

LETTERS

Technical Reports

The material of Burton and Green ["Technical Reports in Physics Literature", by R. E. Burton and B. A. Green, Jr., *Physics Today*, October 1961, p. 35] was found of considerable interest. The following information may be helpful to the readers of their paper:

1. Figure 1 bears a striking similarity to one phase of an independent earlier study.¹ Figure 3 of the earlier publication also shows that the peak of the curve representing the number of references obtained from papers as a function of their publication dates corresponds to two years back from the year of search. In an extension of the work,² 24 621 publications in the field of thermophysical properties were investigated, and part of the pertinent data are presented in the figure given below. This also confirms the

fact that the maximum number of cited references occur at about two years back from the search year. An exponential function for the variation of the number of references appearing in papers as a function of their publication dates was also suggested. One may observe from the figure that this function is distorted during the war years.

2. The authors think that the primary reason why reports are not cited more frequently is the presumption that either the material will be published (in the case of a recent report) or that the material is not overly important (in the case of older reports). Often, we have found that reports contain valuable information condensed out of published papers for economy of space reasons.

3. One of us has published a series of literature surveys of recent publications dealing with the three principle transport properties (viscosity, thermal conductivity, and diffusion) of gases and gas mixtures.³ Of a total of 1810 references reviewed, 319 of these were reports, i.e., 18%. No reports were included in the count where journal publication had been noted, although many such reports were known to exist and in some cases were cited in the surveys along with the journal references. The frequency with which the various laboratories have contributed to these reports can be found by inspection of the references cited.³

4. For further information concerning the time lag between publication and citation of reports, duplication of coverage by abstracting journals and similar materials, the reader is referred to (2).

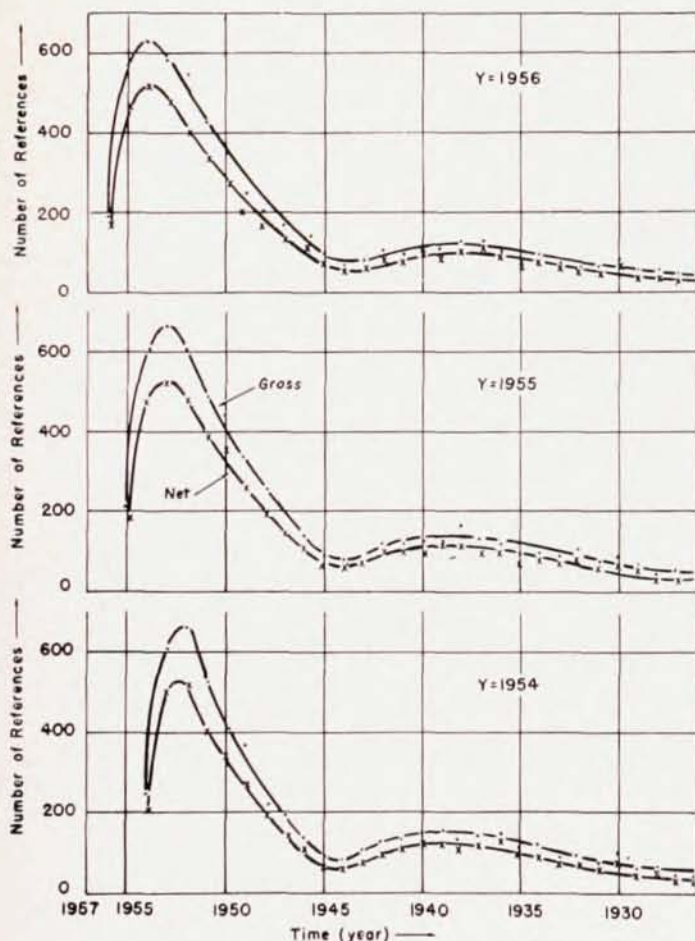
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2. Cezairliyan, A. O., Lykoudis, P. S., Touloukian, Y. S., Analytical and Experimental Study of a Method for Literature Search in Abstracting Journals, Purdue University, TPRC Report 11 (1959). Available from the Office of Technical Services, US Dept. of Commerce, PB 171478.
3. Liley, P. E., "Thermodynamic and Transport Properties of Gases, Liquids and Solids", ASME, N. Y., 1959, p. 40; Purdue University TPRC Reports 10 (1959); 12 (1961); 13 (1961), to be published.

Information Retrieval

Drs. Way, Gove, and van Lieshout in their article on scientific information tools (*Physics Today*, February 1962, pp. 22-27) asked a question that compelled me to answer. They make the statement that compilations are often extremely difficult to locate and cite



Distribution by publication date of useful gross and useful net number of references obtained from papers published in the years 1954, 1955, and 1956.

UNDER ONE ROOF

Modern physics offers numerous examples of the process wherein new scientific discoveries give rise to new technologies, which in turn provide powerful new tools for research — often in fields unrelated to those of the original work. The list is a long one, including vacuum tube and solid state electronics, microwaves, electron and nuclear spin resonance, shock waves and many others even now emerging from contemporary research.

This mutually beneficial interaction between science and technology is a boon to anyone engaged in advanced research and development.

