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Pyroclasts

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Aller au sommaire du numéro

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Not only did the Indian village dwellers, such as the Iroquoian peoples in Ontario, disturb the soils within and around their settlement sites to a degree which is still discernible some three hundred years later, but they also significantly modified the chemical composition of these soils. Soil reaction (pH), organic carbon, organic and inorganic phosphorus, together with elemental calcium, magnesium and iron levels in the present day soils can all be used to study the extent of previous settlement areas as well as to delimit individual house patterns. Not only is it possible to determine where such peoples lived by means of soil chemical properties, but through the investigation of the chemical composition of their refuse it is even possible to reconstruct the diets of the village inhabitants.

The study of soil reaction at archeological sites is important, not only because it may reflect previous human activity, but because it markedly influences the rate and type of soil development. One feature of former Indian villages in southern Ontario, for example, is that the soil pH is invariably higher within the village perimeter than without it. To some extent this may be due to the removal of the soil organic layers which would otherwise have contributed to soil acidity, but the accumulation of fire ash and refuse may also be contributing factors since they serve as neutralizing agents in the soil.

The measurement of soil organic carbon may also serve as a valuable archeological tool. Anomalously high concentrations of organic carbon in the subsoil sometimes indicate the positions of former building posts when the more usual patterns of post moulds in the soil are either absent or incomplete. In this way the full extent of previous buildings can often be determined. Differences in the chemical composition of soil organic matter; variations between organic and inorganic compounds and the degree of organic matter decomposition and mineralization can all be used as indicators of the environmental impact of previous human activities.

Phosphorus, which exists in the soils in both organic and inorganic forms, is particularly suitable for use in archeological interpretation on account of the fact that it readily combines with other elements to form insoluble compounds. Under alkaline soil conditions phosphorus combines with calcium and magnesium, whereas under acid conditions it tends to combine with iron and aluminum. Man, when he inhabits a site, produces amounts of phosphorus-rich waste in the form of urine, excretia, and waste food products. Phosphorus, when released from these various products upon decay, will in most cases become rapidly fixed in the soil and rendered immobile. The detection of anomalously high phosphorus levels in soils can therefore be used as evidence of human habitation and phosphorus determinations can aid considerably in the location of settlement patterns and middens. In some instances phosphorus levels in soils can also be used to determine the length of occupancy for a site, assuming of course that the population of the site is known approximately and that the site, when it was inhabited, was occupied more or less continuously. Studies on Iroquoian villages in southern Ontario, for example, using residual phosphorus accumulations in the soils, suggest that village sites were occupied for periods of between 10 and 25 years before the local soils became nutritionally depleted, crop yields declined and the village site was eventually abandoned and fired.

Thus, pedological investigations undertaken in conjunction with archeological excavations can be of considerable use in the interpretation of the nature and effects of previous human occupancy in an area. As our understanding of the residual physical and chemical features in soils improves, the next few years may very well see the much more extensive use of pedological techniques in archeological work.

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Pyroclasts

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The first of these columns (v. 2, no. 4) was supposed to inspire and provoke readers to send in all sorts of bright ideas, contentious suggestions and vicious comments which would form the grist for subsequent columns. However, I'm afraid the deadline for the third column has arrived before the first one has been delivered by the mails so this pyroclastic eruption still lacks input from our great underground reservoir, the readers. Once again I shall have to tread water and rely on wire taps.

More on the Renaissance in Canadian Geoscience

Signs that geoscience is on the move include the winning of the coveted 1975 Steacie Award by Fab Aumento of Dalhousie U. for his pioneering studies on the Mid-Atlantic Ridge. The award this year was shared with Jules Carbotte, a McMaster physicist. It is only the second time that the Steacie Award has been won by a geoscientist. Much more important is the fact that this is the second time in a row that an earth scientist has won it. We're finally putting some people into that exalted orbit dominated for so long by physicists, chemists and the odd Suzuki!

NRC deserves a great deal of credit for inaugurating the Steacie Award. It serves as a spur to achievement and a reward for individual excellence. It is virtually a national Nobel Prize for young scientists.

