CHAPTER 7

THE PARADIGM OF A SUCCESSFUL JOURNAL: A CASE STUDY OF TWO LEADING PHYSICS JOURNALS

To get a feeling for the reasons behind the success of a journal, a case study was made of two leading journals in physics: The Physical Review and The Physical Review Letters. Their history, growth, factors contributing to their success and present status were studied. For this purpose not only the information available from the journals themselves but also material related to the journals that was available at the Niels Bohr Library of the American Institute of Physics, New York was also examined and analysed.

Till about the 1890's there was no journal in the USA devoted exclusively to physics. Scientific articles were published in journals like the American Journal of Science, Journal of the Franklin Institute, Science, Scientific American, Popular Science and Connecticut Academy of Arts and Science Transactions etc. According to Merritt one of the early editors of Physical review:

> *"....there was at that time in the United States a small group of physicists who believed in the importance of their science and were anxious to see it progress and they were able to make up by their energy and enthusiasm their lack of numbers; this group was responsible for three major landmarks in American physics - American Physical Society, the National Bureau of Standards and the Physical Review"* (Merritt, *1934).*

Physical Review was started in 1893 by Edward L.Nichols and Ernest Merritt at Cornell University, USA. They were supported by Cornell University in this endeavour. Starting with one volume (consisting of four numbers) of around 320 pages per year, it has grown *astronomically* in size. *In* 1989 Physical Review which had by then four different parts (A, B, C and D) published 7,339 articles (including Brief Reports, Comments and Rapid Communications) *comprising* 52,822 *pages* (Bulletin of the American Physical Society, June 1990).

Study of the early volumes of the journal shows that the journal published not only research articles but also extensive book reviews, reports of meetings, and occasionally papers presented at meetings. The editor sometimes used to translate into English articles of interest published in German Periodicals. The journal also published what were called Minor contributions.

Though the journal today commands international readership and receives contributions from all over the world, it went through difficult periods and faced at least for the first thirty five years all the problems Indian journals are facing today. It had very few contributions from outside the USA till 1930 (that is almost for 40 years). In fact, in the earlier years most of the articles were from the Cornell University staff itself. The main reason for ,this was the fact that the *playing fields* of Physics at that time were else where in Europe, specially in Germany, the United Kingdom and France. Hence the journal was not widely read outside the USA. John Cockroft the British Physicist, says in an interview:

> *"...well, up ti77 1932, we would go to Zeitschrift fur Physik and Journal de Physique in France as major journals in the field of nuclear physics outside our own journa7s and we would hardly ever read the Physical Review. As far as I was concerned it was not until people like Lawrence and Truve started publishing in about 1932 or perhaps two years before that, that we started to read the Physical Review..... and from that time onwards it became re7atively more important than the German Journals"* (Cockroft, *1967*).

The American Physicist I. I. Rabi found to his surprise and dismay that the Hamburg University Library was not receiving The Physical Review as and when it was published but in bulk at the end of the year. He

learnt that this was to save some money as it was not thought important to receive this journal immediately after its publication (Rigden, 1987).

The return of young physicists like Oppenheimer and I.I. Rabi to their country (USA) after their studies in Europe (where they had gone to learn the new physics), their determination to put their science through their journals on a firm footing, the growth of physics not only internationally but in particular in the USA and with it the increase in research activity, all led to the Physical Review receiving a large number of good articles. This was a turning point for the Physical Review and by 1933 it had gained importance in Europe too. It also became by then the most cited of all physics journals (Hooker, 1935). The quality of papers appearing was so good that the French physicist Louis de Broglie said in 1935:

> *" Today scientific publications from the United States are awaited with an impatience and curiosity inspired by those from no other country"* (Kevles, 1978).

What a transformation in the impact of the journal on the physics community!

The arrival of physicists like Hans Bethe, Enrico Fermi, Samuel Goudsmit (who later became one of the most influential editors of the Physical Review, and the Physical Review Letters), Von Neumann and Wigner from Europe, enriched American Physics and Physical Review certainly benefited from this. Thus, about forty years after its founding, Physical Review attained a high stature. Though it had a lean period during the Second World War, (only 350 pages were published in 1945) it promptly regained its importance among the physics journals in the world in the post-war period and today, it is one of the top *journals in physics..*

Six years after the starting of Physical Review, the American Physical Society was established. Merritt, one of the early editors of this journal says:

> *" In the years 1893-1899, the Physical Review undoubtedly contributed in no small degree to the increased activity in physics which later resulted in the establishment of the American Physical Society"* (Merritt,1934).

