

**“Nature, Science and Man” and**

**Professor R.H. Clark**

**George Brandie**

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# Outline



- **Professor R.H. Clark**
  - » **Arrival at Queen's**
  - » **Career at Queen's**
  - » **Breadth of Interests**
- **"Nature, Science and Man"**
  - » **Rationale**
  - » **Objectives**
  - » **Structure**
  - » **Response**

**R.H. "Reg" Clark**



**A visionary, ahead of his time**



1928 - 2003

# Reg Clark at Queen's



- **Ph.D. (Chemical Engineering) at Imperial College**
- **Emigrated to Canada**
- **Accepted position as THE Assistant Professor of Chemical Engineering at Queen's, 1955**

# Reg Clark at Queen's



- **Ph.D. (Chemical Engineering) at Imperial College**
- **Emigrated to Canada**
- **Accepted position as THE Assistant Professor of Chemical Engineering at Queen's, 1955**
- **Appointed Acting Head of Department in 1962**
- **Appointed Head in 1964**
- **Resigned Headship in 1971, stayed on as Professor until retirement in 1992**

# Some Research Interests



- **Engineered Landfills (to recover methane)**
- **Automated Recycling (mechanical separation of valuable materials from waste streams)**
- **Allergens (design & construction of a large environmental chamber)**
  - » **Allergens from UFFI**
  - » **Evaluating drug treatments through controlled testing**

**A cheerful, persuasive leader**

# Teaching Innovations



- Introduced Biochemical and Environmental Engineering into the Chemical Engineering curriculum
- Strongly supported use of personal computers by undergraduates
  - » Established computer lab (TRS-80 computers) in Dupuis Hall
  - » Pushed to have computers in the hands of all students and that they be trained in using them for engineering work

“**Established “Nature, Science and Man” as an** outstanding example of openness, humanity, patience, and gentle wisdom tempered with realism.”  
**undergraduate course**

Professor Emeritus Henry Becker

# Sidebar: Engineering Accreditation



- **Canadian Engineering Accreditation Board (CEAB) specifies [and monitors] curricula:**
  - Minimum hours for
    - » Pure Science and Mathematics
    - » Engineering Science
    - » Engineering Design
  - **1/8 of program must be devoted to “Complementary Studies”**
    - » **Engineering economics**
    - » **Humanities and social sciences (H&SS)**
    - **Central issues, methodologies & thought**



# “Nature, Science and Man”



## Rationale

- » Unhappiness with fulfillment of existing H&SS requirement
- » Awareness of growing student interest and concern about contemporary issues (esp. environmental issues)
- » Belief that students needed better understanding of the world to be effective, responsible engineers
- » Belief that a university could, *and should*, be more than a collection of independent, isolated disciplines (“silos”)

# “Nature, Science and Man”



## Planning

- » **Two new courses under the title “Nature, Science and Man” (NSM)**
- » **NSM I would give background on the nature of the universe, the Earth and mankind**
- » **NSM II would critically analyze current environmental problems**
- » **Courses would partially fulfill H&SS requirement**
- » **NSM I approved for a one-year trial in the 1971-2 session in Applied Science (ArtSci students would not receive credit)**

# “Nature, Science and Man”



## Objectives

1. **“To reveal the general nature of Man and his environment in relation to current problems facing Mankind.**
2. **To emphasize to the student the complex, interdisciplinary nature of environmental and world problems, their causes and possible solutions.**
3. **To stimulate and permit the student to extend his knowledge of other disciplines.**
4. **To help the student appreciate and evaluate the work, relevance and interrelationships of the**

# “Nature, Science and Man”



## Implementation

- » **Lecturers**
- » **Notes**
- » **Videotape**
- » **Course Assistant**
- » **Initial Support**
  - **Applied Science Dean Jim Brown**
  - **Principal John Deutsch**
- » **First Run of NSM I (Fall 1971)**
  - **39 registered students**

# “Nature, Science and Man”



## Subsequent Years

- » Student enrollment increased to over the capacity of Dupuis Auditorium (~200); lectures repeated in a second slot
- » Students from other Faculties allowed to enroll
- » NSM tapes used to present course at Brockville Summer School and Kingston Summer School

**“I have followed with much interest your efforts and plans for this path-breaking and very worthwhile venture, and I wish you every success.”**

