

S. A. Merdell
PLEASE RETURN

C. S. I. R.
W. N. N. R.

1960-61

SIXTEENTH ANNUAL REPORT

SESTIENDE JAARVERSLAG

South African Council for Scientific and Industrial Research
Suid-Afrikaanse Wetenskaplike en Nywerheidsnavorsingsraad

JAARVERSLAE VAN W.N.N.R. - LABORATORIUMS

Uitvoerige verslae vir die jaar 1960/61 oor die werksaamhede van onderstaande W.N.N.R.-laboratoriums en die S.A.B.S. kan op versoek verkry word:

Die Suid-Afrikaanse Buro vir Standaarde.
Die Nasionale Chemiese Navorsingslaboratorium.
Die Nasionale Fisiese Navorsingslaboratorium.
Die Nasionale Bounavorsingsinstituut.
Die Nasionale Instituut vir Personeelnavorsing.
Die Nasionale Instituut vir Telekommunikasienavorsing.
Die Nasionale Voedingnavorsingsinstituut.
Die Nasionale Navorsingsinstituut vir Meganiese Ingenieurswese.
Die Nasionale Padnavorsingsinstituut.
Die Nasionale Instituut vir Waternavorsing.

Bogenoemde verslae kan op versoek verkry word van:

**Die Sirkulasiebestuurder
Inligtingsafdeling
W.N.N.R.
Posbus 395
PRETORIA
Suid-Afrika**

Uitgegee in 1961 deur die
Suid-Afrikaanse
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Paul Krugerstraat 67
PRETORIA

ANNUAL REPORTS OF C.S.I.R. LABORATORIES

Detailed reports for the year 1960/61 on the activities of the following C.S.I.R. laboratories and the South African Bureau of Standards are available on request:

The South African Bureau of Standards.
The National Chemical Research Laboratory.
The National Physical Research Laboratory.
The National Building Research Institute
The National Institute for Personnel Research.
The National Institute for Telecommunications Research.
The National Nutrition Research Institute.
The National Mechanical Engineering Research Institute.
The National Institute for Road Research.
The National Institute for Water Research.

The above reports are available on request from:

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67 Paul Kruger Street
PRETORIA

P.O. Box 395
PRETORIA
1st April 1961

Sir,

I have pleasure in presenting to you the Sixteenth Annual Report of the Council for Scientific and Industrial Research. This report covers the period from the 1st April, 1960, to the 31st March, 1961, which coincides with the end of the Council's financial year.

Balance sheets and statements of income and expenditure for the financial year ended 31st March, 1961, certified by the Controller and Auditor-General, are included.

I have the honour to be,

Sir,

Your obedient servant,

S. M. NAUDÉ

PRESIDENT: COUNCIL FOR SCIENTIFIC
AND INDUSTRIAL RESEARCH

The Hon. Dr. N. Diederichs
Minister of Economic Affairs
Paul Hof
Minnaar Street
PRETORIA

Posbus 395
PRETORIA
1 April 1961

Waarde Heer,

Met genoë lē ek die Sestiende Jaarverslag van die Wetenskaplike en Nywerheidsnavorsingsraad aan u voor. Hierdie verslag dek die tydperk van 1 April 1960 tot 31 Maart 1961, wat met die einde van die Raad se boekjaar saamval.

Hierby gaan die balansstaat en die staat van inkomste en uitgawe vir die boekjaar geëindig 31 Maart 1961, deur die Kontroleur en Ouditeur-generaal gesertifiseer.

Dienswillig die uwe,

S. M. NAUDÉ

PRESIDENT: WETENSKAPLIKE EN
NYWERHEIDNAVORSINGSRAAD

Sy Edele Dr. N. Diederichs
Minister van Ekonomiese Sake
Paulhof
Minnaarstraat
PRETORIA

DIE SUID-AFRIKAANSE WETenskaplike VOLKSRaad MINISTER VAN EKONOMIESE Sake EN NYWERHEIDNAVORSINGSRAAD

PRESIDENT, W.N.N.R.

ADMINISTRATIEWE EN
TEGNIESE DIENSTE

NASIONALE NAVORSINGS-
LABORATORIUMS EN -INSTITUTE

FISIKA, CHEMIE, BOUNAVORSING, PAAIE, PER-
SONIEEL, WATER, MEGANIESE INGENIEURSWESE,
VOEDING, TELEKOMMUNIKASIES

STANDAARDISASIE

SUID-AFRIKAANSE BURO VIR STANDAARDE

NYWERHEIDNAVORSINGS-
INSTITUTE

LEER, VIS, WOLTEKSTIEL, VERF, SUIKERFABRIKASIE

MEDIESE EN TANDHEELKUNDIGE
NAVORSING

Amebiase, Bilharzia, Nar-kosesterigevalle, Pneumokoniöse,
Virussiektes deur artropode oorgedra, Kardiopulmonale
siektes, Kardiovaskulêre pulmonale siektes, Kliniese
voeding, Degenerasiesiektetoestande, Veroudering, Tand-
heelkunde, Voeding, en Tandheelkunde, Endo-
krien, Hartnavorsing, Tering, Menslike Biochemie, Sonlig-
reakties van die vel, Biologiese uitwerking van ioniserings-
bestraling.

INLICHTING EN SPESIALE DIENSTE

BIBLIOTEEK

INLICHTING

WETenskaplike SAMEWERKING

NAVORSINGSTOEKENNINGS

ONTWIKKELING VAN NYWERHEIDNAVORSING

ONTWIKKELING VAN UITVINDINGS

BEDRYFSEKONOMIE

PROFESSIONELE LIGGAME
UNIVERSITEIT
NYWERHEID
HANDEL

ADVIESKOMITEES

STANDAARDAARAD

BEHEERAADE

KOMITEE VIR NAVORSING OP
DIE MEDIESE WETenskap

ADVIESKOMITEE

ADVIESKOMITEE VIR INTERNASIONALE
VERHOUDINGS IN DIE WETenskap

HOOFKOMITEE VIR NAVORSINGSTOE-
KENNINGS

ADVIESKOMITEE VIR ONTWIKKELING
VAN NAVORSING VIR NYWERHEID

ADVIESKOMITEE VIR ONTWIKKELING
VAN UITVINDINGS

ADVIESKOMITEE VIR BEDRYFSEKONO-
MIE

Nasionale navorsingsprogramme
Nywerheidondersteunde projekte (Kontrakte, beurse en
eenhede)

Spesifikasies
Gebruikskodes
S.A.B.S.-merkteets

Outonome liggame ondersteun deur bydraes van nywer-
heid en W.N.N.R.

Ondersteun deur W.N.N.R. en ander belanghebbende
liggame

Nasionale wetenskaplike bibliotek vir
Suid-Afrika

Redaksie, vertaling en reklame

Lidmaatskap van internasionale wetenskaporganisasies
Wetenskapsakekantore in buiteland

Senior en studentbeurse, assistentskappe en toekennings
vir nagrade navorsing aan universiteite, museums, ens.

Ontwikkeling van ko-operatiewe nywerheidnavorsings-
projekte, -eenhede, -institute

Patente, tantieme, ooreenkomste

Bedryfsekonome ondersoek van navorsingsprojekte en
die ontwikkeling van nywerheidsnavorsing

THE SOUTH AFRICAN COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH

PARLIAMENT
MINISTER OF
ECONOMIC AFFAIRS
PRESIDENT, C.S.I.R.

ADMINISTRATIVE AND
TECHNICAL SERVICES

NATIONAL RESEARCH
LABORATORIES AND INSTITUTES

PHYSICS, CHEMISTRY, BUILDING, ROADS, WATER,
MECHANICAL ENGINEERING, NUTRITION, TELE-
COMMUNICATIONS, PERSONNEL

STANDARDIZATION

SOUTH AFRICAN BUREAU OF STANDARDS

INDUSTRIAL RESEARCH INSTITUTES

LEATHER, FISH, WOOL TEXTILES, PAINTS, SUGAR
MILLING

MEDICAL AND DENTAL RESEARCH

Anoebiasis, Bilharzia, Anaesthetic deaths, Pneumoconiosis,
Arthropod-borne virus diseases, Cardiopulmonary
diseases, Cardiovascular pulmonary diseases, Clinical
nutrition, Degenerative diseases, Dental research, Nutri-
tion and dental research, Endocrine, Cardiac, Human
biochemistry, Sunlight reactions of skin, Biological effect
of ionizing radiation, Ageing, Tuberculosis.

INFORMATION AND SPECIAL
SERVICES

LIBRARY

INFORMATION

SCIENCE CO-OPERATION

RESEARCH GRANTS

INDUSTRIAL RESEARCH DEVELOPMENT

INVENTIONS DEVELOPMENT

INDUSTRIAL ECONOMICS

National research programmes
industrially sponsored projects
(Contracts, fellowships and units)

Specifications
Codes of practice
S.A.B.S. mark testing

Autonomous bodies sponsored by contributions from
industry and C.S.I.R.

Sponsored by C.S.I.R. and other interested bodies

National scientific library for South Africa

Editorial, translations and publicity

Membership of international scientific organizations
Overseas Scientific Liaison Offices

Senior and student bursaries, assistantships and grants
for post-graduate research at universities, museums, etc.

Development of co-operative industrial research projects,
units, institutes

Patents, royalties, agreements

Industrial economic investigations i.c.w. research projects
and the development of industrial research

PROFESSIONAL BODIES
UNIVERSITIES
INDUSTRY
COMMERCE

ADVISORY COMMITTEES

STANDARDS COUNCIL

BOARDS OF CONTROL

COMMITTEE ON RESEARCH IN
MEDICAL SCIENCES

ADVISORY COMMITTEE

ADVISORY COMMITTEE ON INTER-
NATIONAL RELATIONS IN SCIENCE

MAIN RESEARCH AWARDS COMMITTEE

ADVISORY COMMITTEE ON DEVELOP-
MENT OF RESEARCH FOR INDUSTRY

ADVISORY COMMITTEE ON DEVELOP-
MENT OF INVENTIONS

INDUSTRIAL ECONOMICS ADVISORY
COMMITTEE



C. S. I. R.
W. N. N. R.

1960-61 SIXTEENTH ANNUAL REPORT

SESTIENDE JAARVERSLAG

South African Council for Scientific and Industrial Research
Suid-Afrikaanse Wetenskaplike en Nywerheidsnavorsingsraad

LEDELYS EN VERGADE- RINGS VAN DIE RAAD

Lede van die Raad op 31 Maart 1961, was:

Dr. S. M. Naudé	<i>President</i>
Dr. F. J. de Villiers	<i>Organiserende Direkteur van Nywerheidsontwikkeling, Departement van Naturellesake.</i>
Dr. P. J. du Toit	<i>Raadgewer van die President en voormalige President van die W.N.N.R.</i>
Dr. T. Alty	<i>Prinsipaal en Vise-kanselier van Rhodes-universiteit.</i>
Dr. B. Gaigher	<i>Kontroleur van In- en Uitvoer en Nywerheidsadviseur van die Departement van Handel en Nywerheid.</i>
Prof. J. Goudriaan	<i>Professor Emeritus en Hoof van die Instituut vir Bestuur en Administrasie.</i>
Mnr. F. G. Hill	<i>Tegniese Bestuurder, Rand Mines Ltd.</i>
Prof. H. O. Mönnig	<i>Besturende Direkteur, Agricura Laboratoria, Beperk, Voorsitter van die Adviserende Raad vir Wetenskaplike Beleid</i>
Prof. S. F. Oosthuizen	<i>Voorsitter, S.A. Mediese Raad.</i>
Brig. J. H. Rauch	<i>Oud-Geneesheer-generaal, Unie verdedigingsmag.</i>
Mnr. P. E. Rousseau	<i>Besturende Direkteur, S.A. Steenkool-, Olie- en Gaskorporasie, Beperk.</i>
Dr. G. C. Scully	<i>Direkteur, Union Whaling Co. Ltd., en die Dundee Coal Co. Limited.</i>
Prof. W. G. Sutton	<i>Prinsipaal, Universiteit van die Witwatersrand.</i>
Dr. H. J. van Eck	<i>Voorsitter en Besturende Direkteur, Nywerheidsontwikkelingskorporasie.</i>
Dr. R. W. Wilcocks	<i>Voorsitter van die Universiteitsadviesraad en voormalige Rektor van die Universiteit van Stellenbosch.</i>
Mnr. J. E. Worsdale	<i>Voorsitter en Besturende Direkteur, White's S.A. Portland Cement Co., Limited.</i>
Sekretaris/Tesourier.	<i>Mnr. A. J. Miller-Smit.</i>

In die onderhawige tydperk is sewe Raadsvergaderings gehou.

Ledelys en Vergaderings van die Uitvoerende Komitee
Onderstaande was op 31 Maart 1961 lede van die Komitee:

Dr. S. M. Naudé (Voorsitter)
Dr. F. J. de Villiers, Dr. P. J. du Toit (met mnr. J. E. Worsdale, prof. H. O. Mönnig, prof. S. F. Oosthuizen en prof. W.G. Sutton as plaasvervangende lede sowel vir dr. de Villiers as vir dr. du Toit).

Die Uitvoerende Komitee het ses vergaderings gehou.

MEMBERSHIP AND MEET- INGS OF THE COUNCIL

Membership of the Council on 31st March 1961, was:

Dr. S. M. Naudé	<i>President.</i>
Dr. F. J. de Villiers	<i>Organizing Director of Industrial Development, Department of Native Affairs.</i>
Dr. P. J. du Toit	<i>Adviser to the President and former President of the C.S.I.R.</i>
Dr. T. Alty	<i>Principal and Vice-Chancellor of Rhodes University.</i>
Dr. B. Gaigher	<i>Controller of Imports and Exports and Industrial Adviser to the Department of Commerce and Industries.</i>
Prof. J. Goudriaan	<i>Professor Emeritus and Head of the Institute for Management and Administration.</i>
Mr. F. G. Hill	<i>Technical Manager, Rand Mines Ltd.</i>
Prof. H. O. Mönnig	<i>Managing Director, Agricura Laboratoria, Ltd., Chairman of the Advisory Council on Scientific Policy.</i>
Prof. S. F. Oosthuizen	<i>Chairman, S.A. Medical Council.</i>
Brig. J. H. Rauch	<i>Formerly Surgeon-General, Union Defence Force.</i>
Mr. P. E. Rousseau	<i>Managing Director, S.A. Coal, Oil and Gas Corporation Ltd.</i>
Dr. G. C. Scully	<i>Director, Union Whaling Co., Ltd. and the Dundee Coal Co. Ltd.</i>
Prof. W. G. Sutton	<i>Principal, University of the Witwatersrand.</i>
Dr. H. J. van Eck	<i>Chairman and Managing Director, Industrial Development Corporation.</i>
Dr. R. W. Wilcocks	<i>Chairman of the University Advisory Council and former Rector of the University of Stellenbosch.</i>
Mr. J. E. Worsdale	<i>Chairman and Managing Director, White's S.A. Portland Cement Co., Ltd.</i>
Secretary/Treasurer	<i>Mr. A. J. Miller-Smit.</i>

During the period under review seven meetings of the Council were held.

Membership and Meetings of the Executive Committee
The membership of the Committee on 31st March, 1961, was:

Dr. S. M. Naudé (Chairman).
Dr. F. J. de Villiers, Dr. P. J. du Toit (with Mr. J. E. Worsdale, Prof. H. O. Mönnig, Prof. S. F. Oosthuizen en Prof. W. G. Sutton as floating alternates to both Drs. de Villiers and du Toit).

The Executive Committee held six meetings.

INHOUDSOPGAWE

- 2 Inleiding
- 6 Wetenskaplike en tegniese inligting
- 8 Internasionale samewerking op wetenskaplike gebied
- 18 Navorsing in die nasionale navorsingslaboratoriums en -institute
- 44 Samewerking met die nywerheid
- 52 Standaardisering
- 58 Toekennings vir navorsing aan universiteite
- 60 Mediese navorsing
- vii Bylaag I: Navorsingsbeurse en assistentskappe
- xxi Bylaag II: Finansiële state

Frontispies

Hoek van die leessaal van die W.N.N.R. se biblioteek te Scientia.

CONTENTS

- 3 Introduction
- 7 Scientific and technical information
- 9 International co-operation in science
- 21 Research in the national research laboratories and institutes
- 45 Co-operation with industry
- 53 Standardization
- 59 University research grants
- 61 Medical research
- vii Appendix I: Research bursaries and assistantships
- xxi Appendix II: Financial statements

Frontispiece

A corner of the reading room in the C.S.I.R. Library at Scientia.

ALGEMENE OORSIG

INLEIDING

In sy vorige jaarverslag het die Raad die aandag gevestig op die belangrike rol wat hy verwag word om te speel in die aanmoediging van die ontwikkeling van navorsing in die nywerheid. Daar is op gewys dat die Raad hom gedurende die eerste vyftien jaar van sy bestaan hoofsaaklik besig gehou het met die opbou van 'n organisasie om in die mees in die oog lopende behoeftes te voorsien, en dat daar reeds tekens was dat hy nou eindelik in staat is om aan die basiese vereistes te voldoen. 'n Begin is tans gemaak met 'n hersiening van alle aspekte van die Raad se beleid en werksaamhede, ten einde te verseker dat die beste gebruik van bestaande hulpbronne gemaak word, en om leemtes in die bestek van die Raad se navorsingsprogram met betrekking tot die behoeftes van die nywerheid, asook op gebiede van breëre landsbelang, te vul.

Finansies

Die finansiële beperkings waarna in die vorige verslag verwys is, is nog steeds die remskoen in die Raad se huidige taak van interne reorganisasie. Hoewel besef word dat die nuttige besteding van die bedrag vir navorsing opsy gesit, op die oomblik hoofsaaklik gestrem word deur 'n gebrek aan die nodige opgeleide personeel, het die strenge toepassing van 'n vooropgestelde beperking aanleiding tot baie werklike moeilikhede gegee.

Die noodsaak vir die ontwikkeling van navorsing in die een of ander nuwe rigting ontstaan gewoonlik as gevolg van 'n dringende behoefte, en indien sulke navorsing nie op 'n afdoende skaal aangepak kan word nie, as die Raad noodgedwonge die fondse daarvoor van 'n ander program moet afknyp of fondse moet aflei uit meer as een program of projek, het dit beslis 'n frustrerende uitwerking op die personeel. Die bande waaraan die Raad gelê is, het hom in sy werk gedwarsboom en tot die verlies van sleutelende uit navorsingspanne gelei. Derhalwe het die Raad verskillende finansiële werkwyse ondersoek in 'n poging om 'n manier te vind om die soepelheid te bewerkstellig wat onontbeerlik vir die geslaagde funksionering van 'n navorsingsliggaam is. Die opgelegde beperkings was veral misplaas vir 'n Raad wat faktore in aanmerking moet neem soos die betreklik snelle tempo van salarisverhoging van 'n jong personeel, die koste aan die betrekking van 'n nuwe perseel verbonde en die toenemende verpligtings op nuwe of ontwikkelende terreine.

Buiten en behalwe hierdie finansiële beperkings, het die geleidelike oplegging van beperkende maatreëls waarmee die administratiewe werksaamhede van 'n Staatsdiens gewoonlik gepaard gaan, daartoe gelei dat die Raad beroof is van die soepelheid wat dit die bedoeling was om hom te verleen deur hom in te stel as 'n liggaam met regs persoonlikheid buite die Staatsdiens.

GENERAL REVIEW

INTRODUCTION

In its last Annual Report, the Council drew attention to the important role it is called upon to play in stimulating the development of research in industry. It was pointed out that, for the first fifteen years of its existence, the Council had been concerned primarily with building up an organization to meet the most obvious needs and that there were indications that it is at last in a position to meet basic requirements. A start has now been made with reviewing all aspects of the Council's policy and operations, in order to ensure that existing resources are being used most effectively, and to reveal any gaps in the coverage of the Council's research programme in relation to the needs of industry, as well as in fields of broader national interest.

The financial restrictions referred to in the last report have continued to hamper the Council in its present task of internal reorganization. While it is recognized that the amount which could be spent usefully on research is at present limited mainly by the availability of the necessary trained personnel, the rigid application of a predetermined limit has given rise to very real difficulties.

Finance

A need for the development of research in some new direction usually arises as a matter of urgency, and if this research cannot be undertaken on an adequate scale, if the Council is compelled to switch funds from some other programme or to draw off funds from a number of programmes and projects, the effect on the staff is most frustrating. The conditions imposed on the Council have hampered its work and resulted in the loss of key members from research teams. The Council has therefore examined various financial procedures in an attempt to find one which will make possible the flexibility that is essential for successful functioning in a research organization. In particular, the restrictions imposed have been inappropriate for a Council which must take into account factors such as the relatively high rate of salary increment of a young staff, the cost of occupying new premises, and expanding commitments in new or developing fields.

In addition to these financial restrictions, the gradual imposition of restrictive measures normally associated with Civil Service administrative procedures, has tended to deprive the Council of the flexibility which establishment as a corporate body outside the Civil Service was intended to provide.

It is a pleasure to record that, as a result of representations to the Treasury, the following special additional grants were made available:—

- £30,000 for the support of research at the universities, of which £10,000 is for medical research;
- £32,250 (over three years) for participation in the International Indian

Met genoeg kan vermeld word dat as gevolg van verhoë tot die Tesourie gerig, onderstaande addisionele toekennings beskikbaar geword het:

£30,000 ter ondersteuning van navorsing aan die universiteite, waarvan £10,000 vir mediese navorsing bestem is;

£32,250 (oor 'n tydperk van drie jaar) vir deelname aan die Internasionale Ekspedisie na die Indiese Oseaan 1962/63 (hoofsaaklik bestem vir navorsers aan universiteite en museums), en

£15,000 vir die S.A. Wolteksieltnavorsingsinstituut aan die Universiteit Rhodes te Grahamstad.

Bouprogram

Teen Maart 1960 het die oprigting van die verskillende laboratoriums en geboue wat deel vorm van die W.N.N.R. se bouprogram—waarmee in 1952 'n begin gemaak is—die stadium bereik waarin die volgende afdelings in geboue te Scientia, Pretoria, gehuisves is: Bou-, Fisiese, Chemiese, Water- en Voedingnavorsing; Administrasie, Biblioteek en Tegnieke Dienste. Die Nasionale Instituut vir Telekommunikasienavorsing was ook klaar gebou en voorsiening vir streeklaboratoriums is in Durban en Kaapstad gemaak.

Gedurende die jaar is die Prosesontwikkelingslaboratorium van die Nasionale Chemiese Navorsingsinstituut voltooi, en is addisionele noodsaaklike terreindienste soos water- en kragleidings en paaie (met inbegrip van dergelike dienste vir die S.A.B.S.-geboue) te Scientia, Pretoria, aangelê. Die Nasionale Instituut vir Personeelnavorsing het sy nuwe gebou in Johannesburg betrek.

Daar is 'n begin gemaak met die bou van die Termodinamika- en die Hidromeganikalaboratorium van die Nasionale Navorsingsinstituut vir Meganiëse Ingenieurswese—laasgenoemde laboratorium is reeds ver gevorder. Die planne vir die Hooflaboratorium en die Lugmeganikalaboratorium van hierdie Instituut nader voltooiing.

Die voorbereidende ondersoek in verband met die behoeftes van die Nasionale Instituut vir Padnavorsing het 'n aanvang geneem.

Die planne vir die S.A.B.S.-geboue het 'n gevorderde stadium bereik. Die gebou vir die ondersoek van ontploffingsgevaar en die vernaamste subkragstasie is klaar en 'n begin is gemaak met die vyf vernaamste laboratoriums. Alle werk in verband met die S.A.B.S.-geboue is egter tydelik opgeskort.

Die geboue wat reeds op die Scientia-terrein verrys het, gee 'n beeld wat gunstige kommentaar uitgelok het, nie alleen plaaslik nie, maar ook van 'n groot aantal belangrike besoekers uit die buiteland.

Net soos by ander navorsingsorganisasies in Suid-Afrika, en inderdaad in die meeste dele van die wêreld, word daar aanhoudend moeilikheid ondervind by die werwing en die behoud van die dienste van wetenskaplikes met die nodige opleiding en bekwaamheid vir gevorderde navorsing.

Ocean Expedition 1962/63 (which will go mainly to workers at universities and museums), and
£15,000 for the S.A. Wool Textile Research Institute at Rhodes University, Grahamstown.

By March 1960, erection of the various laboratories and buildings envisaged in the C.S.I.R.'s building programme—which commenced in 1952—had reached the stage where the following branches were accommodated in buildings at Scientia, Pretoria:— Building, Physical, Chemical, Water, and Nutrition Research; Administration, Library, and Technical Services. The National Institute for Telecommunications Research in Johannesburg had also been completed and regional laboratories provided at Durban and Cape Town.

Building
programme

During the year the Process Development Laboratory of the National Chemical Research Laboratory, and additional essential site services such as water, power, and roads (including similar services for the S.A.B.S. buildings) were completed at Scientia, Pretoria. The National Institute for Personnel Research occupied its new building in Johannesburg.

Erection of the Thermodynamics and Hydromechanics Laboratories of the Mechanical Engineering Research Institute was commenced, the latter having reached an advanced stage. The planning of the Main Laboratory and the Aerodynamics Laboratory of this Institute is nearing completion.

A start was made with the preliminary investigation into the requirements for the National Institute for Road Research.

The planning of the S.A.B.S. buildings reached an advanced stage. The Explosive Hazards Building and the main power sub-station were completed, and the first of the five major laboratories was commenced. All work connected with the S.A.B.S. buildings was, however, temporarily suspended.

At the stage now reached, the buildings at Scientia provide a picture which has drawn favourable comment, not only locally, but from many important visitors from abroad.

In common with other research organizations in South Africa, and indeed in most other parts of the world, difficulties continue to be encountered in recruiting and retaining the services of scientists with the necessary training and ability for advanced research.

Staff

These difficulties are accentuated in South Africa by salaries which are lower than those paid to scientists in other countries. Combined with the general misapprehension concerning recent political events in Africa and the disabilities associated with isolation from the great centres of learning, this has made it virtually impossible to recruit scientists of the required standard from overseas.

Steps which have been taken to remedy the shortage of scientists in South Africa include recommendations to the Government for increased support for the training of research workers at universities; the initiation of discussions with the universities with a view to improving the effectiveness of the Council's

Hierdie soort moeilikheid word in Suid-Afrika vererger deurdat die salarisse hier te lande aan wetenskaplikes betaal laer is as in ander lande. Hierdie feit, tesame met die algemene wanbegrip van onlangse politieke gebeurtenisse in Afrika en die euwels waarmee afsondering van die bekende sentrums van geleerdheid gepaard gaan, het dit so te sê onmoontlik gemaak om wetenskaplikes van die vereiste standaard in die buiteland te werf.

Die stappe wat gedoen is om die tekort aan wetenskaplikes in Suid-Afrika te verhelp, het o.a. die volgende ingesluit: aanbevelings by die Regering vir groter ondersteuning vir die opleiding van navorsingswerkers aan universiteite; die aanvoring van besprekings met die universiteite met die oog op verbetering van die Raad se skema vir nagraadse navorsingstoekennings; die instelling van voorgraadse beurse in 1959; en 'n ondersoek i.v.m. die salarisstruktuur vir wetenskaplikes in verhouding tot besoldigings in ander beroepe. In noue verband met hierdie probleem staan die hele vraagstuk van die wetenskap-onderrig op skole en die tekort aan wetenskaponderwysers, wat ook in die vorige Jaarverslag vermeld is.

Op administratiewe terrein het die Raad opdrag aan die Nasionale Instituut vir Personeelnavorsing gegee om 'n poswaarderingsoopname binne die W.N.N.R.-organisasie te doen. Soos verwag kon word, het 'n aantal unieke probleme hul voorgedoen aangesien die organisasie van 'n wetenskaplike navorsingsliggaam eise stel wat nêrens anders in hierdie beroepsgroep aangetref word nie. 'n Aanvoorsonderzoek is voltooi waarby die eienskappe omskryf is waarvolgens take gewaardeer kan word.

In die Departement Tegniese Dienste bly dit moeilik om behoorlik gekwalifiseerde ambagsmanne te vind van die standaard wat noodwendig deur die Raad se Sentrale werkplase gestel moet word. Hierdie toestand is nog 'n bewys van hoe belangrik dit is om vakleerlinge op te lei. Die opleiding van wetenskapinstrumentmakers in die werkplase is met sukses voortgesit en daar is bevind dat leerlinge wat op hierdie manier opgelei word baie gunstig vergelyk met instrumentmakers uit die buiteland.

Organisering van navorsingswerk

In die vorige jaarverslag is melding gemaak van die moeilikhede wat hul voordoen by die pogings om doeltreffende samewerking met ander staats-organisasies wat ook navorsing doen, te bewerkstellig. Hierdie moeilikhede ontstaan ten gevolge van die nogal lukraak ontwikkeling van navorsing onder verskillende administratiewe staatsliggame gedurende die afgelope 50 jaar, en is onvermydelik by gebrek aan 'n algemene navorsingsbeleid van die Regering.

WETENSKAPLIKE EN TEGNIESE INLIGTING

Die Raad het 'n Advieskomitee vir Dokumentasie aangestel om hom behulpsaam te wees om sy pligte op die gebied van wetenskaplike en tegniese dokumentasie te vervul deur bemiddeling van sy Biblioteek- en Inligtingsafdelings. Hierdie komitee het gedurende die jaar twee maal vergader.

Die Biblioteekafdeling is reeds 'n paar jaar besig met die hersiening van die *Katalogus van Unie-tydskrifte*, Deel I: *Wetenskap en Tegnologie*. Hierdie katalogus is 'n lys van al die tydskrifte of vervolgpublikasies wat ontvang word

Post-graduate Research Grants Scheme; the introduction of pre-graduate bursaries in 1959; and an investigation into the structure of scientists' salaries in relation to remuneration in other walks of life. Coupled with this problem is the whole question of the teaching of science at schools and the shortage of science teachers, to which reference was made in the last Annual Report.

In the administrative sphere, the Council has arranged for the National Institute for Personnel Research to undertake an evaluation of posts within the C.S.I.R. organization. As was to be expected, a number of unique problems have been encountered, since the running of a scientific research organization makes demands which are not found elsewhere in this occupational category. A pilot study has been completed which defines the qualities on which the jobs can be evaluated.

In the Technical Services Department, it remains difficult to find suitably qualified artisans measuring up to the standards which must of necessity be set by the Council's Central Workshops. This situation has further emphasized the importance of apprentice training. The training of scientific instrument-makers in the Workshops has continued successfully and it has been found that those trained in this way compare very favourably with instrument-makers from overseas.

In the last Annual Report, reference was made to difficulties which are encountered in achieving effective co-operation with other Government organizations responsible for research. These difficulties arise as a result of the rather haphazard development of research under different administrative agencies of the Government during the past 50 years, and are inevitable in the absence of an overall Government research policy.

Organization
of research

This problem has been discussed with the Government, and it is believed that there is now a clearer understanding of the stumbling blocks in the way of more effective deployment of the country's scientific resources in the national interest.

SCIENTIFIC AND TECHNICAL INFORMATION

The Council has appointed an Advisory Committee on Documentation to assist it in discharging its responsibilities in the fields of scientific and technical documentation through its Library and Information Divisions. This committee met twice during the year.

For some years the Library Division has been engaged on the revision of the *Catalogue of Union Periodicals: Volume 1. Science and Technology*. This is a list of all the periodicals or serial publications received by 136 co-operating South African libraries, among which are included many scientific and technical libraries of industrial firms. It is essentially a finding list, through which scientists and research workers can locate a particular volume, part, or set of a journal.

deur 136 samewerkende Suid-Afrikaanse biblioteke, waaronder baie wetenskaplike en tegniese biblioteke van nywerheidsfirmas. Dit is hoofsaaklik 'n treflys met behulp waarvan wetenskaplikes en navorsers 'n bepaalde deel of stel van 'n tydskrif kan opspoor.

Op aanbeveling van die Suid-Afrikaanse Biblioteekvereniging gaan die Wetenskaplike en Tegnologiese deel verbind word met die tweelingdeel oor die humaniora, wat deur mej. E. Hartmann by die Universiteit van Suid-Afrika geredigeer word, gesteun deur 'n toekening van die Nasionale Raad vir Sosiale Navorsing. Daar is besluit dat die naam verander behoort te word in *Tydskrifte in Suid-Afrikaanse Biblioteke*. Dit word lettersgewys in die vorm van los blaaie uitgegee; sodra 'n letter klaar is, word hy gepubliseer. Wanneer die hele alfabet deurgewerk is sal die hersiening en aanvulling van elke letterseksie hopelik voortgesit kan word.

Daar is goed gevorder met die samestelling van 'n *Gids vir Wetenskaplike Hulbronne in Suid-Afrika*. Hierdie gids word in die vorm van los blaaie uitgegee, en elke blad word hersien na gelang dit nodig is. Die eerste vier seksies word in onderstaande volgorde gepubliseer:

Wetenskaplike navorsingsorganisasies in Suid-Afrika.

Wetenskaplike en tegniese verenigings in Suid-Afrika.

Wetenskaplike en tegniese tydskrifte in Suid-Afrika uitgegee.

Bronnegids vir wetenskaplike, tegniese en mediese inligting in Suid-Afrikaanse biblioteke.

Die dokumentasie van wetenskappe en tegnologie het oor die hele wêreld agteruit gegaan gedurende die afgelope tien jaar, hoofsaaklik weens die enorme toename in navorsingswerk. Daar word gesê dat 90% van die wetenskaplikes wat ooit geleef het, vandag nog in lewe is. Tradisionele dokumentasiestelsels het onvoldoende geblyk vir die eise van hierdie staat van sake, en die behoefte aan positiewe maatreëls om die toestand sowel op nasionale as internasionale peil te verbeter, word steeds dringender.

Die publikasie van die resultate van navorsing in Suid-Afrika het onder die soeklig gekom op 'n konferensie wat op 2 en 3 Februarie by die Universiteit van Suid-Afrika in Pretoria gehou is onder die gesamentlike beskerming van die Departement van Onderwys, Kuns en Wetenskap en die W.N.N.R. Ongeveer 177 afgevaardigdes, wat 133 organisasies verteenwoordig het, het probleme bespreek waarmee die uitgewers en gebruikers van wetenskaplike en tegniese inligting te kampe het. Die konferensie het die benoeming van 'n voortsettingskomitee aanbeveel om die reëlingsliggame van die konferensie behulpsaam te wees by hul bestudering van die implikasies van die verskillende aanbevelings, in oorleg met belanghebbende organisasies. Die reëlingsliggame is versoek om 'n tweede konferensie te belê alvorens finale aanbevelings aan die regering voorgelê word.

INTERNASIONALE SAMEWERKING OP WETENSKAPLIKE GEBIED

Internasionale samewerking op wetenskaplike gebied was altyd meer samewerking tussen individuele wetenskaplikes as tussen nasies. Wetenskaplikes het, al praat hulle verskillende tale, op gemeenskaplike terrein beweeg, en hulle het self organisasies gestig om regstreekse kontak en samewerking tussen individuele wetenskaplikes te vergemaklik. Die vernaamste onder hierdie liggame was die internasionale wetenskaplike verenigings wat hulle tot 'n

On the recommendation of the South African Library Association, the Science and Technology volume is to be combined with the twin volume on the humanities, which is being edited by Miss E. Hartmann at the University of South Africa under a grant from the National Council for Social Research. It has been decided that the title should be altered to *Periodicals in South African Libraries*. It will be issued progressively in loose-leaf format, each letter being issued when completed. Upon completion of the whole alphabet, it is hoped to continue the revision and enlargement of each letter section.

