



Stimulus & Challenge

Dental Research News

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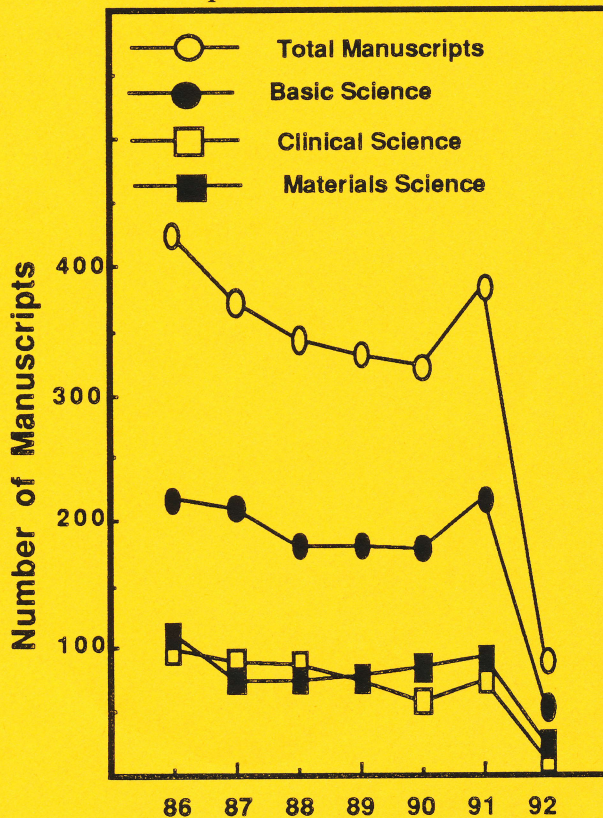
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The voice of Dal Dental research

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Journal of Dental Research

The following graph gives an indication in the trend of the number of papers by subject published in the JDR from 1986 to the first quarter of 1992.



Trivia Question

Which came first the IADR or the Journal of Dental Research? See answer on page 5

Does this Ring a Bell?

"Son, when the people of my district think of basic research, they think of the telephone. Give me a practical argument for funding science."

Late Congressman, Olin Teague

Experimentation and Scientific Realism

"Experimental physics provides the strongest evidence for scientific realism. Entities that in principle cannot be observed are regularly manipulated to produce new phenomena and to investigate other aspects of nature. They are tools, instruments not for thinking but for doing."

Ian Hacking

Derek W. Jones

Assistant Dean

Well Done Colin

Colin Dawes steps down as editor of the JDR in March 1993. Colin has served the IADR/AADR well, he has achieved much during his term of office. The Dental Research News congratulates Colin on an outstanding job in his capacity as editor he has been a credit to the Canadian dental scientific community.

According to Colin in his 1992 annual report, the number of manuscripts submitted to the JDR has been declining since 1986. However, in 1991 there was a 20% increase in manuscript submissions over the number in 1990. Some changes in the requirements for manuscripts have recently taken place.

When submitting a revised version of a manuscript, authors are now being requested to include an additional copy of their manuscript on a diskette. For the few manuscripts for which a diskette is not available, the text can be put into the Central Office computer by use of a scanner. This is all made possible by the transition to desktop publishing, which is mainly carried out by the Publication Department in the Central Office. These procedures should save IADR considerable money in typesetting and printing costs and also reduce the frequency with which

typographical errors occur in the page proofs.

Apparently a few authors have been unhappy in the past with the format used by the JDR for references since most "reference manager" software packages are unable to cope with producing the author's names as capitals. The Publication Committee and the IADR and AADR Boards of Directors have now agreed to change the format for references. Unfortunately, in their wisdom they have chosen a "hybrid" system rather than a standard system such as the Vancouver style.

A revised 'Instructions to Authors', which incorporated the new reference style appeared in the December, 1991, issue of the JDR. The format for references in the text remains as before. The major changes in the reference lists is that authors' names and the titles are in lower case. Authors' surnames are followed by a space, with no periods separating their initials, and multiple authors are separated only by commas. The May 1992 issue of the Journal made the transition to the new style references. For those of us who have taken ten years to get used to the old style this is going to be very difficult. Especially without Colin Dawes who in his own inimitable humorous way would always try to help us.

Tunneled Vision

In research we must always keep a very sharp sense of scepticism when viewing the results and raw data of our research endeavours. The lessons of cold fusion were a classic example of this. Another less well publicized research project from last year involved some of the most astounding and promising scientific photographs ever taken which may end up being worthless.

These photographs released over the past four years, were said to show the DNA molecule magnified a million times, to a level of detail never seen before.

The images generated great excitement, raising hopes that researchers could use the technique to study viruses, proteins and even the genetic information of DNA. The photos were splashed across the covers of important journals.

Scientists at the University of Utah reported that some of the images might show not DNA, but merely flakes and snags of the graphite used as a background. The pictures were taken with the scanning tunneling microscope, which is powerful enough to distinguish individual atoms.

