core-forming metals that had equili-
brated, segregated and collected at the
bottom of the magma ocean as a layer,
may have traversed later through the
solidified and possibly sheared core-
mantle boundary zone by percolation?
Such a process would satisfy both con-
cepts of core growth. Or, did the core
evolve through different routes at dif-
ferent times? Only future experimental
studies can answer these enigmas and
unify many of the existing postu-
lates.

   Planet. Inter., 1997, 100, 81–95.
2. Ringwood, A. E., in Origin of the Earth
   (eds Newsom, H. E. and Jones, J. H.), Ox-
4. Li, J. and Agee, C., Nature, 1996, 381,
   686–689.
   Planet. Inter., 1997, 100, 61–79.
   2000, 64, 2363–2369.
8. Wetherill, G. W., Science, 1985, 228, 877–
   879.
9. Stevenson, D. J., in Origin of Earth (eds
   Newsom, H. E. and Jones, J. H.), Oxford
10. Tonks, W. B. and Melosh H. J., in Origin of
    Earth (eds Newsom, H. E. and Jones, J. H.),
11. Elsasser, W. M., in Earth Science and Me-
    teorites (eds Geiss, J. and Goldberg, E.),
12. Von Bergen, N. and Waff, H. S., J. Geo-
14. Minarik, W. G., Ryerson, F. J. and Watson,
16. Bruhn, D., Groeber, N. and Kohlschutz, D.
18. Commerney, J. E. P., Science, 1999, 284,
    794–798.
20. Kato, T., Inoue, T. and Ringwood, A. E.,
21. Kato, T., Ringwood, A. E. and Inoue, T.,
22. Righter, K., Drake, M. J. and Yadegy, G.,
    Phys. Earth Plan. Inter., 1997, 100, 115–
    134.
23. Tschanner, O., Zerr, A., Specht, S., Ro-
    choll, A., Boehler, R. and Palme, H., Na-
24. MacFarlane, E. A., Drake, M. J. and Rubie,
    57, 5161–5172.

A. V. Sankaran lives at No. 10, P and T
Colony, I Cross, II Block, RT Nagar,
Bangalore 560 032, India

From the archives

Vol. II] SEPTEMBER 1933 [NO. 3

History of Science as related to civil-
ization*

Although the current century has wit-
nessed a greatly increasing occupational
absorption of men trained in various
branches of science, their fraction of those
engaged in all employments taken together
must remain very small. It is therefore rea-
sonable to ask, is it profitable for the State
to provide an expensive form of school-
training framed as if all those who receive
it were embryo professional scientists?
There can be no question that every indi-
vidual who is privileged to vote should
have some knowledge of the fundamental
relation of science to the State, but cannot
this be conveyed without giving him at the
outset a training he might expect to receive
if destined to embark on a scientific career?

*Sir Krishnaratnendr Sri Silver Jubilee Lecture by
Sir Martin Forster, F.R.S.

The basic idea underlying the new
movement is that a more generally useful
approach to scientific method and sci-
entific ways of thought is the historical one.
Every intelligent mind finds attraction in
biography, because when faithfully pre-
sented this offers the encouraging picture
of shortcomings besides virtues, and thus
makes us feel more at home even with
outstanding personalities. An honest biog-
raphy levels while it stimulates, and if with
these effects the true bearing of science on
civilization be conjoined, this form of in-
struction can be made most fruitful. It for-
unately happens that the history of science,
more readily than general history, lends
itself to this treatment because its duration,
and at least the period of most flourishing
development, extends over little more than a
century. Consequently its basic facts are
more surely ascertainable, many being
within the recollection of living people. If
this advantage were applicable to general
history, much of the rubbish unseasonably
uttered about the superiority of the ‘good
old times’ would be self-condemned, and
much of the discontent prevailing now, as
it has prevailed throughout the history of
the world, being avoidable, might be avoided.

In designing a course on the history of
science appropriate for students who will
not for the most part become specialists in
science it will be desirable to select the
biographies of men whose discoveries may
be definitely correlated with improvement
in our ways of living and our outlook on
life. If examined from this standpoint the
whole subject will yield some surprises. Let
us take an example that was very much in
all our minds two years ago, being the cen-
tenary of Michael Faraday’s discovery of
electro-magnetic induction on 29th August
1831. It has been claimed that ‘no other
experiment in physical science has been
more fruitful in benefit for mankind’. All
scientific men will agree that the claim is
defensible, but the biography of Faraday
may be less impressive in a course of sci-
ence-history for the normal student than it is
for the professional scientist. Because although
his experiments were fundamental, an
equally fundamental experiment in the same
field had been made by the Danish philoso-
pher Oersted in 1820, he having in that year
discovered that a magnitude needle is de-
lected by a voltaic current; while several
other contemporaries of Faraday, notably
Arago, Ampère and Humphry Davy were
fruitfully engaged in similar studies. In fact,
Sir Ambrose Fleming has recorded that
‘nothing is more remarkable in the history of
discovery than the manner in which Ampè-
re seized upon the right clue which en-
abled him to disentangle the complicated
phenomena of electrodynamics and to de-
duce them all as a consequence of one sim-
ple fundamental law, which occupies in
electrodynamics the position of the Newto-
nian law of gravitation in physical astron-
ym’.