Good progress has been made with the compilation of a *Directory of Scientific Resources in South Africa*. This directory is being issued in loose-leaf format and each sheet will be revised when necessary. The first four sections are being published in the following order:

Scientific research organizations in South Africa.

Scientific and technical societies in South Africa.

Scientific and technical periodicals published in South Africa.

Guide to sources of scientific, technical and medical information in South African libraries.

The documentation of science and technology throughout the world has deteriorated during the past ten years, mainly as a result of the vast increase in research. It has been stated that 90% of the scientists who have ever lived are alive at the present time. Traditional systems of documentation have proved inadequate for the demands of this situation, and the need for positive steps to improve the position, at both the national and the international level, becomes increasingly urgent.

The publication of the results of research in South Africa was reviewed at a conference held on 2nd and 3rd February at the University of South Africa, Pretoria, under the joint auspices of the Department of Education, Arts and Science and the C.S.I.R. Some 177 delegates, representing 133 organizations, examined problems confronting the publishers and users of scientific and technical information. The conference recommended the appointment of a continuation committee, to assist the sponsors of the conference in studying the implications of the various recommendations, in consultation with interested organizations. The sponsors were requested to call a second conference before finally submitting recommendations to the Government.

INTERNATIONAL CO-OPERATION IN SCIENCE

Traditionally, international co-operation in science has been between individual scientists rather than between nations. Scientists, although they may speak different languages, have met on common ground and the scientists have themselves developed organizations for facilitating direct contact and co-operation between individual scientists. Most important of these are the international scientific unions which themselves form a federal union under the International Council of Scientific Unions (I.C.S.U.).

In recent years, however, science has become of increasing interest to Governments, because of the increasing extent to which science is being systematically applied by industries and by governments to the solution of practical

federale unie verenig het, onder die Internasionale Raad van Wetenskaplike Unies (I.C.S.U.).

Sedert 'n paar jaar het die wetenskap egter van groter belang vir regerings geword weens die toenemende mate waarin die verskillende wetenskappe deur die nywerheid en regerings stelselmatig toegepas word om praktiese probleme op te los. Namate toegepaste wetenskappe en derhalwe ook die suiwer wetenskappe waarop hulle berus, van groter belang vir die staatshuishoudkunde geword het, is hulle teen wil en dank in die nasionale en internasionale politiek ingesleep. Tegnologiese prestasie is vandag 'n belangrike faktor in nasionale prestige, en tegniese samewerking van regerings speel 'n al hoe vernamer rol in internasionale diplomatie.

Die Raad het hom derhalwe geroepe gevoel om 'n kanaal te verskaf waarlangs wetenskaplikes 'n effektiewe rol kan speel deur die regering raad te gee i.v.m. wetenskaplike aangeleenthede wat in verband staan met sy betrekkinge met ander regerings, en terselfdertyd deur die tradisionele regstreekse kontak met wetenskaplikes in ander lande i.v.m. sake van suiwer wetenskaplike belang te vergemaklik. 'n Nuwe denkwysie was nodig om die regte benadering van hierdie dubbele verantwoordelikheid te vind, en dit is met genoeg dat melding gemaak kan word van die wedersydse begrip waardeur die Raad se noue en hartlike betrekkinge met die Departement Buitelandse Sake gekenmerk word.

Advieskomitee

Lidmaatskap van die I.C.S.U. en sy samestellende verenigings, asook van internasionale wetenskaplike liggame, word deur die Raad versorg met die hulp van 'n Advieskomitee, en 'n Afdeling vir Internasionale Samewerking op Wetenskaplike gebied. Dit bring nie alleen die verspreiding van inligtings van hierdie internasionale liggame afkomstig, mee nie, maar ook die organisering van die deelname van Suid-Afrikaanse wetenskaplikes aan hul werksaamhede. Met betrekking tot hierdie en verwante aangeleenthede kan die Raad met genoeg meld dat die samewerking van staats- en ander navorsingsorganisasies dit vir Suid-Afrikaanse wetenskaplikes moontlik gemaak het om 'n wesenlike rol te speel in die internasionale wetenskaplike werksaamhede waarin hulle besondere belang het, hetsy weens Suid-Afrika se geografiese ligging, of hul eie belange, bekwaamhede en prestasies. Deur dieselfde bemiddeling kan die Raad die regering help deur raadpleging van wetenskaplikes en koördinerende van hul sienswyses omtrent die wetenskaplike en tegniese aspekte van aangeleenthede van hoofsaaklik politieke belang, asook omtrent sake wat voortspruit uit ons regering se lidmaatskap van internasionale liggame onder beskerming van ander regerings, in die lewe geroep.

Internasionale Raad van Wetenskaplike Unies

Die Advieskomitee i.s. Internasionale Wetenskaplike Samewerking wat in Februarie 1960 vir die eerste maal byeengekom het, het gedurende die jaar twee vergaderings gehou. Hierdie komitee wat erken is as die Suid-Afrikaanse Nasionale Komitee van die Internasionale Raad van Wetenskaplike Unies (I.C.S.U.) het die lidmaatskap nagegaan van die nasionale komitees van die konstituerende internasionale wetenskaplike unies waaraan die W.N.N.R. namens Suid-Afrika behoort.

Internasionale Geofisiese Samewerking

Voortspruitende uit die Internasionale Geofisiese Jaar (I.G.Y.) 1957-58, wat onder beskerming van die I.C.S.U. georganiseer is, is vier komitees in die

problems. As applied science and thus the pure science on which it depends have become of increasing importance to national economies, they have inevitably been drawn into national and international politics. Technological achievement is today an important factor in national prestige, and technical co-operation between governments is playing an increasingly important role in international diplomacy.

The Council has thus found itself called upon to provide a channel through which scientists can play an effective role in advising the Government on scientific matters affecting its relations with other Governments and, at the same time, in facilitating the traditional direct contacts with scientists in other countries on matters of purely scientific interest. New thinking has been required in developing the right approach to these dual responsibilities, and it is a pleasure to record the mutual understanding which is a feature of the Council's close and cordial relationships with the Department of External Affairs.

Membership of I.C.S.U. and its constituent unions, as well as of other international scientific bodies, is a responsibility which the Council discharges with the assistance of an Advisory Committee and a Division of International Scientific Co-operation. This entails not only the dissemination of information from these international bodies but organization of the participation of South African scientists in their activities. In these and related matters the Council is glad to be able to record that the co-operation of government and other research organizations has made it possible for South African scientists to play an effective part in those international scientific activities in which they have a special interest, whether by reason of South Africa's geographical situation or their own interests, abilities and achievements. Through the same agency the Council is able to assist the Government by consulting and co-ordinating the views of scientists on scientific and technical aspects of matters of mainly political content, as well as on questions arising out of the Government's membership of international agencies set up under government auspices.

Advisory
Committee

The Advisory Committee on International Scientific Co-operation which met for the first time in February, 1960, had two meetings during the year. This Committee, which was recognized as the South African National Committee of the International Council of Scientific Unions (I.C.S.U.), reviewed the membership of the national committees of the constituent international scientific unions to which the C.S.I.R. adheres on behalf of South Africa.

International
Council of
Scientific Unions

Arising out of the International Geophysical Year (I.G.Y.) 1957/58, which was organized under the auspices of I.C.S.U., four committees were set up to carry forward work initiated during the IGY. These are the International Geophysics Committee (CIG), the Special Committee for Antarctic Research (SCAR), the Special Committee for Oceanographic Research (SCOR) and the Special Committee for Space Research (COSPAR).

International
Geophysical
Co-operation

lewe geroep om voort te gaan met die werk waarmee gedurende die I.G.Y. 'n begin gemaak is. Hulle is die Internasionale Komitee vir Geofisika (C.I.G.), Die Spesiale Komitee vir Suidpoolnavorsing (S.C.A.R.), die Spesiale Komitee vir Oseanografiese Navorsing (S.C.O.R.) en die Spesiale Komitee vir Ruimte-navorsing (C.O.S.P.A.R.).

Suidpoolnavorsing

Suid-Afrika se deelname aan Suidpoolnavorsing het 'n belangrike punt bereik met die besetting van die Noorse basis aan die Suidpool (volgens 'n ooreenkoms met die regering van Noorweë) deur 'n ekspedisie onder leiding van mnr. J. J. la Grange van die Weerburo in Januarie 1960. Die verantwoordelikheid vir Suidpoolwerkzaamhede berus by die Departement van Vervoer. Die Departement het toe die Suid-Afrikaanse Nasionale Suidpoolnavorsingskomitee (S.A.N.C.A.R.) in die lewe geroep onder voorsitterskap van mnr. M. P. van Rooy, Direkteur van die Weerburo, en 'n Wetenskaplike Advieskomitee benoem met dr. W. S. Rapson, Vise-president van die W.N.N.R., as voorsitter, om hom met die vervulling van hierdie pligte te help. Die sekretariaat van hierdie wetenskaplike advieskomitee wat aanbevelings aan S.A.N.C.A.R. moet doen vir sy wetenskaplike navorsingsprogramme, word waargeneem deur W.N.N.R. se Afdeling vir Internasionale Samewerking op Wetenskaplike Gebied. Die komitee het in Januarie 1961 sy eerste vergadering gehou, en alles dui daarop dat hierdie nuwe reëling waarskynlik 'n doeltreffende middel sal vorm om die deelname van Suid-Afrikaanse wetenskaplikes aan Suidpoolnavorsing te organiseer.

Internasionale Ekspedisie na die Indiese Oseaan 1962/63

Op advies van sy Nasionale Koördineringskomitee i.v.m. Oseanografiese Navorsing, het die Raad sterk by die Regering aanbeveel dat 'n bedrag van £32,250 beskikbaar gestel behoort te word om Suid-Afrikaanse wetenskaplikes in staat te stel om daadwerklik deel te neem aan die Internasionale Ekspedisie na die Indiese Oseaan 1962/63 wat onder beskerming van S.C.O.R. georganiseer word. Die grootste deel van hierdie fondse sal na universiteite en dergelike inrigtings gaan vir navorsing wat van direkte belang vir Suid-Afrika is en wat terselfdertyd 'n bydrae sal vorm tot die groot internasionale onderneming (waaraan 16 nasies deelneem) om die oseanografie van die Indiese oseaan beter te leer ken.

Ruimteverkenning- en satelliet- waarnemingspos

Op die gebied van ruimte-navorsing het die Raad hom veral toegespits op deelname deur die Nasionale Instituut vir Telekommunikasie-navorsing aan die program van die National Aeronautics and Space Administration van die Verenigde State van Amerika by die oprigting van 'n gekombineerde Pos vir Ruimteverkenning en Radiowaarneming van naby satelliete.

Hierdie werk het voortgespruit uit die program vir samewerking wat gedurende die Internasionale Geofisiese Jaar gesamentlik deur die Unie van Suid-Afrika en die Verenigde State van Amerika aangepak is. Hierdie samewerking het gelei tot die onlangse sluiting van 'n ooreenkoms tussen die onderskeie regerings, om voorsiening te maak vir voortsetting en uitbreiding van die samewerking vir die studie van die ruimte-omgewing van die mens, en die uitwerking daarvan.

South Africa's participation in Antarctic research took an important step forward with the occupation in January, 1960, of the Norwegian base in Antarctica (under an agreement with the Norwegian Government) by an expedition under the leadership of Mr. J. J. la Grange of the Weather Bureau. Responsibility for Antarctic activities rests with the Department of Transport. To assist it in the discharge of these responsibilities, the Department set up the South African National Antarctic Research Committee (SANCAR) under the chairmanship of Mr. M. P. van Rooy, Director of the Weather Bureau, and appointed a Scientific Advisory Committee under the chairmanship of Dr. W. S. Rapson, Vice-President of the C.S.I.R. The secretariat of this scientific advisory committee, which is required to recommend scientific research programmes to SANCAR, is provided by the C.S.I.R.'s Division of International Scientific Co-operation. The committee had its first meeting in January, 1961, and the indications are that this new arrangement will provide an effective medium for organizing the participation of South African scientists in Antarctic research.

Antarctic
Research

On the advice of its National Co-ordinating Committee on Oceanographic Research, the Council strongly recommended to the Government that a sum of £32,250 should be made available to enable South African scientists to play an effective part in the International Indian Ocean Expedition 1962/63, which is being organized under the auspices of SCOR. The bulk of these funds will go to universities and similar institutions for research which is of direct interest to South Africa and which, at the same time, will contribute to the great international effort, in which 16 nations are participating, to achieve a better understanding of the Oceanography of the Indian Ocean.

International
Indian Ocean
Expedition
1962/63

In the field of space research, the Council's main efforts have been concerned with participation by the National Institute for Telecommunications Research in the programme of the National Aeronautics and Space Administration of the United States of America, in the establishment in South Africa of a combined Space Probe and Near Satellite Radio Tracking Station.

Space probe and
satellite tracking
station

This work is an outcome of the co-operative programme initiated during the International Geophysical Year between the Union of South Africa and the United States of America. This co-operation has resulted in the recent conclusion of an agreement between the respective governments, making provision for further and extended co-operation in the study of man's spatial environment and its effects.

The combined station is being equipped initially with an automatic tracking 85-foot parabolic reflector-type antenna, and the associated radio receiving and recording equipment for the observation of unmanned space-craft used for lunar and interplanetary exploration. It is also equipped with a new Minitrack system, for the observation of artificial earth satellites used for the study of the earth's environment.

The Institute is responsible, within the Council for Scientific and Industrial

Die gekombineerde pos word om mee te begin toegerus met 'n outomatiese paraboliese opspoorantenna van die reflektortipe, 85 vt. lank, en die bybehorende radio-ontvang- en registreertoestelle vir die waarneming van onbemande ruimtevaartuie wat vir maan- en interplanetêre verkenning gebruik word. Die pos is ook toegerus met 'n nuwe Minitrack-stelsel vir die waarneming van kunsmatige lugsatelliete wat vir ondersoek van die aarde se omgewing gebruik word.

Die Instituut is, as deel van die Wetenskaplike en Nywerheidsnavorsingsraad, verantwoordelik vir die Suid-Afrikaanse aspekte van die oprigtingsprogram, en sal mettertyd algehele verantwoordelikheid vir die onderhoud en werking van die pos aanvaar. Die werk word gedoen volgens 'n kontrak tussen National Aeronautical and Space Administration en die W.N.N.R. Die oprigting van die gekombineerde pos het reeds goet gevorder.

Samewerking
fussen regerings
op wetenskaplike
gebied

Wat samewerking van regerings op wetenskaplike gebied betref, was die vernaamste gebeurtenis waarmee die Raad iets te doen gehad het, die byeenkoms van deskundiges op die terrein van waterbehandeling. Hierdie byeenkoms het in September 1960 te Pretoria plaasgevind en was namens die Wetenskaplike Raad vir Afrika besuide die Sahara (C.S.A.) belê. Nog 'n belangrike gebeurtenis was die vergadering van die koördineerders van die Commonwealth Advisory Aeronautical Research Council (C.A.A.R.C.) op die gebied van atmosferiese onstuimigheid wat die bestuur van lugvaartuie affekteer en op die gebied van vliegtuiggeraas. Die vergaderings van die British Commonwealth Scientific Committee wat in Julie 1960 in die Verenigde Koninkryk gehou is, is deur dr. S. M. Naudé, President van die W.N.N.R., en mnr. E. Boden, hoof van die Suid-Afrikaanse Wetenskaplike Skakelkantoor, Londen, bygewoon.

Die Europese Suidelike Observatorium (E.S.O.) is gehelp om die geskiktheid van 'n terrein naby Beaufort-wes vir die oprigting van die voorgestelde Observatorium vir die Suidelike Halfrond te bepaal. Hulp is ook verleen by die keuring van kandidate vir die United States Health Services Fellowships, en die Harwell Special Research Fellowships.

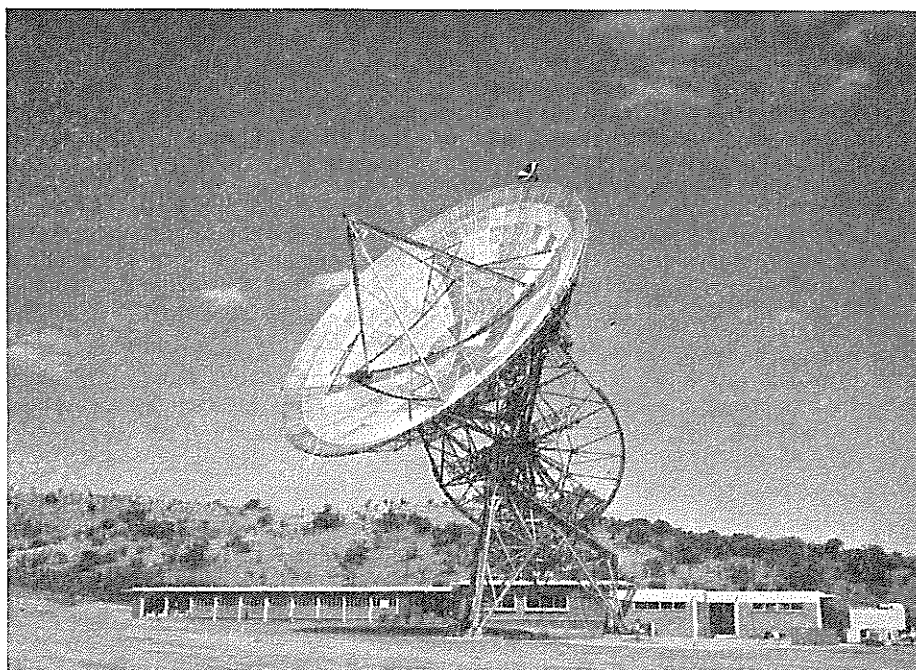
C.C.T.A./C.S.A.

Doeltreffende samewerking met ander nasies in Afrika is in baie gevalle gereël deur bemiddeling van die Kommissie vir Tegnieese Samewerking in Afrika besuide die Sahara (C.C.T.A.) en onderlinge kontakte is aangekweek tussen wetenskaplikes deur bemiddeling van die geaffilieerde liggaam, die Wetenskaplike Raad vir Afrika besuide die Sahara (C.S.A.). In September 1960 het die C.S.A. in Kaapstad byeengekom en by dié geleentheid het dr. P. J. du Toit, F.R.S., 'n lid en eertydse President van die W.N.N.R., bedank as President van die C.S.A. nadat hy die posisie sinds die stigting in 1960 beklee het. Op dieselfde vergadering is dr. S. M. Naudé van die W.N.N.R. tot Vise-president van C.S.A. verkies.

Hieronder volg 'n paar voorbeelde van die bydraes wat die Raad se nasionale navorsingslaboratoriums en institute lewer om probleme van besondere belang vir die ontwikkeling van Afrika besuide die Sahara te help oplos.

Behuising

Die Nasionale Bounavorsingsinstituut het die C.C.T.A. se Inter-African Committee on Housing gehelp by sy werk om samewerking en die uitwisseling



The 110-ft high antenna of the Radio Space Research Station, situated at Hartebeesthoek, 17 miles north of Krugersdorp.

Die 110 vt hoë antenna van die Radioruimtenavorsingspos by Hartebeesthoek, 17 myl benoorde Krugersdorp.

Research, for the South African aspects of the installation programme, and will in due course assume full responsibility for the maintenance and operation of the station. The work is being carried out under a contract between National Aeronautical and Space Administration, and the C.S.I.R. Installation of the combined station has reached an advanced stage.

In the field of inter-governmental co-operation in science, the main event with which the Council was concerned was the meeting of specialists on water treatment which was convened in Pretoria in September, 1960, on behalf of the Scientific Council for Africa South of the Sahara (CSA). Another notable event was the meeting in Pretoria in February 1961 of co-ordinators in the fields of Atmospheric Turbulence affecting the operation of aircraft, and Aircraft Noise from the Commonwealth Advisory Aeronautical Research Council (CAARC). The meetings of the British Commonwealth Scientific Committee, held in the United Kingdom in July 1960, were attended by Dr. S. M. Naudé, President of the C.S.I.R. and Mr. E. Boden, head of the South African Scientific Liaison Office, London.

Assistance was given to the European Southern Observatory (ESO) in connection with investigations into the suitability of a site near Beaufort West for the erection of the proposed Southern Hemisphere Observatory. Assistance was also given in the selection of candidates for the United States Public Health Services Fellowship, and the Harwell Special Research Fellowships.

**Inter-governmental
co-operation in
Science**

van inligtings tussen ledelende in Afrika i.v.m. die gebruikelike metodes van navorsing en behuising te bevorder. Die sekretariaat van hierdie Komitee wat deur die Instituut waargeneem word, het hom hoofsaaklik besig gehou met hulpverlening aan die Algemene Sekretariaat van C.C.T.A./C.S.A. in verband met die voorbereidings en reëlings vir vier vergaderings en simposiums van Afrikastate vir 1961 voorgestel wat bounavorsing, skoolgeboue en gesondheidsaspekte van behuising sal bespreek. Bowendien is 'n gids opgestel en versprei van organisasies in Afrika wat navorsing doen en inligtings verstrek in verband met behuising; 'n verslag oor grond- en fonderingsvraagstukke wat hulle in Afrika voordoet, is opgestel; en werk is aangepak i.v.m. die versameling van klimatologiese gegewens wat geskik is om by bouwerk en ontwerp in Afrika gebruik te word, as ook i.v.m. 'n geskikte stelsel vir die berekening van die koste van bouwerk en die verskaffing van verwante dienste. Inligtings is uit verskillende dele van die wêreld versamel i.v.m. die ontwerp van goedkoop stowe wat met hout, steenkool, olie, gas of sonenergie werk en wat moontlik geskik sal wees vir goedkoop behuisingskemas in Afrika. Verskillende nywerhede in Suid-Afrika is genader om belangstelling by hulle te probeer opwek vir die ontwikkeling en vervaardiging van geskikte stowe, sowel vir verwarming as vir die kook van kos, wat goedkoop in die gebruik sal wees.

Hulp is verleen aan die Laboratorio de Ensaio de Mecanico de Solo in Mosambiek deur een van hulle navorsingsbeamptes op te lei in die toerusting- en navorsingsmetodes wat deur die Afdeling vir Funkisionele Doeltreffendheid van die Nasionale Bounavorsingsinstituut gebruik word by bestudering van die menigte probleme wat die funksionele ontwerp van geboue wat die beste in 'n bepaalde klimaat sal beantwoord, oplewer. Hierdie navorsingsgebied omvat o.a. ventilasie, dagligverligting, gedrag wat warmte betref, en klimatologiese ondersoek i.v.m. die verskillende tipes geboue. Die idee is dat hierdie navorsingsbeampte verantwoordelik sal wees vir die instelling van 'n dergelike afdeling binne sy eie organisasie om soortgelyke werk te doen i.v.m. toestande in Mosambiek.

Mannekrag

In die Nasionale Instituut vir Personeelnavorsing is metodes uitgewerk vir die keuring en beroepsindeling van Bantowerkers, en sentrums is deur die mynbedryf, die sekondêre nywerhede en staatsdepartemente in die Unie, die Federasie van Rhodesië en Njassaland, Oos-Afrika, Ghana en Nigerië geopen waar hierdie keurmetodes as 'n roetinemaatreël ingestel is.

Meer onlangs het opvoedkundiges wat in Afrikagebiede werk, tot die besef gekom hoe dringend die behoefte aan keuring van swart leerlinge nadat hulle die laerskool verlaat het, is, asook tot die erkenning van die belangrikheid van psigologiese toetse as 'n middel om dit te bereik. In Afrika word die toetsbatterye vir die keuring van swart ongeletterde personeel ontwerp, as die betroubaarste en beste metodes vir daardie deel van die bevolking erken. Maar die huidige opvoedkundige wurgplek in Afrika-gebiede kom in die stadium na die laerskool voor weens die tekort aan onderwysfasiliteite op die vlak van hoërskool-, of tegniese en vakonderrig. Die omvang en dringende aard van hierdie vraagstuk word terdeë deur alle ledegebiede van die C.S.A. besef, en die bydrae wat die Nasionale Instituut vir Personeelnavorsing in verband hiermee gelewer het, is erken deur die benoeming van die Instituut se direkteur, dr. S. Biesheuvel, tot psigotegniese korrespondent vir die Afrikastate onderling wat betref toetsing vir beroepskeuring.

In many instances, effective collaboration with other nations on the African Continent has been organized through the agency of the Commission for Technical Collaboration in Africa South of the Sahara (C.C.T.A.), and mutual contacts between scientists have been fostered through the affiliated body, the Scientific Council for Africa South of the Sahara (C.S.A.). In September 1960 C.S.A. met in Cape Town, and Dr. P. J. du Toit, F.R.S., a member and sometime President of the C.S.I.R., resigned from the position of President of C.S.A., a position which he had held since its inception in 1960. At the same meeting Dr. S. M. Naudé, President of the C.S.I.R., was elected Vice-President of C.S.A.

C.C.T.A./C.S.A.

Some examples are given here of the contributions which the Council's national research laboratories and institutes are making to problems of peculiar interest to the development of Africa south of the Sahara.

The National Building Research Institute gave assistance to the C.C.T.A. Inter-African Committee on Housing, in its work to promote co-operation and the exchange of information between member countries in Africa on research and building practices relating to housing. The secretariat for this Committee, which is provided by the Institute, was mainly occupied in assisting the C.C.T.A./C.S.A. General Secretariat with preparations and arrangements for four Inter-African meetings and symposia proposed for 1961, which will deal with building research, school buildings, and health aspects of housing. In addition, a directory of organizations in Africa which carry out research or provide information on housing was compiled and distributed; a report on soil and foundation problems experienced in Africa was prepared; and work was undertaken on the preparation of climatological data suitable for application to building and design in Africa, as well as on a suitable system for the costing of house construction and the provision of related services. Information was collected from various parts of the world on designs of low-cost stoves operating on wood, coal, oil, gas or solar energy, which might be suitable for low-cost housing in Africa. Various industries in South Africa were approached, to interest them in developing and manufacturing suitable low-cost cooking and heating stoves.

Housing

Assistance was given to the Laboratório de Ensaios de Mecânico de Solo in Mozambique, by training one of their research officers in the equipment and research techniques that are used by the Functional Efficiency Division of the National Building Research Institute in studying the many problems associated with functional design of buildings to suit the climate. This field of research includes ventilation, day-lighting, thermal performance, and climatological investigations relative to the various types of buildings. It is intended that this research officer will be responsible for establishing a similar division within his own organization, to carry out similar work with reference to the conditions in Mozambique.

In the National Institute for Personnel Research, procedures for the selection and occupational classification of black workers have been devised, and

Manpower

Vir Basoetoland is 'n voorlopige ondersoek uitgevoer i.v.m. die keuring van swart leerlinge vir tegniese onderrig. Tanganjika, Uganda, Suid- en Noord-Rhodesië het hulle belangstelling in hierdie probleem getoon en in die laaste kwartaal van die jaar administratiewe personeel na die Instituut in Johannesburg gestuur vir 'n oriënteringskursus.

'n Studie van diensversuim en personeelwisseling is op 'n Pan-Afrikabasis uitgevoer vir die gebied besuide die Sahara. Die bedoeling daarvan was om die menslike faktore te bestudeer wat produktiwiteit beïnvloed met betrekking tot diensversuim en personeelwisseling. Twee benaderings is toegepas: 'n statistiese ontleding van diensversuim en personeelwisseling, en 'n sosiologiese en psigologiese ondersoek waarby monstergroepe van swart nywerheidswerkers tydens onderhoude ondervra is. Die voorlopige bevindings van hierdie ondersoek is nou beskikbaar. Die mate van diensversuim en personeelwisseling in die bestudeerde nywerhede was die teenoorgestelde van wat verwag was. Die hoeveelheid diensversuim en personeelwisseling is oor die algemeen klein, en vergelyk gunstig met dié in nywerheidsgemeenskappe in Brittanje, Australië en Amerika. Die jong, ongetroude, kortdiensmans en dié wat min verdien, het 'n groter neiging tot wegbly van hul werk getoon. Hierdie bevindings stem ooreen met dié in ander industriële gemeenskappe. Die werkers se beoordeling van opsigters, toesighoudende personeel en beroepsveiligheid was oor die algemeen gunstig. Dit mag aan die feit te wyte wees dat baie van die nywerhede bewus is van die behoefte aan 'n gesonde personeelbeleid wat betref toesigmetodes. Hierdie besef is miskien ook 'n faktor wat bydra tot die lae syfer vir diensversuim en personeelwisseling. Alle beskikbare bevindings in verband met elke nywerheid wat ondersoek is, is geïntegreer om die bepaalde patroon van diensversuim en personeelwisseling in die bepaalde industriële eenheid te verklaar. Hierdie benadering het aan die lig gebring dat industriële stabiliteit, wat deur nywerheids-uitbreiding of geen afdankings, voldoende vergoeding, en positiewe bestuursbelangstelling verkry is, gepaard gaan met 'n stabiele houding teenoor die werk. Aangesien diensversuim en personeelwisseling geen hoofsaaklike van lae produktiwiteit kan wees nie, sal dit nodig wees om feite in verband met die werklike produktiwiteitspeil te ondersoek.

NAVORSING IN DIE NASIONALE NAVORSINGS-LABORATORIUMS EN -INSTITUTE

Basiese navorsing

In die Raad se nasionale navorsingslaboratoriums en -institute word navorsingswerk gedoen, hetsy op eie inisiatief, hetsy op versoek van nywerheids-firmas of liggame wat die sentrale, provinsiale of plaaslike besture verteenwoordig. Die oogmerk van alle navorsingsprogramme is om die weg oop te stel vir die uitwerk van koöperatiewe projekte, waarin industriële en ander organisasies met die Raad saamwerk in gesamentlike navorsingsondernemings in hul eie, sowel as die land se belang. Hieronder volg 'n paar voorbeelde van projekte wat 'n beeld gee van die groot aantal belange deur die Raad gedien.

Om die W.N.N.R. in staat te stel om die talryke verpligtings aan hom opgelê deur die wet waarkragtens hy ingestel is, na te kom, spreek dit vanself dat hy van die allerbeste wetenskaplikes in sy laboratoriums moet hê en dat dit hulle, om hul in die organisasie se diens te hou, vry moet staan om basiese navorsing te doen. Dit bied egter 'n gulde geleentheid vir die nywerheid.

centres have been set up by the mining industry, by secondary industry, and by government departments where these selection procedures have been instituted on a routine basis in the Republic, the Federation of Rhodesia and Nyasaland, East Africa, Ghana and Nigeria.

More recently, educationalists working in African territories have come to realize the urgency of the need for post-primary selection of black pupils, and to accept the importance of psychological testing as a means to this end. In Africa, the test batteries designed for the selection of black illiterate personnel are accepted as the most reliable and valid existing procedures for that sample of the population. But the present educational bottleneck in African territories occurs at the post-primary stage, owing to the shortage of teaching facilities at secondary or technical and trade levels. The magnitude and urgency of this problem has been appreciated by all member territories of C.S.A., and the contribution which the National Institute for Personnel Research has made in this field has been recognized in the appointment of the institute's director, Dr. S. Biesheuvel, as inter-African psycho-technical correspondent for vocational selection testing.

For Basutoland, a pilot study has been carried out on the selection of black pupils for technical schooling. Tanganyika, Uganda, Southern and Northern Rhodesia have shown their interest in this problem, and sent administrative personnel on an orientation course to the Institute in Johannesburg in the last quarter of the year.

A study of absenteeism and labour turnover has been conducted on a Pan-African basis for the area south of the Sahara. Its aim was the study of the human factors affecting productivity in relation to absenteeism and labour turnover. Two approaches were used, a statistical analysis of absenteeism and labour turnover, and a sociological and psychological investigation using interview techniques on industrial samples of black workers. The preliminary findings on this study are now available. The absence and turnover rates in the industries studied are contrary to those that were expected. Absence and turnover levels are generally low, and compare favourably with those in industrial communities in Britain, Australia and America. Greater absence proneness was found among young, unmarried, short-service, and low-earning men. These findings are also consistent with those in other industrial communities. The workers' ratings on supervisors, supervisory personnel and occupational security are generally favourable. This may be attributed to the fact that many of the industries are aware of the need for sound personnel policy in regard to supervisory practices. This awareness may also be a factor contributing to the low levels of absences and turnover. All available findings on each industry investigated were integrated, to explain the particular pattern of absence and turnover in that industrial unit. This approach showed that industrial stability achieved under expanding industrial conditions or no retrenchment, adequate remuneration, and positive managerial interest, is associated with stable work behaviour. Since absenteeism and labour turnover cannot be major causes of low productivity, facts concerning the actual levels of productivity require investigation.

Daar bestaan maar min industriële laboratoriums wie se hulpbronne nie geheel en al bestee word om, aan die hand van beskikbare kennis, werkprobleme wat hulle van dag tot dag voordoën, te probeer oplos nie; ongelukkig is die beskikbare kennis dikwels ontoereikend, wat beteken dat daar behoefte aan meer basiese navorsing bestaan. Dit is in hierdie opsig dat die laboratoriums van die W.N.N.R. 'n belangrike rol kan speel deur langtermynnavorsing van meer as suiwer akademiese belang aan te pak.

Heelwat sulke basiese navorsing is reeds onder beskerming van die nywerheid gedoen. In 'n poging om meer bekendheid aan sulke moontlikhede te verleen, het die Nasionale Fisiese Navorsingslaboratorium in samewerking met verteenwoordigers van die mynbedryf, 'n tweedaagse simposium oor „Onlangse Ontwikkelings i.v.m. Analitiese Metodes wat van belang is vir Raadgewende Metallurge in die Goud- en Uraanmynbedrywe” georganiseer. Die simposium is deur ongeveer 40 verteenwoordigers van die mynbedryf bygewoon; atoomabsorpsie-spektografie, die gebruik van uitwisselingsharse tesame met röntgenstraalfluorensiemetodes, en van radioaktiewe speurdermetodes by prosesbeheer, was onder die onlangse ontwikkelings wat bespreek is.

Hopelik sal hierdie en latere simposiums min of meer op dieselfde lees geskoei, tot 'n beter begrip lei van die rol wat die W.N.N.R. kan speel by die aanpak van basiese navorsing namens die nywerheid.

Fisika
Chemiese fisika

Die Nasionale Fisiese Navorsingsinstituut het in 'n aantal gevalle hulp aan die nywerheid verleen by die toepassing van fisiese metodes by die oplossing van vraagstukke i.v.m. chemiese ontledings. Sulke fisiese metodes (soos bv. spektroskopie en röntgenstraalfluorensie) gaan gewoonlik vinniger en is derhalwe beter vir prosesbeheer geskik as chemiese metodes.

Vanweë hierdie ontwikkelings is 'n eenheid vir *chemiese fisika* geskep in samewerking met die Nasionale Chemiese Navorsingslaboratorium, vir die meer intensiewe ontwikkeling van sulke metodes.

Radio-isotope

Radio-isotope is gebruik vir die oplossing van 'n aantal nywerheidsprobleme, veral in verband met 'n ondersoek van oseaanbewegings naby die kus; dit is van belang by beplanning met die oog op die wegruiming van rioolvuil uit groot kusstede, en ook van sand wat uit hawes uitgebagger is.

