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JOHANNESBURG OR GROUP

News and Views

January, 1969

(Your news and views will be welcomed and published)

NEXT MEETING

Chairman: Mr. M. C. F. King

Speaker: Mr. Rex Border

After graduation with a BSc Honours in Mathematics, Mr. Border spent six years with IBM. When he left IBM it was to become a partner in Service Bureaux Scientific Applications. He is currently managing a new company, the Computer Applications Bureau, which specializes in computer information for business management.

Subject: "Linear Programming Applications"

The application of L. P. to a Brewery problem will be described. The problem involves the allocation of loads to vehicles and the planning of their routes.

Date: January 15th

Time: 8 p. m. - 9.30 p. m.

Venue: Room G101, 1st Floor, North Wing,
Mining and Geology Block,
Witwatersrand University.

Agenda:

1. Chairman's Welcome
2. Report from SIG leaders
3. "Linear Programming"
4. Questions
5. Matters of Special Interest
6. Tea and Talk

Next Meeting + 1

The February meeting will be interactive. That is, a real problem currently being tackled at African Wire Ropes, will be presented to a panel of four, who will be required to arrive at a solution in front of the meeting.

The procedure will be:

- a. A description of the problem will be circulated to all members of the OR Group, well before the meeting (including the panel of four).
- b. The members of the panel will not be allowed to discuss the problem with each other, but will be encouraged to ask questions of A. W. R. (Mr. King).
- c. At the interactive meeting a chairman will preside, while the panel put their views to each other and to the meeting, and attempt to arrive at a solution.

Chairman: Dr. Sichel

Panel: Mr. Cohen
Mr. Rozwadowski
Dr. Rudolph
Dr. Ryder

Date: February 19

Time: 8 p. m.

Last Meeting

About 30 people heard a talk on SIMON, a Fortran simulation language, given by Mr. Aubrey Cohen.

SIG Activities

The purpose of the Special Interest Groups is to help people to work together in depth, independently of our monthly meetings, on their special interests or problems. If you are interested in any of the activities outlined below, please contact the SIG leader. If you would like to lead a group in an activity not yet catered for, please inform any member of the committee.

<u>Cybernetics:</u>	Mr. Mike Roberts	(838-3581)
<u>Dynamic Programming:</u>	Mr. Tom Rozwadowski	(706-1373)
<u>Econometric Models:</u>	Mr. John Joslin	(836-8321)
<u>Forecasting:</u>	Dr. John Ryder	(838-3581)
<u>Simulation:</u>	Mr. Gert van der Veen	(713-4201)
<u>Statistical Quality Control:</u>	Dr. Sichel	(724-8172)
<u>OR in the Construction Industry:</u>	Mr. V. Shaw	(74-6011)

Current Events

Nato APOR Symposium,
'Cost Benefit Analysis',
Hague, 7 - 11 July 1969
Applications before 29th February.

British OR Society Annual Conference 1969,
Grand Hotel, Eastbourne.
16 - 18 November 1969.

The UK Automation Council will hold the following conferences:

Computer Science and Technology,
30 June - 3 July,
Manchester.

Industrial Application of Dynamic Modelling,
Durham,
16 - 18 September.

International Cybernetics Congress,
London,
1 - 5 September

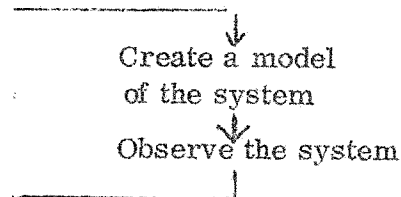
Views

(The views published are no necessary supported by the OR Group)

Scientific

The word 'scientific' is frequently used and abused in today's industry. I have written down some thoughts in an effort to understand its use.

In any of the sciences, research and discovery takes the form of a continuing repetition:



I would only call a process of investigation or control, scientific, if it included both these activities. There are some interesting differences between pure science 'scientific' and industrial 'scientific'.

1. Pure Science: A model is created to describe an already existing system (e.g. a nucleus). The model should predict behaviour under different conditions and the observed behaviour of the system should not contradict this prediction.

Thus, experiments are performed a). to check the validity of the model, b.) to measure the constants of the model e. g. charge, mass, spin etc.

Broad generalities are useless. The model must be in sufficient detail to unambiguously imply patterns of behaviour in the significant parameters of the system.

The experiments are carefully planned i. e.

- a.) chance is taken into account via probability and statistical theory.
- b.) The boundary conditions of the experimental set-up are defined and controlled.
- c.) The instruments used are critically examined for their effect.

Here are some extracts that emphasise the two activities of science, model building and observation.

"The experimental method is the recognised and accepted means of scientific enquiry" (Richtmeyer, Kennard & Lauritsen).

"The purpose of science is to facilitate the prediction and control of experience by providing propositions and formulae which express in the most economical way, the relationship between observable objects and events" (Ramsperger).

"(1) Scientific Technique facilitates the analysis of a situation into characters or elements that are more abstract than those ordinarily observed.

(2) The relationships between these elements are expressed in a scientific language whose terms can be defined with precision.

'An elephant slides down a grassy hillside' becomes 'A mass of two tons moves down a plane inclined at 60 degrees and having a coefficient of friction of 0.8.' (Ramsperger).

"Science is knowledge ascertained by observation and experiment; critically tested, systematised and brought under general principles." (A dictionary).

2. Industry:

For the nucleus for example, the system exists. The purpose is to describe it, not to design it. In industry the physical system could actually be changed, to conform to the model. Therefore building a model consists of describing those parts of the system which already exist and are taken as unchangeable (a), as well as designing and describing those parts of the system which will be created (b). e. g. (a) product structure, method of construction.

(b) stock control rules, scheduling rules.

However, for both industry and the nucleus, the model should predict the behaviour of the system in some detail with respect to the significant parameters (average stock, service level to customer).

A stock control model might consist of the one statement: 'Keep two weeks stock', but this model is not sufficiently defined or detailed to be able to predict any feature of the stock system.

The predicted behaviour must be plotted out and examined. For the nucleus this enables us to decide which model best describes the given system. For a factory, it shows us which model will lead to the creation of the best system.

Observation, in a factory, consists of measuring and describing the already existing parts (routing, components, order distribution, costs, flow rates). But how can the effects of a new system be observed. A scientific approach would insist that a new model cannot be relied on until it has been tested by observation and experiment. In the case of the nucleus, the system itself (the nucleus) would be subjected to experiment. Since it is too costly to experiment on the factory, experiments are made on the model.

Thus I conclude that SIMULATION is a major feature of a SCIENTIFIC approach, and that both the MODEL and the MEASUREMENT must be MANIFEST.

M. C. F. KING.

National Co-ordinating Committee

Dr. Sichel	724-8172
Mr. Pirow	836-1166
Mr. Joslin	836-8321
Dr. Mendelowitz	
Dr. Rudolph	
Professor Jacobsz	
Professor Venter	
Mr. du Plessis	

Johannesburg Operations Research Group Committee

Mr. R. T. Rozwadowski	(Chairman)	706-1373
Dr. J. A. Ryder	(Vice Chairman)	838-3581
Mr. M. C. F. King	(Honorary Secretary)	25-2124
Mr. D. Masterson	(Honorary Treasurer)	23-6547
Mr. M. P. Roberts		838-3581
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