executive committee to be of prime im-

portance and general interest. And although the program committee may not be able to effect the unity and completeness that an individual can plan into his own set of lectures, the repetition of some of the basic aspects of the subject by different speakers with different angles is educationally useful.

What really give the program its special character are interactions between the different speakers, comparisons (sometimes collisions) of points of view and individual enthusiasms, together with the common effort to present the basic physics. The symposium is lively but relaxed, spirited but congenial. An audience of about 350 interested specialists from all fields is large enough to be challenging to speakers but not so large as to preclude personal interchange. The sessions move at a smart pace, but the audience does not seem harassed and the talk in the halls during coffee breaks is not so frenetic as that overheard at national meetings. There is time for thoughtful consideration, questions, discussion. Grueling multiple sessions are dispensed with; people can give their attention to the subject at hand. And finally there is an atmosphere of positive satisfaction: it would seem that the individual



popular writing is for the layman

Symposium at IBM Thomas J. Watson Research Center
April 9 and 10, 1965
MAGNETISM
----- selected definitions and terminology -----

This bookmark has been prepared for the State Section's 53rd Meeting to acquaint the non-specialist with some general information on the subject matter of the Symposium: "Modern Aspects of Magnetism."

1. Magnetically Ordered System -- A material containing uncompensated electronic spins whose orientations are correlated. Below a well-defined transition temperature two spins will be correlated, however far apart they may be, and the system is magnetically ordered and is said to exhibit long-range order. Above the transition temperature the correlation between spin orientations falls toward zero as the separation of the spins increases but is not zero for neighboring spins. The system then exhibits short range order. Several types of ordered systems are:
 - a) Ferromagnets -- in which the spins are associated magnetic moments pointing in the same direction.
 - b) Antiferromagnets -- in which the spins are associated magnetic moments pointing in opposite directions.

MAGNETISM CATECHISM. Bookmarks like this carry technical terms and

go to participants before seminar. Card is pocket size; width shown is actual.

at the meeting really feels, "At last I am catching up on what the other specialists are doing."

It could be extended

The New York Section has provided an example of a valuable program that could readily be extended to other professional groups, especially other sections of APS. In its six years it has certainly proved that physicists really do want to keep up with other specialists' work, and it has more than proved that the small regional meeting is a good way to effect this. Within APS sections the mechanics of organization—elections, memberships, mailing lists—are already functioning; executive committees already exist as the senior groups of physicists to direct the programs; the sections already have experience with a number of meeting places within a reasonable area, and perhaps most important, the size of the meeting is automatically limited so that the congenial intellectual atmosphere can be preserved.

The idea to transform the New York State Section meeting into a tutorial program came from D. R. Morey, of Eastman Kodak, chairman of the section during 1959–61. Since then, K. H. Moore of Rensselaer Polytechnic Institute and W. V. Smith of IBM Research, the current chairman, have continued to lend their active support, particularly in the preparation of programs. A. F. Turner, of Bausch and Lomb, is secretary-treas-



alternating selection of persons with industrial and academic backgrounds

urer of the section, and it was his idea to publish the bookmark of terms and definitions. His early production of the bookmark along with the program and the local details of each meeting is another convenience to the members that makes the program run more smoothly.

Continuity and experience are provided by entrusting the key position of program-committee chairman to the outgoing vice-chairman of the section (currently H. Levinstein of Syracuse University) and by the two-year terms of each of these offices, generally held successively. Since the vice-chairman is traditionally chosen from within the executive committee, a continuous experience of at least six years results. Alternating selection of persons with industrial and academic backgrounds is sought to give balance to the committee and its officers.

How it is organized

Since we are, in effect, describing a fairly large-scale experiment, it is worthwhile to add a few remarks on the organizational setup which in no small way contributes to the success of the program. We think there are probably many harder ways to produce the same results. The meeting occupies a Friday and the morning of a Saturday, a banquet and popular lecture providing some relaxation on Friday evening. From the good attendance, we conclude that it is not hard for people to fit this modest time schedule into their regular routines. The meeting location moves from place to place in the state, but the distances are always short enough so that most people can get to the meeting on Friday morning. The fact that the audience (and the speakers as well) are not worn out by trans-

continental travel surely contributes to the general liveliness.

The advance arrangements for the meeting, too, are designed to be time- and effort-saving for the committee members. The executive committee picks a topic and a program committee; the program committee juggles subtopics and, with available experts, forms a program, and the local committee does the rest. Since the state section has about 50 member institutions that can handle a meeting of this size, there is no double jeopardy for the local chairman, the one person who—besides the program chairman, the chairman and the secretary—carries a heavy load.

As a further description of the scale of the program as well as its administration, we would like to summarize the cost of a typical meeting. The registration fee for members is \$2.00 and for nonmembers \$6.00, of which \$2.00 may be applied toward a membership application. Students go free. The fees pay for most of the cost and the usually small balance is made up by sponsoring companies in the local area. To give an idea of the costs involved, we present at the left a balance sheet modeled after the actual costs of the Spring 1965 meeting on magnetism held at the IBM Research Center. By way of explanation, the social hour is held before the banquet, and the expense is the subsidy required to serve drinks at the convivial price of 50¢. An "icebreaker" for speakers and local committee members is held on Thursday evening before the symposium. It is well worth the expense because it gives speakers a chance to vent their specialist energies on one another and change gradually into a more tutorial mood appropriate to the symposium.

Seminar Accounts*

Expenses

Banquet (400 people)	\$1000
Social hour	100
Icebreaker	100
Coffee breaks (3)	300
Honorarium for the dinner speaker	100
	<u>\$1600</u>

Receipts

Registration fees	
members (250)	\$ 500
nonmembers (150)	900
Contributions from four local companies	200
	<u>\$1600</u>

*Figures are for spring 1965 seminar.