OPERATIONS RESEARCH SOCIETY OF SOUTH AFRICA
OPERASIONELE NAVORSINGSVERENIGING VAN SUID-AFRIKA

P.O. Box :
Posbus :   3982

BULLETIN

OKTOBER 1970

NUUS VAN DIE PRETORIA-TAK

Vorige Vergadering:

Dr. Hartley van die Universiteit van Manchester "Institute of Science and Technology" het tydens sy onlangse besoek aan Suid-Afrika die tak toegespreek oor die algemene filosofie van hulle spesiale rekenaar apparatuur en sy toepassing op simulasie probleme. 'n Opsomming van die lesing sal in die volgende bulletin verskyn.

Volgende Vergadering:

Tyd:	8 nm.
Datum:	28 Oktober 1970
Lokaal:	Kamer 306,
	Wiskundegebou (Regoor die Aula)
	Universiteit van Pretoria.
Spreker:	Mnr. N.J. Breytenbach
Onderwerp:	Toepassings van Totale Unimodilariteit in
	Heeltallige Programmering.

Nic Breytenbach het gestudeer aan die Universiteit van Pretoria en na verwerwing van sy Magistergraad in Wiskunde sit hy sy studies voort in die V.S.A. en verwerf 'n M.S. te Stanford en 'n M.Eng. te Berkeley. Hy is tans Senior Lektor in die Departement Wiskundige Statistiek van UNISA waar hy mede-verantwoordelik is vir die nagraadse opleiding in Operasionele Navorsing.

OPERATIONS   RESEARCH   SOCIETY   OF   SOUTH   AFRICA
OPERASIONELE   NAVORSINGSVERENIGING   VAN   SUID-AFRIKA

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OPERASIONELE NAVORSINGSVERENIGING VAN SUID-AFRIKA

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K.   Wilson
K.   Zoller

ANNUAL GENERAL MEETING

The Annual General Meeting of O.R.S.S.A.
will be held at ISCOR on 20th November,
1970. It will take place in the after-
noon, after the panel discussion.

The committee hereby calls for nominat-
ions of members to serve on the new
national executive.

Our Vice President for 1970 automatically
become the new President. The members
of the executive to be elected are : -

      Vice President
      Secretary
      Treasurer
      Editor
      Member
      Member.

Both full and associate members have the
right to vote, but only full members may
be nominated. Members are entitled to
appoint a proxy who shall vote on their
behalf at the AGM.

Nominations shall be in writing and shall
state the name of the nominee and the
position for which he is nominated.

Nominations shall be signed by the nominee
and by a proposer and seconder, and must
be lodged with the secretary at least
fourteen days before the Annual General
Meeting.

The members of the retiring executive are :

      President   : Dr. H.S. Sichel

      Vice-President : Mnr. Jos Grobbelaar

      Secretary   : Mr. J. Joslin

      Treasurer   : Mr. D. Masterson

      Editor   : Mr. M. King

      Member   : Professor Rudolph

      Member   : Professor Troskie

ALGEMENE JAARVERGADERING

Die Algemene Jaarvergadering van ONSA sal
gehou word te ISCOR op 20 November, 1970.
Dit sal die middag na die paneelbespreking
plaasvind.

Die komitee vra hiermee nominasies vir lede
om op die nasionale uitvoererde komitee vir
volgende jaar to dien.

Die vise-president van vanjaar word outomaties
die nuwe president vir die volgende jaar.
Die lede van die uitvoerende komitee wat ge-
kies moet word is : -

    Vise President
    Sekretaris
    Tesourier
    Redakteur
    Lid
    Lid

Beide volle- en geassosieerde lede het
stemreg maar slegs volle lede kan genomineer
word.

Lede wat nie teenwoordig kan wees nie kan 'n
persoon aanwys om vir hulle to stem op die
AJV.

Nominasies moet op skrif ingehandig word en
moet die naam van die genomineerde asook
die posisie waarvoor genomineer, bevat.

Nominasies moet onderteken woord deur die
voorsteller en die sekondant en moet die
sekretaris minstens veertien dae voor die
AJV bereik.