Let's Not Tell Anyone

NRC deserves rather less Kudos for its handling of publicity concerning the Award. I'll bet that you and me and Fab's mother are the only people who know he won something. Far more fame goes to Ottawa's or Halifax' young athlete of the year. Even our poor neglected brothers and sisters in the arts achieve more renown when they win a best play or best novel award. What an opportunity has been missed to publicize Canadian science at a time when it really needs a shot in the arm. It would have required little effort to translate some of the excitement and possible economic importance of Aumento's studies of the ocean floor into terms understandable by the general public. When we're living in an age of anti-intellectualism, increasing suspicion and decreasing support of science the appearance of an articulate, award-winning young scientist on the National News, in the newspapers or on Barbara Frum's program wouldn't have done any harm to our cause. Oh well, peer-group recognition is really the important thing - except do any of the peers know?

Don't Just Talk, Write Canajan

This year, for the first time, the NRC booklet on Awards contained a little note stating that research supported by NRC grants should be published in reputable journals and GET THIS preferably Canadian journals. Shame! Shades of poor Time and Readers Digest. Narrow nationalistic chauvinism is intruding on the great international science scene!

But let's look a little more closely - why is it that so little trail-breaking science is published in Canadian publications? There has certainly been some but more often than not the really exciting Canadian geoscience ends up elsewhere, e.g., aulacogens with the British Royal Society, the first plate tectonic interpretation of the Canadian Cordillera in the *American Journal of Science* and so on. Too often only the dull supporting data are published here in the homeland.

Many good explanations are given for the export of most of our best geoscience papers. Thus some are given at prestigious international symposia and then published by the sponsoring organization. But we stage lots of symposia at home, the GAC, CIM and CSPG seem to be constantly on this kick. Why don't they attract more of the path-finder papers?

A more common explanation is that Canadian journals have relatively restricted circulation and so a really red hot paper doesn't get to all the right people in the author's field unless it is published in an international specialty journal. But usually the list of super specialists is not large, a few hundred at most, and can easily be reached by reprints. Canadian reprints are reasonably priced and a nicely autographed reprint stands an even better chance of being read than an article lumped in with a dozen others. Try this approach next time you write your best paper.

The Mountains Must Come to Mohammed

The late great Paul D. Krynine, sedimentologist and iconoclast extraordinary didn't worry about publishing in well-known international journals. Some of his exciting break throughs used to appear in journals like the Annals of the Natural History Society of Tierra del Fuego. When *YOU* wrote *HIM* for a reprint you would receive a faded, blue-line duplicate which you would read carefully and treasure ever afterwards. He took a particular pride in the fact that it didn't matter where he published "if they want to find oil they've got to read my stuff". I guess we don't have enough Canadian geoscientists with the self assurance of P.D.K.

First the World Then Canada

I was recently describing this situation to a well-known industrial physicist. He said his impression was that in chemistry and physics a growing number of mature scientists sent their very good papers to Canadian journals after they had proved to themselves that they could make it with the prestige journals abroad. This is probably reflected in the fact that our national journals of physics and chemistry have higher circulations abroad and rate higher on international citation lists than any of the Canadian geoscience publications.

Is it worth luring more Canadian geoscientists into putting their best work into Canadian journals after they've satisfied themselves that they are world class? Who gives a damn as long as it's published? I do. Nothing burns me more than the receipt of manuscripts from authors who attach their rejection slips and referee reports from *Nature*, *Science* and *Geology* as a form of endorsement. The reports usually state "a well written competent piece of work which is terribly dull and really contributes nothing new to the science. I suggest you send it to the Canadian *Journal of Vertebrate Paleomagic*". Ouch!

MS received March 1, 1976.

Note

A Renaissance for Canadian Geoscience, v. 3, no. 1, p. 7. Sterry Hunt did not go on to become the first president of M.I.T. as stated. Hunt only occupied the Chair of Geology at that Institute from 1872-1878.