**Principal John Deutsch in a note to R.H. Clark, January 1973**

# “Nature, Science and Man”



## **NSM I Topics (1972)**

- » **The Physical World**
- » **The Biological World**
- » **The Social World**
- » **Global Issues**

## **NSM II Topics (1973)**

- » **Environmental Futures**
- » **The Urban Environment**
- » **Oil from the North**
- » **DDT: A “Miracle Chemical”**

# “Nature, Science and Man”



## Student Evaluation

- » **Mid-Term & Final Exams (10% & 40%; multiple choice)**
- » **Student paper on an environmental topic (40%)**
- » **Course evaluation with comments (10%)**

## Challenges

- » **Student evaluation**
- » **Time for student discussion with lecturers and each other**

# “Nature, Science and Man”



## NSM I Lectures, 1972

- » “Birth & Ageing of the Material Universe” & “Alternatives to Earth” (A.H. Bridle, Queen’s)
- » “The Earth & Its Evolution” & “The Changing Crust of the Earth” (A.W. Joliffe and R.A. Price, Queen’s)
- » “The Nature of Soil” (G.K. Rutherford, Queen’s)
- » “The Atmosphere and Climatology” (H. McCaughey, Queen’s)
- » “The Oceans” & “An Outline of Marine Chemistry” (G.A. Bartlett and W.G. Breck, Queen’s)
- » “Chemical & Energy Balances in Nature” (D.H. Bone, Queen’s)
- » “Origin & Evolution of Life”, “Ecosystems”, & “Evolution of Man”



# **“Nature, Science and Man”**



## **NSM I Lectures 1972 (Continued)**

- » **“An Historian on the Idea of Progress” (J.A. Leith, Queen’s)**
- » **“Man Today” (R.H. Clark)**
- » **“Man’s Dependence on Energy”, “Prospects for New energy Sources” & “The Industrial Materials of Man” (C. Lafkas, Queen’s)**
- » **“Water as a Resource” (T.R. Warriner, Queen’s)**
- » **“Food for Man” (R.H. Clark)**
- » **“The Psychology of Human Relationships” & “Development of Attitudes and Beliefs” (P. Platenius and J.W. Berry, Queen’s)**
- » **“The Society of Man” & “Cohesion and Conflict” (M.P. Maxwell and L. Karchmar, Queen’s)**

# “Nature, Science and Man”



## NSM I Lectures 1972 (Continued)

- » “Man and his Laws” (G. Alexandrowicz, Queen’s)
- » “Man and Economics” (R.G. Lipsey, Queen’s)
- » Two sessions of student papers on “The Environment Today”
- » “Man and his Health” (R. Steele, Queen’s)
- » “Man and Politics (J. Meisel, Queen’s)
- » “Science and Man” (A.T. Stewart, Queen’s)
- » “Technology and Man” (W.G. Richardson, Queen’s)
- » “Biblical Man: Nature’s Servant-King” (M.K. Schumaker, Queen’s)
- » “Human Experience” (J.J. Russell, Queen’s)

# “Nature, Science and Man”



## NSM II Lectures 1973

### A) Environmental Futures

- “The Writers Prophecy” (W.B. Thorne, Queen’s)
- “Technological Forecasting” (R.J. Uffen, Queen’s)
- “The Forrester [*Limits to Growth*] Model” (C. Lafkas, Queen’s)
- “The Case for Inherent Stability” (K.G. Palda, Queen’s)
- Panel Discussion

# **“Nature, Science and Man”**



## **NSM II Lectures 1973**

### **B) The Urban Environment**

- **“The City” (J. Holmes, Queen’s)**
- **“The Development of Toronto” (M.B.M. Lawson, Planning Consultant, Toronto)**
- **“The Urban Planning Process” (E.W. Thrift, Queen’s)**
- **“Current Plans for Toronto” (G.K. Bain; Director, Local Planning Policy Branch, Ministry of Treasury, Economics and Intergovernmental Affairs, Ontario)**
- **“Visions of an Ideal City” (H.S.M. Carver; Fmr Advisory Group Chair, CMHC, Ottawa)**

# **“Nature, Science and Man”**



## **NSM II Lectures 1973**

### **C) Oil from the North**

- **“Arctic Gas & Oil: Need, Supplies and Current Industrial Activity” (G.A. Beven; Gen Mgr, Corporate Planning Dept, Shell Canada)**
- **“Arctic Gas & Oil: An Alternative Viewpoint” (K. North, Prof of Geology, Carleton)**
- **“Modes of Transport” (C.E. Law, Queen’s)**
- **Ecological Aspects” (P. Cooke, Queen’s)**
- **Panel Discussion (C.E. Law, F. Cooke, J.W. Berry, N. Orvik)**