Die uittredende lede is : -

    President   : Dr. H.S. Sichel

    Vise-President : Mnr. Jos Grobbelaar

    Sekretaris   : Mnr. J. Joslin

    Tesourier   : Mnr. D. Masterson

    Redakteur   : Mnr. M. King

    Lid   : Professor Rudolph

    Lid   : Professor Troskie

COMPUTER APPLICATIONS IN THE MINERAL INDUSTRY

The 10th International Symposium on Computer Application in the Mineral Industry will be held in Johannesburg during April - May 1972. This is the first time that one of these symposia will be held outside the North American continent and is a tribute to workers from South Africa who have done a great deal in advancing knowledge in this field.

The field of mathematics, statistics, operations research as well as computer methods as applied to model building for decision - making purposes in the areas of exploration, project appraisal, financial analysis, production planning and control, mine planning and strata control, processing and marketing will be covered. Emphasis will be on practical applications rather than on general theory and the sessions, which will extend over one week, will provide ample opportunity for discussion in depth.

Enquiries should be directed to the South African Institute of Mining and Metallurgy.

NEWS FROM THE JOHANNESBURG CHAPTER

Last Meeting

Mr. B. James, presently head of the O.R. division of M.I.T.A.C., gave a very up to date presentation of the latest techniques used in Critical Path Planning Methods. The use of concepts like "target date", "transient times", "order and delivery activity" was explained and discussed. The difficulties encountered in the scheduling of physical and financial resources were pointed out and various practical techniques were illustrated. Advantages and disadvantages of the so-called "precedence" network were also discussed. The participation of the public was lively. The lecture will be published in a future bulletin.

Next Meeting

Date	21st October, 1970
Venue	University of the Witwatersrand Geology Building, Room G201
Time	5.30 p.m. for 5.45 p.m.
Speaker	Mr. R. Hittos
Subject	Simulation of a Message Handling Computer System

Please note the change in time. Tea will be served at 5.30 p.m. in the foyer of the Geology Building.

OPERATIONS RESEARCH SOCIETY OF SOUTH AFRICA
OPERASIONELE NAVORSINGSVERENIGING VAN SUID-AFRIKA

NEWS FROM THE JOHANNESBURG CHAPTER
(continued)

SIMULATION OF A REAL-TIME COMPUTER SYSTEM

ISCOR has during the past years developed a real-time computer
system which at present performs on-line data capturing
        and reporting for a portion of their Vanderbijlpark
steelworks. A simulation model of the software-hardware system
has been developed for planning purposes. The method of
simulation and some problems encountered will be discussed.

Mr. Robin Hittos has been working in the Data Processing Division
at ISCOR since 1966. He has been involved in systems software
design and maintenance and is presently responsible for the
provision of computer equipment to keep abreast of ISCOR data
processing requirments.

Prior to this he was a lecturer in the department of physics
at the University of the Witwatersrand.

ONSA/ORSSA 1970

At the 1970 conference you can listen to speakers from Cape Town,
Durban, Pretoria, Johannesburg and Potchefstroom as well as
Zambia, the U.S.A. and the United Kingdom.

It will be a good opportunity to keep informed of the state of
the science. Send your registration form to :

    J.W. Grobbelaar,
    Box 392,
    PRETORIA

Gedurende die konferensie van 1970 sal sprekers van Kaapstad,
Durban, Pretoria, Johannesburg en Potchefstroom asook Zambie, die
V.S.A. en Engeland optree.

Die konferensie bied dus goeie moontlikhede om op hoogte to kom
met verwikkelinge op die gebied. Stuur u registrasievorms aan :

    J.W. Grobbelaar,
    Bus 392,
    PRETORIA.

GUEST SPEAKER

Brian M. Reich, who is Associate Professor of Civil Engineering at
Pensylvania State University, has accepted an invitation to address
the conference. His subject will be :

'The Systems Analyst and the Water Engineer' He will describe
problems which would be a challenge to OR or Mathematical skills.

OPERATIONS RESEARCH SOCIETY OF SOUTH AFRICA
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GUEST SPEAKER
(continued)

Professor Reich, who is presenting a paper at the water year conference, has 25 publication in Water Research to his credit.

CONFERENCE FEES

Members : - R3.50 per person

Non Members : R5.00 per person

BUT

If you register before 31st October, 1970, the fees reduce to : -

Members : - R2.50 per person

Non Members : R4.00 per person

NOTE also that if we overflow the available space for lunch at fountains, the early registrations will be allocated seats. Arrangements will be made to cater for the overflow,

SPEAKERS

Dr. G.J. Rudolph of the Post Office will speak on 'Optimal Mail Sorting Policy'

Dr. R.P. King of Natal University will speak on 'Statistical Description and Optimal Control of a Finite Dam with Physically Realistic Inputs'.

