



TOO MUCH RESEARCH, TOO LITTLE ACTION

BY

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It is often said “science and technology can eventually solve every societal problem”. In the July 19 issue of *Chemical & Engineering News (C&EN)* published by one of the large international professional organizations, the American Chemical Society (ACS), an article entitled *Pursuing Scientific Excellence* appeared. This dealt with growth in the publication of scientific and technical papers, which has increased globally from about 467,000 in 1988 to about 650,000 in 2001 as reported by the US National Science Foundation (NSF). The number of journals from which NSF collected its data had grown from over 4,500 to over 5,250 during that period. The Chemical Abstract Service (CAS) which also tracks journals has the number increasing from about 8,000 in 1988 to nearly 9,000 today worldwide. Unfortunately, no further information was given as to the breakdown of the source or topics areas of papers, such as academia versus industry or chemistry versus medicine. Although the US had an increase in total numbers of papers published, its global share of publications fell from nearly 40% to about 30%, while those of Western Europe rose to slightly above 35% and those of Asia rose sharply, nearly doubling to almost 18%.

In the same issue, *C&EN* covered the recent CHEMRAWN Conference (Chemical Research Applied to World Needs) held, naturally, in Paris, which examined how chemistry can aid in meeting global water supply and quality needs. Statistics presented indicated that global fresh water supply is limited, representing only 3% of the total water available. The World Health Organization (WHO) noted about 2.4 billion people do not have adequate access to basic sanitation and more than 1 billion do not have access to safe drinking water. It has been estimated more than 10,000 children a day die from infectious diseases present in contaminated and untreated water. WHO also notes that nearly 90% of the wastewater in Latin America and two-thirds in Asia is discharged untreated into surface

waters. In India, over 1 million litres of raw sewage is discharged into the Ganges River each minute.

In the meantime, the world population has grown from 1 billion people in 1920 to over 6 billion today. Among the diseases, diarrhea takes the life of 1.6 million children a year, while AIDS accounts for nearly 3 million deaths annually. The only new information associated with these numbers and statistics is that they are increasing.

Contemplate for a moment the renewable and non-renewable resources consumed in the process of producing these publications, and the travel to and from conferences to present the findings. Thousands of conferences are held annually with literally one or more on nearly any topic somewhere at sometime in the world. One would think with all of this research and results, coupled with ten of thousands of new patents and products each year there would be no unresolved environmental, energy, or health problems remaining in the world. There are also the issues of quality control and peer review to ensure what is published is truthful. Increasingly, more deficiencies and inaccuracies are found in collective scientific databases cataloging these publications. How many times does one see similar technical materials published repeatedly by multiple authors over several years, justifying something as novel with only a slight nuance?

With the astronomical rise in the use of the Internet and video conferencing, couldn't the billions of dollars spent on these publications and related conferences be put to better use? Based on mere statistics there appears to be a distinct correlation between the increasing number of publications and conferences and the rise of disease, energy shortages, environmental disasters, global warming, obesity, overpopulation, and starvation. The more mankind tries to resolve its own impacts and problems, the worse they become. There exists a clear and dramatic disconnect between our ability to examine and talk about human problems and apply the resultant knowledge we gain to resolve them. The examples of this disconnect are numerous and all around us. Mining has its own interesting group of professional organisations and conferences. For example, literally thousands of publications and scores of conferences have examined the causes, sources, impacts, mitigation, characterisation, sampling, modelling, and treatment of acid rock drainage (ARD) or acid mine drainage (AMD). Yet impacts continue to grow, while it remains the number one environmental issue and long-term financial liability facing the mining industry. The correlation seems to hold once again.

Another example is the continued research into the environmental impacts of chemicals such as DDT, which was banned because of potential impacts to wildlife, but in turn the ability was lost to control insects spreading deadly infectious water-borne diseases causing hundreds of thousands of premature deaths each year. There are straightforward unglamorous solutions such as building sewage treatment plants. At times it seems there is a tendency to promote polarisation bettered suited to generating financial support for research than grappling with real solutions. The straightforward practical solution to an environmental problem is often scoffed as too simplistic or unappealing as the 'intellectual challenge' is to find a complex and clever answer that commands personal respect without any for cost.

A manifestation of this paradox between theory and practice is found in China. By brute force and a will to 'get the job done', China is driving the world economy while consuming resources at a staggering pace. There has been a dramatic increase in Asian scientific publications, but air pollution still exists, as do water quality impacts and shortages of health care. Nonetheless, the standard of living is rising rapidly as is carbon dioxide output as tens of millions of Chinese achieve middle class status. International resource companies have seen and seized the opportunity, while the academic debate rages on whether or not the US and Russia should include their forests as carbon dioxide sinks in global warming models. Does this disconnect arise from the inability of researchers to truly understand and focus on mundane but real issues, or does it arise from the inability or lack of will of industry, government, or society in general to grasp or accept their findings? There must be a conference in Monaco, on the Mediterranean, next summer that addresses this dilemma!