'n Reis is vir dr. M. Seligman van die International Atomic Agency (Atoombank) georganiseer om lesings te hou ten einde nyweraars in Suid-Afrika meer bewus te maak van die moontlikhede wat die toepassing van radio-isotope bied.

Lugbesoedeling

Hulp is aan die Regering verleen by die opstel van wetgewing wat dit moontlik sal maak om geskikter maatreëls te tref om die toenemende gevaar van rookmis in Suid-Afrikaanse stede te bestry.

Outomatisering

Toestelle om by berekenings te help, is ontwikkel met die doel om by navorsingwerk gebruik te word en dit te bespoedig. Instrumente vir die versameling van gegewens op geponste papierband is ontwikkel en in gebruik

RESEARCH IN THE NATIONAL RESEARCH LABORATORIES AND INSTITUTES

Research is undertaken in the Council's national research laboratories and institutes either on their own initiative, or at the request of industrial firms or agencies of central, provincial and local government. The aim of all research programmes is to open up the way to development of co-operative projects, in which industrial and other organizations combine with the Council in joint research ventures in their own and the national interest. Examples are given here of projects which illustrate the wide range of interests served by the Council.

In order to fulfil the many obligations which the Act of its establishment places upon the C.S.I.R., it is obvious that it must have in its laboratories scientists of the highest quality, and that to keep them in the organization they must be free to do basic research. This however also offers a unique opportunity to industry.

Basic research

There are few industrial laboratories whose resources are not entirely devoted to solving the day to day operational problems in the light of existing knowledge; but frequently existing knowledge is inadequate, thus pointing to a need for more basic research. It is here that the laboratories of the C.S.I.R. can play an important part in undertaking long-range research of more than purely academic interest.

A considerable amount of such basic research has already been done under the sponsorship of industry. In an effort to make such possibilities more widely known, the (N.P.R.L.) organized, in collaboration with representatives of the mining industry, a two-day symposium on "Recent Developments in Analytical Methods of Interest to Consulting Metallurgists in the Gold and Uranium Mining Industry". The symposium was attended by some 40 representatives of the mining industry; among other recent developments, atomic absorption spectroscopy, the use of exchange resins in conjunction with X-ray fluorescence methods, and of radioactive tracer methods in process control, were discussed.

It is hoped that this and further symposia along similar lines will lead to a better appreciation of the role which the C.S.I.R. can play in undertaking basic research on behalf of industry.

The N.P.R.L. has, in a number of instances, given assistance to industry in the application of physical methods to problems of chemical analysis. Such physical methods (as for example spectroscopy and X-ray fluorescence) are usually much more rapid, and therefore more suitable for process control, than chemical methods.

Physics
Chemical Physics

As a result of these developments a unit for *chemical physics* has been established in co-operation with the National Chemical Research Laboratory, for the more intensive development of such methods.

geneem, waardeur die gevaar van vertraging en die maak van foute wat by menslike berekenings dikwels voorkom, tussen die instrument en die reken-
outomaat uitgeskakel word.

Die gebruik van die elektroniese rekenoutomaat ZEBRA het in so 'n mate
toegeneem dat die aanskaffing van 'n groter masjien 'n dringende noodsaaklik-
heid geword het. Stappe om aan hierdie toestand die hoof te bied, is gedoen.

Chemie
Geochronologie

Soos in die vorige jaarverslag vermeld, is die bestudering van die ouderdom
van rotse van groot praktiese belang vir enige land waar die myne 'n belangrike
bedryf vorm, en langtermynnavorsing word deur die Nasionale Fisiese Navors-
singslaboratorium, die Nasionale Chemiese Navorsingslaboratorium en die
Bernard Price Instituut gesamentlik uitgevoer. Uiteindelik hang dié navorsing
af van hoogs noukeurige chemiese skeidings, en die ontleding van geringe spore
van sekere elemente uit rotsmonsters. Die Nasionale Chemiese Navorsings-
laboratorium het hom toegelê op die verbetering van erkende chemiese metodes
vir rotsmonsters van besondere belang vir Suid-Afrika, en kan minstens twee
gevalle meld waarin gedurende die afgelope jaar belangrike vordering gemaak is.

Ione-uitruilers

Hierdie stowwe is welbekend deur hul gebruik vir die sagmaak van water.
Hulle word ook gebruik vir die algehele verwydering van minerale uit water,
waardeur inderdaad 'n chemies gemaakte „gedistilleerde water” ontstaan; in
Suid-Afrika word hulle ook vir die winning van uraan gebruik. Vanweë die
moontlikheid van hul vervaardiging in Suid-Afrika het die werk in die Nasionale
Chemiese Navorsingslaboratorium i.v.m. die produksie van nuwe tipes ione-
uitruilers van meer belang geword. Die nuwe stowwe sal waarskynlik makliker
en goedkoper gemaak kan word, en hulle is net so goed as die tipes wat op die
oomblik vir die sagmaak en ontsouting van water verkrygbaar is. Dit wil ook
voorkom of hulle in 'n vorm wat vir uraanwinning geskik sal wees, gemaak sal
kan word.

Ensieme

In elke lewende organisme vind daar gedurig 'n magdom van chemiese
veranderings plaas, en hierdie veranderings word amper almal beheers deur
minieme hoeveelhede van stowwe wat as ensieme bekend staan. Die bestudering
van ensieme is dus 'n fundamentele vereiste vir biologie, geneeskunde en vee-
artsenykunde. Ensieme is egter baie ingewikkelde en maklik vernietigbare
stowwe en kom in sulke klein hoeveelhede voor dat daar weinig hoop op welslae
is tensy spesiale fasiliteite en metodes beskikbaar gestel word, en tensy daar
biochemici byderhand is wat opgelei is in die ingewikkelde, fyn hantering wat
nodig is om ensieme af te sonder en hul gedrag te bestudeer. Aangesien daar
geen fasiliteite vir hierdie soort werk in Suid-Afrika was nie, het die N.C.N.L.
hom ten doel gestel om as tenminste een sentrum te dien waar dit gedoen kon
word. 'n Belangrike prestasie gedurende die afgelope jaar was die voltooiing
en publikasie van 'n metode vir die afsondering van 'n belangrike plant-ensiem
in 'n suiwere toestand. Die hoeveelheid uit twintig pond plantmateriaal verkry,
was omtrent een tiende van 'n gram.

Fosfate

Die werk i.v.m. Phalaborwafosfate deur navorsingspersoneel van FOSKOR
in die N.C.N.L. aangepak, is voortgesit. Aandag is spesiaal gewy aan die pro-
duksie van superfosfaat uit konsentrate van pirokseeniet verkry, aangesien daar
feitlik 'n eindelose voorraad van hierdie materiaal is.

Radio-isotopes have been applied to the solution of a number of industrial problems, notably in an investigation of ocean movements near the coast; these are important in the planning for disposal of sewage from large coastal cities as well as of sand dredged from harbours.

Radio-isotopes

A lecture tour by Dr. M. Seligman of the International Atomic Agency was organized, in order to make industrialists in South Africa more aware of the possibilities in the application of radio-isotopes.

Assistance has been given to the government in preparing legislation which will make it possible to take more effective measures to combat the growing menace of smog in South African cities.

Air pollution

Computing aids have been developed with a view to assisting and speeding up research. Instruments for collecting data on punched paper tape have been developed and put into use, thus eliminating the delay and error hazard involved in human intervention between instrument and computer.

Automation

The use of the electronic computer ZEBRA has increased to such an extent that the acquisition of a larger machine has become an urgent necessity. Steps to meet this situation have been taken.

As discussed in last year's review, the study of ages of rocks is of great practical value to any country where mining is an important industry, and long-term research is being carried out jointly by the National Physical Research Laboratory, the National Chemical Research Laboratory and the Bernard Price Institute. Ultimately, the research depends upon highly accurate chemical separations, and analysis of small traces of certain elements from rock samples. The National Chemical Research Laboratory (N.C.R.L.) has concentrated upon improvement of accepted chemical procedures for rock samples of particular interest to South Africa, and is able to record at least two important advances made in the past year.

Chemistry
Geochronology

These materials are familiar in their use for water softening. They are also used for complete removal of minerals from water, giving, in effect, a chemically produced "distilled water"; in South Africa they are also used for recovery of uranium. In view of the possibility of manufacture in South Africa, work in the N.C.R.L. on production of new types of ion exchangers has assumed increased importance. The new materials promise to be easier and cheaper to make, and are as good as the types at present marketed for water softening and demineralization. There are also indications that they can be made in a form suitable for uranium recovery.

Ion Exchangers

In every living organism a host of chemical changes is always taking place, and practically every one of these is governed by minute quantities of substances

Enzymes

Plants being set out to dry in the drying room, prior to milling and testing for alkaloids.

Plante word in die droogkamer geplaas voordat hulle fynemaal en vir alkaloiëde inhoud getoets word.



Alkaloïede

Die werk onder die nagraadse nywerheidsnavorsingsbeurs deur die farmaseutiese firma Smith, Kline en French van Philadelphia, V.S.A., beskikbaar gestel, is tot die grootste tevredenheid van die beurstoekenners voortgesit en hulle het die beurs vir nog twee jaar verleng. 'n Groot aantal Suid-Afrikaanse plante is ondersoek wat hul alkaloïedinhoud betref, en groot monsters ekstrakte van verskeie daarvan wat 'n taamlike groot hoeveelheid alkaloïede bevat het, is na die V.S.A. gestuur vir farmakologiese beoordeling. Tot nog toe is nog geen stof van voldoende waarde vir die geneeskunde gevind om die eksploitasie daarvan te regverdig nie. 'n Interessante aspek van die navorsing is egter dat 'n aantal nuwe alkaloïede wat van waarde vir die wetenskap is, hul verskyning maak, en hulle sal goeie onderwerpe vir navorsing aan Suid-Afrikaanse universiteite wat in hierdie bepaalde onderwerp belangstel, uitmaak.

Kukurbitasiene

Navorsing i.v.m. hierdie baie giftige bestanddele van die komkommersfamilie is voortgesit in samewerking met die Afdeling Tuinboukunde. Gedurende die jaar het die senior beampte met die beheer oor hierdie werk belas, die Internasionale Konferensie oor die Chemie van Plantprodukte in Australië bygewoon, waarop die meeste van die vooraanstaande organiese chemici van die wêreld teenwoordig was. Sy verhandeling oor die werk van sy eie groep het heelwat belangstelling gewek en bespreking uitgelok.

Wolwesels

Navorsing in hierdie verband is weer deur die Wolraad ondersteun maar op 'n kleiner skaal as in die verlede. Nogtans is goeie vordering gemaak en is 'n begin met 'n nuwe benadering gemaak wat hopelik tot 'n beter kennis van die samestelling van wolwesels sal lei.

Waterontsouting

Die N.C.N.L. het verdere verbeterings in die ontwerp van 'n eenvoudige, sterk eenheid vir die elektrodialitiese ontsouting van water met 'n hoë mineraalgehalte aangebring. Drie van die toestelle is gebou en een daarvan is verskeie

called enzymes. Study of enzymes is therefore basic to biology, medicine, and veterinary science. Enzymes, however, are such complex and easily destroyed substances and occur in such small amounts that there is little hope of success unless special facilities and techniques are provided, and unless there are biochemists at hand with training in the complex and delicate manipulations needed to isolate enzymes and to study their behaviour. As facilities for this type of work were lacking in South Africa, it has been an objective of the N.C.R.L. to serve as at least one centre where it could be undertaken. A notable achievement of the past year was the completion and publication of a method for isolating an important plant enzyme in a pure state. The amount obtained from twenty pounds of plant material was about one-tenth of a gram.

The work on Phalaborwe phosphates carried out by research staff of FOSKOR in the N.C.R.L. has been continued. Attention has been specially devoted to production of superphosphate from concentrates derived from pyroxenite, since the reserves of this are practically unlimited.

Phosphates

The industrial research fellowship instituted by the pharmaceutical firm of Smith, Kline and French of Philadelphia, U.S.A., has been prosecuted in a manner highly satisfactory to the sponsors, and they have therefore undertaken to renew it for a further two years. A great number of South African plants have been tested for alkaloids, and large samples of extracts from several showing reasonably high alkaloid contents have been sent to the U.S.A. for pharmacological evaluation. Thus far, no substance of sufficient medical value for exploitation has turned up. An interesting side-line of the research, however, is that a number of new alkaloids of value to science are making their appearance, and these will furnish valid subjects for research at South African universities with an interest in this special field.

Alkaloids

Research on these highly poisonous constituents from the cucumber family continued, in collaboration with the Division of Horticulture. During the year, the senior officer in charge of the work attended the International Conference on Chemistry of Plant Products in Australia, at which most of the leading organic chemists of the world were present. His paper on the work by his own group gave rise to considerable discussion and interest.

Cucurbitacins

Research has been supported by the Wool Board on a smaller scale than in the past. Nevertheless, progress has been good and a new line of work has been started which it is hoped will lead to a better knowledge of the constitution of the wool fibre.

The N.C.R.L. has further improved the design of a simple, rugged unit for electro-dialytic desalting of highly mineralized waters. Three units have been built and one of these has been subjected to several months of testing under

maande op die proef gestel in toestand wat op 'n verafgeleë plaas aangetref sou kan word. Tot nog toe het geen onverwagte moeilikhede hul voorgedoen nie. Daar is nou een toestel op 'n plaas naby Upington waar die Departement Landbou-tegniese Dienste die water sal gebruik vir 'n langtermynproefneming i.v.m. die southeidsgrense vir vee.

Die groot installasie deur die mynmaatskappye by die Vrystaatse Geduldmyyn op Welkom, Oranje-Vrystaat, is tans reeds een jaar in werking as 'n gereelde produksie-installasie. Dit het tog nog 'n bietjie moeilikheid opgelewer en kon nie die prestasie bereik waarvoor dit ontwerp was nie. Party van die konstruksiemateriale wat eers goed beantwoord het, het na 'n paar maande se gebruik defek geraak. Dit wil voorkom asof die myngroepe nou minder waarde aan die installasie heg, aangesien die volume soutwater wat opgepomp moet word, aan die afneem is.

Meganiese ingenieurswese

Swigting van onderdele

Die Nasionale Navorsingsinstituut vir Meganiese Ingenieurswese het namens die nywerheid 'n toenemende aantal gevalle van swigting of swak werkverrigting van onderdele van masjiene, ens. ondersoek om te probeer vasstel wat die oorsaak daarvan was. Baie van hierdie ondersoekings het weer tot pogings gelei om beter ontwerpe te ontwikkel deur die gebruik van eksperimentele spanningsontledings en vermoeidheidstoetse. Die ondersoekings was o.a. in verband met verbeterde ontwerpe vir kables vir hysmasjiene vir die myne, rotsboorstawe wat verskillende warmtebehandelings ondergaan het, plaaslike vervaardigde motorkarvere, gesweiste spoorstawe en geïsoleerde lasplate.

Rotsbarstings

Die navorsing i.v.m. rotsbarstings en strataverskuiwing in diep goudmyne is voortgesit; besondere aandag is daarby geskenk aan verbetering van die tegniek van ontspanning om die frekwensie en strafheid van rotsbarstings te verminder. 'n Begin is ook gemaak met ondersoekings i.v.m. die gedrag van grond rondom steenkoolmynuitgrawings, met die oog op die vasstelling van betroubare maatstawwe vir die beplanning van ondergrondse werkplekke in die steenkoolmyne.

Toegepaste fisiologie

Hulp is aan die Kamer van Mynwese se Laboratorium vir Toegepaste Fisiologie verleen by die ontwikkeling van instrumente en toerusting om die warmte-uitwisseling tussen die menslike liggaam en sy omgewing te meet. Toerusting vir die meet van die warmteverlies van 'n liggaam deur konveksie is voltooi, en 'n radio-meterarm om liggaamsuitstraling te meet is amper klaar. Werk ter verbetering van 'n toestel om warmteverlies deur verdamping te meet, is voortgesit.

Mynskagstrukture

Die bestek van die navorsing wat vir die Kamer van Mynwese gedoen word i.v.m. die lugstroomweerstand van mynskagte is vergroot om ondersoeking in drie rigtings te koördineer nl. bestudering van die lugstroomweerstand wat toe te skrywe is aan konstruksies in ventilasieskagte, bestudering van die spannings in die staalwerk in mynskagte wat veroorsaak word deur die ophys van hysbakke in die skag, en bestudering van die moontlikheid van gebruik van hysbakke met leitoue in baie diep skagte. By laasgenoemde projek is 'n

conditions to be expected on a remote farm. Thus far, no unexpected difficulties have arisen. A unit is now sited at a farm near Upington, where the Department of Agricultural Technical Services will use the water for a long-term experiment on salinity limits for stock.

The large plant constructed by the mining companies at the Free State Geduld Mine at Welkom, Orange Free State, has been operated as a regular production plant during the past year. It has not been free from difficulty, however, and it has not been able to reach its designed capacity. In particular some of the materials of construction, which were satisfactory at first, have broken down after a number of months in service. The mining groups, however, are now inclined to place less emphasis on this plant, as the volume of saline water which has to be pumped to the surface is diminishing.

An increasing number of inquiries were carried out by the National Mechanical Engineering Research Institute, on behalf of industry, to establish the causes of failure or inferior performance of many components in service. Many of these led to investigations aimed at developing improved designs by the use of experimental stress analyses and fatigue tests. Investigations included work on improved designs for mine hoist ropes, rock drill rods heat-treated in various ways, locally manufactured car springs, welded rails and insulated fish plates.

Mechanical Engineering

Failures of components

Research into rock bursts and strata movement in deep level gold mining continued, particular emphasis being laid on improving the technique of destressing to reduce the frequency and severity of rock bursts. Investigations were also started into the behaviour of ground surrounding coal mine excavations, with the object of establishing reliable criteria for the design of underground colliery workings.

Rock bursts

The Applied Physiology Laboratory of the Chamber of Mines was assisted in the development of instruments and equipment for measuring the exchange of heat between the human body and its environment. Equipment to measure the convective heat loss from a body was completed, while a radiometer arm to measure body radiation was almost completed. Development work continued on an apparatus to measure the evaporative heat loss.

Applied physiology

The scope of research being carried out for the Chamber of Mines into the airflow resistance of mine shafts has been expanded to co-ordinate investigations in three directions, namely, the study of airflow resistance due to structures in ventilation mine shafts, the study of stresses in mine shaft steel work caused by the hoisting of conveyances in the shaft, and study of the possible use of rope-guided conveyances in very deep shafts. In the last project, correlation tests were commenced to compare behaviour in a full scale rope guide installation with behaviour in tests carried out on a scale model in a vertical wind tunnel.

Mine shaft structures

begin gemaak met korrelasietoetse om die gedrag van 'n volskaalse leitou-installasie te vergelyk met die gedrag tydens toetse op 'n skaalmodel in 'n vertikale windtonnel.

Afskuring van
pompe

Daar is goed gevorder met verskillende probleme wat in verband staan met die verwydering van enorme hoeveelhede troebel water uit diep goudmyne. Metodes vir die goedkoop maar doeltreffende verwydering van skadelike hoeveelhede vaste deeltjies in die water is verder ondersoek, en die optimum ontwerp vir 'n doeltreffende besinker is bepaal. Die ondersoekings is uitgebrei tot metodes vir die verwydering van die water uit die modder wat uit die besinker uitkom. Vaste deeltjies in suspensie in die water laat pompe en dergelike toerusting gou slyt. Derhalwe is verdere toetse uitgevoer om die invloed te bepaal wat die grootte van gesuspendeerde deeltjies op die slytasietempo van pompe het, en om gegewens te versamel oor die optimum graad van besinking wat nodig is voor die water gepomp word.

Hidromeganika

Twee groot projekte op die gebied van ingenieurswerk in kusgebiede is aangepak. Die eerste projek staan in verband met die riviermondingsprobleem by St. Lucia. Daar is 'n begin gemaak met die bou van 'n hidrouliese model van die riviermonding om te probeer om 'n praktiese metode te ontdek om 'n kanaal van die St. Luciameer na die see altyd oop te hou. Die werk word deur die Natalse Provinsiale Administrasie ondersteun. Die ander projek bring die konstruksie van 'n hidrouliese model van die Durbanse kusgebied mee waarop toetse uitgevoer sal word in 'n poging om 'n oplossing te vind vir Durban se strandwegspoeling- en hawetoeslikingsprobleem. Hierdie werk word gesamentlik deur die S.A. Spoorweë en die Durbanse stadsraad ondersteun.

Telekommunikasie
Tellurometer

Samewerking met Tellurometer (Eds.) Bpk. het voortgeduur in verband met die ontwikkeling van radio-instrumente vir landmeting en die noukeurige bepaling van posisies. Die geodetiese instrument wat in Kaapstad vervaardig is, was die eerste toepassing van die beginsels wat deur die Nasionale Instituut vir Telekommunikasieavorsing uitgewerk is. Dit word nou oorsee op verskillende gebiede vir direkte lynmeting gebruik. Meer onlangs is nuwe toepassings vir hierdie beginsels gevind in die vorm van instrumente in die lug en in die see, onderskeidelik Aerodist en Hydrodist genoem. Met die Aerodist kan afstande noukeurig gemeet word binne meetgebiede van meer as 100 myl, en gedurende onlangse proefnemings in die Verenigde Koninkryk kon die noukeurigheid van die stelsel nie behoorlik beoordeel word nie aangesien die noukeurigheid van die bestaande trigonometriese inligting onvoldoende vir die doel was. Die Hydrodist word hoofsaaklik vir hidrografiese opmetings gebruik. Dit is ook tydens oorsese proefnemings met bevredigende resultate beoordeel. Die gedetailleerde ingenieurswerk van hierdie twee stelsels was die verantwoordelikheid van die vervaardigers, maar die Instituut het 'n taamlike rol in die beginstadium gespeel. Hierdie nuwe toepassings en die ontwikkeling van 'n noukeurige stelsel van radioposisievasstelling toon hoe 'n basiese uitvinding ontwikkel kan word ten voordele van die elektronikanywerheid in Suid-Afrika.

Boukundige en
konstruksie-
ingenieurswese
Agteruitgang van
sement en beton

Met die oog op die groot ekonomiese belang van agteruitgang van beton en ander sementprodukte, is heelwat moeite gedoen om hierdie probleem te ondersoek.

Good progress was made in various problems associated with the removal of vast quantities of turbid water from deep gold mines. Methods for cheap but effective removal of detrimental quantities of solid particles in the water were investigated further, and the optimum design for an efficient settler was determined. Investigations were extended into methods of dewatering the sludge that is withdrawn from the settler. Solid particles suspended in the water lead to rapid wear of pumps and associated equipment. Further tests were therefore carried out to determine the influence of size of suspended particles on the wear rates of pumps, and to obtain data on the optimum degree of settling required before the water is pumped.

Abrasion of pumps

Two major projects in the field of coastal engineering have been commenced. The first project concerns the estuary problem at St. Lucia. Construction of a hydraulic model of the estuary was begun, to find a practical method of maintaining a permanently open channel from lake St. Lucia to the sea. The work is sponsored by the Natal Provincial Administration. The other project entails construction of a hydraulic model of the Durban coastal area, on which tests will be carried out to find a solution to the beach erosion and harbour siltation problem at Durban. This work is sponsored jointly by the S.A. Railways and the City Council of Durban.

Hydromechanics

Co-operation has continued with Tellurometer (Pty.) Limited in the development of radio instruments for survey and precise position fixing. The geodetic instrument manufactured in Cape Town was the first application of the principles developed in the National Institute for Telecommunications Research. It is now used overseas for direct line measurement in a wide variety of roles. More recently new applications for these principles have been found in the form of air and sea borne instruments known as Aerodist and Hydrodist respectively. Aerodist offers the possibility of accurate distance measurements at ranges in excess of 100 miles, and in the course of recent trials in the United Kingdom the accuracy of the system could not be fully assessed as the accuracy of existing trigonometrical information was inadequate for the purpose. Hydrodist finds its applications mainly in hydrographic survey. It also has been assessed in overseas trials with satisfactory results. The detailed engineering of these two systems was the responsibility of the manufacturers, but the Institute played a considerable part in the initial stages. These new applications and the development of a precise system of radio position fixing illustrate how a basic invention can be developed to the benefit of the electronics industry in South Africa.

Telecommunications
Tellurometer

In view of the great economic importance of deterioration of concrete and other cement products, considerable effort has been directed to the study of this problem.

Building and
Structural
Engineering
Deterioration of
cement and
concrete

Studies of the corrosion of reinforcing steel in concrete have enabled the National Building Research Institute to make certain recommendations for dealing effectively with this problem, and further investigations aimed at even

Bestudering van die verroesting van wapeningstaal in beton het die Nasionale Bounavorsingsinstituut in staat gestel om sekere aanbevelings te doen aangaande die doeltreffende hantering van hierdie probleem, en ondersoekings om die vraagstuk selfs nog beter die hoof te bied is aan die gang. Verskeie belangrike ondersteunde ondersoekings vir openbare owerhede is op hierdie gebied uitgevoer.

Die aantasting van beton en mortelsoorte deur aggressiewe stowwe soos sagtewater, en sulfate in die water of die grond, is deeglik ondersoek en aanbevelings om sodanige aantasting te verminder of te bestry is na aanleiding van talryke navrae gedoen. 'n Verhandeling oor hierdie werk is aan die vierde Internasionale Simposium oor die Chemiese Aspek van Sement voorgelê.

Huise vir
kleurlinge

Werk i.v.m. behuising is vanjaar toegespits op die spesiale probleem van huise vir kleurlinggemeenskappe en vir bejaarde blankes. Hierdie werk word deur die Nasionale Behuisingskommissie ondersteun. 'n Uitgebreide sosio-ekonomiese opname om die behuisingsvereistes van kleurlinge te bepaal, is deur die Nasionale Instituut vir Personeelnavorsing in sekere gebiede van die Westelike Kaapprovinsie gedoen. Met behulp van die gegewens deur hulle versamel, het die Nasionale Bounavorsingsinstituut 'n aantal planne vir huise ontwerp wat aan alle belangrike vereistes sal voldoen teen die laags moontlike prys. 'n Begin is met die bou van 'n aantal proefhuise gemaak om die deugdelikheid van die planne te toets, en ook om die uitvoerbaarheid van moontlike konstruksietipes, veral wat mure, vloere en plafonne betref, te bepaal. Hand aan hand met hierdie werk is hulp aan verskeie munisipaliteite verleen by die aanleg en ontwerp van dringend benodigde behuisingskemas vir kleurlinge.

Hospitaalnavorsing

Navorsing i.v.m. die ontwerp van hospitaalgeboue, ondersteun deur die vier Provinsiale Administrasies en die Departement van Gesondheid, het o.a. spesiale bestudering van sentrale steriele toevoer, sentrale babavoeding, die röntgendepartement en operasiesale omvat.

Die oorspronklike plan was dat die hele navorsingsprogram hom met hospitaalgeriewe vir die Bantoe sou besig hou, maar namate die werk gevorder het, het dit duidelik geword dat die konsep van 'n rasonale benadering van die beplanning en die ontwerpbeginsels wat uit die studiewerk afgelei is met ewe veel reg op hospitaalgeriewe vir enige ander rassegroep toegepas sou kan word. 'n Belangrike ontwikkeling was die versoek van die Transvaalse Provinsiale Administrasie om hulpverlening by die beplanning van die voorgestelde hospitaal vir blankes op Carltonville. Hierdie hulp word verleen in oorleg met die argitekte aan wie die bouwerk opgedra is, sodat die meeste voordeel uit die navorsingsbevindings van die vroegste planstadium af getrek kan word.

Omdat hierdie probleem so besonder dringend was, is ook 'n begin gemaak met die ontleding van die vereistes wat beplanning betref vir hospitale vir sielsieke Bantoes.

Geboue vir
tegniese opleiding

Na skatting sal die Departement van Onderwys, Kuns en Wetenskap gedurende die volgende tien jaar meer tegniese as alle ander soorte skole—handels-, industriële en spesiale hoërskole—bymekaar, bou. 'n Nuwe projek, deur die Departement ondersteun, is derhalwe aangepak om die beplanning van tegniese

more effective control are in progress. Several important sponsored investigations for public authorities were carried out in this field.

The attack on concrete and mortars by aggressive agencies such as sulphates in water or in the soil and soft water has been intensively investigated and recommendations to reduce or control such attack have been made in response to numerous enquiries. A paper on this work was presented to the fourth International Symposium on the Chemistry of Cement.

Work on housing during this year was concentrated on the special problems of housing for the Coloured communities and housing for aged Europeans. This work is being sponsored by the National Housing Commission. An extensive socio-economic survey to assess the housing requirements of Coloureds was carried out in selected areas of the Western Cape Province by the National Institute for Personnel Research. Using this information, a number of house plans were developed by the National Building Research Institute in order to meet all the important requirements at the lowest cost. Construction of a number of experimental houses was started in order to test the validity of the plans, and also to establish the feasibility of possible types of construction, particularly regarding walls, floors and ceilings. Parallel with this work, assistance was given to various municipalities in the layout and design of urgently needed housing schemes for Coloureds.

Housing for
Coloureds

Research on the design of hospital buildings, sponsored by the four Provincial Administrations and the Department of Health, included special studies on central sterile supply, central infant feeding, the X-ray department, and operating theatres.

Hospital research

Originally, the whole research programme was intended to relate to hospitalization for the Bantu but, as the work progressed, it became clear that the concept of a rational approach to planning and the principles of design which evolved from the studies, could validly be applied to hospitalization for any racial group. An important development was the request from the Transvaal Provincial Administration for assistance in planning the proposed European hospital at Carltonville. This assistance is being provided in consultation with the architects who were commissioned for the building, so that the greatest benefit can be obtained from research findings from the very early stages in planning.

Because of the special urgency of this problem, analytical work was also undertaken on the planning requirements of mental hospitals for the Bantu.

It has been estimated that over the next ten years the Department of Education, Arts and Science, will build more Technical Schools than schools of all other types added together—such as Commercial, Industrial, and Special High Schools. A new project, sponsored by the Department, was therefore undertaken to investigate the planning of Technical Colleges and Schools, with particular reference to efficient functional design to suit educational

Buildings for
technical training

kolleges en skole te ondersoek, veral met betrekking tot doeltreffende funksionele ontwerp om by onderwysmetodes en klimaat aan te pas, en ook tot die verskaffing van geboue teen 'n redelike prys. 'n Voorlopige ondersoek het aan die lig gebring dat meer as die helfte van die oppervlakte van bestaande skole vir die werkwinkels gebruik word en dat ook meer as die helfte van die uitgawes vir hul rekening gaan. Gevolglik word die aanvanklike navorsing toegespits op die ruimte vir die verskillende soorte werkwinkels vir opleiding in die verskillende ambagte vereis.

Klimatologie in die boukunde

Studies in die verlede i.v.m. probleme verbonde aan die funksionele ontwerp van geboue in verhouding tot hul plaaslike fisiese omgewing, het tot die gevolgtrekking gelei dat dit, om hierdie werk voort te sit, nodig sou wees om 'n groot aantal klimaatsparameters te meet oor 'n tydperk van minstens 5 jaar, en ook om die toestand binne-in proefhuise in dieselfde buurt te meet. Op hierdie manier sou dit moontlik wees om die verhouding tussen binne- en buitetoestande te bepaal vir gebruik by ontwerpwerk met die oog op ventilering, dagverligting en warmtegerief. Op hierdie manier sou ook metodes uitgewerk kan word vir die ontleding en weergawe van klimatologiese gegewens in 'n vorm wat geskik sou wees vir gebruik deur argitekte. Vir hierdie doel is daar 'n meteorologiese pos en 'n paar proefgeboue op die Scientia-terrein opgerig en toepaslik ingerig. Spesiale instrumente is vir hierdie projek ontwikkel; 'n opmerkenswaardige kenmerk is dat alle metings outomaties en regstreeks gekodeer en op ponsband gedruk word wat in die W.N.N.R. se elektroniese rekenoutomaat verwerk kan word. Sodoende kan 'n menigte metings vinnig ontleed word en word die presiese gegewens in 'n geskikte vorm verkry. Sekere oorsese meteorologiese dienste het heelwat belangstelling vir hierdie instrumentasieselsel aan die dag gelê.

Bou-ekonomie

Studies i.v.m. bou-ekonomie het hoofsaaklik die versameling en ontleding van gegewens oor belegging in die boubedryf in Suid-Afrika en die uitgawes in verband daarmee, oor die afgelope paar jaar, gedek. Hulle het o.a. 'n ontleding van die hoeveelhede en waarde van geïmporteerde materiale en dele omvat. Die hoofdoel van hierdie studies is om 'n agtergrond van feite beskikbaar te stel vir die bou- en konstruksiebedryf as 'n hulpmiddel vir die beplanning en beoordeling van die navorsingswerk van die Nasionale Bounavorsingsinstituut op hierdie gebied, en ten slotte, die doeltreffende toepassing van die resultate van hierdie werk.

Paaie Padveiligheid

Om meer besonderhede omtrent die Republiek se padongelukkebeeld te verkry, is dit nodig om oor inligting te beskik betreffende die verband waarin die blootstellingsrisiko staan met die jaarlikse mylafstand deur die verskillende kategorieë motorbestuurders en ook die mylafstande jaarliks deur verskillende soorte voertuie afgelê. Aangesien hierdie soort statistiese inligtings nie uit normale bronne verkry kan word nie, word 'n poging aangewend om hulle deur middel van 'n vraelys (antwoord betaal) aan voertuigeienaars gerig, in te win.

Die eerste deel van hierdie vraelys handel oor die mylafstande gedurende die afgelope twaalf maande deur die voertuig in stedelike en plattelandse gebiede afgelê. Die tweede deel betref die bestuurder van die voertuig; besonderhede word daarin gevra omtrent ouderdom, geslag, ras, beroep, normale woonplek, jaar waarin rybewys uitgereik is, mylafstand as bestuurder van verskillende soorte voertuie afgelê en die aantal ongelukke waarin betrokke.

methods and the climate, and also to providing buildings at a reasonable cost. A preliminary investigation showed that over half the area of existing schools is utilized for the workshops, which also account for over half the cost. Consequently, the initial research is being devoted to space requirements for the various types of workshops needed for training in the different trades.

Past studies on problems of the functional design of buildings in relation to local physical environment lead to the conclusion that for further progress in this work it would be necessary to measure a large number of climatic parameters over a period of 5 years or more, and also to measure the indoor conditions in experimental structures in the same vicinity. In this way it would be possible to establish relationships between indoor and outdoor conditions for use in design for ventilation, day-lighting and thermal comfort. Methods of analyzing and presenting climatological data in a form suitable for use by building designers could also be determined in this way. With these objects in view, a meteorological station and some experimental buildings were erected at Scientia and suitably equipped. Special instrumentation was developed for this project; a noteworthy feature is that all measurements are automatically and directly coded and impressed on punch tape which can be used in the C.S.I.R.'s electronic computer. In this way the numerous measurements made can be rapidly analyzed in order to provide the precise data required in an appropriate form. Considerable interest in this system of instrumentation has been shown by certain overseas meteorological services.

Building
climatology

Studies in building economics were mainly concerned with the collection and analysis of data on investment in, and expenditure on, the building industry in South Africa during recent years. They included an analysis of the quantities and values of materials and components imported into the Union. The primary object of these studies is to provide a factual background for the building and construction industry, as an aid both to the planning and assessment of the National Research Institute's research activities in this field, and to the effective implementation of the results of these activities.