This is in contrast to the development of physics journals in India. Indian Journal of Physics was started by the Indian Association for the Cultivation of Science almost forty years after the founding of the Association. However, there is similarity in one

aspect - Scientists in India during that period had some nationalistic feelings similar to what was seen among the physicists in the USA. They wanted to publish their scientific work in Indian Journals. But this spirit was limited to only a few people and lasted only for a short while.

From its inception, the American Physical Society strongly supported the Physical Review. In 1913, the publication responsibility of the journal was handed over by the Cornell University to the American Physical Society. When the American Institute of Physics was founded in 1931, it took over the publication activity of the American Physical Society and started publishing the Physical Review (on behalf of the Society) from 1932.

In 1930, the concept of page charges was introduced for the first time and the Physical Review started levying page charges for articles published in it. An amount of $2 per page was charged to start with. This amount has steadily increased and today it stands around $100 per page. Page charges were levied to make the journal *self sustaining* without seeking continuous support from outside (especially Government agencies). Page charges have helped considerably to counter the

rising cost of journal production without raising steeply the subscription rates. It may be pointed out here that the subscription rates of the journals produced by the societies have been reported to be much lower than those journals published by commercial publishers (Barschall, 1986). As pointed out in an earlier chapter, Indian Journals do not levy any page charges as most of the science journals are published by academies/institutions which receive funds from the Government towards this activity or by a Government funded agency (like the Pub1ications and Information Directorate of CSIR).

The American Physical Society had started the journal Reviews of Modern Physics in 1930 and the American Institute of Physics started Journal of Chemical Physics (1933) and continued the journal Physics as a new journal with the title Journal of Applied Physics (1938 onwards). These journals took a part of the load off Physical Review. Articles which had some significance to physics but not suitable for The Physical Review were published in these journals. The Physical Review had a section called ***"Letters to the Editor"*** for a long time.

A new journal titled Physical Review Letters (PRL) was started by the American Physical Society in 1958. It comprised of the letters to editor section contained in the Physical Review and the abstracts of the articles to be published in the future issues of the Review. The publication delay was three weeks. Sam Goudsmit who was the first editor of this journal and connected intimately with the Physical Review for a long time, set standards for the new journal. He wrote in his first editorial :

> *" Since there is little time or none at all for refereeing, most of the decisions for acceptance and for minor attentions will have to be made in the Editor's office. We shall do our best to make as few mistakes as possible but for this we require the cooperation of authors and an understanding on their part of the many problems facing a journal of this type. To maintain the high speed and high standards, only Letters which really deserve rapid publications should be submitted" (Goudsmit, 1958).*

After five years, when the articles received did not meet this requirement, he made an appeal to the scientists for cooperation in maintaining the standards. In an editorial he appealed:

> *" Physical Review Letters still has an alarming rejection rate. We are disappointed by observing that so many authors still send us letters which are unsuitable for this journal. We admit, as we have stated on previous occasions, that the difficult decision of what deserves speed is sometimes the*

result of a rather subjective judgement, which may appear to be arbitrary. But it is most essential to keep the number of Letters limited if we want the journal to fulfill its function of speed and readabi7ity. Our principal complaints are sti77 about the authors who pub7ish their research in a series of Letters instead of performing the more useful service of writing a good definitive article..... Physical Review Letters can maintain and improve its high standards only if the editors have the ful7 cooperation of a77 contributors". (Goudsmit,1962).

G.L.Trigg was the first Assistant Editor and later became the Editor. He edited this journal steadfastly for 30 years till 1988. Physical Review Letters is now the most sought after journal by the physics community for publication of their research findings. This journal which started as a fortnightly became a weekly in 1964.

With the increase in the number of papers received, Physical Review was issued in two parts from 1956 onwards. By 1970 the journal grew to such a size that it was split into four parts - A, B, C and D. Each part is issued twice a month and as mentioned earlier, in 1989 a total number of 52,822 pages were published by a11 the parts put together. A separate publication, Physical Review Abstracts is being brought out to announce the articles to appear in the forth coming issues of the various parts of the Physical

Review. This is done due to the increased number of articles received for publication by the various parts of this journal.

It is however to be noted that with this proliferation in publication, there has been an increase in deiay in publication. The reasons for this delay have been ascribed to the large number of articles received in recent years (Passell,1988). In 1931 when the letters were a part of the Review the delay was about 21 days; by 1980 it was 138 days and in 1989 it is about 4 to 6 months. Though it has a very wide circulation, physicists no longer read the letters from cover-to-cover. Mermin of Cornell University has raised similar doubts and also points out that Physical Review Letters has reached a stage in volume whichThe Physical Review had reached during 1956 (Mermin, 1988). Undoubtedly as can be seen from the number of pages published, there is some truth in it. However, the rate of rejection of articles in Physical Review Letters is quite high. In 1988 it was 66%. Because a large-number of above average articles are published in it, Physical Review Letters receives a large number of citations and has a high impact factor. In 1988 its Impact Factor was 8.312.