Dr. J.D. Roode and Dr. L. Raubenheimer of AEB will present a paper : Plant Location and Long Term Planning.

Mr. Heuberger of ICL will discuss Train Scheduling - a development of ideas presented at a Johannesburg OR interactive meeting during 1969

The following are summaries of two of the Contributed Papers.

A SIMULATION MODEL OF A COPPER SMELTER

By: A.J. Davies. M.A.

The Smelter at the Rokana Division of Nchanga Consolidated Copper Mines Limited in Zambia consists essentially of three sequential batch processes - smelting, converting and anode furnacing. The transfer of molten material between processes is achieved by four cranes operating on the same gantry.

In 1968, as part of a long term scheme to increase Smelter production, it was planned to install additional furnaces. The OR Department was asked to advise on the possible provision of a fifth gantry crane to cope with the increased throughput.

Due to the complex interactions between processes and equipment, a simulation model was developed, one of the features being the fine detail in which crane activity was modelled. Results from the model showed that throughput was ultimately limited by the availability of, and interference between cranes, the increased congestion resulting from the use of an additional crane nullified its own benefit. Also the full potential of additional furnaces would not be realisable with the difficulties of material handling.

During the last two years the model has been used by Smelter management as part of the normal process of evaluating possible changes to plant or practice.

A.J. Davies,
Assistant Head of Operational Research,
Centralised Services Division,
Nchanga Consolidated Copper Mines Ltd.,
P.O. Box 172,
Kitwe,
Zambia.

O. R. S. S. A. National Conference – Submission of Paper

Title: A Model for Forecasting by International Comparison

Authors: J. R. LEE, A.E. and C.I. Limited, P. O. Box 1122,
           Johannesburg.

           D. B. VAN GINKEL, School of Business Leadership,
           University of South Africa, P. O. Box 392, Pretoria.
           (Formerly of A. E. and C. I. Limited)

Summary: In an attempt to reduce the dangers inherent in the
extrapolation of some function fitted to a single historical
time series (often of limited length), a model has been developed
whereby a "universal curve" is fitted to the comparable historical time series for a number of different countries.

          A linear relationship is assumed between the annual
percentage growth rate and some transformation of the actual
value of the variable to be forecast. This results in a
differential equation whose solution yields a relationship between the forecast variable and the time. The form of this
relationship is determined by the transformation used in the
previous stage. Those used by the authors lead to the Logistic
Gomperty or Modified Exponential functions.

          The assumption of linearity enables the determination of the parameters of the universal by a simple least
squares fitting procedure using the pooled historical data for
all the countries, since the time factor does not appear explicitly in this relationship. The "time displacement" of each
country's data is determined separately.

          The model incorporates a test of conformity of each
individual country's data to the universal growth pattern.

          An example of the application of the model is presented and its advantages and limitations are discussed.

what: o.r. 1970 s.a.

when: 20-21st november 1970.

where: iscor headquarters pretoria —

pleasant surroundings, restful,
smogfree — luxurious aircondi-
tioned lecture hall — transport
arranged from hotels.

what else: lunch with pretoria city council
— fountains pleasure resort.
cocktail — * * * boulevard hotel.

*   *   *

:

wat: o.n. 1970 s.a.

wanneer: 20-21 november 1970.

waar: yskor hoofkwartier pretoria —

landelik, rustig, rookvry —
luukse lugverkoelde lesingsaal
— vervoer gereël vanaf hotelle.

wat nog: onthaal deur pretoria stads-
raad — fonteine plesieroord.
skemerkelk — * * * boulevard hotel

registrasievorm — registration form

naam/name ....

adres/address ....

sodat referate en   in order that papers
verdere stukke u   and other correspondence
betyds bereik   reach you promptly.

gaan u die skemerkelkparty bywoon?/will you attend the cocktail party?

....

bring u, u metgesel saam?/will you be accompanied?

