Keeping up with what's going on in physics

AIP's Current Physics Information program offers new products to help scientists and engineers stay up-to-date.

Arthur Herschman

In an earlier incarnation, it seems, when I did things in physics rather than for physics, I was dimly aware of having an information problem although I doubt that I would have used that term. I scanned *Phys Rev* and certain other journals; I attended APS meetings. But somehow key items kept getting lost in the chinks—I found out about them much too late to use them properly. This frustration was compounded every time I decided to work on a new topic; tracking down the basic references was maddening. Later, when I became involved in physics information to the exclusion of physics research, I discovered a quote from Lord Rayleigh that summed up my feelings better than I could:

> "In science, by a fiction as remarkable as any to be found in law, what has once been published, even though it be in the Russian language, is spoken of as *known*, and it is too often forgotten that the rediscovery in the library may be a more difficult and uncertain process than the first discovery in the laboratory."

My dim awareness began to give way to grim apprehension when I started working at *The Physical Review* office, watching the green volumes proliferate on my office shelves, seeing the precipitous rise in manuscripts received as depicted on a chart on my office wall —not to mention the growing effort required simply to handle the material received and published. Two questions, in particular, began to concern me more and more. How could anyone find anything if even *Phys Rev*, just one journal out of many, was getting so large? And why were so many manuscripts submitted? Particularly, why was a given manuscript submitted to a given journal? The "publish or perish" shibboleth appeared too facile an answer. The answer to my first question was, apparently, that no one *did* find anything, so I was left with the problem of what could be done about it. My opportunity to do something came later, and, as it turned out, the two questions were by no means independent of one another.

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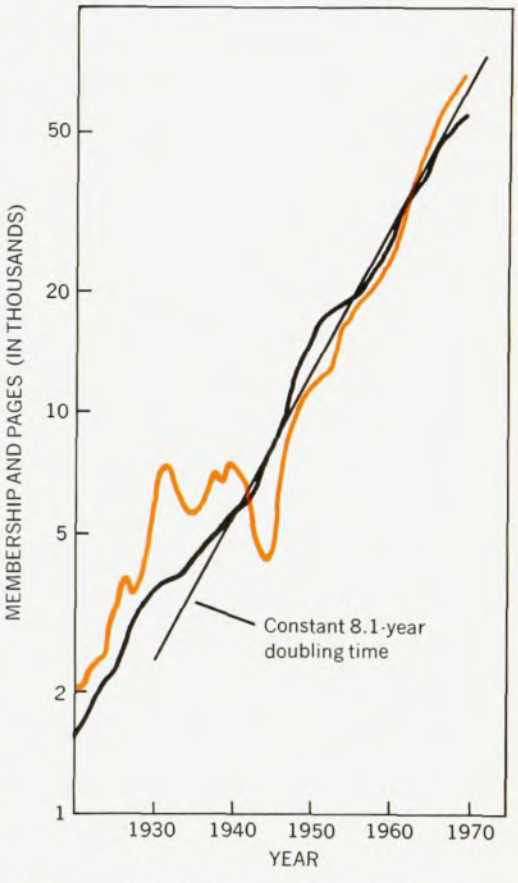
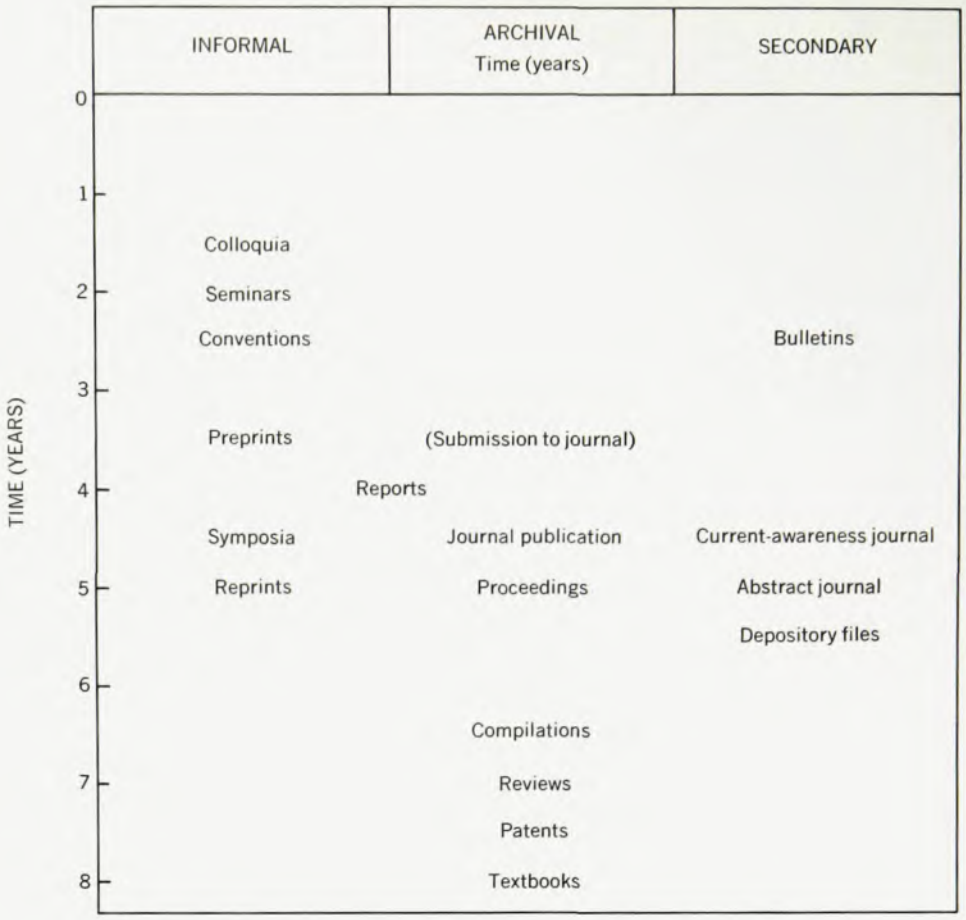
AIP begins a program