Building economics

To obtain more detail in the Union's road accident picture, it is necessary to have information on the exposure risk in terms of annual mileages travelled by different classes of drivers, and also on mileages covered annually by different classes of vehicles. As this type of statistical information is not available from the normal sources, an attempt is being made to obtain it by a reply-paid questionnaire to vehicle owners.

Roads
Road safety

The first part of this questionnaire concerns the mileages covered by the vehicle in urban and rural areas during the past twelve months. The second part concerns the driver of the vehicle; it asks for information on age, sex, race, occupation, normal place of residence, year of issue of driver's licence, mileages covered as driver of different classes of vehicles, and number of accidents involved.

All vehicle owners registered in the Pretoria Licensing area have been

Vir die eerste opname is alle geregistreerde voertuigeienaars in die Pretoriase lisensiegebied gekies, en 73,000 vraelyste is aan hulle gepos. As die resultate van hierdie opname gunstig is, is dit die plan om dit tot ander groot stede uit te brei en so 'n beeld vir die hele Republiek te verkry.

Tegnologie van die aanbring van bitumineuse bolae

'n Nuwe kenmerk van die werksaamhede van die onderafdeling Bitumineuse Materiale gedurende die afgelope jaar, was die instelling van 'n onderrigkursus vir ingenieurs oor bitumens, teer en bitumineuse padbolae. Twee kursusse wat in die winter van 1960 gegee is, is deur ongeveer 70 ingenieurs bygewoon. Die kursus duur een week en omvat lesings, demonstrasies en besoeke aan proefpaaie. Die welslae met hierdie eerste twee kursusse behaal, skyn daarop te dui dat die instituut elke jaar so'n kursus sal reël.

Die ontwerp van bolae op pasaangelegde paaie

Die eerste groot volkskaalse padproefneming om veelvoudige verseëling vir die oppervlak van 'n nuwe pad te ondersoek, is op 'n gedeelte van die nasionale pad naby Standerton uitgevoer. 'n Tweede, soortgelyke proefneming om dieselfde metodes in 'n gebied met 'n ander klimaat te ondersoek, is op 'n gedeelte van die nasionale pad ten noorde van Malmesbury, Kaap, uitgevoer. Hopelik sal uit hierdie stukke proefpad nadat daar 'n paar jaar verkeer oor hulle gegaan het, waardevolle inligting afgelei kan word oor die gedrag, duur en koste van verskillende soorte bolae, en sal hulle van nut wees by die opstel van standaard-spesifikasies vir nuwe padbolae.

Spesiale padfondamentprobleme

Twee bepaalde werksaamhede i.v.m. padfondamente het spesiale ondersoekwerk vereis wat in samewerking met die Provinsiale Administrasies uitgevoer is. Die vraag hoe die sterkte van 'n bestaande padfondament bereken kan word, het gedurende die jaar ontstaan toe die Oranje-Vrystaatse Administrasie aan die Instituut gevra het of verskeie baie groot ondeelbare laste oor bestaande paaie vervoer kan word sonder gevaar dat die padfondamente daardeur beskadig sal word. 'n Ondersoek ter plaatse is gedoen en 'n verslag oor die algemene vraagstuk van die uitwerking van oorbelasting is aan die Administrasie gestuur.

In Natal is uitgebreide ondersoekings gedoen om die oorsaak van barsvorming in groot stukke van die hoofpad tussen Durban en Pietermaritzburg te probeer vasstel. Die onderhoud van hierdie pad het 'n dringende probleem geword en dit sal waarskynlik 'n aansienlike bedrag kos om die moeilikheid te oorwin. Hoewel die ondersoekings nog nie klaar is nie, is 'n voorlopige verslag oor die oorsaak van die barsvorming reeds ingedien. Verskillende behandelings om die gebrek te herstel is toegepas op 'n paar proefstukke van die pad wat voortdurend dopgehou word.

Raad is ook gegee i.v.m. die ontwerp vir 'n ander pad in dieselfde gebied om te verseker dat dieselfde soort gebrek nie weer voor sal kom nie.

Oorstromings- en spoelsteuringsmeter vir brûe

Op versoek van die Natalse Provinsiale Administrasie is 'n outomatiese meter wat met 'n battery werk, en waarmee oorstromings- en spoelsteuringshoogtes gemeet kan word, vir hulle ontwerp en gebou. Dit het gevolg op die nuttige resultate deur die Instituut verkry by sy ondersoekings i.v.m. die spoelsteuringdiepte rondom brugcaissons en walle, gedurende die ernstige oorstromings in Mei 1959. Die eerste meter is nou by die Toegelarivierbrug in Natal geïnstalleer en sal outomaties begin registreer sodra die water 'n sekere hoogte

selected for the first survey, and 73,000 questionnaires have been posted to them. If the results from this survey are satisfactory, the intention is to extend it to other large centres, so as to build up a picture for the whole Republic.

A new feature of the Bituminous Materials Division's activities in the past year has been the inauguration of a course of instruction for engineers on the subject of bitumens, tars and bituminous road surfacings. Two courses were given in the winter of 1960, which were attended by nearly 70 engineers. The course lasts one week and comprises lectures, demonstrations and visits to road experiments. From the success of these first two courses it is clear that they will become an annual feature of the Institute's work.

Bituminous
surfacing
technology

The first major full-scale road experiment to investigate multiple sealing for surfacing on new construction was carried out on a portion of the national road near Standerton. A second, similar experiment to investigate the same methods in another climatic area was conducted on a section of the national road north of Malmesbury, Cape. It is hoped that, after some years under traffic, these experimental sections will give valuable information on the performance, life and cost of surfacings of various types, and help with the drawing up of standard specifications for new road surfacings.

The design of
surfacing on newly
constructed roads

Two particular activities concerning road foundations have entailed special investigations carried out in collaboration with Provincial Administrations. The problem of estimating the strength of an existing road foundation came to the fore during the past year, when the Orange Free State Administration asked for advice on whether several excessive indivisible loads could be transported over existing roads without fear of damage to the road foundations. A site investigation was made and a report on the general problem of the effects of overloading was submitted.

Special road
foundation problems

In Natal, extensive investigations were made to find the cause of the widespread cracking of the Durban-Pietermaritzburg main road. The problem of maintenance measures for this road has become very urgent and considerable expenditure may be required to remedy the trouble. Although the investigation is not yet complete, a preliminary report on the cause of the cracking has been submitted. Different remedial treatments have been applied to a few trial lengths of road and these are under observation.

Advice has also been given on the design of the foundation for another road in the same area to ensure that a repetition of the same type of failure will not occur.

At the request of the Natal Provincial Administration an automatic battery-powered flood and scour level recorder was designed and built for them. This follows the useful results obtained by the Institute in the investigations into scour depth around bridge caissons and embankments in the severe flood of May, 1959. The first recorder has now been installed at the new Tugela River Bridge in Natal and will automatically come into operation when the water level reaches a predetermined height. It is hoped that similar recorders will

Flood and scour
recorder for
bridges

bereik. Hopelik sal dergelike meters ook by ander brûe aangebring word en waardevolle gegewens oor 'n tydperk van verskeie jare versamel kan word, wat in die toekoms weer van nut sal wees by die ontwerp van fundamente vir ander brûe oor riviere waarvan verwag kan word dat hulle partykeer sterk sal afkom.

Water
Rivieropnames

Fundamentele navorsing i.v.m. die biochemie van rioolvuil, riooluitvloeiensels en afsaksels op die bodem van riviere en damme, wat deur die Nasionale Instituut vir Waternavorsing aangepak is, is daarop gemik om rioolvuil- en selfsuiweringsprosesse beter te leer verstaan; 'n beter begrip sal tot meer ekonomiese gebruik van Suid-Afrikaanse watervoorrade lei.

Metodes en tegnieke word uitgewerk om die afsaksels op die bodem van riviere en damme te klassifiseer uit die oogpunt van algemene chemie en veral van kolloidale chemie. Klassifikasietegnieke is op die proef gestel op 'n aantal moddersoorte met die oog op aanvulling van die chemiese en fisiese gegewens vir die basiese beoordeling wat sulke modders vereis. So 'n klassifikasie moet rivierskeikunde in die algemeen en selfsuiwering van strome in die besonder weergee.

Metodes vir die beoordeling van die ekologiese betekenis van bakterieë in riviere word bestudeer en ontwikkel. Dit sal ons 'n beter begrip gee van riviere in hul natuurlike toestand en van die invloed van eksterne faktore op daardie toestand soos bv. organiese besoedeling.

Hydrobiologie

'n Nuwe projek, wat gesamentlik deur die Departement Natuurbewaring (van die Transvaalse Provinsiale Administrasie) en die Nasionale Instituut vir Waternavorsing uitgevoer word, vereis bestudering in die laboratorium van die invloed van omgewingsfaktore (soos bv. temperatuurruiterstes, opgeloste suurstof, pH en stroomsnelheid) op die voortbestaan van visse en ander waterdiere. Werk wat gedoen word, sal die gegewens verskaf wat nodig is om proewe uit te werk vir die beoordeling van die uitwerking van die wisselwerking tussen hierdie faktore en besoedelingstowwe op die dierelewe in riviere.

Afvoer van
afvalwater
in die see

Veldtoetse met verskillende soorte speurders het bemoedigende resultate van kwalitatiewe aard opgelewer by die beoordeling van stromings in die brandersone. Daar word nou getrag om die vloeiensnelheid van hierdie stromings, sowel as hul verspreidings- en verdunningsfaktore ten opsigte van ontlastings in die brandersone, kwantitatief te bepaal.

Die Waterwet

By die toepassing van die Waterwet word rivieropnames deur die Nasionale Instituut vir Waternavorsing gedoen om basiese gegewens te versamel waarop spesifikasies vir afvalwater gebaseer kan word. Gedurende die jaar is hierdie opnames aansienlik uitgebrei. Dit was moontlik weens verbetering van die personeelposisie. Die verbetering sal egter slegs tydelike verligting bring aangesien die hoeveelheid werk steeds toeneem. Daar was sewe Reëlingskomitees wat adviesdienste in verband met afvalwaterprobleme aan verskillende nywerhede verleen het.

Die Suid-Afrikaanse Buro vir Standaarde het baie werk vir die Departement Waterwese gedoen wat betref aanbevelings vir kwaliteitstandaarde vir afvalwater van die nywerhede.

be installed at other bridges and that useful data will be accumulated over a period of several years to assist in the design of foundations for future bridges over rivers liable to occasional excessive flooding.

Fundamental research into the bio-chemistry of sewage, sewage effluents and bottom deposits of rivers and dams, which has been initiated by the National Institute for Water Research, is aimed at a better understanding of sewage and self-purification processes; this in turn will result in better economy of South African water supplies.

Water
River surveys

Methods and techniques are being developed to classify bottom deposits of rivers and dams from a colloid chemical and otherwise fundamental chemical point of view. Classification techniques were tried out on a number of muds in order to supplement chemical and physical data required for the basic assessment of such muds. Such a classification is required to interpret river chemistry in general and self-purification of streams in particular.

Methods of assessing the ecological significance of bacteria in rivers are being studied and developed. This will afford us a better understanding of rivers under their natural conditions and of how such conditions are influenced by external factors, like organic pollution.

A new project, conducted jointly by the Department of Nature Conservation (of the Transvaal Provincial Administration) and the National Institute for Water Research, involves laboratory studies on the influence of environmental factors (such as extremes of temperature, dissolved oxygen, pH and current velocity) on the survival of fish and other aquatic animals. Work which is in progress will provide the data necessary for developing experiments to assess the effects of the interaction of these factors and polluting substances on the fauna of rivers.

Hydrobiology

Field tests with various tracers have yielded encouraging results of a qualitative nature in assessing currents within the surf zone. Work is proceeding to assess quantitatively the rate of flow of these currents, and the dispersion and dilution factors afforded by these currents with effect on discharges into the surf zone.

Marine disposal
of effluents

In implementation of the Water Act, river surveys are undertaken by the National Institute for Water Research to provide basic information on which specifications for effluents can be based. During the year these surveys were considerably extended. This was possible because of an improvement in the staff position. The improvement will however bring temporary relief only, as the volume of work is continuously increasing. There were seven Steering Committees for advisory services to various industries on effluent problems.

Water Act

The South African Bureau of Standards has done extensive work for the Department of Water Affairs in connection with recommendations for standards of quality for industrial effluents.

Verwerking van
munisipale afval
tot kompos

Ondersoekings i.v.m. die biologiese verwerking van munisipale afval in 'n grootskaalse gemeganiseerde installasie vir die produksie van kompos, is amper voltooi. Die W.N.N.R. het 'n lisensie aan 'n ingenieursfirma verleen om installasies te maak waarin die hoofkenmerke van die proefinstallasie ingebou is. Die Johannesburgse Stadsraad het op hul geneem om te ondersoek of dit lonend sal wees om verkoopbare voorwerpe uit afval te red; die Durbanse stadsraad het hom bereid verklaar om die ontwatering van rioolslyk te ondersoek omdat dit 'n uiters belangrike faktor in munisipale komposbereiding is; en die Departement Landboutegniese Dienste het veldtoetse i.v.m. die eindproduk gedoen. Al bogenoemde fasette is in een omvattende program gekoördineer.

Voeding
Opnames i.v.m. die
voedingstatus van
die bevolking

Die beskikbare feite omtrent die voedingstatus van die bevolking van Suid-Afrika is baie onvolledig. Doeltreffende voedingsprogramme moet op grondige wetenskaplike kennis van die voedingstatus van die verskillende rasse-, ouderdoms- en geslagsgroepe gebaseer wees.

'n Volledige opname van die voedingstatus moet die volgende omvat: bestudering van die voedselgewoontes en die inname van verskillende voedingstowwe, 'n kliniese ondersoek, bepaling van die gehalte aan sekere stowwe in die bloed en die urine, besonderhede van lengte, gewig en sekere ander liggaamsmate, en indien nodig geag, ook 'n röntgenondersoek van die mate van vervanging van polskraakbeen deur been by die jonger leeftydsgroepe. Die Nasionale Voedingnavorsingsinstituut het heelwat aandag bestee aan die beoordeling en standaardisering van die metodes waarvolgens hierdie opnames geskied. Verskeie opnames is reeds gedoen, bv. in plattelandse Bantoegebiede in die Westelike Transvaal, in 'n stedelike Bantoelekasie en onder blanke skoolkinders in Pretoria. Bowendien is besonderhede van die lengte en gewig van ongeveer 600 kleuterskoolkinders in Pretoria versamel.

Hierdie opnames sal uiteindelik gegewens verskaf waarop gegronde aanbevelings vir die verbetering van die voedingstatus van die verskillende bevolkingsgroepe gebaseer sal kan word.

Kliniese navorsing

Gedurende die afgelope jaar is die navorsing i.v.m. die voedingsiekte Kwashiorkor voortgesit. Die N.V.N.I. se ondersoekings het hoofsaaklik in verband gestaan met die voorkoming van die siekte en die verlaging van die betreklik hoë sterftesyfer in die akute stadium.

Voedselnavorsing

Die N.V.N.I. het sy ondersoekwerk i.v.m. die verskillende aspekte van Suid-Afrikaanse voedsels voortgesit. Aangesien mielies verreweg die belangrikste voedselsoort is wat in Suid-Afrika geëet word, speel dit natuurlik 'n verneme rol by die ondersoekings.

Werk i.v.m. die gehalte aan voedingstowwe in die verskillende voedsels is voortgesit en het 'n uitgebreide ondersoek namens die Raad van Beheer oor die Mielienywerheid ingesluit om die betreklike waarde van die verskillende standaardgrade mieliemeel as voedsel vir menslike gebruik te bepaal. Aandag is bestee aan 'n studie van die metodes vir die beoordeling van die mikrobiologiese toestand van stapelgraanvoedsels, en veral mielies. Daar is goed gevorder met die bestudering van geskikte versuringsprosesse vir die industriële produksie van die tradisionele Bantoe drank wat van mielies of kaffer koring gemaak word.

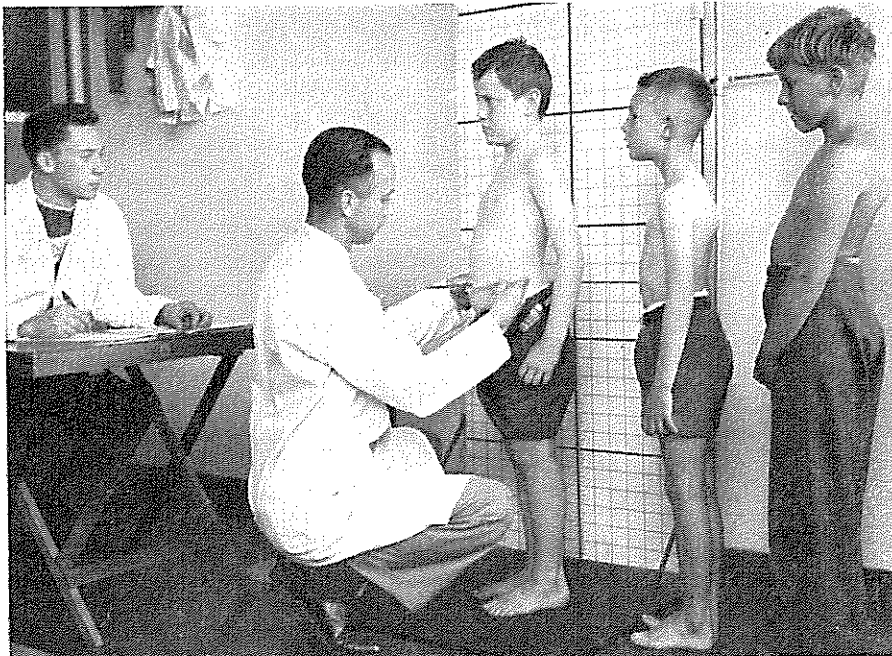
Investigations into the biological processing of municipal wastes in a large-scale mechanized plant, to produce compost, are nearing completion. An engineering firm has been granted a licence by the C.S.I.R. to manufacture plants embodying the main features of the pilot plant. The Johannesburg City Council undertook to study the economics of salvaging marketable items from refuse; Durban City Council agreed to investigate sewage sludge dewatering, which is an extremely important factor in municipal composting; and the Department of Agricultural Technical Services conducted field tests on the final product. All the afore-mentioned facets were fully co-ordinated in one comprehensive programme.

Composting of municipal waste

The available data on the nutritional status of the population of South Africa are very incomplete. Effective nutrition programmes must be based on sound scientific knowledge of the nutritional status of the various racial, age, and sex groups.

Nutrition
Surveys of the nutritional status of the population

A complete nutritional status survey consists of study of the food habits and the intake of various nutrients, a clinical examination, determination of the levels of certain substances in the blood and urine, survey of heights and weights and of various other body measurements, and may also include an X-ray investigation of the rate of ossification of the carpal bones in the younger age groups. The National Nutrition Research Institute has devoted considerable attention to the evaluation and standardization of the methods of carrying out these surveys. Several surveys have already been conducted, for example in rural Bantu areas in the Western Transvaal, in an urban Bantu location and among European school children in Pretoria. In addition, an investigation of the heights and weights of approximately 600 nursery school children in Pretoria has been carried out.



Die liggaamsmate van kinders word deur N.V.N.I. bepaal.

Body measurement of children being taken by the N.N.R.I.

Beoordeling van die voedingswaarde van voedsel

Die werk i.v.m. die beoordeling van die voedingswaarde van voedsels met gebruikmaking van laboratoriumdiere, is voortgesit. Daar is getrag om die metode vir die bepaling van die proteïenwaarde van voedsels verder te vereenvoudig, met die oog op die gebruik daarvan by die soektog na beter bronne van goedkoop voedselproteïene vir nie-blanke kinders in Suid-Afrika.

'n Paar jaar gelede is heelwat werk gedoen om die waarde van reukloos gemaakte vismeel (vismeelblom) as 'n proteïensupplement te bepaal. Gedurende die afgelope jaar is aandag bestee aan die waarde van vismeelblom as 'n bron van minerale. Hierdie werk het aan die lig gebring dat die mengsel van minerale wat in sekere soorte vismeelblom aanwesig is, nie voldoende is om „normale” groei by jong rotte teweeg te bring of om hulle gesond te hou nie. Byvoeging van kalium by die vismeelblomminerale het tot 'n duidelike verbetering in die groeiselheid en die gesondheidstoestand gelei.

Diagnose van stofwisselingsveranderinge waarmee hartdegenerasiekwale in verband staan

Koronêre trombose is die vernaamste oorsaak van sterfgevallen onder middeljarige en bejaarde blanke mans in Suid-Afrika, en die vroeë diagnose van die bestaan van veranderinge in die stofwisseling wat tot 'n te vroeë hartaanval lei, vorm nog altyd een van die moeilikste vraagstukke vir die geneesheer.

Die hoë lewenstandaard in Suid-Afrika en sekere ander lande, gekenmerk deur 'n oorfloed van voedsel en die neiging om te veel te eet, skyn 'n taamlike groot faktor te wees in die veroorsaking van versteurde stofwisseling. Dit is byvoorbeeld bekend dat 'n normale koolhidraatmetabolisme onontbeerlik vir normale vetmetabolisme is en dat stuiting van eersgenoemde tot 'n hoë gehalte aan vet in die bloed lei.

Die koolhidraat- en vetmetabolisme van verskillende groepe mense in Suid-Afrika is deur die N.V.N.I. bestuurder om die mate van verandering wat in hul stofwisselingsprosesse mag plaasvind, te beoordeel. Daar is bevind dat die koolhidraat- en vetmetabolisme van omtrent 30 persent van die klinies normale blanke mans van oor die 30 jaar wat bestudeer is, abnormaal was. By 'n ooreenstemmende Bantogroep en by blanke mans en vrouens onder die 30 jaar was daar geen teken van dié abnormaliteit nie. 'n Ontwrigte koolhidraat- en vetmetabolisme is by elkeen van verskeie mense wat reeds 'n aanval van koronêre trombose gehad het, aangetref.

Personeel Keuring van arbeidskragte

Die dienste van die Nasionale Instituut vir Personeelnavorsing dek tans 'n wye psigologiese en territoriale veld. Hierdie jaar veral was gekenmerk deur aansienlike uitbreiding van die personeelkeuring vir plaaslike sekondêre nywerhede en die staatsdiens, en van beroepsvoorligting aan die publiek. Die neiging by die keuring van blanke personeel was om meer gebruik van keuringmetodes te maak vir aanstellings in administratiewe en bestuursposte. 'n Belangrike projek is vir die Suid-Afrikaanse Spoorweë en Hawens uitgevoer; dit het bestaan in die keuring by die opleidingsentrum in Esselenpark van leerlinge vir die bekleding van administratiewe poste in die toekoms. Die grootste deel van die werk wat gedoen is, was egter vir die kleiner nywerhede in die Unie.

Dienste i.v.m. die gebruikmaking van arbeidskragte

Voorkeur is verleen aan studies i.v.m. taakbeskrywing en taakwaardering. Een van die oogmerke was om 'n meer rasonele, minder subjektiewe grondslag vir taakontleding uit te werk. Daar was egter groot vraag na toegepaste werk.

These surveys will eventually yield data on which sound recommendations for the improvement of the nutritional status of the various population groups can be based.

During the past year further research has been carried out in connection with the nutritional disease known as Kwashiorkor. Investigations by the N.N.R.I. have been concerned mainly with the prevention of the disease and the reduction of the comparatively high mortality rate in the acute stage.

Clinical research

The N.N.R.I. continued its investigations into various aspects of South African foodstuffs. Maize being by far the most important food item consumed in South Africa, it of necessity featured prominently in these investigations.

Work on the nutrient content of foods was continued and included an extensive investigation, on behalf of the Mealie Industry Control Board, to determine the relative value of the various standard grades of mealie meal as human food. Attention was given to a study of methods for the evaluation of the microbiological state of staple cereal foods, particularly maize. Good progress was also made in studies of souring processes suitable for the industrial manufacture of traditional Bantu beverages, which are based on maize or kaffir corn.

Work in the N.N.R.I. continued on assessment of the nutritive value of foods with the aid of laboratory animals. Further investigations were made into simplification of the method for determining the protein value of foods, with a view to using it in the search for better sources of low cost dietary protein for non-European children in South Africa.

Assessment of the nutritive value of foods

In previous years, considerable work was done to evaluate deodorized fish meal (fish flour) as a protein supplement. In the past year attention was paid to the value of fish flour as a source of minerals. This work revealed that the mixture of minerals present in certain fish flours is unable to support "normal" growth and health in the young rat. Supplementation of the fish flour minerals with potassium led to a marked improvement in growth rate and state of health.

Coronary thrombosis is the number one killer of middle-aged and elderly European men in South Africa, but it is still a major problem for the physician to diagnose in time the existence of the metabolic changes that lead to a premature heart attack.

Diagnosis of metabolic changes associated with degenerative heart disease

There is much to suggest that the high standard of living in South Africa and certain other countries, with the accompanying abundance of food and tendency to over-eating, may lead to such a disturbance of metabolism. It is for instance known that a normal carbohydrate metabolism is essential for normal fat metabolism, and an inhibition of carbohydrate metabolism may lead to high lipid levels in the blood.

The carbohydrate and fat metabolism of different groups of people in South Africa was studied by the N.N.R.I. with a view to assessing possible metabolic changes which may occur. It was found that about 30 per cent of the

'n Belangrike projek, met die oog op taakwaarderung, was die opstel van taakbeskrywings vir meer as 1,000 take deur nie-blanke werknemers in groot organisasies verrig. Hierdie take wissel in ingewikkeldheid van eenvoudige handwerk tot die bereiding van geneeskundige preparate. Uit hierdie projek sal 'n taakwaarderingsstelsel voortspruit wat 'n taamlik omvattende reeks take dek deur swart personeel in die Unie verrig. By hierdie werk is 'n spesiale toets toegepas om die ekonomiese waarde wat swart werkers aan hul taak heg, te bepaal en om vas te stel hoe hierdie waardes verskil van dié deur die bestuur daaraan geheg.

Opleiding is 'n betreklik nuwe iets in die Instituut, maar daar bestaan vraag na die dienste van die afdeling. Een projek i.v.m. die opleiding van opsigters in 'n nywerheid is beëindig. Uit die verslag het duidelik geblyk dat die opleiding van blanke opsigters baie te wense oorlaat as daar tenminste na gestreef word om die produktiwiteit en bekwaamheid van die swart arbeidskragte te verhoog. Selfs waar stelselmatige opleiding gegee word, is langer en meer toepaslike opleiding nodig. Vir 'n ander groot organisasie is die opleibaarheid van opsigters ondersoek. Vir hierdie doel moes nie alleen die vermoë nie, maar ook die houding van hierdie personeelgroep ondersoek word. Klaarblyklik begin die nywerhede tans groter belang as in die verlede aan die keuring en opleiding van opsigters te heg.

'n Probleem wat baie nou verband hou met die kwessie van keuring en opleibaarheid van blanke nywerheidspersoneel is dié van die werkkragtepotensiaal. 'n Verslag oor die verhouding tussen vermoëpotensiaal en die gebruik van daardie potensiële vermoë is voltooi. Die verhouding is vasgestel tussen die resultate van toetse om algemene vermoë te meet en die beroeps- en onderwyspeil en die aspirasies van 'n groep jong blankes in die Unie. Die gevolgtrekkings toon dat die onderwyspeil van jong blankes nie die vermoëpotensiaal bereik nie. Aangesien van die blanke groep verwag word om leiding te gee in die nywerheid, handel en die professies, en ook om die grootste deel van die tegniese opgeleide personeel te lewer, is die bevindings in hierdie verslag gegee onrusbarend. Hulle laat die lig val op belangrike sosiale en ekonomiese probleme wat op 'n nasionale skaal aangepak behoort te word.

Dienste i.v.m.
toetsbeplanning
en -opstelling

Hierdie statistiese en toetsopstellingsdienste is van fundamentele belang vir die toegepaste en veldnavorsingsprojekte. Die steekproefmetode, proefgroepgrootte en -samestelling is statistiese vereistes by die beplanning van enige ondersoek hetsy sosiologies of psigologies, hetsy eksperimenteel of demografies. Ontleding van die resulterende data is 'n statistiese diens van net so veel belang. Ook die uitwerk en opstel van toetse bestem vir personeelkeuring of beroepsvoorligting is 'n essensiële diens. Dit is veral belangrik by ondersoekings i.v.m. swart personeel. Dit vereis dikwels heelwat basiese navorsing i.v.m. die geskiktheid van die toetsmateriaal voordat toetse vir praktiese toepassing opgestel kan word. 'n Voorbeeld hiervan is die bevinding deur een van die eksperimentele afdelings van die Instituut dat swart proefpersone, selfs indien goed geleerd, moeite ondervind het om prentemateriaal driedimensionaal te sien; hulle het neigings getoon om dit twee dimensionaal te sien. Hierdie bevinding is nie alleen van nut by toetsopstelling nie, maar ook in skole, advertensies en reklame, en waar prentemateriaal didakties gebruik word. Dit verklaar die punt dat nog baie basiese navorsing i.v.m. die geestelike eienskappe van die swart rasse nodig is alvorens die gevolgtrekkings uit psiolo-

clinically normal European men over 30 years of age who were studied, showed an abnormal carbohydrate and fat metabolism. No such abnormality could be detected in a corresponding Bantu group or in European men and women under 30 years of age. A deranged carbohydrate and fat metabolism was found in all of several people who had previously suffered attacks of coronary thrombosis.

The services of the National Institute for Personnel Research now cover a wide area psychologically and territorially. The present year in particular has shown a considerable expansion in personnel selection for local secondary industry, government services, and in vocational guidance direct to the public. In the selection of white personnel the trend has been towards increasing use of selection procedures for high level administrative and executive personnel. A major project was carried out for the South African Railways and Harbours in the selection of administrative trainees for the Esselen Park Training Centre. But the bulk of the work has been undertaken for the smaller industrial concerns in the Union.

Personnel
Selection of
labour

Studies in job description and job evaluation have been allotted priority. Part of the objective is to devise a more rational, less subjective foundation for job analysis. But there has been a great demand for applied work.

Services in the
utilization of
labour

A major project has been the construction, for job evaluation purposes, of job descriptions of more than 1,000 tasks performed by black employees in a large organization. These tasks range in complexity from simple labouring to medicating. The outcome of this project will be a job evaluation system representing a fairly comprehensive coverage of jobs done by black personnel in the Union. In the course of this project a special test has been used to determine the economic values which black workers attach to jobs, and to study how these values differ from those expressed by management.

Training has been a comparatively recent innovation in the Institute, but there is a demand for the services of the division. One project on the training of supervisors in an industry was completed. It was clear from the report that the training of white supervisors leaves much to be desired if the productivity and efficiency of the black labour force is to be increased. Even where systematic training is given, longer and more appropriate training is necessary. For another large organization, a study of the trainability of supervisors was undertaken. This has involved investigation, not only of the capacity, but also of the attitudes of this personnel group. It is obvious that industry is coming to attach greater importance than it did in the past to the selection and training of supervisors.

Closely related to the question of selection and trainability of white industrial personnel, is the problem of manpower potential. A report dealing with the relationship between ability potential and the utilization of that potential ability has been completed. Results of tests measuring general ability were related to occupational and educational levels and aspirations of a sample of young White Union males. The conclusions show that the ability potential of White youths is not being realized educationally. In view of the fact that the White group is called upon to furnish leadership in industry, commerce and the professions, and in addition to supply most technically trained personnel,

giese en sosiologiese ondersoeke aanvaar word. 'n Stap in die rigting van 'n beter begrip van die swart rasse is reeds gedoen nou dat die eerste stadium in 'n studie van die geestelike en psigomotoriese ontwikkeling van jong swart kinders voltooi is. By hierdie proefneming moes hul fisiese en geestelike groei gemeet word. Dit het weer die opstelling en toepassing van voorskoolse toetse vir die bepaling van intelligensie en psigomotoriese ontwikkeling noodsaaklik gemaak. 'n Studie van die eerste lewensjaar is voltooi. Die plan is om die studie voort te sit tot die eerste 5 kinderjare en om die bestek uit te brei tot navorsing van die ontwikkeling van sosiale persepsie, houdings en persoonlikheid met behulp van waarnemings-, onderhouds- en groepproedures.

SAMEWERKING MET DIE NYWERHEID

Vennootskap met die nywerheid

By die bevordering van die ontwikkeling van nywerheidsnavorsing in die Unie het die Raad, wanneer enigsins moontlik, die nywerheid aangemoedig om hul eie geriewe te voorsien. Van die begin af is egter besef dat die meeste Suid-Afrikaanse industriële ondernemings nog nie die stadium bereik het waarin hulle kan bekostig om hul eie private navorsingsinrigtings op doeltreffende skaal te stig nie. Derhalwe het die Raad, met goedkeuring van die Regering, 'n skema ingestel ter ondersteuning van koöperatiewe nywerheidsnavorsingsverenigings, om op 'n kollektiewe basis in die navorsingsbehoefte van 'n bepaalde nywerheid te voorsien.

Terselfdertyd was die Raad hom bewus van die feit dat baie nywerhede nog nie eers die stadium van ontwikkeling bereik het waarin hulle hul eie kollektiewe navorsingsverenigings kan oprig nie. Nasionale navorsingslaboratoriums en -institute is derhalwe op so 'n manier ontwikkel dat die duur geriewe vir moderne navorsing ter beskikking van individuele firmas of groepe firmas gestel kan word deur middel van beurstoekennings vir nywerheidsnavorsing of kontrakte, of groepe, of langtermynprojekte van regstreekse belang vir die industriële ondersteuners.

Hierdie beleid vorm die basis van 'n doeltreffende vennootskap met die nywerheid. Die bedrag wat industrieë as lid van nywerheidsnavorsingsverenigings vanjaar bygedra het, beloop R211,667 terwyl die nywerheid R315,108 bygedra het om die koste van navorsingsprojekte deur die Raad se nasionale navorsingslaboratoriums en -institute onderneem, te help bestry. Dit verteenwoordig 'n aansienlike deel van die jaarlikse lopende uitgawes van R6,050,000 in verband met die navorsingslaboratoriums aangegaan. Die Raad, die Regering en die hele land het alle rede om tevrede te voel oor die manier waarop die nywerheid saamhelp om die koste van navorsing te dra en om hul sienswyses oor hierdie projekte wat wesenlik tot die ontwikkeling van die land se ekonomie bydra, tot algemene nut voor te lê.

Ontwikkeling van uitvindings

'n Belangrike neweproduk van navorsing is die uitvinding van instrumente en ander hulpmiddels. Waar moontlik, het die Raad gestreef na die kommersiële ontwikkeling van sy uitvindings deur Suid-Afrikaanse firmas. Die welslae wat hiermee bereik is, het dit nodig gemaak om 'n Korporasie vir die Ontwikkeling van Uitvindings in die lewe te roep en wetgewing met hierdie doel voor oë is met die Regering bespreek.

Vanweë die feit dat die grootste mark vir die meeste van hierdie uitvindings

the findings of the report are disturbing. They raise important social and economic problems, which should be tackled at a national level.