....

stuur asseblief hierdie vorm vergesel van u kongresfooie in die ingeslote koevert
voor 31 oktober.
please return this form accompanied by your confrence fees in the enclosed envelope
before october 31st.
fooie indien betaal voor 31 oktober:/fees when paid before october 31st:
r2.50 vir lede/for members — r4.00 vir nie-lede/for non-members.
tjeks betaalbaa   an: oprasionele navorsingsvereniging van s.a.
cheques payable to: operations research society of s.a.
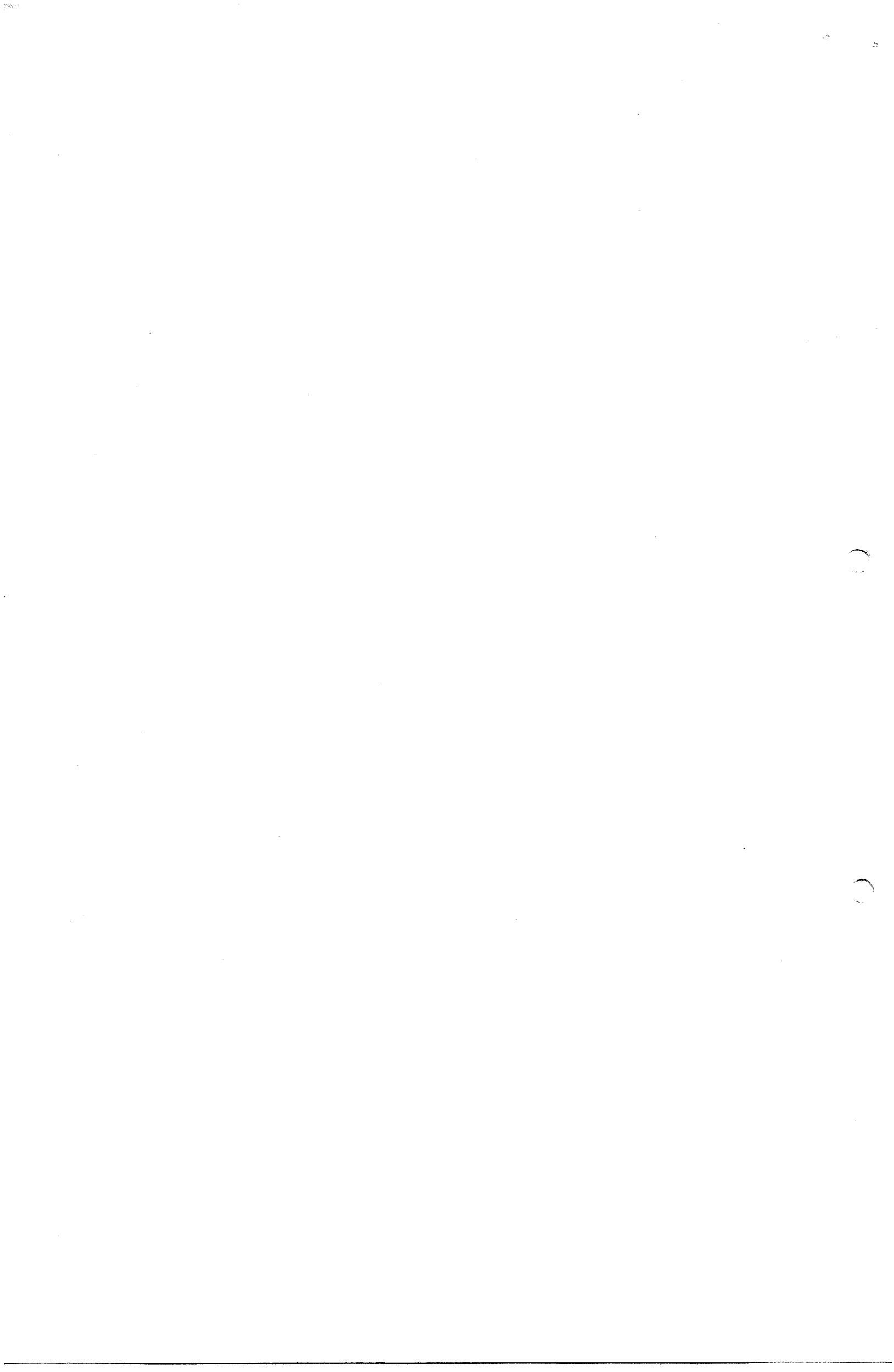
guest speakers

(1) **h. i. d. du plessis** is assistant manager: planning of sanlam. he will address the conference on the development of a general planning model of sanlam, showing how short term projects are selected and solved with their contributions to this model always in mind.