This opportunity came in 1966 when I was asked to join the staff of the American Institute of Physics to help develop its information program, a program for the improvement of communications in physics and astronomy. The results of this program will be our principal concern here.

In 1966, AIP had a modest program in physics information supported by the National Science Foundation. The program went back several years,[1] and AIP was considering a major expansion.[2] The first task faced in such an expansion was to augment the staff so as to be interdisciplinary in physics, computer operations and scientific information. The staff would be able to analyze and extend the studies made at AIP[3] and elsewhere,[4] and would formulate a basic approach.[5] This project was carried out with NSF support, and preliminary results were reported to the physics community.[6] We made a further proposal to NSF for the development[7] and implementation[8] of a system for improving what we found to be



Physicists and pages. Membership in AIP societies (black curve) shows the same 8.1-year doubling time as does the number of pages published in AIP and member-society journals (color). Apparently, "publish or perish" is either not important or not new. Numbers before 1933 are estimated from APS data.
Figure 1



Evolution of scientific information. The interrelations between the various primary and secondary channels show how raw data and partially formulated concepts can develop into journal articles, reviews, and perhaps into textbook chapters.
Figure 2

the major shortcoming of the existing communications procedures in physics. I shall summarize this system for "Current Physics Information"[9] below, and describe for you the reasoning that led up to it and what we expect it to accomplish.

Our studies analyzed the various ways in which scientific information is communicated, the interrelationships between these ways, and the relationship between how science is communicated and how it is done. The results largely confirmed the "gut" feelings most of us have. But they also dispelled certain notions and helped, because of the coherent picture that emerged, to focus on certain aspects of the communications problem as more important than others. What was this picture?

The literature *is* increasing, in fact, doubling every 8.1 years, and for all of science, not only physics. This increase is *not* due to any increased productivity among physicists but rather to an increase in the number of physicists; figure 1 shows that the number of pages published in AIP journals per member has remained about equal to one per year for the last half century. "Publish or perish" is either not important or not new. (For those among us with a "golden-age fixation," who believe that more trash is published today than at an earlier and better time, let me propose the following experiment: pick out your favorite "golden-age" paper, go to the library and find the actual musty volume it is in, then evaluate the other papers published in that volume relative to what is published now.) But the fact that increased productivity is not a factor does not eliminate the problem; on the contrary, the increase in the number of physicists also means an increase in the number working in any given speciality, no matter how narrow. Thus, even if one could find all of the material pertinent to his speciality, the problem of digesting it all is still considerable.[10]