These statistical and test construction services are basic to the applied or field research projects. The method of sampling, sample size and composition, are statistical requirements in the design of any investigation, whether it is sociological or psychological, whether it is experimental or demographic. Analysis of the resultant data is an equally important statistical service. Similarly, the design and construction of tests intended for personnel selection or vocational guidance is an essential service. This is particularly important in investigations of black personnel. It is often necessary for a good deal of basic research to be carried out into the applicability of testing material before tests can be constructed for applied purposes. A case in point concerns the finding by one of the experimental divisions in the Institute that black samples, even if highly educated, had some difficulty in perceiving pictorial material three-dimensionally; they tended to see it two-dimensionally. This finding has value not merely in test construction but also in schools, advertisements and propaganda, and where pictorial material is used didactically. It illustrates the point that much basic research into the mental characteristics of the black races is necessary before the findings from psychological and sociological investigations can be accepted. A step towards a more accurate understanding of the black races has been taken now that the first stage in a study of the mental and psycho-motor development of black infants has been completed. This experiment has involved the measurement of physical and mental growth. This in turn has necessitated the construction and application of pre-school tests of intelligence and psychomotor development. A study of the first year of life is nearly complete. It is proposed to lengthen this study to the first five years of childhood, and to extend its scope to include investigations by observation, interview and group procedures into the development of social perception, attitudes and personality.

Services in experimental design and test construction

CO-OPERATION WITH INDUSTRY

In fostering the development of industrial research in the Union the Council has, whenever possible, encouraged industry to establish its own facilities. It was realized from the start, however, that the majority of South African industrial concerns have not yet reached the stage where they can afford development of their own private research establishments on an effective scale. For this reason the Council introduced a scheme, with the approval of the Government, for the support of co-operative industrial research associations, each to provide collectively for the research requirements of a particular industry.

Partnership with industry

At the same time, the Council recognized the fact that many industries have not reached even that stage of development at which they can establish their own collective research associations. National research laboratories and institutes were accordingly developed in such a way that the expensive facilities for modern research could be made available to individual firms or groups of firms through industrial research fellowships or contracts, or groups, or long-term projects of direct interest to the industrial sponsors.

uit die aard van die saak oorsee lê, bevorder hul eksploitasie nie alleen die ontwikkeling van industrie nie, maar ook die uitvoer van produkte, waarvan die waarde by vervaardiging styg. Dit is miskien een van die beste voorbeelde van die rol wat navorsing in die ekonomiese ontwikkeling van 'n klein volk speel wat in die verlede hoofsaaklik grondstowwe uitgevoer en vervaardigde goedere ingevoer het.

Advieskomitee

Die Raad het 'n Advieskomitee i.v.m. die Ontwikkeling van Navorsing vir die Nywerheid benoem om hom te help om die dienste wat hy binne die raamwerk van sy beleid lewer, na te gaan, en het tewens 'n Afdeling vir die Ontwikkeling van Nywerheidsnavorsing gestig om die nodige professionele dienste te verskaf. Die Raad het besluit om die opdrag te verbree en om die ledetal van bogenoemde Advieskomitee te vergroot. Die volgende nuwe lede is aangestel: mnr. G. S. J. Kuschke, Algemene Bestuurder van die Nywerheidontwikkelingskorporasie en dr. C. M. Kruger, Direkteur en Algemene Bestuurder van die S.A. Yster en Staal Industriële Korporasie.

Op advies van hierdie Komitee het die Raad besluit tot saamgroepering van die geriewe en dienste van die verskillende navorsingslaboratoriums en -institute wat ontwikkel is om bepaalde takke van die nywerheid te bedien, of wat werkzaam is op bepaalde gebiede waarby 'n aantal verskillende wetenskaplike dissiplines betrokke is. Dit maak deel uit van die interne hergroepering waarna in die begin van hierdie verslag verwys en wat in die vorige jaarverslag vermeld is.

Nywerheidsnavorsingsverenigings

In die loop van die jaar het die Komitee die Visnywerheidsnavorsingsinstituut te Kaapstad en die Leernywerheidsnavorsingsinstituut te Grahamstad besoek en die Beheerrade van hierdie nywerheidsnavorsingsverenigings wie se toekennings in hersiening geneem moes word, ontmoet om oor die basis van toekennings vir die volgende tydperk van 5 jaar te beslis. Die komitee het bevind dat hierdie twee institute uiters geslaagde bydraes gelewer het tot die ontwikkeling van die nywerhede wat hulle behulpsaam is, en ook tot verbetering van die kwaliteit van hulle produkte waardeur die belange van die verbruikers weer gedien is. Die Komitee was geïmponeer deur die mate waarin die twee institute die ondersteuning van hierdie nywerhede verwerf het, en was ten gunste daarvan dat die Raad finansiële toelaes verleen wat ooreenstem met die maksimum mate waarin dit moontlik is om gearandeerde nywerheidstoekennings te maak.

Nywerheidsnavorsings-eenhede

Daar is gevorder met die ontwikkeling van navorsingseenhede vir hout, keramiek, kafferbier en sanitasie, as ook met die ontwikkeling van gekombineerde projekte vir navorsing in verband met lugbesoedeling, haaiestrydingsmaatreëls en kusingenieurswerk. Een faktor wat egter baie duidelik te voorskyn getree het, is dat daar terrene is waarop positiewe maatreëls nodig is vir die ontwikkeling van navorsing, maar ten opsigte waarvan die waarskynlikheid dat die nywerheid die voortou sal neem, gering is. In sulke gevalle is dit die Raad se plig om self die inisiatief te neem en juis in hierdie opsig word die Raad gestrem deur die huidige begrotingsbeleid.

These policies have provided the basis for an effective partnership with industry. The contributions of industrial subscribers to industrial research associations for this year amount to R211,667, while industry contributed R315,108 to the cost of research projects undertaken in the Council's national research laboratories and institutes. This represents an appreciable proportion of the annual running costs of R6,050,000 of the research laboratories. The Council, the Government and the country generally have every reason to be gratified at the way in which industry is coming forward to share in the costs of research and in pooling ideas on these projects which are materially contributing to the development of the national economy.

An important by-product of research is the invention of instruments or other devices. Whenever possible, the Council has aimed at the commercial development of its inventions through South African firms. Success in this direction has created a need for the establishment of an Inventions Development Corporation, and legislation to this end has been discussed with the Government.

Development
of inventions

In view of the fact that the major markets for most of these inventions do, by their nature, lie overseas, their exploitation promotes not only the development of industry, but also the export of products to which the value added in manufacture is high. This is perhaps one of the best possible demonstrations of the role that research can play in the economic development of a small nation which, in the past, has mainly exported raw materials and imported manufactured goods.

To assist it in reviewing the services which it provides within the framework of its policies, the Council appointed an Advisory Committee on the Development of Research for Industry, and created an Industrial Research Development Division to provide the necessary professional services. The council decided to widen the terms of reference and to increase the membership of its Advisory Committee on the Development of Research for Industry. New members appointed were:

Advisory
committee

Mr. G. S. J. Kuschke, General Manager of the Industrial Development Corporation, and

Dr. C. M. Kruger, Director and General Manager of the S.A. Iron and Steel Industrial Corporation.

On the advice of this Committee the Council decided to group together into Units those facilities and services in its various research laboratories and institutes which had been developed to serve specific branches of industry. At the same time Council decided to co-ordinate those activities with common fields of application which are now the concern of different laboratories and scientific disciplines. This forms part of the internal regrouping to which reference was made earlier in this report, and which was mentioned in the last Annual Report.

During the year, the Committee visited the Fishing Industry Institute in Cape Town and the Leather Industries Research Institute in Grahamstown and met the Boards of Control of these industrial research associations, which were due for review, to determine the basis of grants for the next 5-year period. The

Industrial research
associations

Keramiek-
navorsingseenheid

Gedurende die eerste jaar van sy bestaan was hierdie eenheid baie suksesvol in sy werk, ten spyte van die feit dat sy leier na ongeveer 'n halfjaar 'n betrekking in die V.S.A. aanvaar het. Opgebou uit afdelings wat al jare lank aktief met die nywerheid in verbinding gestaan het, is die eenheid goed toegerus en het 'n goed saamgestelde personeel wat al die vernaamste fasette van die keramieknywerheid dek. Die eenheid is versoek om 'n baie groot hoeveelheid kontrakwerk vir individuele firmas te doen.

Baksteennavorsing-
nagraadse beurs-
toekenning

Volgens 'n ooreenkoms met die Transvaal Clay Manufacturer's Association, verskaf die Nasionale Bounavorsingsinstituut geskikte werkruimte en tegniese hulp vir die werk kragtens 'n nagraadse beurstoekenning (Fellowship) wat deur bogenoemde vereniging ondersteun word, om die ekonomiese sy van die gebruik van bakstene te bestudeer en om metodes te ondersoek vir die verbetering van die vervaardiging en gebruik van bestaande en nuwe produkte van vuurklei in die boubedryf. Aanvanklik sal die werk hoofsaaklik tot 'n ekonomiese studie beperk bly; en die plan is dat die werk op 'n later tydstip ook navorsing sal insluit om nuwe muurbou-elemente van klei gemaak, te ontwikkel. Die werk word in noue samewerking met die Keramiekeenheid en die Raad se Bedryfsekonomieafdeling gedoen.

Kafferbier-
navorsingseenheid

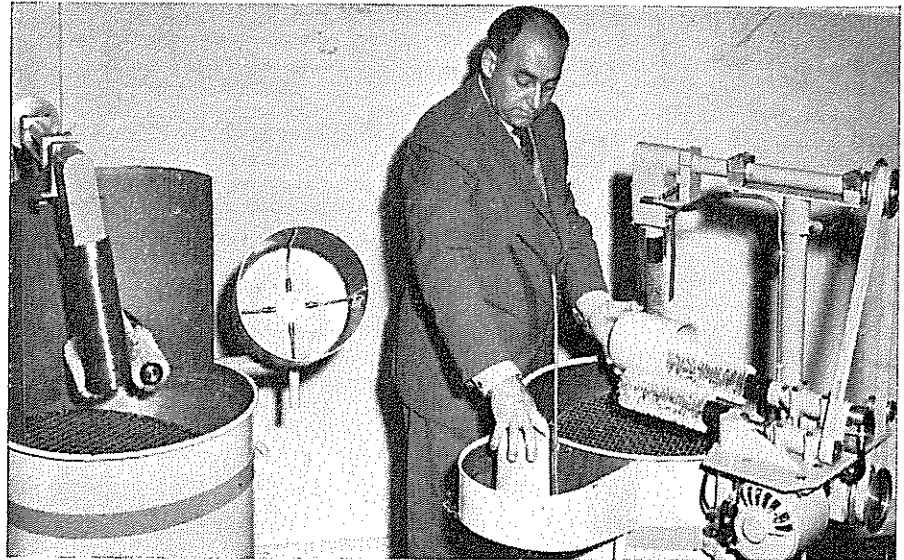
Die werk van hierdie groep is op dieselfde manier as gedurende die afgelope paar jaar voortgesit, en namate die werk meer bekend word, wen die groep aansag. Die Departement Bantoe-administrasie eis nou dat die Eenheid geraadpleeg moet word by die beplanning van nuwe brouerye. Die Departement oorweeg dit ook of die W.N.N.R. versoek behoort te word om standarde vir kafferbier op te stel. Die eenheid hou hom op die oomblik besig met die chemiese aspekte van 'n omvattende ondersoek deur die Johannesburgse Munisipaliteit i.v.m. die sosiale en mediese uitwerking van die drink van kafferbier.

Wynnavorsing-
eenheid

Die gedagte om 'n wyneenheid in die W.N.N.R. te stig wat saam met die Instituut vir Wynbou en Enologie van die Departement Landbou-tegniese

*Beer mug washing
machine.*

Bier bekerwasmas-
jien.



Committee found that these two institutes had been most successful in contributing to the development of the industries they assist, and in serving the interests of consumers by improving the quality of their products. The Committee was impressed by the extent to which the two institutes had won the support of these industries, and was in favour of the Council making matching financial grants to the maximum extent possible for guaranteed industrial grants.

Progress has been made in the development of research units for timber, ceramics, kaffir beer, and sanitation, as well as in the development of combined projects for research on air-pollution, anti-shark measures and coastal engineering. One factor which has emerged very clearly, however, is that there are fields in which positive steps are required for the development of research but in which there is little likelihood that industry will take the initiative. In such cases it is incumbent on the Council to take the initiative itself, and it is precisely in this that the Council is handicapped by present budget policies.

Industrial research units

During the first year of its existence this unit has proved very successful, despite the loss of its leader to a post in the U.S.A. at about the half-year. Formed from sections which had already been in active contact with industry for many years, it is well equipped and has a well-integrated staff covering all the major facets of the ceramics industry. It has been asked to carry out a very large amount of contract work for individual firms.

Ceramics research unit

By arrangement with the Transvaal Clay Manufacturers' Association, the National Building Research Institute is providing appropriate accommodation and technical assistance for a Fellowship being sponsored by the Association to study the economics of the use of bricks, and to investigate methods of improving the manufacture and application of existing and new fired-clay products in the building industry. Initially the work will be confined mainly to an economic study; it is intended that, at a later stage, the work will also include research to develop new types of wall-building media manufactured from clay. The work is being carried out in close co-operation with the Ceramics Unit and the Council's Industrial Economics Division.

Brick research fellowship

The work of this group has continued along the lines established in past years, but it is gaining increased authority as its work becomes better known. The department of Bantu Administration now requires that the unit should be consulted on plans for new breweries. The Department is also considering whether the C.S.I.R. should be asked to set up standards for kaffir beer. The Unit is at present dealing with the chemical aspects of a comprehensive investigation by the Johannesburg Municipality into the social and medical effects of drinking kaffir beer.

Kaffir beer research unit

The possibility of establishing a wine unit in the C.S.I.R. to work in collaboration with the Institute for Viticulture and Oenology in the Department

Wine research unit

Dienste sou werk, is opgegee, en hierdie werk is gedurende die jaar gestaak. Dit verdien egter vermelding dat die W.N.N.R. se Wyneenheid gedurende sy bestaan goeie dienste aan die wynnywerheid verleen het deur hul ontdekking van die oorsake van troebelheid en van bruinwording by wyn in bottels, en deur remedies daarvoor aan die hand te doen.

'n Sekere hoeveelheid basiese navorsing i.v.m. mikro-organismes wat van belang vir die wynnywerheid is, word nog gedoen.

Houtnavorsings-
eenheid

Die Suid-Afrikaanse houtnywerheid het 'n kapitale bedrag van meer as £180,000,000 in bosbou, saagmeule en verwerkingsfabrieke belê. Dit is 'n vinnig groeiende nywerheid, en 'n groot toename in die hoeveelheid beskikbare hout word binne die volgende jaar of tien verwag aangesien meer as die helfte van die bome op die 1.8 miljoen acres wat op die oomblik met bome beplant is, minder as sewe jaar oud is. Gevolglik het die behoefte aan navorsing taamlik toegeneem en sal, na verwagting, nog toeneem, veral met die oog op die feit dat die nywerheid vinnig besig is om sy toerusting en metodes te moderniseer, en dat die behoeftes van verbruikers dringender word.

Hoewel daar in die verlede 'n mate van navorsing in verband met bepaalde houtprobleme in die verskillende laboratoriums van die W.N.N.R. gedoen is, het die Raad besluit dat dit meer in die algemene belang van die land sou wees as spesiale voorsiening binne die W.N.N.R. se organisasie gemaak word vir gekoördineerde en beplande navorsing en tegniese dienste vir die industrie. Na bespreking met die Departement Bosbou en ander belanghebbende partye, is 'n Houteenheid gestig, wat in April 1960 met sy werksaamhede begin het. Die Eenheid sal natuurlik noue samewerking onderhou met ander W.N.N.R.-laboratoriums en Regerings- en ander liggame wat navorsing op hierdie gebied doen, sodat die beste gebruik van die beskikbare geriewe gemaak kan word by die ondersoek van probleme i.v.m. die gebruik en behandeling van hout en houtprodukte.

'n Groot deel van die Eenheid se werk sal in verband staan met die groter gebruik van hout in die boubedryf. 'n Uitgebreide studieprogram i.v.m. hierdie vraagstuk is aangepak, vernaamlik in samewerking met die Nasionale Bounavorsingsinstituut. Die werk omvat o.a. die ontwikkeling van houtverf en die verf van hout om dit teen agteruitgang deur verwerking te beskerm; navorsing in verband met die bou en die kenmerke van houthuise wat betref hul strukturele stabiliteit en duursaamheid, hul bestandheid teen reen en hitte, en hul beskerming teen brand en aantasting deur insekte en swamme; navorsing i.v.m. lamelhout vir konstruksiedele, en die koste-aspek van houthuise.

Daar is ook 'n begin gemaak met 'n aantal spesiale probleme i.v.m. die meer doeltreffende gebruik van hout op ander gebiede, en die produksie van chemiese en ander produkte van goeie kwaliteit uit hout verkry.

Die persoon aan wie die nagraadse beurs vir navorsing i.v.m. die pulp-eienskappe van hout van Suid-Afrika gekweekte bome, toegeken is, het sy werk in die Nasionale Chemiese Navorsingslaboratorium voortgesit met die ondersteuning van die S.A. Pulp and Paper Industries Ltd., en het reeds 'n groot magdom inligting versamel.

Sanitasienavorsings-
eenheid

Navorsing deur die pasgestigte sanitasienavorsingseenheid is toegespits op rioolvuilstabiliserings- en verouderingsdamme; die resultate was bemoeidigend. Munisipaliteite is om finansiële steun genader, om die bestek van die ondersoekings in verband met sanitasieprobleme waarteenoor alle plaaslike besture te staan kom, te kan uitbrei.

of Agricultural Technical Services had to be abandoned, and this work was brought to an end during the year. It should be recorded, however, that during its existence the C.S.I.R. Wine Unit rendered great services to the wine industry by discovering causes of turbidity and of browning in bottled wines, and by putting forward remedies for these.

A certain amount of basic research on micro-organisms of interest to the wine industry is still being carried out.

The timber industry in South Africa has a capital investment of over £180,000,000 in timber growing, sawmills, and processing factories. It is moreover a fast expanding industry; large increases in the quantity of timber becoming available are expected within the next decade or so, since more than half the trees in the present 1.8 million acres of afforested country are less than seven years old. Consequently, a considerable demand for research has arisen and is expected to increase, especially in view of the fact that the industry is rapidly modernizing equipment and techniques, and that requirements of consumers are becoming more critical.

Although some research on specific problems concerning timber had in the past been carried out in various laboratories of the C.S.I.R., Council decided it would better serve the interests of the country generally if special provision were made within the C.S.I.R. for co-ordinated and planned research and technical services for the industry. After discussions with the Department of Forestry and other interested parties, a Timber Unit was established and came into effective operation in April 1960. The Unit will, of course, work in close collaboration with other laboratories of the C.S.I.R. and with Government and other bodies which undertake research in this field, so that the best use can be made of available facilities for investigating problems concerning the use and processing of timber and timber products.

A major part of the Unit's work will be related to the greater use of timber in the building industry. An extensive programme of studies on this problem was started, mainly in collaboration with the National Building Research Institute. The work includes the development of paints, and the painting of wood to provide protection against deterioration due to weathering; research on the construction and characteristics of timber houses with reference to their structural stability and durability, their resistance to rain and heat, and their protection against fire and insect or fungus attack; research on laminated timber for structural members, and cost aspects of timber housing.

Research also commenced on a number of special problems concerning more effective utilization of timber in other fields, and production of high quality chemical and other products derived from timber.

The fellowship maintained in the National Chemical Research Laboratory by the S.A. Pulp and Paper Industries Limited for research on pulping qualities of timbers grown in South Africa has continued, and a substantial body of information is becoming available.

Research by the newly established Sanitation Research Unit was concentrated on sewage stabilization ponds and maturation ponds; results were promising. An approach has been made to municipalities for financial support, in order to extend the scope of investigations on the sanitation problems that confront all local authorities.

Timber research unit

Sanitation research unit

STANDAARDISERING

Verdienste Die toename in die werk van die Buro vir Standaarde wat inkomste ingebring het, kan uit onderstaande syfers gesien word:

	1955/56	1959/60
	R	R
Inspeksies en toetswerk	74,760	141,894
1½-persent-aannametoetskontrakte	92,490	127,040
Merkgelde	86,500	134,769
Verkoop van spesifikasies	7,142	13,820

Algemeen Daar was 'n opvallende toename in die aanvraag om die Buro se standaardiserings- en toetsdienste deur staatsdepartemente, provinsiale administrasies en die groot nywerheidsliggame in die Unie. Hoewel baie werk in die verlede vir hierdie liggame gedoen is, het die omvang van die werk in 1960 'n nuwe hoogtepunt bereik en is die bestek aanmerklik uitgebrei.

Die paar voorbeelde in hierdie verslag aangevoer, gee 'n beeld van die soort diens aan die land gelewer.

Toetskontrakte Toenemende belangstelling is in die Buro se toetsfasiliteite aan die dag gelê, veral deur raadgewende ingenieurs en mynmaatskappye. Op die oomblik word daar nog werk gedoen volgens kontrakte met die vier Provinsiale Administrasies, die Administrasie van Suidwes-Afrika, Yskor en die Departement van Pos-en-telegraafwese.

Wesenlike hulp word op 'n kontrakbasis deur die Afdeling Nie-verniegtigende Toetse aan S.A.S.O.L. gelewer. Volgens 'n kontrak met Escom toets die Buro die plaaslike galvanisering van konstruksies wat die ingevoerde produkte vervang.

Motornywerheid Na aanleiding van aanbevelings deur die Handelsraad is die Buro genader in verband met die toets van onderdele wat in Suid-Afrika gemaak word, met die oog op groter gebruikmaking daarvan deur moterkarbouers. 'n Konsultkomitee om raad in hierdie verband te gee, word benoem en die Direkteur van die Buro vir Standaarde is uitgenooi om daarin te dien.

Hout Die groot toename in die inkomste van die Houtafdeling is grotendeels toe te skrywe aan die Kabinet se opdrag aan staatsdepartemente, provinsiale administrasies en ander openbare liggame om waar moontlik, konstruksiehout wat in Suid-Afrika gekweek is en die S.A.B.S.-merk dra, te gebruik. Die verdienstes het van R10,880 (£5,440) in 1959/60 tot R17,126 (£8,563) in 1960/61 gestyg.

Die volume aan konstruksiehout met die merk daarop, wat gedurende dieselfde tydperk verkoop is, was 590,000 kub. vt. in 1959/60 teenoor 1,180,000 kub. vt. in 1960/61.

Inspektoraat vir ingemaakte voedsel Die Inspektoraat vir ingemaakte voedsel het in die geheel ongeveer 300,000 blikkies vis, kreef, vleisprodukte, vrugte, groente en konfyt ondersoek vir voldoening aan die verpligte en vrywillige standaarde. Van die 300,000 blikkies is 60,000 bakteriologies ondersoek. Die aantal blikkies van hierdie produkte

STANDARDIZATION

Expansion in the income-earnings work of the Bureau of Standards can be gauged by the following figures: Earned income

	1955/56	1959/60
	R	R
Inspections and Tests	74,760	141,894
1½ Per Cent Acceptance Testing Contracts . . .	92,490	127,040
Mark Fees	86,500	134,769
Sale of Specifications	7,142	13,820

A most notable feature has been an upsurge in the demand for the Bureau's standardizing and testing services by government departments, provincial administrations, and the Union's great industrial organizations. Although much work had been done for these bodies in the past, that done in 1960 reached a new peak in volume and its scope widened considerably. General

The few examples given in this report illustrate the type of service rendered to the country.

Widening interest was shown in the Bureau's testing facilities, especially by consulting engineers and the mining houses. Testing contracts are at present in operation for the four Provincial Administrations, the Administration of South West Africa, Iscor, and the Department of Posts and Telegraphs. Testing contracts

Material assistance on a contract basis is being given to S.A.S.O.L. by the Non-Destructive Testing Section. Under its contract with Escom the Bureau is testing local galvanizing of structures which have replaced the imported products.

Following on recommendations by the Board of Trade, approaches have been made to the Bureau in connection with the testing of components made in South Africa, with a view to their greater use by motor assemblers. A consultative committee to advise on the matter is being appointed, on which the Director of the Bureau of Standards has been invited to serve. Motor industry

The greatly increased income earned by the Timber Section can be attributed largely to the Cabinet's instruction to government departments, provincial administrations, and other public bodies to use South African grown structural timber bearing the S.A.B.S. mark wherever possible. Earned income rose from R10,880 (£5,440) in 1959/60 to R17,126 (£8,563) in 1960/61. Timber

The volume of mark-bearing structural timber sold during the same period was 590,000 cu. ft. in 1959/60 compared with 1,180,000 cu. ft. in 1960/61.

The Canned Food Inspectorate examined a total of approximately 300,000 cans of fish, rock lobster, meat products, fruits, vegetables, and jams for compliance with compulsory and voluntary standards. Of the 300,000 cans, 60,000 were examined bacteriologically. The number of cans of these products produced under S.A.B.S. supervision between March 31st 1960 and April 1st 1961 Canned Food Inspectorate

wat tussen 31 Maart 1960 en 1 April 1961 onder toesig van die S.A.B.S. vervaardig is, het in die geheel ongeveer 600,000,000 bedra. Die blikkies wat vir ondersoek en toetsing ooggemaak is, maak dus 0.05 persent van die aantal wat geproduseer is, uit. Was dit nie vir die S.A.B.S. se inspeksiestelsel nie waarvolgens informasie omtrent die produk verkry word aan die lopende band (d.w.s. voor die blikkies toegemaak en behandel word), sou heel wat meer monsterblikkies ooggemaak moet word om 'n noukeurige beoordeling van die kwaliteit van die vervaardigde produkte moontlik te maak.

Filmwapendiens Die filmwapendiens wat kontrole uitoefen oor die mate waarin persone wat met radioaktiewe materiale werk, deur die strale geaffekteer word, is in 1959 op 'n roetinediensbasis deur die Buro oorgeneem. Dit is tot die mediese professie en almal wat dit nodig het, uitgebrei. Tot 2,500 wapens word tans elke maand uitgestuur.

Nie-vernietigende toetswerk Na aanleiding van die herhaalde versoeke van kragstasies in die swaar nywerhede in die Kaap ontvang om nie-vernietigende toetse uit te voer, is 'n eenheid van die Afdeling vir Nie-vernietigende Toetswerk by die S.A.S.B. se Kaapstadse takkantoor ingestel. Hierdeur word geriewe waarvan al hoe meer in Transvaal en Natal gebruik gemaak word, ook direk beskikbaar gestel aan die Kaapse nyweraar.

Inspeksiedienste vir die uitvoerder Die waarde van hierdie diens het duideliker uitgekome ten gevolge van die huidige veldtog om die Unie se uitvoermarkte uit te brei. Groot uitvoerbestellings is geplaas onderworpe aan besendinginspeksie en die uitvoering van aannametoetse deur die Buro.

Aannametoetse vir staatsdepartemente Aannametoetse is op groot skaal vir staatsdepartemente uitgevoer, soos bv. vir:

Die brandstofvoorrade vir straalvliegtuie van die Suid-Afrikaanse Lugmag is gereeld geïnspekteer. Plaaslik vervaardigde kables vir gebruik op skepe van die Suid-Afrikaanse vloot en vir die moderniseringsprogram van die skeeps-werf te Simonstad bestem, is ondersoek. Vir laasgenoemde program is ook transformators ondersoek. Kontrolering van die skoeisel deur die gewapende magte gedra, is voortgesit. Ook die materiaal vir vegtenue en voorgeskrewe uniforms, sowel as sokkies en komberse is gereeld geïnspekteer en ondersoek.

Die Departement van Pos- en -telegraafwese Alle plaaslik vervaardigde kables, isolators en koperdraad deur die H.P.K. aangekoop, is geïnspekteer. Besendings asbesamentdeurvoerpype is by die fabriek in Transvaal en die Kaap geïnspekteer.

Unie-tenderraad Die Buro is versoek om die administrasie van die Regering se smeermiddel-behoefte voort te sit deur bemiddeling van sy Petroleumafdeling. Die diens omvat spesifikasies, aannametoetse, kwaliteitsbeheer, en voorligting omtrent smering. Private spesifikasies wat 'n baie groot verskeidenheid handelsware dek, is vir hierdie Departement opgestel.

totalled approximately 600,000,000. The cans cut for examination and testing thus constitute 0.05 per cent of those produced. But for the S.A.B.S. system of inspection whereby information concerning the product being manufactured is obtained on the production line (that is, prior to the closing of the can and its processing), a considerably greater number of samples would have to be cut in order to make an accurate assessment of the quality of the products manufactured.

The film badge service, used to exercise control of the radiation received by persons engaged in work involving radio-activity, was taken over by the Bureau in 1959 on a routine service basis. It has been extended to the medical profession and to all who have need of it. As many as 2,500 badges are now sent out monthly.

Film badge service

In response to frequent requests for non-destructive tests received from power stations and heavy industries at the Cape, a unit of the Non-Destructive Testing Section was established at the S.A.B.S. Cape Town branch office. This brings facilities which are gaining increasing popularity in the Transvaal and Natal to the doorstep of the Cape industrialist.

Non-destructive testing

The value of this service was underlined by the current drive towards expanding the Union's export markets. Large export orders were placed, subject to consignment inspection and acceptance testing by the Bureau.

Inspection services for the exporter

Large scale acceptance testing for government departments was conducted, examples being given below.

Acceptance testing for Government Departments

Regular inspections of fuel supplies for jet aircraft of the South African Air Force were carried out. Locally manufactured cable was inspected. This will be used for ships of the South African Navy and for the modernizing programme of the Simonstown dockyard; for the latter, transformers were also inspected. Control of footwear worn by the Armed Forces continued, as did inspection and testing of the material used in the manufacture of battle dress and regulation uniform, and of socks and blankets.

Department of Defence

All locally manufactured cables, insulators and copper wire purchased by the G.P.O. were inspected. Consignments of asbestos cement conduit piping were inspected at factories in the Transvaal and the Cape.

Department of Posts and Telegraphs

Through its Petroleum Section the Bureau was requested to continue the administration of the Government's lubricant requirements. The service given includes specifications, acceptance testing, quality control, and guidance on lubrication. Private specifications covering a very wide range of commodities were drawn up for this Department.

Union Tender Board

- Doeane en Aksyns Meer as 800 monsters van ander artikels as tekstielware is vir die Departement van Doeane en Aksyns getoets met die oog op klassifikasie. Hierdie diens is verlede jaar deur die Buro oorgeneem. Tussen April 1960 en Februarie 1961 is 1,115 aannametoetse vir verbruikers deur die Tekstielafdeling uitgevoer.
- Geregtelike werk vir die Departement van Justisie Die Spektrochemie- en die Tekstiellaboratorium van die Buro verleen heelwat hulp aan die Kriminele Buro van die Suid-Afrikaanse Polisie, in die vorm van wetenskaplike ondersoek en identifisering van artikels wat met misdade in verband staan en later as bewysstukke aan die Hof voorgelê word.
- Vervoer van goedere op spoorwegrisiko Die beginsel is deur die S.A. Spoorwegadministrasie aanvaar dat sekere goedere wat in goedgekeurde houers verpak is, op spoorwegrisiko vervoer sal word. „Goedgekeurde” beteken hier houers wat gemaak is volgens spesifikasies deur die betrokke nywerheid en die Spoorweë, onder leiding van die Buro, opgestel.
Die Buro het die gebruik van sy Verpakkingslaboratorium en die uitgebreide geriewe wat dit bied vir die ondersoek van die geskiktheid van die houers, aangebied.
- Provinsiale Administrasie Die Provinsie Natal het voorgestel dat die Standaardewet so gewysig word dat die Buro bevoegd sal wees om sy modelbouregulasies as staatsregulasies in die *Staatskoerant* te publiseer, sodat Plaaslike Besture (met toestemming van die betrokke Administrateur) hierdie Regulasies as verordenings sal kan afkondig as hulle dit wil. Twee Provinsies het reeds hul instemming met die voorstel betuig. Verdere menings word nog afgewag.
Die inspeksie van die gordynmure van geanodiseerde aluminium in die gebou van die Transvaalse Administrasie te Pretoria word deur die Afdeling Metallurgie behartig. Die Afdeling Siviele Ingenieurswese neem gereeld by elke volgende stadium van die aannemer se werk monsters van die beton en inspekteer hulle.
- Standaardspesifikasies Die opstel van standaardspesifikasies het ondanks die tekort aan personeel goed gevorder. Dertig standaardspesifikasies en gebruikskodes is uitgegee, 36 is by die drukkers en nog 261 in die verskillende stadiums van voorbereiding. Saam met die 461 reeds gepubliseerde spesifikasies en kodes, bedra die totale aantal op die lys tans 788.
- Standaardmerkskema Die aantal uitgereikte permitte het 129 bedra, wat die totaal op 676 te staan bring. Dit skyn al hoe meer besef te word dat die S.A.B.S.-merk op 'n handelsartikel nie alleen vertrouwe by die verbruiker wek nie, maar die goeie naam sowel hier te lande as oorsee verhoog. 'n Interessante voorbeeld hiervan is die ingemaakte vrugte wat die merk dra. 'n Betekenisvolle vingerwysing in hierdie verband is die feit dat die grootste vrugte-inmaakorganisasie in die Unie aansoek om toestemming tot gebruik van die merk in sy nege fabriek gedoen het. 'n Begin is reeds met die inspeksie van hierdie fabriek kragtens die standaardmerkskema gemaak. Van die totale hoeveelheid vrugte in Suid-Afrika ingemaak, val 80 persent tans onder die standaardmerkskema.

More than 800 samples of items other than textiles were tested for the Department of Customs and Excise for classification purposes. This service was taken over by the Bureau last year. Between April 1960 and February 1961, 1,115 consumer acceptance inspections were carried out by the Textile Division.

Customs and
Excise

Through its Spectrochemistry and Textile Laboratories the Bureau gives considerable assistance to the Criminal Bureau of the South African Police, by scientific investigation and identification of articles connected with crime, which are later handed into Court as exhibits.

Forensic work for
the Department
of Justice

The principle has been accepted by the S.A. Railways Administration that certain goods packed in approved containers will be carried at railway risk. "Approved" here means containers made to specifications drawn up by the industries concerned and the Railways, guided by the Bureau.

Conveyance of
goods at railway
risk

The Bureau has offered the use of its Packaging Laboratory and the extensive facilities with which this is equipped for testing the suitability of the containers.

It has been suggested by the Province of Natal that the Standards Act should be amended to empower the Bureau to publish its Model Building Regulations in the Government Gazette, as national regulations, to enable Local Authorities (with the consent of the Administrator concerned) to promulgate these Regulations by reference as by-laws, should they so wish. Two Provinces have already expressed their approval of this proposal. Further opinions are awaited.

Provincial
Administrations

Inspection of the anodized aluminium curtain walling being built into the Transvaal Administration building in Pretoria is being carried out by the Metallurgical Section. Concrete for the building is being regularly sampled and inspected by the Civil Engineering Division at each successive stage of the contractor's operation.

The work of preparing standards, although hampered by shortage of staff, made good progress. Thirty standard specifications and codes of practice were published, 36 are in the hands of the printers and a further 261 in various stages of preparation. With 461 already published, the number of specifications and codes listed is now 788.