(2) **j. c. engelbrecht** is head of operations research at iscor. he will talk on operations research in a steel works. the location in the organization with some applications will be discussed.

(3) **j. m. hattingh** is senior lecturer in the department of statistics at the university of potchefstroom. the title of his paper is linear- and quadratic programming algorithms.

(4) **g.g. stephenson** is group manager of market research and long term planning in heavy organic chemicals, a division of i.c.i. in the u.k. the subject of his address will be a hierarchy of models developed for planning in a division of i.c.i.

(5) there is a distinct possibility that an overseas speaker attending the international wateryear conference in pretoria will be able to address our society on november 20th on operations research in this connotation.

gassprekers

(1) **h. i. d. du plessis** is assistent-bestuurder: beplanning van sanlam. hy sal die kongres toespreek oor die ontwikkeling van 'n algemene model vir die beplanning van sanlam. daar sal gewys word hoe korttermyn projekte gekies en opgelos word met hulle bydrae tot hierdie model altyd in gedagte.

(2) **j. c. engelbrecht** is hoof van operasionele navorsing te yskor. hy sal praat oor operasionele navorsing in 'n staalwerke. die plasing in die organisasie en enkele toepassings sal toegelig word.

(3) **j. m. hattingh** is senior lektor in die departement statistiek van die potchefstroomse universiteit. die titel van sy referaat is lineêre en kwadratiese programmerings-algoritmes.

(4) **g. g. stephenson** is "group manager" van "market research and long term planning" in "heavy organic chemicals", 'n afdeling van i.c.i. in die v.k. die onderwerp van sy lesing is 'n hiërargie van modelle ontwikkel vir beplanning in 'n afdeling van i.c.i.

(5) daar is 'n besliste moontlikheid dat 'n oorsese spreker wat die internasionale waterjaarkongres in pretoria sal bywoon ons vereniging op 20 november sal toespreek oor operasionele navorsing in hierdie verband.
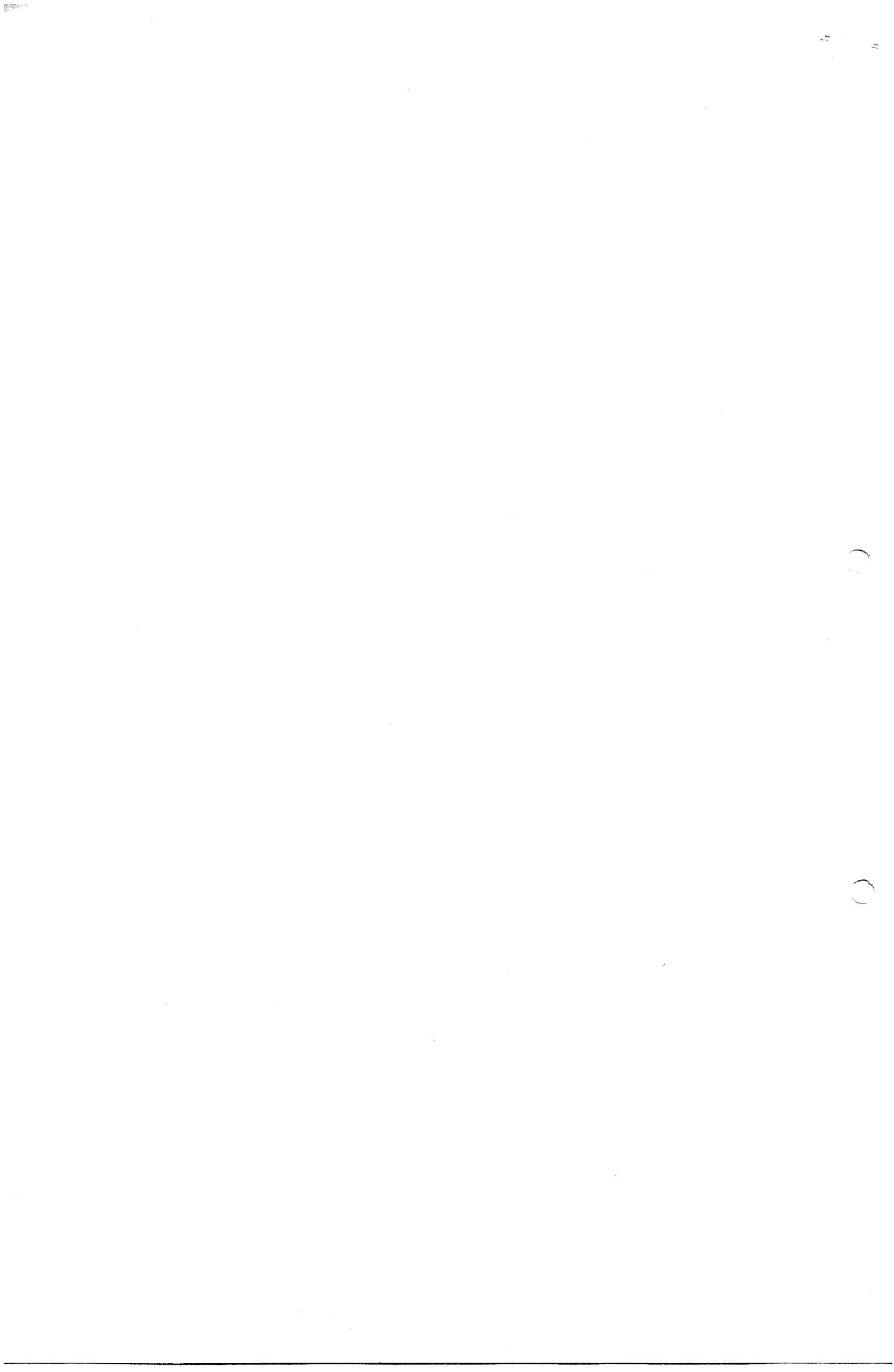
SANLAM
LEWENSVERSEKERING