But in the summer of 1990, while examining nearly 1,000 blank sheets of graphite with the microscope, the scientists found

meandering, jagged lines that look dangerously like some of the (images) that have been published, Dr. Thomas Beebe a chemist said "Actually, they look better than some of things that have been published. They looked absolutely marvellous."

Graphite is used as a background because it is chemically inert and, in theory, perfectly smooth. It comes in thin layers, like sheets of paper, that are loosely held together. To separate them, scientists press a piece of transparent tape against the surface and lift it off, bringing away a few layers to be used under the microscope.

But in practice, the layers often rip and leave jagged edges, according to a report by Beebe and Clemmer published in the journal *Science* in February 1991. Under the microscope, some of these edges were said to be indistinguishable from DNA and other molecules.

According to Digital Instruments, a Santa Barbara, a Calif., firm that makes scanning tunneling microscopes. The covers of reputable magazines have published images that are not correct. The blame is put on scientists who, in their rush to get their findings into print, don't double-check their images or question their authenticity. In research we must always keep control of our excitement and preserve a sense of scepticism.

Ionomers

Many commonly used terms in dentistry are accepted without a clear understanding of their origin. A typical example is the term 'ionomer' which is the name given to a class of restorative dental materials.

Our biomaterials research laboratory are synthesizing a whole range of glass ionomer cement systems. These materials have the ability to chemically bond to natural tooth and bone.

The term 'ionomer' like the word 'nylon' was invented by the Du Pont company in the US to cover a class of polymeric material, consisting of an organic backbone bearing a small proportion of ionizable functional groups.

Ionomer is now accepted as a generic term for polymers that contain inter chain ionic bonding. These ionic cross links occur randomly between the long-chain polymer molecules to produce solid-state properties usually associated with high-molecular-weight substances.

The organic backbones are typically hydrocarbon or fluorocarbon polymers and the ionizable functional groups are generally carboxylic or sulphonic acid groups. These functional groups, which are attached to no more than about 10% of the monomer units in the polymer, readily react with sodium or zinc ions. The presence of these ionic

groups bestows on the polymer improved mechanical strength and chemical resistance which it might otherwise not have. Ionomers are resistant to dissolution in many solvents because of the unconventional chemical character, often being too ionic to dissolve in non-polar solvents and too organic to dissolve in polar solvents.

Ionomers described in the research literature, include copolymers of styrene with acrylic acid, ethyl acrylate with methacrylic acid, and ethylene with methacrylic acid.

Fluorinated sulphonate ionomers known as Nafions, have been developed by the Du Pont company as membranes. The properties of most ionomers used commercially are very different to the 'glass ionomers' used as biomaterials. Ionomers find wide application in food packaging (Most of the commercial ionomers comply with regulations for contact with foods.), automotive parts, sporting goods, footwear, carpets, furniture surfaces, foamed sheets for ski-lift seat pads, wrestling mats, covers for hot water tanks and piping.

Ionomers in the form of membranes are also used in dialysis, reverse osmosis, and in electrolytic cells for the chlor-alkali industry. The wide range of diverse ionomer materials clearly have a broad application in our daily lives in addition to their use as biomaterials.

Rules for Rounding

An important step in presenting research data often involves the rounding of uncertain numbers.

- (1) If the digit to the right of the first uncertain digit is greater (smaller) than 5, increase by 1 (leave unchanged) the first uncertain digit.
- (2) If the digit to the right of the first uncertain digit is a 5, and if there are other non-zero digits further to the right, increase the first uncertain digit by 1. Otherwise:
 - (a) increase the first uncertain digit by 1 if it is odd or
 - (b) leave it unchanged if it is even.
- (3) Round to the first uncertain digit in one step not a succession of steps.

For example, rounding 0.123 456 to three significant figures gives 0.123, rounding 0.123 50 to three significant figures gives 0.124, but rounding 0.122 50 to three significant figures gives 0.122.

Answer to Trivia Question

The Journal of Dental Research was founded in 1919, it was thus in existence eighteen months before the IADR was organized and 42 months before the first scientific papers were read at the 1922 meeting.

Modernized Dalhousie

How many attending the IADR took the time to visit Dalhousie Castle in Midlothian not far from Edinburgh. The building is a castellated castle dating from the 12th century. However, it has been much altered and converted into a modern mansion, and is now a school for boys.

Research Policies and Procedures Hand Book

The office of the Associate Vice-President "Research Services" have put together with advice from the Research Advisory Committee, an excellent Handbook. The booklet brings together for the first time in one place most of the information that is important to faculty members who are planning a research project. The information will be especially valuable for the first time investigator and new faculty members. However, faculty members experienced in research will also find much of the information to be extremely valuable. The booklet is a WORKING DRAFT and dental faculty are strongly encouraged to provide comments and suggestion to the RDO or direct to Research Services. A copy of this book is available in each department. Please take time to review this book and provide any feedback on its usefulness and suggestions for improvement.