Standard
specifications

The number of permits issued was 129—making a total of 676. There appears to be increasing realization that the S.A.B.S. mark on a commodity not only creates consumer confidence but enhances the prestige of the product both locally and overseas, an interesting example being the keen overseas demand for mark-bearing canned fruit. A significant pointer in this connection was the application for use of the mark in its nine factories by the largest fruit canning organization in the Union. Inspection of these factories under the standardization mark scheme has already started. Of the total amount of canned fruit produced in South Africa, 80 per cent now falls under the standardization mark scheme.

Standardization
mark scheme

TOEKENNINGS VIR NAVORSING AAN UNIVERSITEITE

Organisasie en administrasie

Gedurende die jaar het die Raad besprekings met die universiteite aan die gang gesit oor die organisasie en administrasie van die toekennings aan navorsers gegee. By die besprekings wat nog voortgesit word, is veral nadruk gelê op die wenslikheid van noue samewerking tussen die W.N.N.R. en die universiteite, die ontoereikendheid van fondse wat vir die ondersteuning van universiteitsnavorsing beskikbaar is, en die noodsaaklikheid om voldoende finansiële steun aan studente te verleen om hul aan te moedig om nadat hulle hul graad verwerf het, nog verder te studeer.

Fondse

Aansoeke om ondersteuning vir navorsing op alle wetenskaplike gebiede behalwe geneeskunde, gedurende die kalenderjaar 1961, altesame vir 'n bedrag van ongeveer £197,000, is ontvang. 'n Bedrag van ongeveer £138,100 is toegeken; hiervan was £112,800 vir die ondersteuning van *ad hoc* navorsers aan universiteite en ander inrigtings, en £25,300 vir navorsingseenhede en -groepe. Die toegekende bedrag sluit 'n ekstra bedrag van £20,000 in wat beskikbaar gestel is nadat spesiale vertoë deur die Raad tot die Tesourie gerig is; dit sluit egter nie 'n bedrag van £32,250 (oor 'n tydperk van 3 jaar) in nie wat deur die regering beskikbaar gestel is vir die koste van deelname aan die Internasionale Ekspedisie na die Indiese Oseaan en wat hoofsaaklik na werkers aan universiteite en museums sal gaan.

Nuwe navorsingseenhede

Die Raad het met ingang van 1961 die volgende eenhede ingestel:—

1. Seenavorsingseenheid onder die direksie van prof. D. H. Davies, Oseanografiese Navorsingseenheid van die Suid-Afrikaanse vereniging vir Seebiologiese Navorsing.
2. Navorsingseenheid vir Kosmiese Strale onder die direksie van prof. P.H. Stoker, Potchefstroomse Universiteit vir C.H.O.
3. Navorsingseenheid vir Natuurprodukte onder die direksie van prof. F. L. Warren, Universiteit van Natal, Pietermaritzburg.

Afsonderlike reëlingskomitees is benoem vir die navorsingseenheid vir Kosmiese Strale en dié vir Natuurprodukte, maar die Seenavorsingseenheid sal, saam met die Oseanografiese Navorsingseenheid aan die Universiteit van Kaapstad, funksioneer onder leiding van die Raad se Koördineringskomitee vir Oseanografiese Navorsing. Laasgenoemde komitee vervul ook die funksie van die S.A. Nasionale Komitee vir S.C.O.R. (Spesiale Komitee vir Seenavorsing) en is verantwoordelik vir die beplanning van Suid-Afrika se deelname aan S.C.O.R. se Internasionale Ekspedisie na die Indiese Oseaan 1962/63.

Voorgraadse beurse

Die Raad het in 1959 'n skema ingestel waaronder beurse toegeken word aan buitengewoon knap matrikulante vir universitêre opleiding op voorwaarde dat hulle nadat hulle hul studies voltooi het, by die Raad in diens tree. Twintig sulke beurse is in 1959 toegeken en nog nege-en-twintig in 1960. Die beurse wissel in waarde van £50 tot £300 per jaar.

UNIVERSITY RESEARCH GRANTS

During the year the Council initiated discussions with the universities on the organization and administration of the grants made to research workers. The discussions, which are still proceeding, have highlighted the desirability of close liaison between the C.S.I.R. and universities, the inadequacy of funds available for the support of university research, and the necessity for providing adequate financial encouragement to enable students to proceed to post-graduate studies.

Organisation and
administration

Applications totalling about £197,000 were received by the Council for the support of research in sciences other than medicine during the calendar year 1961. A sum of approximately £138,100 was allocated, of which £112,800 was for the support of *ad hoc* grantees at universities and other institutions, and £25,300 for research units and groups. The amount allocated includes an extra sum of £20,000 which was made available after special representations by the Council to Treasury; but it does not include the sum of £32,250 (over 3 years) provided by the Government for the costs of participation in the International Indian Ocean Expedition and which, in the main, will go to workers at universities and museums.

Funds

The Council established the following units as from 1961:

1. Marine Research Unit under the direction of Prof. D. H. Davies, Oceanographic Research Institute of the South African Marine Biological Association, Durban.
2. Cosmic Ray Research Unit under the direction of Prof. P. H. Stoker, Potchefstroom University for C. H. E.
3. Natural Products Research Unit under the direction of Prof. F. L. Warren, University of Natal, Pietermaritzburg.

New research
units

Separate steering committees have been appointed for the Cosmic Ray and Natural Products Research Units but the Marine Research Unit will, together with the Oceanographic Research Unit at the University of Cape Town, function under the guidance of the Council's Co-ordinating Committee for Oceanographic Research. This latter committee also fulfils the functions of S.A. National Committee for S.C.O.R. (Special Committee for Oceanic Research) and is responsible for the planning of South African participation in the S.C.O.R. International Indian Ocean Expedition 1962/63.

The Council introduced a scheme, in 1959, whereby bursaries are awarded to outstanding matriculants for university training on condition that they enter the Council's service after completion of their studies. Twenty such bursaries were awarded in 1959 and a further twenty-nine in 1960. The bursaries vary in value from £50—£300 p.a.

Pre-graduate
bursaries

Bedrywighede van navorsingseenhede
Oseanografiese Navorsingseenheid

Tussen Maart en Augustus 1960 is daar sewe togte onderneem waartydens gegewens met die onderseetermograaf ingesamel is en waarnemings in verband met temperatuur, soutgehalte en suurstofgehalte gedoen is; vertikale en horisontale planktonmonsters is ook versamel. Daar is verdere waarnemings gedoen en materiaal versamel van die R.R.S. „Shackleton” en die „Polarhov” af. In Desember is daar ’n aanvang gemaak met regstreekse waarneming van stroomsnelheid al langs die Agulhasbank.

Ander werksaamhede was o.a. die bestudering van die gemiddelde seevlak en bepaling van die CS^{137} -gehalte van seewater en die γ -aktiwiteit van seewater en seesediment. Daar is ook begin met die ontwikkeling van elektroniese apparaat in die meting van waterbeweging.

Die sortering van planktonmonsters in die vernaamste taksonomiese groepe, het voortgegaan. Baggermateriaal en bodemonsters is versamel en die diere is geïdentifiseer sover dit spesies betref. Al die monsters van seesediment wat ingesamel is, word tans ontleed. Die resultate van die ontledings word met die fauna-studies gekorreleer en die plekke waar al die rotsmonsters vir ontleding uitgehaal is, word vir geologiese doeleindes aangeteken omdat baie van die materiaal wat op die kontinentale plat aan die weskus uitgebagger word, vreemd aan Suid-Afrika is sover dit samestelling betref.

Die opname van tuna gedurende die afgelope jaar het aan die lig gebring dat die gebied om die Kaapse kus besonder ryk aan dié vissoort is, maar dat daar op verskillende tye van die jaar heelwat variasie is wat spesies betref.

Navorsingseenheid vir die Fisika van Vaste Toestand

Die W.N.N.R. se eenheid maak deel uit van die Navorsingsgroep vir die Fisika van die Vaste Toestand, wat bykomende steun ontvang van Hard Metals (S.A.) Ltd. en Industrial Distributors (Ltd.)

Die Direkteur het die hele jaar 1960 in die Verenigde Koninkryk vertoef, waar hy gewerk het aan ’n monograaf oor die ontwingingsteorie.

Die Eenheid het voortgegaan met sy werk oor die morfologie van metaldehiedbaardkristalle en hul elastiese en plastiese gedrag, en i.v.m. die georiënteerde groei van metale wat op mika gedamp is. Studies in verband met oppervlak-effekte by die plastiese vervorming van metale en gebreke in halfgeleiers van die diamant tipe, het voortgegaan.

Dan is daar ook nog die volgende projekte: studie van die oppervlakke van geanodiseerde en gewronge aluminiumdraad, afname in sterkte wat met die elektropolering van koudverwerkte aluminiumkristalle in verband staan, die toets van kristalle by hoë temperatuur, die ondersoek van germanium deur middel van die elektronemikroskoop deurstraling, die invloed van voorspanning en uitgloeyd op die verandering in resistiwiteit wat by verskillende silwer/goud-legerings teweeggebring word, meting van hardheid, vertweeling en breukvorming by kwarts en die adsorpsie van gasse en water, die nasporing van energieniveaux in die verbode sone van nie-geleidende diamante, en studies i.v.m. die stralingskade wat elektron- en gammastraling in koperkristalle veroorsaak.

MEDIESE NAVORSING

Inleiding

Die tekort aan fondse beperk nog steeds die volle ontwikkeling van navorsing i.v.m. die mediese wetenskappe. Dit het gedurende die jaar nog erger geword deur die besluit van die Rockefeller-stigting om teen 31 Desember 1960

From March to August 1960 seven cruises were carried out during which bathythermograph records were taken and observations of temperature, salinity and oxygen were made; vertical and horizontal plankton samples were also collected. Further observations and collections were made from R.R.S. "Shackleton" and the "Polarhov". Direct observations on current velocity were started in December along the Agulhas Bank.

Oceanographic
Research Unit

Work was also done on studies of the mean sea level, estimation of Cs^{137} content of sea water and of γ -activity of sea water and ocean sediments. The development of electronic apparatus for measuring water movement was started.

The sorting in major taxonomic groups of plankton samples continued. Dredging and bottom samples were collected and the animals identified down to species level. All marine sediments collected are being analyzed; results of the analyses are correlated with the faunal studies, and the localities of all rock samples analyzed are recorded for geological purposes as composition of much of the material trawled from the continental shelf off the West coast is foreign to South Africa.

The tunny survey undertaken during the year has shown that the area off the Cape is exceptionally rich in tunny, although the species composition varies greatly at different times of the year.

The C.S.I.R. unit is established within the Solid State Physics Research Group, which receives additional support from Hard Metals (S.A.) Ltd. and Industrial Distributors (Ltd.)

Solid State
Physic Research

Throughout 1960 the Director was in the U.K., preparing a monograph on the theory of dislocations.

At the Unit, work continued on the morphology of metaldehyde whiskers and their elastic and plastic behaviour, and on the epitaxial growth of metals evaporated on to mica. Studies were also continued on surface effects in the plastic deformation of metals, and on defects in diamond-type semi-conductors.

Other projects included: the study of surfaces of anodized and twisted aluminium wire, reduction in strength associated with the electropolishing of cold-worked aluminium crystals, high temperature testing of crystals, transmission electron microscopic examination of germanium, effect of pre-strain and annealing time on the change of resistivity produced in varying compositions of silver/gold alloys, hardness measurements, twinning and fracture in quartz and adsorption of gases and water, detection of energy levels in the forbidden gap of insulating diamonds, and studies of radiation damage produced in copper crystals by electron and gamma rays.

MEDICAL RESEARCH

The shortage of funds continues to impose restrictions on the full development of research in the medical sciences. This was aggravated during the year by the decision of the Rockefeller Foundation to withdraw, by the 31st December 1960, the generous support that it had given in the past to the Arthropod-borne Virus Diseases Research Unit. At the same time the increasing support given to South African research workers by foreign organizations such as the United States Public Health Service has acted as a stimulus to research which, in turn, has increased the demands being made on the Council. There seems

Introduction

die milde steun wat hulle in die verlede aan die Navorsingseenheid vir Virus-siektes deur Artropode oorgedra verleen het, terug te trek. Terselfdertyd het die groter mate van steun deur buitelandse organisasies, soos die Amerikaanse Openbare Gesondheidsdiens, aan Suid-Afrikaanse navorsers verleen, 'n prikkel tot navorsing gevorm wat op sy beurt weer daartoe gelei het dat daar al hoe meer by die Raad om hulp aangeklop is. Dit ly min twyfel dat die W.N.N.R. se steun vir mediese navorsing gedurende die afgelope twaalf jaar, tans internasionale erkenning geniet, d.w.s. erkenning van die unieke materiaal wat Suid-Afrika bied en van die menigte fundamentele bydraes deur ons navorsers aan die wetenskap gelewer.

Die vertrek van uitstekende wetenskaplikes na ander lande wat milder fasiliteite vir navorsing bied, baar sorg.

Fondse

Gedurende 1961 het die Raad aansoeke ten bedrae van ongeveer £225,000 vir ondersteuning van navorsing in die mediese wetenskappe ontvang. 'n Bedrag van omtrent £174,000 is toegewys, waarvan £23,300 bestem was om *ad hoc* beurshouers aan universiteite en ander inrigtings te help, £7,500 vir die Navorsingsafdeling van die Suid-Afrikaanse Instituut vir Mediese Navorsing, en ongeveer £114,300 vir Mediese Navorsingseenhede en -groepe. By hierdie som inbegryp is 'n ekstra bedrag van £10,000 wat beskikbaar gestel is na spesiale versoë deur die Raad tot die Departement van Finansies gerig. Hierdie bedrag sluit nie die voorsiening van £120,000 vir die Eenheid vir Pneumokoniose-navorsing in nie, wat gedeeltelik deur die Transvaalse en Oranje-Vrystaatse Kamer van Mynwese gefinansier word. Bowendien behartig die Raad die administrasie i.v.m. onderstaande toekennings:

- (i) £8,880 van die Amerikaanse Openbare Gesondheidsdiens aan die Amebiase-navorsingseenheid;
- (ii) £2,000 van die Transvaalse Provinsiale Administrasie en £250 elk van die Provinsiale Administrasie van Natal en van die Oranje-Vrystaat vir navorsing i.v.m. sterfgevalle onder narkose.

Staking van die werksaamhede van eenhede en groepe

Gedurende die jaar het die Raad die Navorsingsgroep vir die Bestudering van Groei en Veroudering opgehef by vertrek van die Direkteur van die groep, prof. T. Gillman, wat 'n betrekking in die Verenigde Koninkryk aanvaar het.

Die voortbestaan van die reeds lank gevestigde Voedingnavorsingseenheid aan die Universiteit van die Witwatersrand word tans oorweeg na die bedanking van sy Direkteur, prof. J. Gillman, en sy assistent, dr. C. Gilbert, wat Suid-Afrika gaan verlaat.

Die werksaamhede van die Gevangenisnavorsingsprojek i.v.m. Dieet en Metabolisme is gedurende die jaar afgesluit na afloop van die proefnemings in die Sentrale Gevangenis te Pretoria. Die magdom gegewens gedurende die ondersoeking versamel, word tans ontleed. Die samewerking van die gevangenisowerhede, die vrywilligers uit die gevangenis en die S.A. Instituut vir Mediese Navorsing, wat hierdie proefneming moontlik gemaak het, word met dank erken.

Nuwe mediese navorsingsgroep

Die Raad het die volgende nuwe mediese navorsingsgroep gedurende die jaar in die lewe geroep:

Navorsingsgroep vir Niermetabolisme aan die Universiteit van Kaapstad, onder die direksie van prof. A. L. Eales.

Internasionale samewerking

Vrugbare tegniese besprekings oor navorsing i.v.m. bilharzia is in Sep-

little doubt that C.S.I.R. support for medical research in the past twelve years is now reaping the fruits of international recognition—recognition of the unique material available in South Africa and of the many fundamental contributions made to science by our research workers.

The departure of eminent scientists to other countries where more generous facilities for research are available is a cause for grave concern.

Requests totalling about £225,000 for the support of research in medical sciences were received by the Council during 1961. A sum of approximately £174,100 was allocated, of which £23,300 was for the support of *ad hoc* grantees at universities and other institutions, £7,500 for the Research Division of the South African Institute for Medical Research and about £144,300 for medical research units and groups. The amount includes an extra sum of £10,000 which was made available following special representations by the Council to Treasury. These amounts do not include the provision of £120,000 for the Pneumoconiosis Research Unit which is partly financed by the Transvaal and O.F.S. Chamber of Mines. In addition the Council administers the following grants:—

- (i) £8,880 from the United States Public Health Service to the Amoebiasis Research Unit;
- (ii) £2,000 from the Transvaal Provincial Administration for Bilharzia research;
- (iii) £2,000 from the Transvaal Provincial Administration and £250 each from the Provincial Administration of Natal and the Orange Free State for research on anaesthetic deaths.

Funds

During the year the Council abolished the Research Group for the Study of Growth and Ageing on the departure of its Director, Prof. T. Gillman, to take up a post in the United Kingdom.

Cessation of the activities of units or groups

The future of the long-established Nutrition Research Unit at the University of the Witwatersrand is at present under consideration following the resignation of its Director, Prof. J. Gillman, and assistant, Dr. C. Gilbert, who are leaving South Africa.

The activities of the Prison Research Project on Diet and Metabolism came to a close during the year after the termination of the experiments being undertaken at the Pretoria Central Prison. The mass of data accumulated during the investigations is at present being analyzed. The collaboration of the Prison authorities, the Prison volunteers and the S.A. Institute for Medical Research, which made this experiment possible, is gratefully acknowledged.

The Council established the following new medical research group during the year:

New medical research group

Renal Metabolism Research Group at the University of Cape Town, under the direction of Professor A.L. Eales.

Fruitful technical discussions on research into bilharzia were held in September 1960, with scientists from Portugal, Mozambique, Bechuanaland and Swaziland.

International collaboration

tember 1960 met wetenskaplikes uit Portugal, Mosambiek, Betsjoeanaland en Swazieland gehou.

Ondersoek van mesoteliom

Met behulp van fondse deur die Nasionale Kankervereniging en die nywerheid verskaf, en met die samewerking van die Uniedepartement van Gesondheid en die Departement van Mynwese, is 'n begin gemaak met 'n ondersoek na die voorkoms van 'n betreklik seldsame siekte, mesoteliom. Die werk word gedoen onder beskerming van die Raad se Pneumokoniosenavorsingseenheid en omvat op die oomblik hoofsaaklik die versameling van gegewens uit opnames verkry.

Skakelwerking

Besoeke aan die buiteland deur prof. S. F. Oosthuizen, die Raad se Adviseur i.v.m. Mediese Navorsing, en prof. H. W. Snyman aan inrigtings in ander gebiede in Afrika, het waardevol geblyk deurdat kontak gemaak is met wetenskaplikes in ander lande en deurdat Suid-Afrikaanse navorsers op die hoogte gebring is van ontwikkelings elders.

„Fellowships” in die Verenigde State

As gevolg van aanbevelings deur die Raad se Subkomitee i.v.m. Toekennings vir Mediese Navorsing, het twee Suid-Afrikaners na-doktorale “fellowships” ontvang wat gedurende 1960 deur die Amerikaanse openbare Gesondheidsdiens aangebied is. Nog drie kandidate is vir hierdie “fellowships” in 1961 benoem.

Nuwe soorte toekennings

Deur die instelling van nuwe kategorieë wat ondersteuning van navorsing betref, nl. Gerigte Navorsingsprojekte en Navorsingsposte volgens Kontrak, hoop die Raad om studie op terreine wat enigsins verwaarloos is, aan te moedig.

Op die oomblik word 'n gerigte navorsingsprojek i.v.m. warmtetoleransie van die organe en weefsels van die menslike liggaam van stapel gestuur op voorstel van die Transvaalse en Oranje-Vrystaatse Kamer van Mynwese, en met sy samewerking.

Amebiase-navorsingseenheid

Die kliniese bestudering van die uitwerking van verskillende middels op *Entamoeba histolytica in vivo* is voortgesit.

'n Begin is gemaak met proefnemings op diere om die virulensie van amebes in verskillende toestande te bepaal.

Die studie i.v.m. diëte en antigene is voortgesit; die hoofbron vir antigene was amebes saam met *C1. welchii* gekweek.

Daar is ook voortgegaan met navorsing i.v.m. ander parasiete, en veral *Taenia solium* en die serologiese reaksie wat dit by diere veroorsaak.

'n Aanvang is gemaak met die vertering van ingewande met die oog op die tel van schistosoma-eiers om op die manier die rede te probeer vasstel waarom die siekteverskynsels by bilharzia in Durban en Lourenco Marques van mekaar verskil.

Gegewens omtrent 760 sterfgevalle onder narkose of operasie is tans versamel en word verwerk vir uitvoerige ontleding.

Gedurende die 15 maande deur hierdie verslag gedek, is ongeveer eweveel aandag aan veldwerk as aan laboratoriumproefnemings bestee.

Entomologiese waarnemings is gedoen en bloedmonsters vir opnames van teenliggaampies is versamel. 'n Belangrike deel van die veldwerk het bestaan

Navorsingsprojek i.v.m. sterfgevalle onder narkose of operasie
Navorsingseenheid vir Virussiektes deur Artropode oorgedra

With funds provided by the National Cancer Association and industry, and with the collaboration of the Government Health Department and the Department of Mines, an investigation into the incidence of a comparatively rare disease, mesothelioma, was started. The work is being done under the aegis of the Council's Pneumoconiosis Research Unit and is at present chiefly concerned with the accumulation of data from surveys.

Mesothelioma
investigation

Visits overseas by Prof. S. F. Oosthuizen, the Council's Adviser on Medical Research, and by Prof. H. W. Snyman to research institutions in other African territories, proved valuable in establishing contact with scientists in other countries and in informing South African research workers of developments elsewhere.

Liaison

Following the recommendations of the Council's Medical Research Awards Sub-committee, two South Africans received post-doctoral Fellowships offered by the United States Public Health Service during 1960. A further three candidates have been nominated for these Fellowships in 1961.

Fellowship in
United States

By the introduction of new categories for the support of research, viz. Directed Research Projects and Contract Research Posts, the Council hopes to stimulate studies in fields which have been neglected to some extent.

New types of
grants

At present a directed research project on the heat tolerance of the organs and tissues of the human body is being initiated at the suggestion of, and in collaboration with, the Transvaal and O.F.S. Chamber of Mines.

Clinical studies on the effects of various agents on *Entamoeba histolytica* *in vivo* continued.

Amoebiasis
Research
Unit

Experimental work on animals was initiated, to determine the virulence of amoebae under varying conditions.

Dietetic and antigenic studies have continued, the main source of antigen being from amoeba grown together with *Cl. welchii*.

Research on other parasites continued during the year, notably on *Taenia solium* and its serological response in animals.

A start was made with the digestion of viscera for the counting of schistosome eggs, in an attempt to find the mechanism underlying the difference in pathognomy of bilharzia from Durban or Lourenco Marques.

Information on 760 deaths associated with anaesthesia and surgery has now been accumulated and is being prepared for detailed analysis.

Anaesthetic Deaths Research
Project

During the 15 months under review about equal emphasis was placed on field and laboratory activities.

Arthropod-borne Virus Diseases
Research Unit
Virus Research
Unit

Entomological observations were made, and bloods for antibody surveys were collected. An important field activity was the collection of male and female

in die versamel van muskiete, bosluise, waterorganismes en diereweefsels, met die oog op virusafsondering. Deur gebruikmaking van die insektarium wat verlede jaar klaargekom het, was dit moontlik om verskeie muskietoordragingsproewe met sukses ten uitvoer te bring.

Die vernaamste laboratoriumwerkzaamhede het die afsondering en uitkenning van virusstamme, en die serologiese ondersoek van menslike en dierlike sera by die hemaglutinasie-inhibisie-(HI-) en neutralisasie-(N-) toetse omvat. 'n Groot aantal sera van veldknaagdiere is d.m.v. die HI-toets ondersoek. Die betreklik hoë persentasie positiewes by hierdie toets gevind, was nogal verbasingwekkend vanweë die feit dat vantevore suiwer negatiewe resultate met die N-toets verkry is. Om die spesifisiteit van hierdie resultate na te gaan, is wilde knaagdiere met verskeie virusse ingeënt en is die resulterende teenliggaampatrone bestudeer.

Die personeellede van die Rockefeller-stigting het vanjaar hul aktiewe deelname aan die werk van die Eenheid, waarmee in 1953 'n begin gemaak is, gestaak. Suid-Afrika is baie dank verskuldig aan die drie betrokke persone vir hul belangrike bydraes i.v.m. arborvirusnavorsing gedurende hulle verblyf in ons land; hul vertrek is 'n groot verlies. Dit lê egter in die Eenheid se bedoeling om die werk op dieselfde peil voort te sit.

Bilharzianavorsing
Die Eenheid te
Nelspruit

Roetinekulture van die slaksoorte *Biomphalaria* spp. en *Physopsis* spp. is gemaak. Ook is 'n kultuur van albino *Biomphalaria* begin.

'n Opname van die slakbevolking in die gebied tussen die Sabierivier, die Portugese grens, die Komati- en die Swart Umbulusirivier en die eskarp is voltooi.

By die ondersoekingswerk i.v.m. slakke het 'n vergelyking van harde en sagte water wat in die natuur voorkom, aan die lig gebring dat sagte water duidelik die vrugbaarheid en groeitempo van *Biomphalaria* spp. verhoog.

Daar is voortgegaan met die bestudering van die slakkebevolking en sy ontwikkeling; en die uitwerking van kalsium- en karbonaatione en die rol van aggressiewe CO₂ by slakkebiologie is ook verder ondersoek.

Die werk om die belangrikheid van wilde knaagdiere in die epidemiologie van schistosomiase te bepaal, is afgehandel en besonderhede van die werk word persklaar gemaak.

Omgewingskontrolewerk by die Crocodile Valley Citrus Estates is voortgesit.

'n Vergelykende studie van die eiers van die Afrikaanse soogdierschistosome met eindstandige stekel (behalwe *Bivettelo-bilharzia loxodontae*) is gemaak.

Twee weekdierdoders is gedurende die jaar ondersoek.

Die Eenheid
aan die
Potchefstroomse
Universiteit
vir C.H.O.

580 slakseksemlare is ontvang en wag op identifisering.

'n Ondersoek van die anatomiese kenmerke van *Bulinus (B) tropicus* en *B. (Physopsis) africanus* is voltooi.

In samewerking met die Nasionale Instituut vir Waternavorsing is 'n begin gemaak met die "randgebiedprogram" in die Potchefstroomse gebied, wat op hierdie tydstip toegespits is op 'n intensiewe opname van die Mooirivier.

Die Eenheid aan
S.A. Instituut vir
Mediese Navorsing

Die instandhoudingstudie van slakkolonies is voortgesit.

Die studie van bilharzia by knaagdiere en ape, asook die bestudering van

mosquitoes, ticks, aquatic organisms and animal tissues, for attempts at virus isolation. The insectary, which was completed last year, made it possible for several successful mosquito transmission experiments to be accomplished.

The main laboratory activities consisted of the isolation and characterization of virus strains, and the serological examination of human and animal sera with the haemagglutination-inhibition (HI) and neutralization (N) tests. A large number of sera from wild-caught rodents were tested with the HI test. The relatively high percentage of positives with this test was somewhat surprising in view of the entirely negative results previously obtained with the N test. As a check on the specificity of these results, wild rodents were inoculated with several viruses and the resultant antibody patterns were studied.

The year was notable for the ending of active participation in the work of the Unit by staff members of The Rockefeller Foundation participation that started in 1953. South Africa is greatly indebted to the three individuals concerned for the notable achievements they made in arbor virus research while working in this country; their departure is a significant loss. However, it is the intention that the work of the Unit should continue at the same level as before.

Routine snail culture of *Biomphalaria* spp. and *Physopsis* spp. continued. In addition a culture of albino *Biomphalaria* was established.

A snail survey of the area bounded by the Sabie River, the Portuguese border, the Komati and Black Umfulusi rivers and the Escarpment, has been completed.

In experimental snail work a comparison of naturally occurring hard and soft waters indicated that softer water significantly increased both fecundity and growth rates of *Biomphalaria* spp.

Snail population and development studies continued, and also work on the effect of calcium and carbonate ions, and the role of aggressive CO₂ in snail bionomics.

Work on the importance of wild rodents in the epidemiology of schistosomiasis was completed and details of the work are being prepared for publication.

Environmental control work continued at the Crocodile Valley Citrus Estates.

A comparative study of the eggs of the African terminal spined mammalian schistosomes (excluding *Bivittelo-bilharzia loxodontae*) was made.

Two molluscicides were investigated during the year.

580 snail specimens were received and are awaiting identification. An investigation of the anatomical characteristics of *Bulinus* (*B.*) *tropicus* and *B. (Physopsis) africanus* was completed.

In collaboration with the National Institute for Water Research a start was made on the "fringe area" programme in the Potchefstroom area, directed, at this stage, to an intensive survey of the Mooi River.

The maintenance study of snail colonies was continued.

Studies were undertaken, and are being continued, of bilharziasis in rodents and monkeys, as well as immunity studies for the purpose of developing a prophylactic vaccine.

Bilharzia research
unit at Nelspruit

Unit at
Potchefstroom
University
for C.H.E.

Unit at
S.A. Institute for
Medical Research

immuniteit met die oog op die ontwikkeling van 'n profilaktiese vaksien, is aangepak en word voortgesit.

Infeksies by die mens is bestudeer en besondere aandag is bestee aan kliniese verskynsels, patologiese letsels, bilharzia as 'n voorloper van kwaadaardigheid, diagnose, en behandeling met medisyne.

Die Navorsings-
eenheid vir
Kardio-pulmonale
Siektes

Die bestudering van akute asemstilstand is gedurende die jaar voltooi.

Die werk i.v.m. longwerking by ruggraatkromming, en i.v.m. die uitwerking van ioniserende stralings op longwerking in gevalle van borskarsinoom is voortgesit. Kliniese en longwerkingstoetsdata in gevalle van emfiseem is vergelyk met voldoeningstoetse op nadoodse, deur emfiseem aangetaste longe. Die waarde van die röntgenfoto by die diagnose van emfiseem is ontleed.

In samewerking met die Narkosedepartement is 'n begin gemaak met die bestudering van pH- en CO₂-regulering by geslote halotaannarkose.

Die bestudering van die eerste en die derde hartgeluid en van die sistoliese geruis in die aorta word voortgesit. Gevalle van saampersing van die aorta is voor en na snykundige ingryping bestudeer, met spesiale nadruk op pre-operatiewe beoordeling.

Daar is weer van die Eenheid se geriewe gebruik gemaak by die ondersoek en bestudering van die dinamika van 'n aantal kliniese toestande, met die doel om metodes wat deur die Eenheid vervolmaak is, toe te pas ter verbetering van diagnose.

Plasma-elektroliete en bloedvolume by die see en op 'n hoogte van 6,000 vt. is gesamentlik bestudeer met gebruikmaking van radioaktiewe isotope.

Navorsingsgroep
vir kardiovaskulêr-
pulmonalesiektes

Die groep het hom vernaamlik toegelê op hemodinamiese studies by die mens, aangebore hartkwale, kroonslagaarsiektes, en nie-aangebore hartklepaandoenings.

Die hemodinamiese studies is ontwikkel nadat die toepassing en standaardisering van metodes wat van kleurstofverdunnings gebruik maak, ingevoer is. Met hulp van die provinsiale besture is die hartkateterisasielaboratorium gereorganiseer en gemoderniseer, en is 'n begin met proefnemings op diere gemaak.

Daar is min vordering gemaak met die werk i.v.m. hartsakontsteking, beri-beri en hartverlamming van onbekende etiologie, vernaamlik weens gebrek aan opgeleide personeel.

Navorsingseenheid
vir kliniese
voeding

Die Eenheid se Onderafdeling vir Niermetabolisme is nou tot 'n afsonderlike W.N.N.R.-groep gevorm onder prof. Eales. Gedurende die jaar het hierdie onderafdeling die werk i.v.m. nier- en elektrolietmetabolisme en die invloed van steroïede op die nefrotiese sindroom voortgesit. Die aantal gevalle van porfirienmetabolisme wat bestudeer is, het 'n totaal van 170 bereik.

In die Proteïene-onderafdeling het 'n ondersoek van die stikstofbalans by volwassenes en klein kinders aan die lig gebring dat die metode niesteenstaande sekere beperkings 'n waardevolle hulpmiddel i.v.m. stikstofmetabolisme kan vorm.

Vroeëre ondersoek van herstellende kwashiorkorgevalle het reeds aan die lig gebring dat ertjiemeelblom wat by graanstapelvoedsel gevoeg word, die voedingswaarde aansienlik verhoog, en studies wat tans nog aan die gang is, dui daarop dat dié waarde ook deur byvoeging van klein hoeveelhede afge-roomde melk in poeiervorm en vismeelblom verhoog kan word. 'n Geskikte

Infections in man were studied, with particular attention to clinical manifestations, pathological lesions, bilharzia as a precursor of malignancy, diagnosis, and treatment with drugs.

Studies on acute respiratory failure were concluded during the year.

Work continued on pulmonary function studies in spinal curvature, and on the effect of ionizing radiations on lung function in cases of carcinoma of the breast. Clinical and pulmonary function test data in emphysema cases were compared with compliance tests on post mortem emphysematous lungs. The value of the radiograph in the diagnosis of emphysema was analyzed.

Studies of pH and CO₂ regulation in closed halothane anaesthesia were undertaken, in collaboration with the Department of Anaesthesia.

Studies are continuing on the first and third heart sounds and on aortic systolic murmurs. Cases of coarctation of the aorta were studied before and after surgery, with emphasis on pre-operative assessment.

The facilities of the Unit were again used for investigation and study of the dynamics of a number of clinical conditions, the objective being to apply methods perfected in the Unit to improvement in diagnosis.

Collaborative studies on plasma electrolytes and blood volume at sea-level and at 6,000 ft. altitude were made by using radio-active isotopes.

Cardio-Pulmonary
Research Unit

The main interests of the Group were haemodynamic studies in man, congenital heart disease, coronary artery disease, and acquired valve disease.

The haemodynamic studies were developed after the introduction and standardization of dye-dilution techniques. With assistance from the provincial authorities the cardiac catheterization laboratory was reorganized and modernized, and a start was made with animal experimental work.

Little advance has been made in work on pericarditis, beri-beri and cardiac failure of unknown aetiology, owing mainly to lack of trained personnel.

Cardio-vascular—
Pulmonary
Research Group

The Renal Metabolic Section of the Unit has now been established as a separate C.S.I.R. Group under Prof. Eales. During the year work in this section continued on renal and electrolyte metabolism and on the effect of steroids on the nephrotic syndrome. Cases of porphyrin metabolism studied increased to a total of 170.

In the Protein Section, work on adult and infant nitrogen balance has shown that, in spite of certain limitations, the technique can make valuable contributions to nitrogen metabolism.

Following earlier work on cases of convalescent Kwashiorkor which had shown the value of pea-flour as supplement to a maize staple, current studies have demonstrated the supplemental value of small quantities of dried skimmed milk or fish flour. A suitable combination of all these gives the same nitrogen content as whole milk powder, and enables limited quantities of dried skimmed milk or fish flour to go very much further when properly combined with basic foodstuffs for human nutrition.

