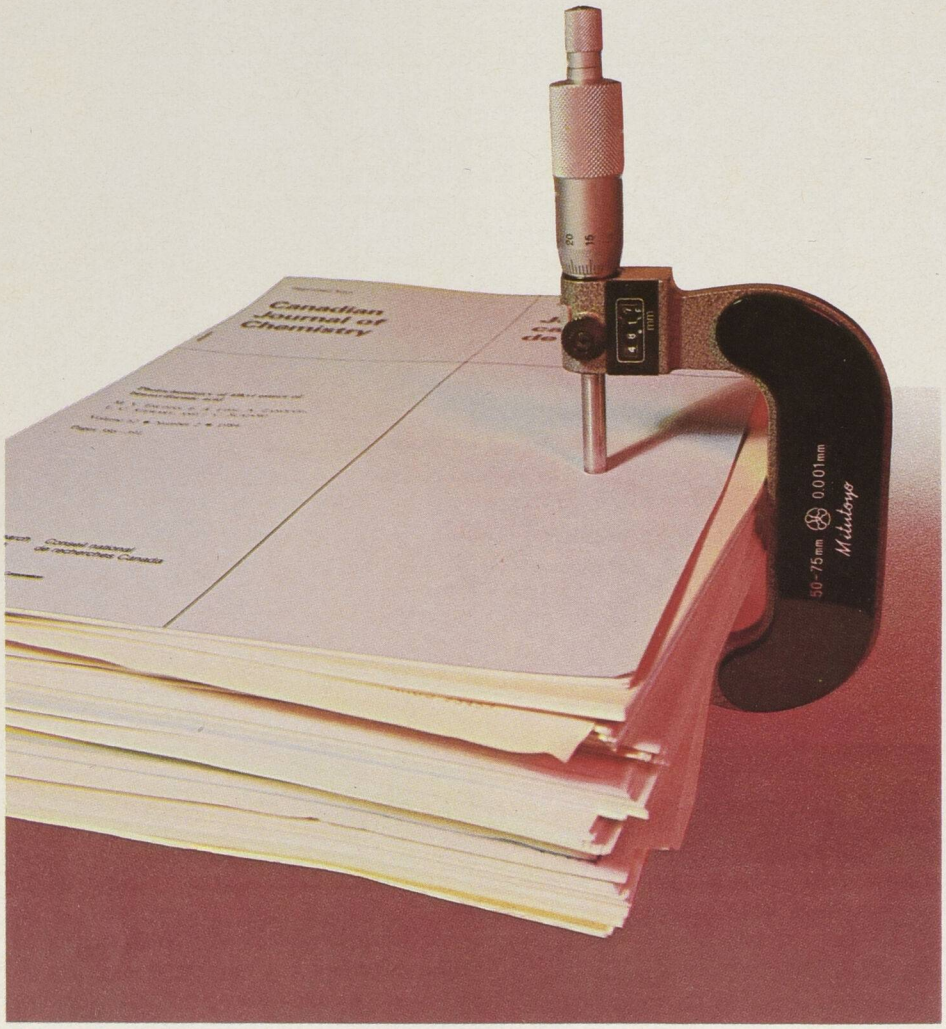

Dan Getz

and that number is expected to double every 10 years. It is on his or her papers that a scientist's prestige is based, and the scientist who does not publish, perishes.

If the best scientists were the most prolific, then they could be ranked in order of merit by counting or weighing the papers they have authored. But there is no such simple relation between the quantity and the quality of a scientist's output.

There may seem to be rewards for turning one concise, well-reasoned paper into two or more mediocre ones. Publish or perish, runs the rule: the more papers one produces, the more secure one's tenure. But poor research, while it may enable a scientist to keep his job longer, is unlikely to earn him peer respect. Scientists whose work is trivial and uninspired tend to be ignored.

But those whose work is imaginative and accurate are read — and heavily cited.

Doing science is a collective and cumulative activity. It begins by refuting, verifying or extending the work of others. Even Isaac Newton acknowledged this debt. "If I have seen a little further," he wrote, "it is by standing on the shoulders of giants."

Scientists today acknowledge their intellectual debts by citing, in the footnotes to their papers, the works of others. They cite those who made the pioneering discoveries in their specialty, those whose data or laboratory methods they use, those with whose results their results are consistent.

Is the frequency with which a scientist's work is cited, then, a reliable and objective measure of scientific merit?

Not necessarily. For scientists do not just cite important papers. They also cite those that are trivial and wrong. There was, for instance, a controversy a few years ago about polywater. Those who wrote on the subject were well-cited, but their work has no lasting significance: polywater, we now know, does not exist.

But there is probably no better way of quantifying a contemporary scientist's significance than by intelligently interpreting a count of the citations of his or her work that other scientists make.

Eugene Garfield, founder and publisher of *Current Contents* and *Science Citation Index* (these are bibliographic tools for scanning the flow of scientific literature) has compiled a list of the thousand most-cited authors of papers published in any scientific field between 1965 and 1978. Twenty-three of these top thousand scientists are at Canadian institutions.

In the pages that follow you will meet five of these distinguished Canadian scientists:

Phil Gold of McGill University in Montreal,
Keith Ingold of the National Research Council, Ottawa,
Howard Clark of the University of Guelph,
John Polanyi of the University of Toronto, and
Ian Smith, of the NRC in Ottawa.