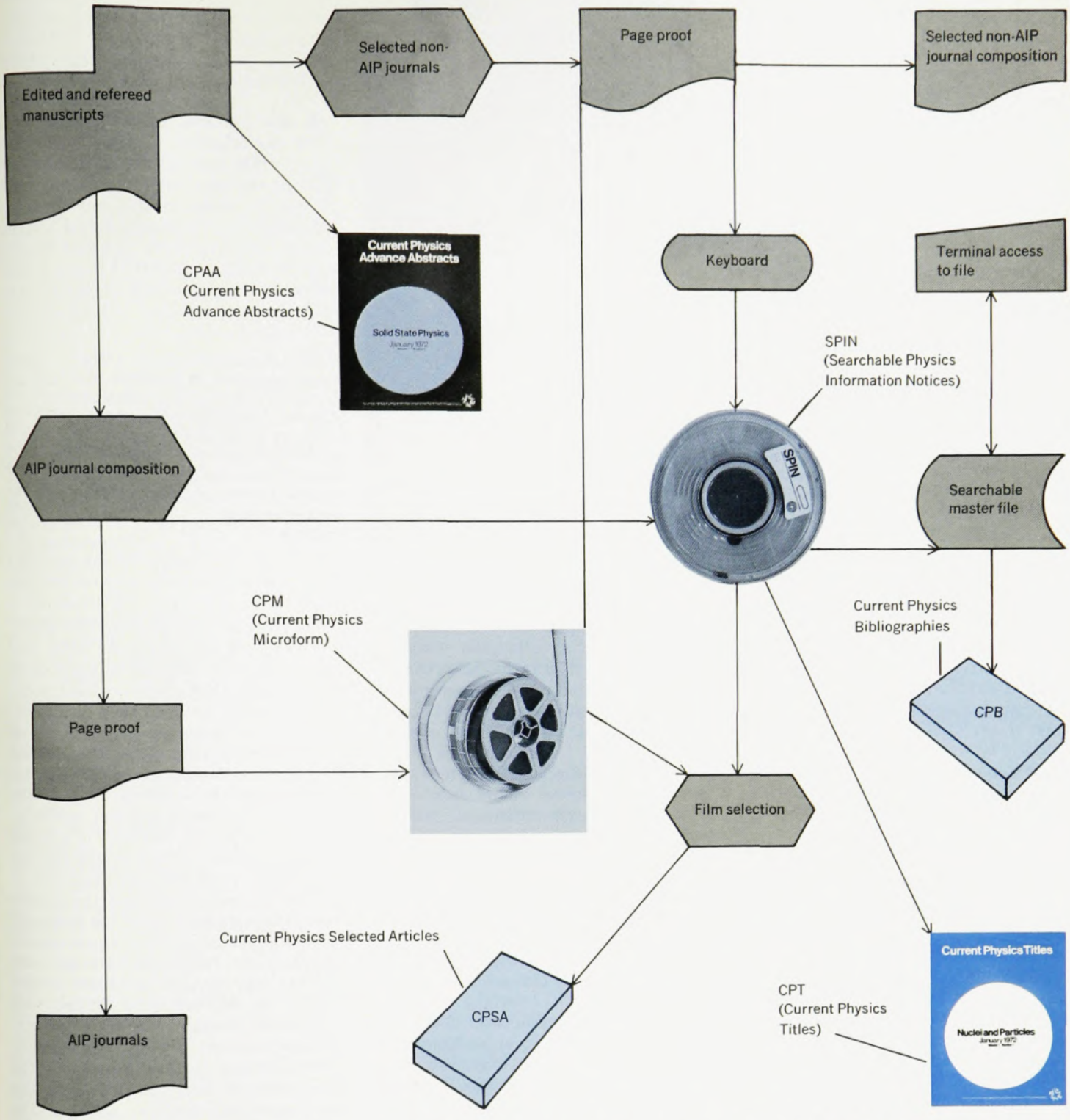
Many ways to communicate

Of course, physics publications are not the only way in which physics information is communicated. It is just one of many "channels," which run the gamut from the formal published information (journals, monographs, texts) through what might be called "quasi-published" (reports, preprints, patents) and the "formal unpublished" (talks delivered at meetings, conferences, colloquia), to the unpublished private communication. Each of these channels has a respectable history and tradition.

The journal, in the modern sense, dates from 1665 with the *Philosophical Transactions of the Royal Society* (London) and the *Journal des Sçavans* (Paris), and the scientific meetings of the Royal Society clearly antedated the journal. These channels are all interrelated and intimately connected to the way physics is done. I shall return to these interrelations later; for now we need only note that the choice of appropriate channel for a given piece of primary information is essentially made by the author of that information. In other words, the input to the primary information channels is "producer oriented." The reader or user must fend for himself as best he can to find the information.

One of the ways devised for helping the user get at the primary information is a "catalogue" of this primary information. The catalogue, also a channel of communication, is usually referred to as the "secondary information channel." It consists of such things as abstract journals, title journals, indexes, bibliographies and computerized files, as well as the various alerting services that such files can produce. (The first abstract journal appears to have been *Chemisches Zentralblatt* (Berlin) established in 1830.) Whether or not this channel really helps the user depends on how well designed the "catalogue" is from his point of view; how easily can he find out about the material of interest to him and then how easily can he get access to the primary material itself. This clearly depends on the quality of the catalogue's indexing system: Are the headings reflective of what currently interests physicists and are they used in a manner reflective of these interests?