It can be seen from the various papers published in the Physical Review from 1900's onwards that most of the physicists who were acclaimed as leaders, achievers and belonging to the top group of physicists of their times, published in this journal some time or the other and this trend is continuing even today. Notable early contributors from India were S.N.Bose, K.S.Krishnan, Raman and Saha. The journal had Editors of high standing who were not only good physicists but also had a commitment to the journal. They contributed significantly to the high standards attained by the journal. This is made very clear in an editorial in 1988 at the time of retirement of George Trigg. Adair, Krumhansal and Sandweiss wrote:

> *" Sam (Goudsmit) was the architect of this first letter journal, a journal that was to change the form of pub7ications in physics and much of science. George (Trigg) was the builder-aye, the Master Builder.....Sam and George set up the initial editorial policies, recognizable forerunner of the policies in place today. With the goal of quick pub7ication precluding the review of proofs by authors, George and Sam recognized that the editing must be meticulous and it was George Trigg who set the standards of care and detail in editing that have marked the journal through its history"* (Adair et al 1988).

It is also noticed that active physicists take up full time editorial jobs of these two journals for a few years at a stretch and then go back to their re-

search work. This must be certainly helping both the journal as well as the physics community including those who work for the journals.

The Physical Review and Physical Review Letters have panels of referees drawn from all over the world. In 1989, the Letters had on its panel 14,000 physicists (American Physical Society, 1989). However, their editorial boards consist of only physicists in the USA. This must be for practical reasons. Besides, the journal can afford to do this now, as it has the needed visibility and recognition in the international community. The members of the editorial board interact with the editors by assisting them in selecting the referees and participating actively in the formal appeal process. The Physical Review and Physical Review Letters receive world wide attention not only in terms of readership as indicated by the large subscription figures (during 1989, The Physical Review had, totalling for all the four parts, a non member subscription of 11,675 and Physical Review Letters had 2,728), but also for publishing research findings. In 1989 these two journals together received articles from 64 countries accounting for approximately 52% of the total contributions they received (13,534 articles). Out of this number 55% were

from six countries - West Germany, Japan, France, Canada, India and China (Bulletin of the American Physical Society, 1990). Table 15 gives the number of articles and number of pages published in The Physical Review and Physical Review Letters during the years 1985 to 1989. The Physical Review and the Letters allow the authors to suggest names of physicists who in their (authors) opinion are suitable to referee their papers. However, the journals are not bound to use the list. The authors are also permitted to indicate if they do not want the paper to be refereed by any particular physicist. If the authors do not want their names to be made known to the referees, they can request for "Blind Refereeing".

The Physical Review and Physical Review Letters have good infra-structural facilities. Authors communicate with the editorial offices of these journals not only by postal mail but also through Electronic Mail and Facsimile Transmission. Communication between Editors and referees through electronic Mail has also been r-apidly increasing.

TABLE 15

Number of Articles/Pages published by *The Physical Review* and *Physical Review Letters* during 1985 - 1989

YEAR	PHYSICAL REVIEW				PHYSICAL REVIEW LETTERS			
	No. of Articles / B.C.R.* published			No. of pages published	No. of Letters / Comments published			No. of pages published
	Articles	B.C.R.	Total		Letters	Comments	Total	
1985	3566	1554	5120	35513	1440	164	1604	5697
1986	3932	1693	5625	39536	1525	198	1723	6186
1987	4211	1890	6101	43181	1442	191	1633	5841
1988	4776	1994	6770	48775	1391	232	1623	5784
1989	5210	2129	7339	52822	1449	230	1679	5957

* B.C.R. : Brief Reports, Comments, Rapid Communications

Source : Bulletin of the American Physical Society, June 1985, June 1987, June 1988 July / August 1989 and June 1990

During 1989 nearly 9300 reports (36%) were received by the editorial office thorough BITNET. The journal also received articles prepared in TEX and submitted via BITNET. In 1989, the four parts of the The Physical Review (A,B,C and D) together had a man power of 34, comprising of one Editor-in- Chief, one Deputy Editor-in-Chief, 7 Editors, 10 Associate Editors, 3 Assistant Editors, 3 Assistants to the Editors, 8 Editorial Assistants and 1 Editorial Services Assistant.