Work continued on the relationship between quantity and quality of dietary fat and the level of various serum lipid fractions, with special reference to ischaemic heart disease. This investigation has been widened to cover many aspects of the epidemiology, pathology and pathogenesis of the disease.

Clinical Nutrition
and Research
Unit

samestelling van al hierdie byvoegsels gee dieselfde stikstofgehalte as volmelk-poeier, en maak dit moontlik om beperkte hoeveelhede gedroogde afgeroomde melk of vismeelblom baie verder te laat strek wanneer hulle behoorlik met basiese middels vir menslike voeding verbind word.

Die werk i.v.m. die verband tussen die kwantiteit en die kwaliteit van vet in die dieet en die peil van die verskillende serumlipiedfraksies, veral met betrekking tot ischemiese hartsiektes, is voortgesit. Hierdie ondersoek is uitgebrei tot die verskillende aspekte van die epidemiologie, die patologie en die patogenese van die siekte.

Gedurende die jaar het hierdie Eenheid, in samewerking met die Groep vir Endokrinologie, kinders wat aan kwashiorkor en 'n paar wat aan uittering gely het, bestudeer om vas te stel of daar veranderings in die werking van die endokriene kliere plaasgevind het.

**Navorsingsgroep
vir
degenerasiesiektes**

Hierdie groep se werksaamhede was hoofsaaklik op bloedsomloop- en longstudies toegespits, met toenemende nadruk op hul metaboliese aspekte. Die ondersoek van die perifere en die serebrale vaatstelsels is aangepak. Die werk i.v.m. die bepaling van anti-pseudocholesterasewerking in die urine van pasiënte met verhoogde bloeddruk is voltooi maar die resultate moet nog ontleed word.

Wat longnavorsing betref is werk gedoen, en word nog voortgesit, i.v.m. die suurstofverbruik van die asemhalingspiere, en i.v.m. longdiffusie.

**Eenheid vir
Tandheelkundige
Navorsing**

Hierdie Eenheid het hom hoofsaaklik toegelê op die ondersoek van die anatomiese, fisiologiese, fisiese en chemiese eienskappe van verkalkte weefsels. Die molekulêre, sellulêre en makroskopiese struktuur van die weefsels is bestudeer.

Die beennaatstelsel van die blou-apie is funksioneel en histologies ondersoek; die groei en ontwikkeling van die menslike hoof, en die groei van die kop van die rot en die blou-apie is bestudeer. Proefnemings in verband met 'n paar aspekte van beenherstel by die rot is voltooi.

Wat die fisiese en die chemiese sy betref, is die kinetiese gedrag van kalsiumfosfaatsisteme ondersoek.

Werk is verder gedoen i.v.m. die metabolisme van die verhemelteslymvlies van die rot, die bakteriese flora van geïnfecteerde wortelkanale, die histochemiese ondersoek van die hialien en korrelagtige liggaampies in die wande van tandsiste, en die histopatologie van tandsiste.

**Navorsingsgroep
vir Endokrinologie**

Die werk van hierdie groep het hoofsaaklik bestaan in die ondersoek van die werking van endokriene kliere by wanvoeding.

Bepalings van urinêre aldosteron, gonadotrofien en estrogeen is gedoen, tesame met toetse i.v.m. die werking van die byniere, die skildklier en die pankreas gedurende verskillende siekte fases. Die doel van hierdie werk is om 'n verklaring te vind vir die steurnisse in die werking van endokriene kliere, wat by akute instorting as gevolg van wanvoeding voorkom.

Die werk i.v.m. prediabetes, mineraalbalansstudies by steurnisse in die kalsiummetabolisme, die voorkoms van ragitis in die Kaap, en i.v.m. verskillende kliniese toestande, soos primêre amenoree, Cushing se sindroom, en diabetes insipidus, is voortgesit. Studies i.v.m. die diabetes-veroorsakende uitwerking van swangerskap is voltooi.

During the year this Unit, in collaboration with the Endocrine Group, studied infants with kwashiorkor, and a few with marasmus, for changes in endocrine function.

This group's activities were concentrated mainly on circulatory and pulmonary studies, with increasing stress on their metabolic aspects. Peripheral vascular and cerebral vascular investigations were undertaken. Work on anti-pseudocholinesterase activity determinations in the urine of hypertensive patients was completed, but the results must still be analyzed.

In pulmonary research work was done, and is continuing, on the oxygen consumption of respiratory muscles, and lung diffusion investigations.

Degenerative
Diseases Research
Group

The work of this Unit dealt mainly with the anatomical, physiological, physical and chemical properties of calcified tissue. The tissues have been studied at the molecular, cellular and macroscopic levels.

Functional and histological investigations of the suture system of the vervet monkey were done; the growth and development of the human head, and the growth of the skulls of the rat and the vervet monkey were studied. Experiments in connection with some aspects of the repair of bone in rats have been completed.

On the physical and chemical side, the kinetic behaviour of calcium phosphate systems has been investigated.

Work was also done in the metabolism of the palatal mucosa of the rat, on the bacterial flora from infected root canals, on histochemical investigation of the hyaline and granular bodies in the walls of dental cysts, and the histopathology of dental cysts.

Dental Research
Unit

The main work of the Group was investigation of endocrine function in malnutrition.

Estimations of urinary aldosterone, gonadotrophin and oestrogen have been made, together with adrenal, thyroid and pancreatic function tests during different stages of illness. The object of the work is to elucidate the disturbances in endocrine function that occur during acute malnutritional breakdown.

Work also continued on prediabetes, mineral balance studies in disorders of calcium metabolism, the incidence of rickets in the Cape, and on various clinical states such as primary amenorrhoea, Cushing's syndrome, and diabetes insipidus. Studies on the diabetogenic effect of pregnancy have been completed.

The Group has continued to develop its work on calcium metabolism, especially in relation to Vitamin D.

Endocrine
Research Group

Work has continued in an effort to determine, according to formula, the degree of activity of the rheumatic process. A start was made on a new aspect of this work, namely investigation of auto-immunity in the rheumatic group and in cases of cardiac failure of doubtful aetiology.

Heart Research
Group

Die groep het voortgegaan met die ontwikkeling van sy werk i.v.m. kalسيومmetabolisme, veral in verband met vitamin D.

Die pogings om die graad van aktiwiteit van die rumatiese proses volgens 'n formule vas te stel, is voortgesit. 'n Begin is gemaak om hierdie werk van 'n ander oogpunt te benader, nl. die ondersoek van self-immuniteit in die rumatiese groep en in geval van hartverlamming met twyfelagtige etiologie.

Navorsingseenheid
vir Biochemiese
Prosesse in die
mens

Die studie van koronêre hartaandoenings het o.a. werk i.v.m. kalsium-opname en aarverkalking by die Bantoe omvat, en bestudering van primitiewe volkere wie se diët 'n hoë gehalte aan dierlike vet bevat.

Wat die kliniese sy van die werk betref, is elektrokardiogramstudies op stedelike Bantoe-groepe en Johannesburgse pensioentrekkers uitgevoer. Hierdie studies het die gevolgtrekking waartoe baie lykskouings gelei het, bevestig, nl. dat akute episodes van koronêre hartaandoening so goed as nooit onder die Bantoe voorkom nie.

EKG-, bloeddruk-, diët- en biochemiese studies is i.v.m. Indiese bevolkingsgroepe onderneem in 'n poging om lig te werp op die bewering dat daar in Durban net soveel Indiërs as blankes aan koronêre hartaandoenings sterf.

EKG- en ander studies is gesamentlik gemaak van 'n groep blankes om iets te probeer uitvind omtrent die mate van voorkoms van hartspierischemie. 'n Begin is gemaak met die bestudering van groepe "armblankes" in George en Groot-Marico.

By die ondersoek van hoë bloeddruk onder die Bantoe, is 'n studie gemaak van Bantoe kinders, „armblankes”, groepe Indiërs, „geleerde” Bantoe, bejaarde behoeftige Bantoe, en uitgesoekte Bantoebuitepasiënte by die Baragwanath-hospitaal. Verder is 'n begin gemaak met die bestudering van Bantoe-groepe wat verskillende hoeveelhede sout in hul sisteem opneem.

Ander ondersoeke in hierdie verband het dié omvat wat hul besig hou met fisiese aktiwiteit en motoriese geskiktheid met betrekking tot koronêre en kriptogenetiese hartaandoenings, en die voorkomssyfer van suikersiekte by verskillende bevolkingsgroepe (blankes, Bantoe en Indiërs).

Biochemiese ondersoeke het fibrinolitiese studies, hormoonuitskeidingstudies i.v.m. Bantoe proefpersone, biochemiese „normales” onder Indiese bevolkingsgroepe in Suid-Afrika, en serumlipoproteïenkonsentrasies by Bantoe- en blanke proefpersone omvat.

Die werk i.v.m. mineraalmetabolisme het die voorkoms van beenbreuke onder Bantoe- en ander skoolkinders, die biochemie van ragitis en yster-tekortanemie onder swanger Bantoe-, Indiese en „armblanke” vroue gedek.

Navorsingsgroep
vir Voeding en
Tandgesondheid

Hierdie groep hou hom hoofsaaklik besig met ondersoekings in twee verskillende gebiede, die een op Nuwerus waar tussen 9 en 13% van die mense aan tandbederf ly, en die ander in Langkloof waar 99% van die mense aangetas is. Die werk het kliniese en röntgenstraalondersoeke, pH-bepalings op speeksel, tandoppervlakke en bederfletsels, en mikrobiologiese ondersoeke van die mondholtes van kinders uit albei die gebiede omvat.

Gedurende die jaar is die resultate van die voedingsopnames wat in 1958 en 1959 gedoen is, ontleed. Werk i.v.m. die voedingstatusopname en i.v.m. landbou-opnames waarby die water, grond en voedselsoorte in die twee gebiede ontleed word, is nog aan die gang.

Studies bearing on coronary heart disease included work on calcium intake and arterial calcification in the Bantu and the study of primitive populations on high animal fat diets.

On the clinical side, electrocardiograph studies were carried out on groups of rural Bantu and Johannesburg pensioners. These studies have confirmed the conclusion reached from many necropsies, that occurrence of acute episodes of coronary heart disease among the Bantu is virtually nil.

ECG, blood pressure, dietary and biochemical studies on Indian population groups were undertaken, in an attempt to throw light on reports that Durban Indians and Whites are equally prone to die from coronary heart disease.

Collaborative ECG and other studies were undertaken of a group of White persons, to learn something of the incidence of myocardial ischaemia. Studies on "poor White" groups at George and Groot Marico have been initiated.

In an investigation into hypertension among the Bantu, work was done on Bantu children, "poor Whites", Indian groups, "sophisticated" Bantu, elderly indigent Bantu, and selected Bantu out-patients at Baragwanath Hospital. Work was also started on Bantu groups with different intakes of salt.

Other relevant investigations include those into physical activity and motor fitness in relation to coronary heart disease, and cryptogenic heart disease, and the incidence of diabetes in different population groups (White, Bantu and Indian).

Biochemical investigations have covered fibrinolytic studies, hormone excretion studies on Bantu subjects, biochemical "normals" in South African Indian population groups, and serum lipo-protein concentrations in Bantu and White subjects.

Work on mineral metabolism has covered the incidence of fractures in Bantu and other school children, the biochemistry of rickets, and iron deficiency anaemia in Bantu, Indian and "poor White" pregnant women.

The Group is mainly concerned with investigation of two different areas, one at Nuwerus where dental caries affects between 9% and 13% of individuals, and the other at Langkloof where it affects 99% of individuals. Work included clinical and X-ray investigations, pH readings of saliva, dental surfaces and carious lesions, and micro-biological investigation of the oral cavity in children from both areas.

During the year the results of the nutritional surveys carried out in 1958 and 1959 were analyzed. Work continued on the nutritional status survey, and on agricultural surveys in which the water, soil and foods in the two areas are being analyzed.

Work continued during the year on development and improvement of the University of Cape Town Artificial Limb. With the assistance of the B.C.E.S.L., six amputees were selected for testing. Early tests showed however that still further development of the Limb was required, and that the individuals concerned would need adequate practice on the new type of limb. Until this is done, oxygen-consumption and other more detailed tests cannot be carried out satisfactorily. It is hoped that the six men will soon be fitted with their appliances.

Human
Biochemistry
Research Unit

Nutrition and
Dental Health
Research

Orthopaedic
Development
Unit

**Eenheid vir
Ortopediese
Ontwikkeling**

Gedurende die jaar is daar nog steeds gewerk aan die ontwikkeling en verbetering van die kunsbeen wat oorspronklik deur die Universiteit van Kaapstad gemaak is. Met die hulp van die „B.C.E.S.L.” is ses afbeenmense vir die proefneming uitgesoek. Proefnemings het egter reeds in die begin getoon dat die kunsbeen nog verbeter sou moet word en dat die betrokke persone voldoende kans sou moet kry om met die nuwe soort been te oefen. Totdat dit gedoen is, kan suurstofverbruik- en ander meer ingewikkelde toetse nie behoorlik uitgevoer word nie. Hopelik sal die ses mans binnekort van 'n protese voorsien word.

Die Eenheid se tweede projek vir toepassing van die prinsipes van die U.K.-kunsbeen op 'n kind wat sonder bene gebore is, was redelik geslaagd, en heelwat kennis is daardeur opgedoen.

'n Aantal minder belangrike ontwikkelingsprojekte is in samewerking met die Provinsiale Ortopediese Produksiewerkswinkel aangepak.

**Navorsingsgroep
vir fotobiologie**

Die volgende aspekte is gedurende die jaar bestudeer: die invloed van bloedsomloop in die vel op fotobiologiese reaksies; die stimulering van pigment deur beheerde verwonding, en pigmentêre ontwikkeling by albino-Bantoe-toetspersone. Oorspronklike navorsing i.v.m. skeurbuik-pseudosoleroderma is afgehandel; tans word die tirosien-tirosinase-reaksie ondersoek.

Daar is ook verdere ondersoeke uitgevoer i.v.m. nadoodse pigmentasie deur sonlig, velreaksies by melaatsheid en allergiese reaksies op neomisien.

**Navorsingsgroep
vir niermetabolisme**

Hierdie Groep is op 1 April 1961 gestig, maar voor die tyd is die werksaamhede waarvoor hulle nou verantwoordelik is deur die Navorsingseenheid vir Kliniese Voeding behartig.

Die werk oor die afgelope jaar verrig, het egter studies van nier- en elektrolietmetabolisme, en die uitwerking van steroïede op die nefrotiese sindroom omvat. Bestudering van porfirienmetabolisme is voortgesit.

**Virus-
navorsingseenheid**

Die oogmerk van hierdie Eenheid is om fundamentele navorsing te doen i.v.m. die aard van virusdeeltjies en die oplosbare antigene waarmee hulle dikwels in weefsels met virus besmet, geassosieer is.

Gedurende die jaar is met behulp van sone-elektroforese studie van dié entero-virusse voltooi.

Die elektronemikroskoop wat in die Departement Fisika van die Universiteit van Kaapstad gehuisves is, was van groot nut vir die Eenheid by die bestudering van makromolekule en die ultrastruktuur van virusdeeltjies.

'n Nuwe tegniek deur die Eenheid ontwikkel waarby kolomme fyngekorrelde agarjel gebruik word, het nuttig geblyk, en daar word gehoop om die toepassing van die metode uit te brei tot die effektiewe skeiding van virusdeeltjies van hul dissosiasieprodukte of van hul oplosbare antigene.

Proefnemings is voortgesit om die bestaan van vier immunologies onderskeibare oplosbare hondsdolheidsspesifieke antigene te probeer bevestig, en om hulle af te sonder en te suiwer.

'n Nuwe toets is ontwikkel vir die vroeë diagnose van akute poliomiëlitis.

Fundamentele werk i.v.m. die slenkalkoorsvirus is voortgesit, en daar word geprobeer om die aard van die nukleïensuur te bepaal.

The Unit's second project for application of the principles of the U.C.T. Limb to a child borne without legs has been reasonably successful, and considerable knowledge has been gained.

A number of minor development projects were undertaken in conjunction with the Provincial Orthopaedic Production Workshop.

During the year studies were made of the influence of skin circulation on photobiological responses, of pigment stimulation by controlled trauma, and pigmentary developments in albino Bantu subjects. Original work on scorbutic pseudoscleroderma was completed, and work on the tyrosine-tyrosinase reaction is in progress.

Further investigations were also made into post-mortem sunlight pigmentation, skin reactions in leprosy, and allergic responses to neomycin.

Photobiology
Research Group

This Group was established on the 1st April 1961, but prior to this its activities were supported through the Clinical Nutrition Research Unit.

Work during the past year, however, included studies on renal and electrolyte metabolism, and the effect of steroids on the nephrotic syndrome. Studies on porphyrin metabolism were continued.

Renal Metabolic
Research Group

The aim of the Unit is to carry out fundamental research into the nature of virus particles and the soluble antigens with which they are frequently associated in virus-infected tissues.

During the year an extended study of the entero-viruses by zone electrophoresis was completed.

The electron microscope housed in the Cape Town University's Department of Physics has been an important adjunct to the Unit's studies on macromolecules and the ultra-structure of virus particles.

A new technique developed in the Unit, using columns of finely granulated agar gel has proved useful, and it is hoped to extend application of the method to the effective separation of virus particles from their dissociation products or from their soluble antigens.

Attempts have continued to confirm the existence of four immunologically distinct, specific Rabies soluble antigens, and to separate and purify them.

A new test has been developed for the early diagnosis of acute poliomyelitis.

Fundamental work continued on the Rift Valley Fever virus, and attempts are being made to determine the nature of the nucleic acid.

Further cases of generalized Herpes Simplex infection have been detected in non-White children with Kwashiorkor; work is under way to establish the inhibitor content of sera of Kwashiorkor children and of children who die of generalized Herpes infections.

Study of the serological and biophysical properties of plant viruses has continued, and a number have been purified for detailed analysis: these include watermelon mosaic virus, and peach necrotic ringspot virus.

Virus Research
Unit

Verdere gevalle van algemene infeksie met Herpes Simplex is aangetref onder nie-blanke kinders met kwashiorkor; werk is aan die gang om die gehalte aan stremstof in sera van kwashiorkorkinders en van kinders wat aan algemene Herpes-infeksies gesterf het, te bepaal.

Daar is voortgegaan met die bestudering van die serologiese en die biofisiese eienskappe van plantvirsusse, en 'n aantal daarvan waaronder die waatlemoenmosaïkvirus en die nekrotiese ringvlekvirus wat perskes aantast, is gesuiwer vir uitgebreide ontleding.

Pneumokoniose- navorsingseenheid

Die uitbreiding, in opdrag, van navorsing i.v.m. stof- en ingenieursprobleme tot ander myngroepe, is in beginsel aanvaar, en twee sulke groepe het met beplande ondersoek i.v.m. hierdie probleme begin. Die metings van die stowwerigheid van verskillende soorte werk in die myne is voltooi; 'n statistiese ontleding van die resultate behoort van belang en van praktiese nut te wees nie alleen vir die mynbedryf nie, maar ook vir die Pneumokonioseburo.

Sekere projekte van die afdeling fisiologie is so ontwerp dat hulle van nut vir die Pneumokonioseburo se projekte kan wees, soos bv. die somatotipering van mynwerkers om te kan bepaal of 'n persoon met 'n bepaalde liggaamsbou meer vatbaar vir silikose of tuberkulose is. Bowendien word 'n studie van mynwerkers wat ongeskik vir werk geword het, gemaak om objektief die bepaalde funksie wat benadeel is, te beoordeel.

Met die studies van die kliniese en die radiologiese groep is beoog om die radiologiese en patologiese bevindings by silikose en asbestose te korreleer. Hierdie werk is onderneem in samewerking met lede van die afdeling patologie, wat ook die uitwerking van silikose op die hart en op emfiseem bestudeer het. Noukeuriger metodes is ontwikkel om die toksiese werking van 'n monster stof te bepaal, en verder is die uitwerking van stofdeeltjies van verskillende grootte bestudeer. Daar is aan die lig gebring dat die oppervlak van 'n kwartsdeeltjie duidelik katalities aktief is, en 'n groot aantal chemiese verbindinge is gebruik in 'n poging om hierdie aktiwiteit te voorkom, met die uiteindelijke doel om silikose te voorkom.

Die uitwerking van silika op sekere immunologiese stelsels is ondersoek, en daar is bewys dat die inaseming van silika een van die natuurlike verdedigingsmeganismes van die liggaam aantast. Die sera van mynwerkers het eienskappe wat verskil van dié van die sera van nie-mynwerkers. Daar bestaan aanduidings dat die een of ander immunologiese faktor 'n rol by silikose speel.

The extension, by delegation, of research into dust and engineering problems to include other mining groups, was accepted in principle and two such groups have started on planned investigations into these problems. The measurement of the dustiness of different mining operations has been completed; statistical analysis of the results should be of interest and have a practical application not only to mining, but also to the Pneumoconiosis Bureau.

Certain projects of the physiology division are also designated to assist the Pneumoconiosis Bureau-projects such as somatotyping of miners in order to determine whether a person with a particular body build is more susceptible to silicosis or tuberculosis. In addition, a study is being made of disabled miners to assess objectively the particular function which is reduced.

The clinical and radiological groups have carried out studies to correlate radiological and pathological findings in silicosis and asbestosis. This work has been undertaken with members of the pathology division who have also worked on the effect of silicosis on the heart and on emphysema. More accurate methods have been developed to estimate the toxic action of dust particles of different sizes. The surface of the quartz particle has been shown to have marked catalytic activity, and a large number of chemical compounds have been used in an attempt to prevent this action, with the ultimate object of preventing silicosis.

The effect of silica on certain immunological systems was investigated and it was shown that the inhalation of silica does affect one of the natural defence mechanisms of the body. The sera of miners have properties which are different from those of non-miners. There are indications that some immunological factor may play a part in silicosis.



RESEARCH BURSARIES AND ASSISTANTSHIPS awarded by the C.S.I.R. during 1961.

NAVORSINGSBEURSE EN ASSISTENTSKAPPE wat deur die W.N.N.R. gedurende 1961 toegeken is.

GENERAL RESEARCH—ALGEMENE NAVORSING

SENIOR BURSARIES/SENIOR BEURSE

Name and Qualifications Naam en Kwalifikasies	Where tenable Waar geldig	Subject of Research Onderwerp van navorsing
BARNARD, K. H. M.A., D.Sc. (Hons.) Hon. Worker, S.A. Museum. R1,300	S.A. Museum	Revision of South African Marine Mollusca. (Previous awards: 1957-1960). <i>Hersiening van S.A. Seeweekdiere. (Vorige toekennings: 1957-1960).</i>
JUBB, R. A. B.Sc. Scientific Assistant. R600	Rhodes University	The Freshwater fishes of Southern Africa. (Previous awards: 1957-1960). <i>Die varswatervisse van Suidelike Afrika (Vorige toekennings: 1957-1960).</i>
OMER-COOPER, J. B.A., Ph.D., F.R.E.S. (Lond.) F.E.S. (S.A.) Research Associate. R1,100	Rhodes University	Dytiscidae of Southern Africa. (Previous awards: 1955-1960). <i>Dytiscidae van Suidelike Afrika. (Vorige toekennings: 1955-1960).</i>
PILLANS, N. S. Taxonomist in the Bolus Herbarium, Cape Town. R1,200	University of Cape Town	Taxonomic revision of the genus <i>Hermannia</i> (Sterculiaceae). (Previous awards: 1958, 1959, 1960). <i>Taksonomiese hersiening van die genus Hermannia (Sterculiaceae). (Vorige toekennings: 1958, 1959, 1960).</i>
SMITH, J. L. B. B.A., M.Sc., Ph.D., F.R.S. (S.A.) Research Professor. R1,620	Rhodes University	Fishes. (Previous awards: 1947-1960). <i>Visse. (Vorige toekennings: 1947-1960).</i>
<i>SENIOR BEURSE OORSEE</i>		
BORGIN, K. B. Mag.Scient. D.Sc. Professor in Hout-tegnologie. R800	Instituut vir Houttegnologie. Oslo	Studies van Topochemiese reaksie van hout. <i>Study of the Topochemical reaction of wood.</i>
CILLIE, G. G. M.Sc., Ph.D., A.M. (Harv.) R1,200	Astrophysical Observatory, Smithsonian Institution	Bane van naby-satelliete (kunsmane) en die interpretasie van die ligkurwes van naby-dubbelsterre (bedekkings-veranderlikes). <i>Orbits of near-satellites and the interpretation of the light curves of near-double stars (eclipsing variables).</i>
<i>STUDENTEBEURSE</i>		
Botany/Plantkunde		
DREOSTI, I. E. B.Sc. (Agric.) R382.35	University of Natal	Relationship between leaf and grain carotenoids in Maize. <i>Verwantskap tussen blaar- en korrelkaroteniede in mielies.</i>
GOSLIN, H. D. B.Sc. R250	University of the Witwatersrand	Aromatic biosynthesis in plants. <i>Aromatiese biosintese in plante.</i>
HOUGH, M. C. B.Sc. R500	University of Pretoria	Symbiotiese stikstof binding en die vorming van wortelknoppies by peulplante. (Vorige toekening: 1960). <i>Symbiotic nitrogen fixation and the formation of root nodules in leguminosae. (Previous award: 1960).</i>
MITCHELL-INNES, B. A. B.Sc. R300	University of Natal	A project in Botany. <i>'n Plantkundige projek.</i>

Name and Qualifications Naam en Kwalifikasies	Where tenable Waar geldig	Subject of Research Onderwerp van navorsing
VAN DEN HEEVER, M. B.Sc. R500	Universiteit van Pretoria	'n Studie oor proteïen afbraak in ontkiemende sade. (Vorige toekening: 1960). <i>A study on protein catabolism in germinating seeds. (Previous award: 1960).</i>
WARREN, J. L. B.Sc. R300	University of the Witwatersrand	Plant taxonomy and cytology. <i>Plantetaksonomie en -siologie.</i>
Chemical Engineering/Chemiese Ingenieurswese		
BUZZARD, J. L. B.Sc. (Eng.) R382.35	University of Natal	The formation of sodium bicarbonate from carbonate with diluted carbon dioxide in a stirred tank absorber. (Previous award: 1960). <i>Die vorming van natriumbikarbonaat uit karbonaat met verdunde koolstofdioksied in die absorbeerder van 'n roertenk. (Vorige toekening: 1960).</i>
DREW, N. E. B.Sc. (Chem. Eng.) R382.35	University of Natal	The production of concentrated silica sols by ion exchange. (Previous award: 1960). <i>Die produksie van gekonsentreerde silieke-solle deur ion-uitruiling. (Vorige toekening: 1960).</i>
GROENEWALD, T. M.Sc. R500	University of the Witwatersrand	Kinetics of the decomposition of ammonia by the arsenides of the elements of the first transition series. (Previous awards: 1958, 1959, 1960). <i>Kinetika van die ontbinding van ammoniak deur die arseniede van die elemente van die eerste oorgangsrееks. (Vorige toekennings: 1958, 1959, 1960).</i>
CHEMISTRY/SKEIKUNDE		
ALLISON, S. A. B.Sc. R300	University of Natal	A project in chemistry. <i>'n Skeikundige projek.</i>
BRANDT, P. J. B.Sc. (Hons.) R500	Rhodes University	A critical study of the errors involved in the spectrographic analysis for trace elements in plants. (Previous award: 1960). <i>'n Kritiese studie van die foute by spektrografiese ontleding vir die bepaling van spoorelemente in plante. (Vorige toekening: 1960).</i>
BURGER, B. V. M.Sc. R150	Universiteit van Stellenbosch	Dimere vorms van Vitamien A. (Vorige toekennings: 1959, 1960). <i>Dimeric forms of vitamin A. (Previous awards: 1959, 1960).</i>
CLARK, R. C. M.Sc. R600	University of Natal	Alkaloids of the Amaryllidaceae. (Previous award: 1960). <i>Alkaliede van die Amaryllidaceae. (Vorige toekening: 1960).</i>
COETZEE, C. J. M.Sc. R150	Universiteit van Stellenbosch	Ioonuitruilereienskappe van sekere anorganiese verbindinge. (Vorige toekennings: 1959, 1960). <i>Ion exchange properties of certain inorganic compounds. (Previous awards: 1959, 1960).</i>
COTTON, T. H. B.Sc. (Hons.) R500	University of the Witwatersrand	Investigation into instability constants of chromous complexes. (Previous awards: 1959, 1960). <i>Onderzoek van die onbestendighedskonstantes van chroom-II-komplekse. (Vorige toekennings: 1959-1960).</i>
CROWTHER, P. M.Sc. R600	University of Natal	Thermal diffusion in liquid mixtures. (Previous awards: 1958, 1959, 1960). <i>Warmteverspreiding in vloeistofmengsels. (Vorige toekennings: 1958, 1959, 1960).</i>
DEKKER, J. J.	Universiteit van die O.V.S.	Die inwerking van heterosikliëse N-oksiede op broompiridien. <i>The action of heterocyclic N-oxides on brominated pyridines.</i>
DICKS, L. W. R. B.Sc. (Hons.) R382.35	University of Natal	The effect of heat and fluxes on the mobility of trace elements in minerals. <i>Die uitwerking van hitte en smeltmiddels op die beweeglikheid van spoorelemente in minerale.</i>
DU PLESSIS, J. A. K. B.Sc. (Hons.) R500	Potchefstroomse Universiteit vir C.H.O.	'n Onderzoek na die reduksie van kalium-heksasianokobaltaat III en die reaksie van kaliumhidroksopentasianokobaltaat III. <i>An investigation into the reduction of potassium hexacyano cobaltate III and the reaction of potassium hydroxopentacyano cobaltate III.</i>
FOUCHE, K. F. B.Sc. R300	Potchefstroomse Universiteit vir C.H.O.	'n Projek in Chemie. <i>A chemical project.</i>
GARBUTT, D. C. F. M.Sc. R600	University of Natal	Alkaloids of the Amaryllidaceae. (Previous awards: 1958, 1959). <i>Alkaliede van die Amaryllidaceae. (Vorige toekennings: 1958, 1959).</i>

Name and Qualifications Naam en Kwalifikasies	Where tenable Waar geldig	Subject of Research Onderwerp van navorsing
GATENBY, A. M. B.Sc. (Hons.) R382.35	University of Natal	Structural studies on alkaloids in S.A. (Previous award: 1960). <i>Studies i.v.m. die struktuur van alkaloiëde in S.A. (Vorige toekenning: 1960).</i>
GORDON, R. I. B.Sc. R300	University of Natal	A project in Chemistry. <i>'n Skeikundige projek.</i>
GROSSERT, J. S. M.Sc. R600	University of Natal	Structural Studies in the Strychnos Alkaloids. (Previous awards: 1959, 1960). <i>Studie i.v.m. die struktuur van die Strychnos-alkaloïede. (Vorige toekennings: 1959, 1960).</i>
HAINES, R. J. B.Sc. (Hons.) R300	University of Natal	Gas chromatography of inorganic volatiles. (Previous award: 1960). <i>Gaschromatografie van anorganiese vlugtige stowwe. (Vorige toekening: 1960).</i>
HARWOOD, J. E. B.Sc. (Hons.) R500	University of Natal	Development and extension of Isotope analysis (dilution included) to metals with high ionisation potential. (Previous award: 1960). <i>Die ontwikkeling van isotoopontleding (met inbegrip van verdunning en die uitbreiding daarvan) tot metale met 'n hoë ionisasiepotensiaal. (Vorige toekenning: 1960).</i>
HILL, R. O. B.Sc. R300	University of the Witwatersrand	A topic in physical Chemistry. <i>'n Onderwerp i.v.m. fisiese chemie.</i>
HOPE, C. J. B.Sc. (Hons.) R500	University of the Witwatersrand	Analytical application of Ion flotation. (Previous award: 1960). <i>Analitiese toepassing van ioneflottering. (Vorige toekenning: 1960).</i>
HOWE, A. C. B.Sc. R250	University of the Witwatersrand	A topic in organic chemistry. <i>'n Onderwerp i.v.m. organiese chemie.</i>
JONKER, F. J. B.Sc. (Hons.) R500	Universiteit van Stellenbosch	EDTA-titrasie van sekere divalente katione en die stabiliteit van hulle komplekse met ligande in die titrasie-medium. <i>EDTA titration of certain divalent cations and the stability of their complexes with ligands in the titrating medium.</i>
KING, D. A. B.Sc. (Hons.) R500	University of the Witwatersrand	An investigation into the use of a number of catalysts for the synthesis of ammonia. (Previous award: 1960). <i>'n Ondersoek van die gebruik van 'n aantal katalisators vir die sintese van ammoniak. (Vorige toekenning: 1960).</i>
KORT, M. J. B.Sc. R500	University of Cape Town	Reaction of hydrazine with various amido- and imido-benzophenones and quinones. (Previous award: 1960). <i>Die reaksie van hidrasien met verskillende amido- en imido-bensofenone en kinone. (Vorige toekenning: 1960).</i>
KRIGE, G. J. M. B.Sc. R300	Universiteit van Pretoria	'n Projek in Chemie. <i>A project in Chemistry.</i>
LEE, E. G. C. B.Sc. R300	University of Cape Town	A project in Chemistry. <i>'n Skeikundige projek.</i>
LETCHER, R. M. B.Sc. (Hons.) R382.35	University of Natal	A project in Chemistry. <i>'n Skeikundige projek.</i>
LOURENS, L. C. F. B.Sc. (Hons.) R500	Universiteit van Stellenbosch	Verbindings analoog met vitamien A. (Vorige toekenning: 1960). <i>Compounds analogous to vitamin A. (Previous award: 1960).</i>
LUCK, D. N. B.Sc. (Agric.) R500	University of Natal	The synthesis of pyridine nucleotides in liver cells. <i>Die sintese van piridiennukleotiede in lewerselle.</i>
LUSHER, J. A. M.Sc. R500	University of the Witwatersrand	The separation of aluminium and beryllium by means of ion flotation. <i>Die skeiding van aluminium en berillium deur middel van ioneflottering.</i>
McFARLANE, N. R. B.Sc. (Hons.) R500	University of Natal	Studies on solute-solvent interaction particularly in non-aqueous solutions. <i>Die wederkerige inwerking van opgeslote stof en oplosmiddel, veral in nie-waterige oplossings.</i>
MACMILLAN, R. F. G. B.Sc. (Hons.) R382.35	University of Natal	Adsorption of Multifunctional molecules. (Previous award: 1960). <i>Adsorpsie van multifunksionele molekule. (Vorige toekenning: 1960).</i>
MALLAMS, A. K. B.Sc. R300	University of the Witwatersrand	A topic in organic chemistry. <i>'n Onderwerp i.v.m. organiese chemie.</i>
MEARS, G. E. F. B.Sc. R300	University of Cape Town	A project in Chemistry. <i>'n Skeikundige projek.</i>