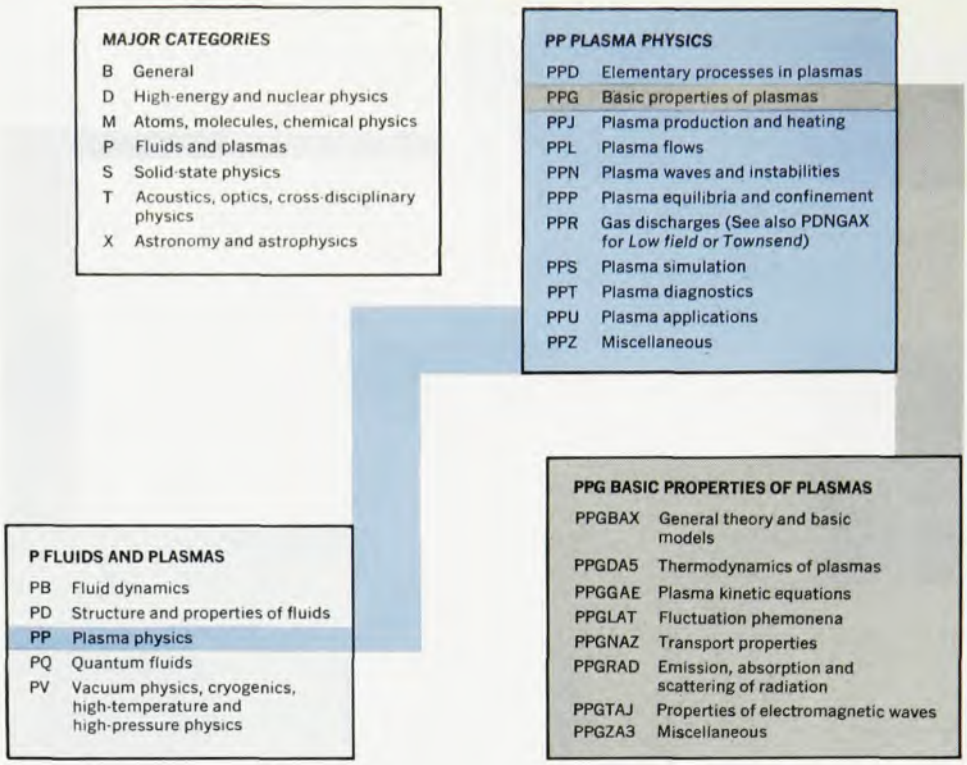
The interrelations between the various primary and secondary channels is seen in figure 2,[11] which shows how



Physics-information flow proceeds from manuscript acceptance through interrelated production operations to finished information products.
Figure 3

scientific information "evolves" from the informal communication to the published archive. This evolution is one from raw data and partially formulated concepts to information acceptable to journal editors and referees, and then on to that which survives the scholarship of one's peers and is—by the mutual consensus of the experts in the field,[12] —the "knowledge" suitable for enshrining in textbooks. This "public archive of science," as epitomized by the scientific journal,[13] is essential to the scientific enterprise: Its quality is controlled,[14] and it is amenable to scholarship and scrutiny, so that a consensus of ideas can be reached.[12]

To understand why the archive is essential, let us look into the question of why authors publish, one of the questions I raised to myself while at *The Physical Review*. The idea that their motivation was the achievement of "publish-or-perish" credits simply did not appear to hold water; it is not borne out by the data in figure 1 and could hardly explain the persistence of authors that I had experienced as an editor. The explanation that finally made sense to me was the one presented by Robert Merton,[15] who points out that publication represents the "vesting" of the "property right" to an idea in the author of the paper. By making his ideas



Basic properties of plasmas from the Physics and Astronomy Classification Scheme, which includes about 1500 headings in its various levels. The six-digit "alphanumeric" codes for these headings are designed for computer use; simpler numerical codes replace them in printed indexes.
Figure 4

publicly known, he also makes public the fact that they are his. Publication is the "currency" with which research efforts are remunerated. Merton points out that this was true from the beginning; Henry Oldenburg, the first editor of the *Philosophical Transactions*, assured Robert Boyle that the best means for insuring Boyle's priority to his work is through publication:

> "They [your papers] are now very safe, and will be within the week in print, as [the printer] Mr Crook assureth, who will also take care of keeping y^m unexposed to y^e eye of a Philosophical Robber [plagiarist]."