The Physical Review and the Physical Review Letters carry from time to time Editorials seeking the suggestions of the readers for improving the journal, explaining the policy of the journal and the basis for any changes made or contemplated. The Editors constantly feel the pulse of the users. During 1984-85, the Physical Review Letters noticed a fall in submission of papers from the field of particle physics. The problem appeared to be with the refereeing of the papers in that field. The Editors took note of this and immediately took remedial action. In an editorial George H Vineyard and George Trigg wrote:

> *" Unfortunately, many particle theorists no longer regard Physical* ***Review Letters as*** *the journal of choice for publication of short communications of their best work. People*

> *have various opinions as to why this is so, but almost surely the special difficulties of securing satisfactory refereeing of papers in this field have contributed. The editors have been concerned with this situation for some time. We have had extensive discussions with particle theorists, with officers of the Division of Particles and Fields, and most recently with the Publication Committee and the Council of the American Physical Society. As a result, a new refereeing system for particleand field-theory manuscripts submitted to Physical Review Letters has been approved.. ..... With everyone's help we can make Physical Review Letters the preferred place to publish particle theory letters"* (Vineyard and Trigg, 1985).

In a similar spirit, David Lazarus, Editor in Chief, American Physical Society wrote in an editorial in the Physical Review Letters :

> *" My job can only reflect your concerns if I know them. I want to know when you have troubles with your papers, when you think that the system is working poorly (or even well!), when you think that there is something that we should be doing that we are not, or any other thoughts you may have that could make the next five years of APS journals better than last. If I hear very little, I may conclude that everything is now perfect and we both know better than that! If I hear a lot from a lot of you, that too, will carry a strong signal. We may not be able actually to effect all the changes suggested (or needed), but atleast we can see the directions where we should be heading"* (Lazarus,1985).

The editorials are quoted here to drive home the point that there was a constant attempt by the editors to be in touch with the users and to solicit their cooperation in keeping the standard of the journal high.

Unfortunately, this aspect is ***very rare*** among the Editors of the ***Indian Journals.***

In 1987, when High Temperature Super Conductivity hit the headlines, Editors of The Physical Review and Physical Review Letters were quick to gauge the importance of the subject and with it the need for quick publication of papers submitted on this topic. To achieve this, they appointed several distinguished scientists to an anonymous review panel to examine the large number of papers which were expected to be generated. This was to accelerate the process involved in refereeing and to keep the reviews and judgments as consistent as possible. Both Physical Review Letters and Physical Review "B" published a large number of articles on this topic and the Letters listed from time to time, the papers published on this subject in the two journals. This sort of fast decisions and speedy actions by the editors must have gained the confidence of the physicists all over the world. We should mention here that the topic of High ***Temperature Superconductivity*** was quite well covered by Indian Journals like Pramana and many Indian physicists published their findings in ***Indian journals.***

The Physical Review introduced in 1981 (in a11 the four parts A,B,C and D) a section called "Rapid Communications". Rapid Communications were short reports of important new work of interest. These were given priority in processing. This section was perhaps introduced to accommodate the specialized articles of interest to only certain groups and which were not suitable for Physical Review Letters where the subject matter was of interest to a wider audience. With the increase in the number of articles received even by the individual parts, The Physical Review had to split these parts into further sub parts like The Physical Review A1 and A15. Such changes have been made for Sections B and D. and in 1987 Section A was split into A1 and A15. As the Physical Review Letters has been growing steadily over the years (it has almost doubled in the last ten years), American Physical Society has appointed in early 1990, a review panel to study the working of this journal and to recommend possible improvements in the journal.

We thus see constant changes in these two journals to keep up standards and to meet the demands of the user community. The efforts of the Editors in maintaining high standards of the journal, the involvement of active physicists with the journal either as

Editors or members of editorial boards or as referees, or as contributors of articles, stand out. In 1993, The Physical Review will be celebrating its centenary, a proud land mark for any journal.

From this study it is concluded that some of the important factors contributing to the growth, visibility and importance of The Physical Review and Physical Review Letters are:

1) High standard of research in the country

2) Commitment in the early days of physicists in the USA to publish most of their good work in these journals, a tradition which is still being continued.

3) High standards maintained by the journal with regard to refereeing, editing and printing

4) Punctuality in publication

5) Good infra-structure (sufficient editorial staff, international panel of referees, modern communication facilities like the E-Mail and Fax at the editorial offices, sufficient funds for quality printing)

6) Commitment of the Editors to the journal.

7) Active scientists spending a few years with the journal as editors

8) Editors constantly feeling the pulse of its users making necessary changes in the journal as and when required.

9) Active involvement of the editorial board members with the editors and the journal.

10) Commitment of both the physicists in the USA

and the American Physical Society to have their own journal of a high standard and

11) The journal receiving good papers from physicists from a11 over the world.

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