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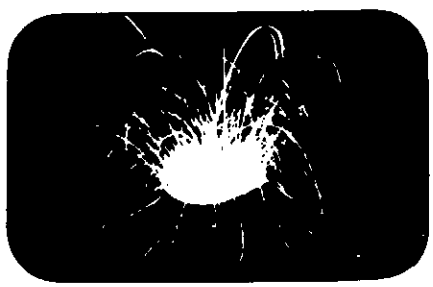

Pyroclasts

Getting Down to Earth: A Challenge to Geoscientists

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While at the 1988 GAC-MAC-CSPG conference in Newfoundland, I happened to attend the session on global change. During the presentations and the ensuing discussion, I was impressed by the data presented. For example, experts predict that the earth will have a population of 10 billion people within a couple of decades — that's 10^{10}. Worse yet, they conservatively expect that the population will reach 14 to 15 billion before it starts to level off at about 2050 AD. Plus, it is expected that urbanization will continue to increase exponentially, especially in the third world. Furthermore, we were told during the session that if the increase in CO_2 does indeed cause uncontrolled warming of the atmosphere, the consequent melting of the ice caps and rising sea levels will flood the most heavily populated parts of the world. Moreover, the increased aridity in the major grain growing areas, continued devastating losses of fertile top soils, increased coastal erosion, and severe mass wasting as permafrost is removed will further stress the carrying capacity of the earth (Nisbet, 1988; Berger, 1986, 1988; St-Onge, 1988; Morgan, 1988; Price, 1986; Anon., 1986).

I'm sure that if any one of us in the geological community had sat down and thought about it for a few minutes, we could have come up with essentially the same scenario. It should not surprise us, given our training and expertise. But sit back for a minute and visualize it in more personal terms: during your lifetime and certainly within that of your children, the number of people in the world will double and then triple. How will we feed all those people? How will you feed yourself and your children if the droughts that the prairies are experiencing now continue to worsen? Even if we can feed North America, what about Africa, India, and Asia? Where do we put all those people? What will happen when the city where you live or work triples in size, or even quadruples, within the next three to four decades? What will happen when sea levels begin to rise a few centimetres per year instead of their current millimetre per year (Newman and Fairbridge, 1986)? Already Bangkok, Venice, Amsterdam, and a few other cities are flooded regularly (Nisbet, 1988; Taylor, 1988; Anon., 1986). What would happen if the greenhouse effect caused the polar caps to melt completely? Where do we put all the people if almost every major city in the world is flooded? Where will your children live? If Tokyo, Kyoto, Hiroshima, Saporo, Shanghai, Canton, Hong Kong, Singapore, Manila, Rangoon, Jakarta, Phnom Penh, Bangkok, Saigong, Melbourne, Sydney, Brisbane, Perth, Adelaide, Dacca, Calcutta, Delhi, Colombia, Bombay, Karachi, Baghdad, Capetown, Casablanca, Algiers, Tunis, Cairo, Alexandria, Tel Aviv, Beirut, Athens, Rome, Marseille, Lisbon, Paris, Amsterdam, Rotterdam, Berlin, Copenhagen, London, Newcastle, Glasglow, Stockholm, Leningrad, Halifax, Montreal, Ottawa, New York, Washington, Philadelphia, Miami, Tampa, New Orleans, Houston, Panama City, Rio de Janeiro, Sao Paola, Los Angeles, San Francisco, Vancouver, and Honolulu are flooded, where do we send the refugees?

It must be obvious that we need change. As geologists, we, if anyone, should have a better than average understanding of time-related and time-dependant processes. We all study them, teach them, and we use them. Many of us have seen every continent. Most of us have travelled to more places than the average person ever dreams of seeing. We have a unique perspective. Unfortunately, we don't communicate that perspective well to the rest of the world. This is true of all scientists, not just geologists. For example, a study in the US determined that only 5% of the population was scientifically literate (in Neale, 1988). Witness the poor PR we as scientists have in the media. For example, on TV this past season, the trained scientist (either professor, researcher, or graduate student) has been the heavy in many highly rated shows, such as Beauty and the Beast, Friday the 13th, LA Law, Miami Vice, Matlock, Street Legal, even McGyver, just to name a few. How many times did you have to explain the purpose of your project or course of study to one of your own family while you were a student? How often do they ask you now, "But what good is that knowledge in the "real world"?" What is worse, is that the UN World Commission on Environment and Development, in preparing its major document, the Brundtland report, on the problems of global change in the next few decades and their potential solutions, only received presentations from one or two scientific groups. But our opinions did not even rate a mention in the final document (Berger, 1986, 1988)! This is the document that most countries are or will be using to prepare for the future, and it disregarded scientific input completely. Some governments are even introducing regressive legislation: for example, Quebec's new monetary incentive program (a kind of super baby bonus) to *increase* their population growth.