With this further insight into the important role the public archive plays in the development of science, one can see why the growth of science and the growth of the archive have been "hand in glove," and why any solution to the information problem that jeopardizes the function of the archive is not acceptable. What *is* needed is a solution that strengthens the archive and improves its role in the dissemination of information, improves its utility to users. As I have noted earlier, this means improving, as well, the secondary information channel and relating it more efficiently to the primary information itself. This problem is still too large and had to be delimited further. To see how we limit it, let us now look more closely at the way information is used.

Current-awareness needs

There are two basic information needs. The first is the need to keep up with one's field and with related fields that have an impact on what one is doing now. This is called the "current-awareness" need, and it exists continuously; in fact most of the information-gathering time of users is spent in satisfying this need. The second need is for background information for a new project or venture. This "retrospective" need generally occurs at relatively widely spaced intervals, perhaps two or three years apart, and although it is very important when it occurs, deficiencies in its fulfillment do not cause the continuous frustration experienced when the current-awareness need is not met.

Once I have said all this, it becomes apparent that the initial thrust of the AIP program should be the improvement of the dissemination of the archive for current-awareness purposes. And this is precisely what we have tooled up to do. We have developed an integrated package (see figure 3) of primary and secondary information products that will greatly improve the dissemination of physics information from a selected set of journals.

The use of a selected set is crucial to the basic current-awareness purpose. Physics is fortunate in that most of the work published appears in relatively few journals: 90% of the coverage of *Physics Abstracts* comes from 120 journals, whereas 2000 journals are needed for *Chemical Abstracts*. As far as the use of this material is concerned, two thirds of all citations (references) in physics journals are to articles from about 20 journals. Thus physics is quite compact with regards to coverage. In fact, from the surveys we have made, coverage of the contents of about 100 selected journals would allow the great majority of users of physics information to keep up with their fields without flooding them with material they don't really need for this purpose. When we let the citations in the papers represent how the literature is used, we get another interesting insight. We find that the number of citations falls off exponentially with age; the "halflife" of a paper is about 3.8 years. Even taking into account the fact that the literature is growing (figure 1), so that there were fewer older papers to cite, the probability of a paper being cited in the future falls off with a halflife of 7.1 years. We see that the physics literature is also compact in time; one need not keep older material available for active access. The mechanism for this obsolescence probably is that the useful results in the older material finds its way into the texts and monographs, so that the original source is no longer referenced.

Secondary-information file

The heart of the AIP system for Current Physics Information is a computerized file of secondary information covering all of the articles in a select set of journals. In 1970, this set consisted of about 60 journals and supplements listed in Table 1; plans are to increase this to about 70 journals in 1972, budget permitting. For each article, the items listed in Table 2 are included as its "unit record." Note that the record includes not only such standard items as title, author, abstract, and place of publication, but also the references in the article (making it possible to search for

papers citing a given paper, as well as to find out what earlier papers might be of interest to someone finding a particular useful reference), and indexing done with AIP's *Physics and Astronomy Classification Scheme*.[16]

This classification scheme was developed at AIP in consultation with physics-journal editors and other interested physicists. Our aim was to best represent the subject areas of current interest and to construct an easily updatable scheme. Its hierarchical structure of about 1500 headings can be seen from figure 4, which gives the major categories, the subdivisions of the "Fluids and Plasmas" category, the further sublevels of "Plasma Physics" and finally the detailed levels of "Basic Properties of Plasmas." Similar breakdowns exist for all of the other categories.

Table 1. 1971 Input Journals for SPIN

American Journal of Physics
Annals of Physics (New York)
Applied Optics (including Supplement)
Applied Physics Letters
Applied Spectroscopy
Astronomical Journal
Astrophysical Journal (including Supplement)
Canadian Journal of Physics
Faraday Society: Discussions and Transactions
Helvetica Physica Acta
High Temperature
Japanese Journal of Applied Physics
JETP Letters
Journal of the Acoustical Society of America
Journal of Applied Physics
Journal of Chemical Physics
Journal of Geophysical Research
Journal of Mathematical Physics (New York)
Journal of the Optical Society of America
Journal of Physics A, B, C, D
Journal of the Physical Society of Japan (including Supplement)
Journal of Vacuum Science and Technology
Molecular Physics
Nuclear Physics A, B
Nuovo Cimento A, B and Rivista
Optics and Spectroscopy (USSR)
Philosophical Magazine
Physica (Utrecht)
Physical Review A, B, C, D
Physical Review Letters
Physics of Fluids (including Supplement)
Physics Letters A, B
Proceedings of the Royal Society, Series A
Progress of Theoretical Physics (including Supplement)
Reviews of Modern Physics (including Supplement)
Review of Scientific Instruments
Soviet Astronomy—AJ
Soviet Journal of Nuclear Physics
Soviet Journal of Optical Technology
Soviet Physics—Acoustics
Soviet Physics—Crystallography
Soviet Physics—Doklady
Soviet Physics—JETP
Soviet Physics—Semiconductors
Soviet Physics—Solid State
Soviet Physics—Technical Physics
Soviet Physics—Uspekhi