For the most part, the technological benefits of this process have accrued to the experimentalist, due to the historic emphasis on providing better tools for the measurement and observation of physical phenomena.

In one field, however,—that of computers and allied means of extending man's intellectual powers—it is the theoretician who benefits more immediately from technological advances. As magnetic cores, semiconductor components, exotic optical elements and the like make larger and faster computers possible, these machines can be used to attack hitherto "insoluble" problems of theoretical physics or applied mathematics.

At RW, the interaction between physical sciences and computer technology is continuously in progress under one roof—that of the Research Laboratory. The investigation of new physical phenomena, which may eventually contribute to the technology, is going on concurrently with the study of better ways of using computers (existing conventional ones, existing unconventional ones recently developed at RW, or new computers still in the concept stage) for the solution of physical problems. The result is a research group whose activities span a remarkably large portion of contemporary physics and mathematics.

The understanding and support of long-range and basic research programs which have always characterized RW, together with the high technical quality of the company's other activities, provide a stimulating environment for the experienced research scientist. Inquiries may be addressed to

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three examples. Then they ask, "How long would it take your librarian to produce these?"

The answer is about five minutes if all three reports are in the library collection. In my case, it took one minute to find the third example (LA-2106) on the shelf, filed by report number. It took two minutes to check the first example (CRGP-784) in the report number file, ascertain that it was not in the library collection, and by use of the Availability Listing of Reports abstracted in Nuclear Science Abstracts know that the report was available from AEC, Oak Ridge, Tennessee. The second example (a report issued by Du Pont) took a little longer because no report number was given. Consequently, it required ten minutes to look up the report by subject in Nuclear Science Abstracts, 1958, find the abstract, note that AEC had assigned the report number NP-6690 and know that it was available from AEC, Oak Ridge; and finally to check the report number file to see if it was in the library's collection (it was not). Thus the location of all three reports was found in thirteen minutes. If any of the reports were not in the author's own library, they should be able to borrow them in less than a day, because they are situated close to so many large report collections in Washington.

In regard to the authors' five proposed tools, I think they are all valuable proposals. It may interest them to know that the professional engineering organizations have already taken steps to produce tool number 3. The American Institute of Chemical Engineers is already providing abstracts and key words for indexing with articles in its publications. It has also published a Chemical Engineering Thesaurus (a list of key words). At a symposium sponsored by the Engineers Joint Council in New York, January 17, EJC recommended that all engineering and technical societies publish abstracts and lists of key words. EJC proposes to prepare a thesaurus adequate across-the-board in engineering.* In the meantime, EJC feels that publishers could do an adequate job using the AICHE Thesaurus, together with one already prepared by the Armed Services Technical Information Agency.

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Typographical Slip

A number of persons who have attempted to make use of my analytic expression for rate of pay [see "An Independent-Particle Model of Scientific Salaries", by Alex E. S. Green, *Physics Today*, January 1962, p. 40] have encountered difficulties in arriving at a reasonable maturity curve. Their difficulty is due to a typesetting error. The second coefficient in the second line

of Equation 4 should read .0214 rather than the .214 value printed in the article. The misprint has a highly adverse effect upon the maturity curve for the workers ($\sigma = -1/2$) and an exceedingly beneficial effect for the wheels ($\sigma = +1/2$). The slip undoubtedly was made by the same person who mistook my S's in the title for dollar signs. There can be no question as to this man's interests and tendencies.

A number of my correspondents have expressed their concern that such a mathematical approach to scientific salaries might be used by personnel experts to scientists' disadvantage. I wish to allay such fears. It has taken almost a quarter of a century for personnel experts to move from the concept—the boss gets paid the most—towards the concept of parallel progression—parallel advancement for the scientific man as for the administrator. In effect, my formula suggests that progression should be viewed as ascent into a four-dimensional hyperspace with the coordinates (r , A , p , and σ). I sincerely doubt that personnel experts are ready to journey into hyperspace. If, however, a scientist is confronted with an administrator or personnel expert who is ready to argue on such terms, I feel I should caution the scientist against a dangerous trap. If one simply differentiates the rate of pay with respect to age, the number so obtained does not represent the appropriate annual increment. Instead, one must recognize that progression curves are usually adjusted to keep pace with cost of living increases. Moreover, the increasing usefulness of scientists during the recent years contributes an additional factor. In effect, our four-dimensional continuum is an expanding universe.

Again, let me caution the reader that statistics show that numerous other variables also play a part in salary determination. Undoubtedly, these can be systematized further with sufficient study, but the writer for one wishes to journey in other spaces at this time.

Alex E. S. Green
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Publish or Perish

"All hope abandon ye who enter here
Unless ye publish papers twice a year—"
So spoke the papal emissary
Before the monks in the monastery—
"Ye must record all conferences and trips
In yon illuminated manuscripts . . ."
Today we find this ancient drama
Enacted in the Research-o-rama,
When the Director of Research exhorts
His PhD's to write reports.
These reports are not illuminated,
But otherwise are long outdated;
Like the monks' reports they are rarely read,
But just as dead, just as dead. . . .

William P. O'Brien
University Park, Pa.

* "EJC takes bold step forward in attack on growing information problem." *Materials Research and Standards*, Vol. 2, No. 2, February 1962, p. 126.