HOOFKANTOOR

| SANLAMHOF, BELLVILLE | POSADRES: | TELEGRAMADRES: |
| TELEFOON: 97-1311 | POSBUS 1, SANLAMHOF, K.P. | SANLAM, BELLVILLE |

MELD ASB. IN U ANTWOORD: 1/HIDduP/CSS

Mnr. H. I. D. Du Plessis.

29 Junie 1970

Mnr. J. Grobbelaar
Departement Wiskundige Statistiek
Unisa
Posbus 392
PRETORIA, Tvl.

Beste Jos,

Baie dankie vir die uitnodiging om as gasspreker by die O.N.-kongres
in November op te tree.

Vir die voortbestaan van O.N. en die operasionele navorser is dit
uiters belangrik dat ons 'n wesentlike bydrae moet maak op die gebied
van langtermynbeplanning. Om dié rede (en omdat dit so 'n dringende
probleem is) doen ons baie werk op dié gebied hier by Sanlam. In
hierdie projek volg ek die volgende benadering:

(a) Indien 'n mens O.N. in langtermynbeplanning wil gebruik, is dit
in die eerste plek belangrik dat daar struktuur gegee moet
word aan die hele beplanningsproses. Hieraan gee ek voort=
durend aandag.

(b) Die belangrikste bydrae wat O.N. op die gebied van beplanning
kan maak, is die ontwikkeling van 'n ondernemingsmodel. Hierdie
probleem benader ek uit twee gesigspunte. Aan die een kant is
ons besig om 'n baie algemene en oorsigtelike model vir Sanlam
te ontwikkel. Hierdie is natuurlik 'n langtermyn projek. Aan
die anderkant kies ons uit al die baie korttermyn probleme,
waaraan ons kan werk, daardie wat 'n bydrae kan maak tot die
ontwikkeling van die algemene model. Met ander woorde, die
werk aan die algemene model lei ons in ons keuse van kleiner,
meer gespesialiseerde probleme en die oplossing van laasgenoemde
help weer in die ontwikkeling van die algemene model.

Ek sou graag oor bogenoemde aspekte van ons werk by die kongres wil
praat. In so 'n lesing sal ek onder andere die algemene model in
breë trekke wil bespreek en 'n paar van die kleiner probleme wat
alreeds aangepak is, in meer detail wil bespreek. Die versekerings=
wese sal natuurlik die heel tyd op die voorgrond wees in so 'n lesing.