AIP has been offering a monthly magnetic tape, based on this computerized file, to various institutions since the beginning of this year; the tape contains the records of over 2000 articles each month. This SPIN *(Searchable Physics Information Notices)*[17] tape can be searched according to the interests of the clients these institutions serve, so that the client can be furnished with a printout of abstracts likely to be of interest to him. In addition, he is supplied with a "CPM" number for these articles. This number is a cross reference to another service of use to institutions, *Current Physics Microform*, which is a set of 16-mm microfilm cartridges, issued monthly. The cartridges contain the full text of the articles from previous month's issues of the selected set of journals. (Initially, in 1972, this set is limited to those journals published by AIP for itself and its member societies; other journals will be added as soon as appropriate copyright arrangements are made with their publishers.) The CPM number gives the microfilm cartridge and frame number of the initial page of the article. This unambiguous reference to an easily copyable form of the article will save a considerable amount of time and money in supplying actual copies of the articles required by a user of the library services of the subscribing institution. It is the first step in supplying the answer to the problem of how you get the paper once you know which one you want.

In addition to SPIN and CPM, AIP will offer two other products in 1972, designed more for individual use. The first of these is the journal CPT *(Current Physics Titles)*, a computer-photocomposed version of some of the items of each record of the articles in SPIN. This method of composition produces a result of comparable quality to the best typesetting, so that the product is quite easily readable. Among the items selected for each CPT entry is the CPM number, so that CPT can be used not only for references to material of current interest, but also to obtain access to the material itself. CPT is organized by subject, according to the *Physics and Astronomy Classification Scheme*, for easy scanning; related materials are in reasonably close proximity. It will be available in three sections: *Nuclei and Particles, Atoms and Waves*, and *Solid State*. The actual content of each section is given in the box on page 28. The division of material into sections is, like the decision to select the journal coverage, designed to facilitate browsing by limiting the amount of material any user will have to browse through.

The second individual-use product is not as typographically elegant as CPT but is designed for a different purpose. This is "CPAA" *(Current Physics Advance Abstracts)*, which consists of ordinary typewritten abstracts of papers that have been accepted for publication. CPAA is arranged in the same sections as CPT and according to the same classification scheme, and it is issued some two months before publication of the articles. CPAA users can really keep abreast of what is going on because they are alerted to forthcoming articles in their subject areas scheduled for publication in selected journals. To keep the price of CPAA down, typewritten abstracts are solicited from authors (in the manner of the *Bulletin of The American Physical Society*) and are reproduced directly. For this reason its coverage will be initially limited to journals published by AIP for itself and its member societies but will be expanded to other journals as soon as suitable arrangements can be made with the editors of these journals.

Table 2. File Input Unit Record for Journal Articles

1. Source article identifiers:
   Journal CODEN and canonical abbreviation
   Volume; issue number; date
   Beginning and final page of article
   CPM cartridge and frame number
2. Title of article
3. Author information:
   Author(s)' full name(s)
   Author(s)' affiliation(s)
4. Indexing and classification:
   Physics and Astronomy Classification Scheme codes
   Free-language descriptors
5. Abstract of article
6. References cited in source article

The characteristics of these four new products are summarized in the box on page 28. Listed there also are two other products AIP intends to offer in 1973. One, CPSA *(Current Physics Selected Articles)*, is a series of journals offering articles in specific subject areas, taken from any of the journals on CPM. The articles are repackaged to give the subscriber a compact set of material in his area of immediate interest at essentially the same time the original articles appear in their scheduled journals. With CPSA, the user gets directly the core of material of interest to him and still has the browsing capability, inherent in CPT and in the alerting services

Current Physics Information Products

SPIN (Searchable Physics Information Notices, available now) is designed for institutions and is a monthly magnetic tape of the information currently being added to the AIP file. Each tape, designed to be read by computer, includes over 2000 records from selected journals (see Table 1). The contents of each record is shown in Table 2.

SPIN tapes are available in the IBM "TEXTPAC" format and in a special CDC format as well as in the AIP standard SPIN format. Complete technical specifications of SPIN, including a description of how special constructions represent mathematical symbols, are available from AIP on request.[17] Institutions can lease SPIN for $2500 per year for internal use; other prospective users should inquire for terms.