Part of the problem obviously comes from our infrequent and less than skillful attempts at public communication. As scientists, we talk numbers, because we think numbers, and we understand numbers. John Q. Public is not a scientist, because he hates numbers. He avoided math whenever possible in school, especially calculus and statistics. He dropped science as soon as they let him, and took technical shops, business skills, or the humanities instead. He often fears numbers. He hires someone to prepare his tax return, even if it is only a 20-minute job. He avoids banking machines. He may buy his kids a computer, but he is afraid to use it except to

play game and store oddities. He probably can figure out simple percentages. Anything more complex than a simple graph showing obvious increases or decreases, may as well be Greek or Chinese, for all he can comprehend them. He often does not understand inductive or deductive reasoning. He has no grasp of how one attempts to do science. What he does not understand, he inherently fears. Therefore, he believes that the modern Drs. Frankenstein exist. Nor is Jane Q. Public any better: generally she is probably worse because she dropped science and maths even earlier.

What the average person does understand, however, are visual images, hence, the impact of TV. We must paint word pictures, use photos or slides to impress our ideas on people. Even in purely oral or written communication, scientific logic and numbers will fall flat. We must learn the literary tricks of the journalist and novelist and use the oratory of the politician and talk show host. We must appeal to the emotions. We must pique people's curiosity. We must discuss issues in personal terms, using such phrases as "when you", "for your children", "to your family". We must "hit them where they live".

Rather than always publishing our views and results only in the scientific journals, which is a case of "preaching to the converted", we must make ourselves and our message heard in the "real world". There are several ways in which to do this. Some universities have started offering free seminar series on the science of current issues to the public (Moore, 1988; Rogerson, 1988). As academics, we must encourage all universities to offer such programs. With such programs, we could reach a few thousand people per year. If we individually discuss these problems with family and friends, we can reach several thousand more. If we each visited one public or high school per year to talk on the problems of the world and how we as scientists try to attack them, we could reach much of the next generation during their "formative" years. Most of the major newspapers in Canada have a daily or weekly science column in the paper or their weekend magazine. Newspapers reach probably 60% of Canadian families. Most newspapers are always eager for material to fill their columns. Plus many smaller rural or neighbourhood papers will even pay for such material because they need it so badly. If each of us in the Canadian geologic community wrote one or two articles per year for our local paper(s) on a rotating basis, we could ensure that each week, our message would reach readers. If we ensured that each article had several pictures to catch the readers' interest, we would ensure an even broader readership. If we combined our efforts with scientists from all the disciplines we could have an article in the paper every day. Furthermore, local TV and cable channels are always eager for material. Since most of us already have many slides, we could illustrate informative and interesting programs.

If such ideas are going to work, however, we in academia, research, and industry must change our attitudes regarding the value of "popular" science (*cf.* Moore, 1988; Rogerson, 1988). It should be considered as a vital, albeit small, component of the requirements for promotion and/or tenure. We must not castigate those who actively promote science in the community. Finally, we ourselves must actively espouse the views that we are attempting to promote: reducing (preferably eliminating) all forms of pollution, conservation of energy, water, and natural resources, safe and effective municipal planning for rapid expansion, safe disposal for all types of waste, recycling all our garbage, eliminating the use of salt in winter, eliminating smoking, protecting endangered species, reducing the world population, and increasing literacy, especially scientific literacy. We need to be seen as good examples.

This may seem like an impossible task, but it's not. For example, Dr. Helen Caldicutt and the Doctors for Nuclear Disarmament have successully taken their message to the people. We in the geologic (scientific) community can do the same, if we come down from our ivory towers, and get down to earth.

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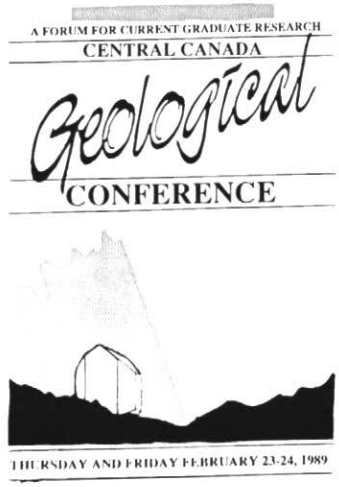

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