# **“Nature, Science and Man”**



## **NSM II Lectures 1973**

### **D) DDT: A “Miracle Chemical”**

- **“The Nature and Effects of Insecticides” (W. Steele, Queen’s)**
- **“Current Status” (A.S. West, Queen’s)**
- **“An Industrial Viewpoint” (J. Bennett, Fisons Canada Ltd, Toronto)**
- **“An Environmentalist’s Viewpoint” (A. Keith; Canadian Wildlife Service, Environment Canada, Ottawa)**

# **“Nature, Science and Man”**



## **NSM II Lectures 1973**

### **E) Optimal Resource Utilization: Recycling**

- **“Introduction” (R.H. Clark)**
- **Resource Recovery Seminar (a Saturday morning)**
  - **R.H. Clark**
  - **K. Bethune; Mgr, Environmental Affairs, American Can Co of Canada, Toronto**
  - **H.E. Dalton; Exec Dir, Glass Container Council of Canada Ltd, Toronto**
  - **R. Hayter; Dir, Plastics Industry Council, Toronto**
  - **F. Kreyer; Pres, F. Kreyer and Associates (Paper Brokers)**

# “Nature, Science and Man”



## NSM II Lectures 1973

### F) International Co-operation: The Stockholm Conference

- “Initiation and Organization” (Students)
- “Proceedings and Results” (J. Maskell, Freelance Writer & Reporter, Kingston)
- Film: “Who Owns the Sea?”
- “An Environmentalist’s Viewpoint” (L.A. Rogier; Dept of Zoology, U of Toronto)
- “An Industrial Viewpoint” (L. Renzoni; Vice-Pres, INCO, Toronto)
- “A Government Viewpoint” (T.C. Bacon; External Affairs,



# “Nature, Science and Man”



## Popular Courses

**1971-2 39 students (all AppSci)**

**1972-3 120 students (all AppSci)**

**1973-4 about 200 students**

**1974-5 NSM I: 224 students (124 AppSci, 86 ArtSci, 14 Other Faculties)**

**NSM II: 223 students (123 AppSci, 87 ArtSci, 13 Other Faculties)**

**1975-6 NSM I: 341 students (146 AppSci, 137 ArtSci, 37 Commerce, 21 Other)**

**NSM II: 377 students (144 AppSci, 163 ArtSci, 55 Commerce, 15 Other)**

# “Nature, Science and Man”



## Decline and Fall

**1976-7 Faculty capped enrollment at approx. 120 upper-year students.**

**NSM I: 118 students (72 AppSci, 39 ArtSci, 6 Commerce, 1 Other)**

**NSM II: 140 students (68 AppSci, 66 ArtSci, 5 Commerce, 1 Other)**

**1977-8 NSM II dropped in favour of full-year NSM. NSM I still offered.**

**1978-1986 NSM I dropped in '78. Funding for NSM by Applied Science declined (= no printed notes, no taping, no course assistant). Enrollment declined. NSM disappeared from the**

# R.H. Clark



**A visionary ahead  
of his time...**

**“Man is now beset with problems of his own making. ... The decisions which need to be made can only arise from a logical analysis of the problems by men and women from all disciplines and nations. ... It would seem to be self-evident that reliance must continue to be placed on specialists and their education must be pursued. But it is equally certain that specialists must be made aware of the work of other disciplines, that communication between disciplines be increased and that ‘friction’ between specialists be eliminated.” [R.H. Clark to NSM class, 1972]**

**“[NSM] should become a core course for all faculties. It is certainly the only course that I have taken in my three years here that I can really get excited about. This is what education is all about—a thinking process rather than a memorizing process. ... I found that I could not leave a lecture without some new ideas to think over.” [NSM student, 1971]**

# For More Information



**Queen's Archives has collections of NSM Course Notes and Annual Reports to the Principal and/or Dean of Applied Science.**

**Queen's Archives also has a collection of the videotapes of NSM classes (on U-Matic cassettes). The Queen's Archivist would like to have those cassettes digitized for posting on the Web, if the necessary funding can be obtained.**