CPM (Current Physics Microform, available 1972) is also designed for institutions and is a combined microfilm edition of the full text of all articles in the previous month's issues of the selected journals. Initially, CPM will include only AIP and member-society journals and translations—about 8500 pages per month.

CPM will be available on 16-mm cartridges, about four per month, with each numbered page marked for both automatic and visual counting; CPM frame numbers are given in SPIN and CPT. Institutions can lease CPM for $2850 per year for internal use; other prospective users inquire for terms.

CPT (Current Physics Titles, available 1972) is a monthly current-awareness journal, photocomposed from SPIN tapes, and is intended for use by individual scientists. Coverage here is the same as for SPIN, with items arranged according to the *Physics and Astronomy Classification Scheme;* an average article has two entries.

CPT is available in three sections:

Nuclei and Particles—general interest, applied mathematics, quantum mechanics, relativity, statistical physics, high-energy physics, nuclear physics, plasma physics, astronomy, astrophysics, cosmic rays.

Atoms and Waves—general interest, applied mathematics, quantum mechanics, statistical physics, atomic physics, molecular physics, physical chemistry, physics of fluids, vacuum physics, cryogenics, acoustics, optics, geophysics, biophysics.

Solid State—general interest, applied mathematics, quantum mechanics, statistical physics, crystallography, lattice dynamics, transport phenomena, superconductivity, magnetic materials, magnetic resonance, optical phenomena, interaction of radiation and solids, physics of surfaces.

Records include title of article; author(s) and affiliation of first author; journal, volume and page of original publication; CPM cartridge and frame number; key words. The cost of CPT is $10 per year per section for members of AIP societies and $25 for nonmembers. Combination rates are available.

CPAA (Current Physics Advance Abstracts, available 1972) will be a monthly preview journal also intended for individual scientists. It will contain copies of abstracts, typed by the authors (similar to the *Bulletin of the American Physical Society*). These abstracts of paper accepted for publication will appear about two months before the papers themselves are published.

Coverage of CPAA will be the same as the coverage of CPM; arrangement and division will be the same as for CPT. For each article, the principal entry will include title, author(s), address for correspondence, abstract and scheduled journal issue. Other entries will list title and will refer to the principal entry. The cost of CPAA is $15 per year per section for members and $40 for nonmembers. Combination rates are available.

CPB (Current Physics Bibliographies, available 1973) is a series of specialized bibliographies in relatively narrow areas of physics and astronomy, updated with a frequency commensurate with the rate of growth of the area involved. The bibliographies are tentatively designed to have the same elements as CPT for each article but may also contain abstracts. No prices have been set as yet.

CPSA (Current Physics Selected Articles, available 1973) is a series of journals of articles reprinted from the selected set covered by CPM and packaged by narrow subject areas similar to those for CPB. These journals are intended to supply individual users with immediate access to articles of most likely interest at a minimal cost. Actual prices have not been set as yet.

from SPIN, to obtain other material copied for him from CPM. The other product, CPB *(Current Physics Bibliographies),* would be a series of bibliographies of papers in similar narrow subject areas to CPSA, but CPB may be taken from a larger data base, such as that produced by the (British) Institution of Electrical Engineers, publishers of *Physics Abstracts.*

This package of present and forthcoming products is designed to facilitate keeping up with what is going on in physics. It systematically reduces the volume of material the individual user must cope with and presents this material in easily scanned formats that he and his institution can control. He has speedy and economical access to abstracts of material to be published, titles and the more significant items published, and ready access to the full text of this material.

Interrelated Products

The components of this package are integrated not only in the way each supplements the other but also in the way they are produced. This can be seen in figure 3, which shows, schematically, the interrelation among the production operations. The system begins with the manuscript accepted for publication. An author-produced abstract is then used for CPAA; for AIP journals SPIN is a byproduct of the "keyboarding" used to produce the primary journal itself; for non-AIP journals this keyboarding is done separately, ultimately by other information processors, such as the Institution of Electrical Engineers.

Page proofs of the articles can then be used to produce CPM and to print the journal issues themselves. The CPM number is inserted into SPIN by computer when the order of journal issues on CPM has been specified. SPIN is used to compose CPT, is distributed to subscribers, and can be cumulated as a master file of information, searchable by computer to produce lists of articles of interest. Fixed search profiles, when run against SPIN, allow the retrieval of articles on related subjects each month; a computer-driven microfilm printer can then be used to produce masters of the full text articles from CPM; these masters can be used to print the various CPSA editions. Although a large part of what I have described is in, or ready for, operation, a comparable part is still in the experimental or even the design stage. However, we are optimistic, considering past experience, that it will all be in operation within another year or two.

This system for Current Physics Information does satisfy the need for keeping up, for current awareness, but what about the other needs for physics

information? As far as the retrospective need is concerned, there are two approaches. The first is to improve library services, and the second concerns review articles.

AIP has completed the first stage of negotiations with IEE, which will result in both organizations jointly sponsoring a worldwide system for physics information. The result will be better and more efficient library services for all physics-information requirements, at the lowest cost to the users.[18] This system will also strengthen the services that IEE has traditionally offered, such as *Physics Abstracts* and its indexes, as well as the new INSPEC magnetic tapes. These are tapes with records for all of the articles abstracted in *Physics Abstracts*, *Electrical & Engineering Abstracts* and *Computer & Control Abstracts*. Commercial and university-based information centers can use the INSPEC tapes for answering queries requiring comprehensive coverage of the literature, and SPIN tapes for current-awareness alerting. The additional cost of comprehensive searches is justifiable, from the user's point of view, because they occur less frequently than current-awareness searches.

As Conyers Herring[10] has pointed out, the real need for distilling the information that we have, for establishing the "body of public knowledge," to which John Ziman[12] has addressed himself, cannot be met by a purely computerized system; we need active human intervention, in the form of physicist–scholars who sift through and compact the information in many papers and produce critical reviews and compilations. AIP and its member societies have recently asked NSF to underwrite a program of grants to be awarded to physicists who would undertake the writing of review articles on the same basis as they undertake research activities. We expect that the availability of computerized retrieval services will greatly aid review writers in their work. But the value of these reviews to those physicists contemplating work in a new field depends on the human analysis and scholarship that goes into their preparation, as well as on the number of such reviews available and the frequency with which new reviews are issued. We hope that the new grant program will stimulate this worthwhile activity.

Informal communication

The information products and services that I have been discussing all relate to published material. There are some services that deal with quasi-published reports and preprints; reports, for example, are covered in the magnetic-tape services of INSPEC (to a limited degree), in NSA *(Nuclear Science Abstracts)* for nuclear and high-energy physics and technology, and in USGRDR *(US Government Research and Development Reports)* for government reports in general. All these services are usable by suitably equipped institutions. A preprint registry and bulletin *(Preprints in Particles and Fields)*, suggested by AIP in 1968, has since 1969 been successfully operated at SLAC (in cooperation with the Particles Data Group at Berkeley) under the auspices of the APS Division of Particles and Fields.

AIP is also interested in ways of improving information flow in scientific meetings and experimenting with such new devices as audio-tape cassettes and closed-circuit television to see whether or not the complex structures of our large meetings may be made more accessible to those who attend and to others. A recent experiment has been performed to see whether notes taken at a topical conference can be turned into a usable review of the subject area of that conference (see appendix C of reference 9). There is little that can be done to improve communications in completely informal channels, at least without considerably more study, because adding a formal component to this essentially private activity may very well do more harm than good. However, an interesting study of informal communication patterns among engineers, made by Thomas Allen,[19] may point the way towards future services if comparable information can be found for physics. Allen's results indicate that engineers, within a given institution, rarely obtain information directly but rather go through an intermediary (Allen calls him the "gatekeeper"); this intermediary is an avid reader and attender of meetings who is consulted by his colleagues when they want to know what's going on or where to find something. Whether similar patterns exist in physics and, if so, whether they are localized within institutions, remains to be seen.

It is, of course, personally gratifying to have been with a program that recognized a problem, then planned and developed a solution for it. But I must confess, as I look over what I have written, that I feel somewhat like someone listening to a glowing summary of physics at the end of the 19th century, in which all that is left is filling in the decimal places, except for two clouds on the horizon, the photoelectric effect and the Michelson–Morley experiment.

In 1966 the major impediment to the growth of physics seemed to be one of communications, but in the intervening five years, there has been a cloud. Although the problem of utilizing the information in physics remains an important one, there is also a problem of utilizing physicists. A question naturally raises itself: Can this expertise AIP has developed for processing large amounts of information be utilized, as well, to process information that might be of use for better planning about physics itself? AIP has sketched out such a project[9] in which information about physics manpower, educational trends, research trends and funding, and similar items would be coordinated and supplied in usable form to deans, research directors, funding agencies and others, so that we may avoid similar clouds in the future.

We, at AIP, who have been developing this information program would welcome your comments. Please write to me about any improvements you can suggest, or for any further information you might wish.

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