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MUTCH, R. E. B.Sc. (Hons.) R450	University of the Witwatersrand	Kinetics and mechanism of some electron transfer reactions. <i>Kinetika en meganisme van 'n paar reaksies by elektrone-ooringing</i>
NASSIMBENI, L. R. B.Sc. R300	Rhodes University	A project in chemistry. <i>'n Skeikundige projek.</i>
NICOL, M. J. B.Sc. (Hons.) R500	University of the Witwatersrand	The Standard oxidation potentials of the Co (II)/Co (III) and V (III)/V (IV) Systems in perchlorate solution. (Previous award: 1960). <i>Die standaard oksideringspotensiale van die Co (II)/Co (III)- en die V (III)/V (IV)-stelsels in perchloratoplossing. (Vorige toekening: 1960).</i>
PRETORIUS, J. L. B.Sc., H.O.D. R400	Universiteit van Pretoria	Sintese van Fluordraende nukleotide. (Vorige toekening: 1960). <i>Synthesis of fluorinated nucleotides. (Previous award: 1960).</i>
RASMUSSEN, M. B.Sc. R300	University of the Witwatersrand	Metabolism of fluoro-acetate. <i>Metabolisme van fluoroasetaat.</i>
RAVNÖ, A. B. B.Sc. (Hons.) R382.35	University of Natal	The E.M.F.'s developed by non-isothermal electrodes. (Previous award: 1960). <i>Die E.M.K. deur nie-isotermiese elektrodes ontwikkel. (Vorige toekening: 1960).</i>
ROSS, F. P. B.Sc. R300	University of the Witwatersrand	A topic in organic chemistry. <i>'n Onderwerp i.v.m. organiese chemie.</i>
SCHLOSSER, F. D. B.Sc. R300	University of Natal	A project in Chemistry. <i>'n Skeikundige projek.</i>
SMIDT, J. F. B.Sc. R450	Universiteit van die O.V.S.	Die reaksie van piridien-N-oksiede met sulfoonsuur-annidriede. (Vorige toekening: 1960). <i>The reaction of pyridin-N-oxides with sulphonic acid anhydrides. (Previous award: 1960).</i>
SMITH, A. J. H. B.Sc. (Hons.) U.E.D. R250	Rhodes University	Accurate determination of sulphur in plant and soil materials. (Previous award: 1960). <i>Die noukeurige bepaling van swawel in plante- en grondmateriaal. (Vorige toekening: 1960).</i>
SMITH, W. McD. B.Sc. (Hons.) R500	University of Natal	Structural studies in the alkaloids of the Amaryllidaceae. (Previous award: 1960). <i>'n Studie van die struktuur van die alkaliede van die Amaryllidaceae (Vorige toekening: 1960).</i>
SON HING, L. B. B.Sc. R300	University of Cape Town	A project in chemistry. <i>'n Skeikundig. projek.</i>
SOUTHGATE, R. B.Sc. R300	Rhodes University	A project in chemistry. <i>'n Skeikundige projek.</i>
STEYN, P. G. B.Sc. (Hons.) R500	Universiteit van Stellenbosch	Verbindings analoog met Vitamien A. <i>Compounds analogous to Vitamin A.</i>
TOUBE, T. P. B.Sc. (Hons.) R500	University of Natal	Structural studies of alkaloids in South African plants. <i>'n Studie van die struktuur van alkaliede in Suid-Afrikaanse plante.</i>
TULLOCH, B. R. B.Sc. (Agric.) R382.35	University of Natal	Studies in the biochemistry of poultry semen. <i>'n Studie van die biochemie van pluimvee-semen.</i>
VICTOR, A. H. B.Sc. (Hons.) R500	Universiteit van Stellenbosch	Invloed van pH en kompleksvormers op die uitruiling van molybdaat aan sintetiese anioon-uitruilers. <i>Effect of pH and complex formers on the exchange of molybdate to synthetic anion exchangers.</i>
WAGENEK, P. C. B.Sc. R300	Universiteit van Pretoria	'n Projek in Chemie. <i>A project in chemistry.</i>
WEIDEMA, E. B.Sc. R500	Universiteit van Pretoria	Die chemie van natuurstowwe. (Vorige toekening: 1960). <i>The chemistry of natural substances. (Previous award: 1960).</i>
WELKE, H. J. F. H. D. B.Sc. (Hons.) R500	University of Natal	A study of cracking patterns of complex organic molecules, produced by the bombardment with electrons. (Previous awards: 1959, 1960). <i>'n Studie van barspatrone van komplekse organiese molekule deur bombardering met elektrone. (Vorige toekennings, 1959, 1960).</i>

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WOODS, G. S. B.Sc. R500	Rhodes University	An X-ray diffraction study of the thermal decomposition of irradiated and unirradiated potassium permanganate. <i>'n X-straal diffraksie studie van die termiese ontbinding van bestraalde en onbestraalde kaliumpermanganaat.</i>
Civil Engineering/Siviele Ingenieurswese		
MARRIOTT, D. L. B.Sc. (Eng.) R500	University of Natal	The behaviour of flat reinforced concrete slabs under load and an improvement of economical design methods. <i>Die gedrag van plat plate van gewapende beton onder belasting en 'n verbetering van ekonomiese ontwerpmetodes.</i>
Electrical Engineering/Elektreiese Ingenieurswese		
HUNT, D. F. B.Sc. (Elec. Eng.) R500	University of the Witwatersrand	Studies in special spark discharge phenomena. <i>'n Studie van spesiale vonkontladingsverskynsels.</i>
SHAPIRO, I. J. B.Sc. (Electr. Eng.) R500	University of the Witwatersrand	Studies of telecommunications. <i>'n Studie van telekommunikasie.</i>
SMITH, E. D. B.Sc. (Eng.) R500	University of Cape Town	An investigation into the essential components of consonants. <i>'n Ondersoek i.v.m. die essensiele komponente van konsonante.</i>
Forestry/Bosbou		
MONK, T. H. B.Sc. (Bosbou) R500	Universiteit van Stellenbosch	Beskerming van hout teen vertering. (Vorige toekenning: 1960). <i>Protection of timber against weathering. (Previous award: 1960).</i>
Geology/Geologie		
BELDERSON, R. H. B.Sc. (Hons.) R382.35	University of Natal	A study of the Natal continental Shelf. (Previous award: 1960). <i>'n Studie van die Natalse kontinentale plat. (Vorige toekenning: 1960).</i>
COETZEE, F. B.Sc. R300	Universiteit van die O.V.S.	Petrologiese studie van sekere Kalahari-sande. <i>A petrological study of certain Kalahari sands.</i>
DOUGHERTY, S. M. B.Sc. R300	University of Natal	Charnockites in the Valley of a Thousand Hills. <i>Charnockiete in die Vallei van Duisend Heuwels.</i>
DRAPER, J. A. P. B.Sc. R300	University of Natal	Geological mapping in the Melmoth area. <i>Geologiese kartering in die Melmoth-gebied.</i>
ERASMUS, B. J. B.Sc. R300	Universiteit van Pretoria	Navorsing in mineralogie en Petrologie. <i>Research in mineralogy and petrology.</i>
JENNINGS, R. P. B.Sc. (Hons.) R250	University of Natal	The geology of a portion of the Munya area; No.thern Rhodesia. (Previous award: 1960). <i>Die geologie van 'n deel van die Munyeke-gebied, Noord-Rhodesië. (Vorige toekenning: 1960).</i>
KOLBE-FALKENHAIN, P. B.Sc. (Hons.) R500	University of Cape Town	Geochemical investigations on the Cape granite. <i>Geochemiese ondersoekings i.v.m. die Kaapse graniet.</i>
LOOCK, J. C. B.Sc. R500	University of Stellenbosch	A sedimentation study of the transition between the Witteberg and the Dwyka series. <i>'n Sedimentasie studie van die oorgang tussen die Witteberg- en die Dwykaserie.</i>
MCQUILLIN, K. B. B.Sc. (Hons.) R382.35	University of Natal	The Sango eclogites. (Previous award: 1959). <i>Die Sango-eklogiete. (Vorige toekenning: 1959).</i>
MANTON, W. I. B.Sc. (Hons.) R450	University of the Witwatersrand	An investigation into the nature and origin of Kimberlite and associated rock types. (Previous award: 1960). <i>'n Ondersoek i.v.m. die aard en oorsprong van Kimberliet en verwante rotsipes. (Vorige toekenning: 1960).</i>

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MIDDLEMOST, E. A. K. M.Sc. R600	University of Cape Town	Petrological and structural studies in the Stinkfontein area of the Richtersveld. (Previous awards: 1959, 1960). <i>Petrologiese en struktuurstudies in die Stinkfontein-gebied van die Richtersveld. (Vorige toekennings: 1959, 1960).</i>
MORTON, P. B.Sc. (Hons.) R382.35	University of Natal	A project in geology. (Previous award: 1960). <i>'n Geologiese projek. (Vorige toekening: 1960).</i>
POOLE, E. J. B.Sc. (Eng.) R500	University of the Witwatersrand	The relationship of structure and tectonic history to ore deposition in Agnes Mine, Barberton District. <i>Die verwantskap tussen struktuur en tektoniese geskiedenis en ertsafsetting in die Agnes-rym, Distrik Barberton.</i>
SEIDNER, C. B.Sc. (Hons.) R500	University of Cape Town	The Geology of the Paresis Igneous complex, S.W.A. (Previous award: 1960). <i>Die geologie van die Paresisstollingskompleks in S.W.A. (Vorige toekening: 1960).</i>
VAN RENSBURG, W. C. J. B.Sc. (Hons.) R166.66	Universiteit van Pretoria	Die geologie in die omgewing van Kennedysvale, Distrik Lydenburg. (Vorige toekening: 1960). <i>The geology in the vicinity of Kennedysvale, Lydenburg District. (Previous award: 1960).</i>
VAN SCHALKWYK, A. B.Sc. R300	Universiteit van die O.V.S.	Gebruik en nut van die kortafstand Seismometer in die Wes-Vrystaat. <i>Use and benefit of the short-distance seismometer in the Western Free State.</i>
VAN ZYL, J. S. V. M.Sc. R600	University of the Witwatersrand	Paleomagnetic studies on Karroo and Post-Karroo Igneous rocks. (Previous award: 1960). <i>Paleomagnetiese studie van Karroo- en na-Karrostollingsgesteente. (Vorige toekening: 1960).</i>
WURZEL, P. B.Sc. R300	University of Natal	Field study of basement rocks in the Valley of a Thousand Hills. (Previous award: 1960). <i>Veldstudie van oergesteente in die Vallei van Duisend Heuwels. (Vorige toekening: 1960).</i>
Mathematics/Matesis		
DE KOCK, G. DE V. B.Sc. (Hons.) R500	Universiteit van Stellenbosch	Afskaltings van oplossings van elliptiese differensiaalvergelykings. (Vorige toekening: 1960). <i>Assessment of the solutions of elliptical differential equations. (Previous award: 1960).</i>
DU PLESSIS, P. DE V. B.Sc. R300	Universiteit van die O.V.S.	'n Projek in wiskunde. <i>A project in mathematics.</i>
LEMMER, G. B.Sc. (Hons.) R500	University of Natal	A project in modern mathematical physics. (Previous award: 1960). <i>'n Projek in moderne wiskundige fisika. (Vorige toekening: 1960).</i>
LEMMER, H. H. M.Sc. R600	Universiteit van Pretoria	'n Ondersoek i.v.m. verdelingsvrye toets vir die probleem van twee en meer steekproewe om vir verskil in spreiding te toets. Vorige toekennings: 1959, 1960. <i>An investigation on distribution-free tests for the problem of two and more samples to test for difference in dispersion. (Previous awards: 1959, 1960).</i>
MALHERBE, S. G. B.Sc. R300	Universiteit van Stellenbosch	'n Projek in wiskunde. <i>A project in mathematics.</i>
MULLER, E. R. B.Sc. (Hons.) R500	University of Natal	A project in modern mathematical physics. (Previous award: 1960). <i>'n Projek in moderne wiskundige fisika. (Vorige toekening: 1960).</i>
POTGIETER, P. C. B.Sc. R300	Universiteit van Stellenbosch	'n Projek in wiskunde. <i>A project in mathematics.</i>
SWART, J. H. B.Sc. R500	Universiteit van Stellenbosch	Groep teoretiese benaderings van die twee-en-drie-dimensionele meetkunde waarvan die ko-ördinate elemente is van willekeurige liggame, kommutatief of nie. (Vorige toekening: 1960). <i>Group theoretical approaches of two-and-three-dimensional geometry, the co-ordinates of which are elements of arbitrary bodies, whether commutative or not. (Previous award: 1960).</i>
VAN DER WALT, A. P. J. B.Sc. (Hons.) R500	Potchefstroomse Universiteit vir C.H.O.	Literatuurstudie van die toepassing van die integraalvergelyking op konforme afbeelding. (Vorige toekening: 1960). <i>Literature study of the application of the integral equation to conformable representation. (Previous award: 1960).</i>

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Physics/Fisika		
ANDERSSON, E. C. B.Sc. R400	Universiteit van Pretoria	'n Studie van die fisiese aspekte wat by dou- en rypvorming betrokke is langs 'n gegewe helling in die Silverton omgewing. (Vorige toekening: 1960). <i>A study of the physical aspects involved in dew and frost formation on a certain slope in the vicinity of Silverton. (Previous award: 1960).</i>
BERGH, H. W. B.Sc. (Hons.) R500	University of Natal	Analysis of ionospheric records and data obtained in Southern Africa during the International Geophysical Year. (Previous award: 1960). <i>Ontleding van ionosferiese aantekeninge en data gedurende die Internasionale Geofisiese Jaer in Suidelike Afrika versamel. (Vorige toekening: 1960).</i>
BOTHA, A. H. B.Sc. (Hons.) R500	Universiteit van Stellenbosch	Ontwikkeling van 'n detektorsisteem met 6 kanale vir die snel-aftassisteem van die Ebertspektrograaf. (Vorige toekening: 1960). <i>Development of a 6-channel detector system for the rapid scanning system of the Eberts spectrograph. (Previous award: 1960).</i>
BOTHA, J. C. B.Sc. R300	Potchefstroomse Universiteit vir C.H.O.	Analise van Wilson-kamerfotos vir sekondêre effekte van mu-mesone in verskillende energie-gebiede in loodplaat. <i>Analysis of Wilson chamber photos for secondary effects of mu-mesons in various energy regions in lead plates.</i>
BREDENKAMP, D. B. B.Sc. R500	Universiteit van O.V.S.	Magnetiese tydeffekte in nikkell. (Vorige toekening: 1960). <i>Magnetic time effects in nickel. (Previous award: 1960)</i>
BURGER, S. J. B.Sc. R300	Universiteit van Stellenbosch	In die breë veld van kernfisika. <i>A subject within the wide field of nuclear physics.</i>
CAVENEY, R. J. B.Sc. R300	University of the Witwatersrand	A project in physics. <i>'n Projek in fisika.</i>
GLENDINNING, L. B.Sc. R300	University of Natal	A project in physics. <i>'n Projek in fisika.</i>
COHEN, N. V. B.Sc. R250	University of the Witwatersrand	A project in physics. <i>'n Projek in fisika.</i>
DANGOR, A. E. B.Sc. (Hons.) R500	University of the Witwatersrand	Plastic deformation of indiumantimonide. (Previous award: 1960). <i>Plastiese deformatsie van indium-antimonied. (Vorige toekening: 1960).</i>
DAVIDSON, A. T. B.Sc. R500	Rhodes University	Investigation of the fluorescence of various organic compounds in the vacuum ultra-violet region. <i>Onderzoek van die fluoressensie van verskillende organiese verbindinge in die vakuum-ultravioletgebied.</i>
DEBBO, C. A. B.Sc. R300	University of Cape Town	A project in physics. <i>'n Projek in fisika.</i>
DORFAN, D. E. B.Sc. R300	University of Cape Town	A project in physics. <i>'n Projek in fisika.</i>
DORMEHL, I. C. B.Sc. R500	Universiteit van Pretoria	Die standaardisering van 'n Na I (Ti)-sintillasie kristal vir γ -straal-intensiteitsbepaling. (Vorige toekening: 1960). <i>The standardization of a Na I (Ti) scintillation crystal for the determination of γ radiation intensity. (Previous award: 1960).</i>
FARRER, R. G. B.Sc. R300	University of Natal	A project in physics. <i>'n Projek in fisika.</i>
FOURIE, P. DU T. B.Sc. R300	Universiteit van Stellenbosch	In die breë veld van basiese kernfisika. <i>A subject within the wide field of basic nuclear physics.</i>
GIBSON, A. A. V. B.Sc. R300	University of Natal	A project in physics. <i>'n Projek in fisika.</i>
GOODHEAD, D. T. B.Sc. (Hons.) R382.35	University of Natal	A project in physics. (Previous award: 1960). <i>'n Projek in fisika. (Vorige toekening: 1960).</i>
GRAHAM, C. B.Sc. R300	University of Natal	A project in physics. <i>'n Projek in fisika.</i>

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KOHN, J. M. A. B.Sc. R300	Universiteit van Stellenbosch	Skedelvormologie van die Noord Amerikaanse genus <i>Phrynosoma</i> . <i>Cranial morphology of the North American genus Phrynosoma.</i>
MARTIN, A. A. B.Sc. R300	University of the Witwatersrand	The biology of <i>Bufo regularis</i> (Bufonidae); with special reference to breeding and metamorphosis in relation to racial variation within the species. <i>Die biologie van Bufo regularis (Bufonidae), met spesiale verwysing na aanteling en gedaanteverwysing met betrekking tot rassevariasie binne die soort.</i>
MORAN, V. C. B.Sc. (Hons.) R500	Rhodes University	Studies on the neuromuscular physiology of some Orthopterous and Hemipterous insects. <i>Studies i.v.m. die spiersemfisiologie van enkele insekte wat tot die Orthoptera en die Hemiptera behoort.</i>
MUNRO, J. L. B.Sc. (Hons.) R500	University of the Witwatersrand	Ecology of Coral Reef Fishes. <i>Die ekologie van koraalrifvisse.</i>
PEAK, M. J. B.Sc. R300	University of Cape Town	A project in zoology. <i>'n Projek in die dierkunde.</i>
SELIGMAN, I. M. B.Sc. R250	University of the Witwatersrand	Comparative biochemistry of Nitrogen excretion. <i>Vergelykende biochemie van stikstofuitskeiding.</i>
SILVER, J. B.Sc. (Hons.) R500	University of the Witwatersrand	The Krebs Urea cycle in <i>Xenopus laevis</i> . (Previous award: 1960). <i>Die Krebs-ureum-siklus in Xenopus laevis. (Vorige toekennig: 1960).</i>
STIGLING, I. M.Sc. R600	Potchefstroomse Universiteit vir C.H.O.	The development and functional morphology of <i>Bulinus tropicus</i> , a common South African freshwater snail (<i>Mollusca Basommatophora</i>). (Previous award: 1958). <i>Die ontwikkeling en funksionele morfologie van Bulinus tropicus, 'n algemene Suid-Afrikaanse varswaterslak (Mollusca Basommatophora). (Vorige toekennig: 1958).</i>
WHEATLEY, G. A. B.Sc. R250	University of the Witwatersrand	Comparative biochemistry of ammonia excretion. <i>Vergelykende biochemie van ammoniakuitskeiding.</i>

STUDENT BURSARIES (OVERSEAS) / STUDENTEBEURSE (OORSEE)

BELDERSON, R. H. B.Sc. (Hons.) R600	Scripps Institution of Oceanography, University California	A study of Marine Geology. <i>'n Studie van seegeologie.</i>
DEKKER, J. M.Sc. R200	Technische Hochschule Karlsruhe	Herstellung und umsetzungen van halogenierten cyclobutanen. Preparation and conversion of halogenated cyclobutanes. (Previous awards: 1957, 1959, 1960). <i>Bereiding en omsetting van gehalogeneerde siklobutane. (Vorige toekennings: 1957, 1959, 1960).</i>
HUDSON, D. J. B.Sc. (Hons.) R500	Imperial College, London	Sequential analysis. <i>Sekwensieële analise.</i>
LAING, M. J. M. Sc. R600	University of California	Determination of the structure of complex molecules using X-Ray crystallographic methods. <i>Bepaling van die struktuur van komplekse molekule deur middel van röntgenkristallografiese metodes.</i>
LEVIN, E. B.Sc. (Eng.) R500	Imperial College, London	Electro-static separation. <i>Elektrostatiese skeiding.</i>
NEL, L. D. M. Sc. R600	Cambridge University	Lineêre transformasies in oneindige produkte van Hilbert ruimtes. <i>Linear transformations in infinite products of Hilbert spaces.</i>
PRETORIUS, P. J. M.Sc. Lektor R600	Vrye Universiteit, Amsterdam	Ondersoek na die moontlikheid van die gebruik van versnellingsbalistokardiografie by die hond en mens. (Vorige toekennig: 1960). <i>Investigation of the possibility of the use of acceleration ballistocardiography in dog and man. (Previous award: 1960).</i>
VAN DER MERWE, D. F. M.Sc. (Ing.) R600	McGill Universiteit	Hitte oordraging na suspensie. <i>Heat transfer after suspension.</i>
VILJOEN, G. M. Sc. R600	Technische Hogeschool, Delft	'n Onderwerp uit die groepe-teorie. <i>A subject from the groups theory.</i>

Name and Qualifications Naam en Kwalifikasies	Where tenable Waar geldig	Subject of Research Onderwerp van navorsing
<i>DIRECTED RESEARCH BURSARIES (OVERSEAS) / GERIGTE NAVORSINGSBEURSE (OORSEE)</i>		
DYER, T. A. M.Sc. R1,200	Imperial College, London	Physiology of seed germination. (Previous awards: 1959, 1960). <i>Die fisiologie van saadontkieming. (Vorige toekennings: 1959, 1960).</i>
FORMAN, A. B.Sc., B.A. R1,200	University of Cambridge	Electronic properties of transition metal chelates. (Previous awards: 1959, 1960). <i>Elektroniese eienskappe van oorgangsmetaalchelate. (Vorige toekennings: 1959, 1960).</i>
HATTINGH, W. J. H. M.Sc. R1,000	University Brit. Columbia. Vancouver	Some aspects of the nutritional requirements of, and nitrogen transformations by micro-organisms in activated sludge. <i>'n Paar aspekte van die voedselvereistes van mikro-organismes in geaktiveerde slijk, en die stikstoftransformasies daardeur teweeggebring.</i>
JAMES, W. B.Sc. (Civ. Eng.) R1,200	Delft Technical University	Diploma in hydraulic engineering. <i>Diploma in waterboukunde.</i>
LEWIN, I. B.Sc. (Hons.) R1,600	In the U.S.A.	Plasma physics. (Previous award: 1960). <i>Plasmafisika. (Vorige toekening: 1960).</i>
O'Donovan, K. H. J. M.Sc. (Eng.), A.M.I. Mech. E. R1,200	University of Cambridge	Investigation of high rates of strain to examine yielding as a function of the elastic stress wave propagation in a material and the subsequent alteration of the stress wave pattern after local yielding. <i>Ondersoek van hoë vormveranderingstempo's om swigting na te gaan as 'n funksie van die elastiese spanningsgolfvoortplanting in 'n materiaal en die daaropvolgende verandering van die spanningsgolfpatroon na plaaslike swigting.</i>
VAN DER WALT, T. M.Sc. (Chem.) M.Sc. (Wisk.) R1,200	Mathematische Instituut, Universiteit Amsterdam	Dekpuntstellinge. <i>Coincidence point theorems.</i>
VAN WYK, J. J. P. M. Sc. R1,600	Duke University, Durham, N. Carolina	Bestudering en ontleding van natuurlike plantgemeenskappe volgens moderne Amerikaanse metodes en statistiese verwerking en interpretasie van die gegewens. <i>A study and analysis of natural plant communities by modern American methods and statistical analysis and interpretation of the data.</i>
VERSTER, T. C. B.Sc., M.Ing. R300 (Hernuwning vir 3 maande)	City and Guilds College, London	Studie van die transistor as 'n skakelaar van klein sein, veral met betrekking tot die spoed en akkuraatheidsbeperkings daarvan. (Vorige toekennings: 1959, 1960). <i>A study of the transistor as a switch of small signals, especially with reference to their speed and accuracy limits. (Previous awards: 1959, 1960).</i>

*DIRECTED RESEARCH BURSARIES (IN THE COUNCIL'S LABORATORIES) /
BEURSE VIR GERIGTE NAVORSING (IN DIE RAAD SE LABORATORIUMS)*

SPOELSTRA, B. M.Sc. R800	N.F.N.L.	Eksperimentele ondersoek oor beta-aktiwiteit met kort halveringstye. (Vorige toekennings: 1959, 1960). <i>Experimental research on beta-activities with short half-lives. (Previous awards: 1959, 1960).</i>
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VACATIONAL BURSARIES / VAKANSIEBEURSE

REITSMA, A. M.Sc. Senior Lektor R64	N.F.N.L.	'n Studie van Steekproefverdelings vir steekproewe uit nie-normale populasies. <i>A study of sampling distributions for samples from non-normal populations.</i>
STEMMETT, M. C. B.Sc. (Hons.) Junior Lektor R132.	N.F.N.L.	'n Studie en ondersoek van Kern-gebeure met die kernemulsietegniek (Vorige toekennings: 1959, 1960). <i>A study and investigation of nuclear interactions by means of the nuclear emulsion technique. (Previous awards: 1959, 1960).</i>

ASSISTANTSHIPS / ASSISTENTSKAPPE (R1,080-R2,040)

(a) GRANTS FOR THE EMPLOYMENT OF SKILLED RESEARCH ASSISTANTS /
TOEKENNINGS VIR DIE INDIENSNEMING VAN GESKOOLDE NAVORSINGSASSISTENTE

AHRENS, PROF. L. H. D.Sc. M.A. F.R.I.C., F.G.S. (U.S.A., U.K.) Professor of Inorganic and Physical Chemistry	University of Cape Town	Investigations on the abundance and distribution of several rare elements in rocks and meteorites. (Previous awards: 1959, 1960). <i>Ondersoek om vas te stel in watter mate verskeie seldsame elemente in rotse en meteoriete voorkom en die verspreiding daarvan (Vorige toekennings: 1959, 1960).</i>
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Name and Qualifications Naam en Kwalifikasies	Where tenable Waar geldig	Subject of Research Onderwerp van navorsing
BALINSKY, B. I. Dr. of Biol. Sci. F. Intern. L. Embryol. Professor of Zoology	University of the Witwatersrand	Electron-microscopic study of the ultra-structure of cells in the early development of animals. (Previous awards: 1957-1960). <i>Elektronemikroskopiese ondersoek van die ultrastruktuur van selle in die vroeë ontwikkeling van diere. (Vorige toekennings: 1957-1960).</i>
BOZZOLI, G. R. D.Sc. (Eng.) Professor of Electrical Engineering	University of the Witwatersrand	Propagation of long sparks in air; effect of electrical constants of plane in point/plane discharges; further studies of effect of dust on flashover. (Previous awards: 1957-1960). <i>Voortplanting van lang vonke in die lug; effek van elektriese konstantes op die vlak in punt/vlakontladings; verdere bestudering van die uitwerking van stof op oorslag. (Vorige toekennings: 1957-1960).</i>
CLARENCE, N. D. M.A., Ph.D. Professor of Physics.	University of Natal	A study of whistling atmospherics. (Previous award: 1960). <i>'n Studie van atmosferiese fluitstoringe. (Vorige toekening: 1960).</i>
DE WAAL, H. L. D.Sc. Dr.Phil. Professor SERFONTEIN, W. J. M.Sc. Dr.Phil.Nat. Senior Lektor en WIECHERS, A. M.Sc. Lektor	Universiteit van Pretoria	(a) Ondersoek van aktiewe stowwe in plante. (b) Die sintese van nukleïensuur-anti-metaboliëte met moontlike karsinostatiese werking. (Vorige toekennings aan prof. de Waal: 1959, 1960). (a) <i>Investigation of active substances in plants.</i> (b) <i>The synthesis of nucleic acid-antimetabolites with possible carcinostatic effect.</i> (Previous awards to Prof. de Waal: 1959, 1960).
FERNIE, J. D. M.Sc. Ph.D. Lecturer in Physics and Astronomy and CHERRY, R. D. M.Sc. Senior Lecturer in Nuclear Physics	University of Cape Town	(a) Investigation of selected Galactic clusters and cepheids. (b) Nuclear Radii studies and certain nuclear property systematics. (Previous award: 1960). (a) <i>Ondersoek van uitgesoekte sterrehope en cepheids in die Melkweg.</i> (b) <i>Kernradiusstudies en sekere kernleenskapsstelsels.</i> (Vorige toekening: 1960).
HALES, A. L. M.A., M.Sc. Ph.D. Director, Bernard Price Institute for Geophysical Research. (2 Assistants)	University of the Witwatersrand	Crustal structure and paleomagnetic investigations in Southern Africa. (Previous awards: 1956-1960). <i>Korsstruktuur en paleomagnetiese ondersoekings in Suidelike Afrika. (Vorige toekennings: 1956-1960).</i>
HOLLIMAN, F. G. M.A., Ph.D., F.R.S.S. Af. Professor of Organic Chemistry	University of Cape Town	The pigments of pseudomonas aeruginosa. (Previous awards: 1956, 1960). <i>Die pigmente van pseudomonas aeruginosa. (Vorige toekennings: 1956, 1960).</i>
ISRAELSTAM, S. S. M.Sc. Ph.D., F.R.I.C. Associate Professor of Chemistry	University of the Witwatersrand	The application of cation exchange resins and polyphosphoric acid in organic synthesis. (Previous awards: 1957-1960). <i>Die gebruik van kationuitruilingsharde en polifosforsuur in organiese sintese. (Vorige toekennings: 1957-1960).</i>
JENNINGS, J. E. B. B.Sc., S.M. (M.I.T.), M. (S.A.), I.C.E., M.I.C.E., M.C.Q.S. Professor of Civil Engineering	University of the Witwatersrand	A study of Earth Pressure Co-efficients. (Previous award: 1960). <i>'n Studie van aardrukkoeffisiënte. (Vorige toekening: 1960).</i>
KING, L. C. D.Sc., F.R.S.S.A. Professor of Geology	University of Natal	A geomorphologic map of Africa (drafting of the final copy of the map on a scale 1:5 million from 1:2 million working sheets). (Previous award: 1960). <i>'n Geomorfologiese kaart van Afrika (opstel van die finale eksemplare van die kaart op die skaal 1:5-miljoen van werkblaaie van 1:2-miljoen). (Vorige toekening: 1960).</i>
KOCH, C. Ph.D. Scientific Professional Officer	Transvaal Museum	Monograph of the Tenebrionidae of Southern Africa. (Previous awards: 1955, 1958-1960). <i>Monografie oor die Tenebrionidae van Suidelike Afrika. (Vorige toekennings: 1955, 1958-1960).</i>
PRETORIUS, V. M.Sc. D.Phil. Professor van Fisiese Chemie	Universiteit van Pretoria	Studie van gasreaksies m.b.v. massa spektrometriese en gas chromatografiese tegnieke. (Vorige toekennings: 1958, 1959, 1960). <i>Study of gas reactions with the aid of mass spectrometric and gas chromatographic techniques. (Previous awards: 1958, 1959, 1960).</i>
RUND, H. B.Sc., Ph.D., Dr. Habil. Professor of Applied Mathematics	University of Natal	(a) Theory of spin particles. (b) Theory of non-commutative rings as foundation of quantum mechanics. (Previous award: 1960). (a) <i>Teorie van spindeeltjies.</i> (b) <i>Teorie van onverwisselbare ringe as grondbeginsel van kwantum-meganika.</i> (Vorige toekening: 1960).
SCHAEFFER, W. M.Sc. Ph.D. Professor of physics	University of Cape Town	X-ray crystallographic studies of complex organic molecules. (Previous awards: 1957-1960). <i>Kristallografiese studie van komplekse organiese molekule met behulp van röntgenstrale. (Vorige toekennings: 1957-1960).</i>

Name and Qualifications Naam en Kwalifikasies	Where tenable Waar geldig	Subject of Research Onderwerp van navorsing
SELLSCHOP, J. P. F. M.Sc. Ph.D. Professor of Nuclear Physics	University of the Witwatersrand	Particle induced interaction at low energies—1) Li^7 (d,p) Li^8 ; 11) (n,p) and (n,d) reactions. (Previous awards: 1956, 1957). <i>Deur deeltjies geïnduseerde interaksie by lae energie 1) Li^7 (d,p) Li^8; 11) (n,p) en (n,d) reaksies. (Vorige toekennings: 1956, 1957).</i>
SIMPSON, E. S. W. M.Sc. Ph.D. Professor of Geology	University of Cape Town	(a) Post-Karoo Igneous Ring-complexes in S.W.A. (b) The anorthosite of Southern Angola. (c) Geological studies in Queen Maud Land, Antarctica. (Previous award: 1959). (a) <i>Na-Karoose stollingsringkomplekse in S.W.A.</i> (b) <i>Die anortosiet van Suid-Angola.</i> (c) <i>Geologiese studies in Queen Maud Land, Suidpool.</i> (Vorige toekening: 1959).
SMITH, J. L. B. B.A., M.Sc., Ph.D., F.R.S. (S.A.) Research Professor	Rhodes University	Fishes. (Previous awards: 1954-1960). <i>Visse. (Vorige toekennings: 1954-1960).</i>
STEYN, H. S. D.Sc. Ph.D. Professor in Wiskundige Statistiek	Universiteit van Suid-Afrika	1. Meerveranderlike kansverdelings. 2. Statistiese distribusies vir ekonometrisse studies. (Vorige toekennings: 1959, 1960). 1. <i>Multivariable probability distribution.</i> 2. <i>Statistical distributions for econometric studies.</i> (Previous awards: 1959, 1960).
VAN ZINDEREN-BAKKER, E. M. M.Sc. Phil. Nat. D. Senior Lektor in Plantkunde	Universiteit van die O.V.S.	Palynology. (Previous awards: 1957-1960). <i>Palinologie. (Vorige toekennings: 1957-1960).</i>
ZEEMAN, P. B. D.Sc. Professor in Eksperimentele Fisika	Universiteit van Stellenbosch	1. Die gelyktydige ontleding van Cu, Pb, Mg, Fe en AL in wynas m.b.v. 'n gelykstroomboog of bandmasjien. 2. Die bepaling van arsen in wynprodukte. 3. Die bepaling van Germanium in Sulfietertse van Cu, Pb en Zn met die atoomabsorpsie metode of bandmasjien. 4. Die bepaling van seidsame aardse Hafnium, Columbium Ytterbium ens. in erte. (Vorige toekennings: 1958-1960). 1. <i>Simultaneous analysis of Cu, Pb, Mg, Fe and AL in wine ash with the aid of a D.C. arc or tape recorder.</i> 2. <i>Determination of arsenic in wine products.</i> 3. <i>Determination of Germanium in sulphite ores of Cu, Pb and Zn by means of the atom absorption method or the tape recorder.</i> 4. <i>Determination of rare earths Hafnium, Columbium, Ytterbium, etc. in ores.</i> (Previous awards: 1958-1960).
TRANSVAAL MUSEUM	Transvaal Museum	Namib Desert Research. <i>Namibwoestynnavorsing.</i>

(b) GRANTS FOR THE EMPLOYMENT OF UNSKILLED RESEARCH ASSISTANTS/
TOEKENNINGS VIR DIE INDIENSNEMING VAN ONGESKOOLDE NAVORSINGSASSISTENTE

LIEBENBERG, A. C. B.Sc. (Eng.), A.M.I.C.E., A.M.I. Struct. Eng. A.M.ASCE Consulting Engineer	University of Cape Town	Extensional forces in concrete floor slabs and stairs being: (a) An investigation of arching action in floor slabs when subjected to transverse loading and (b) the inter-action of stair flights and landings. (Previous award: 1960). <i>Rekspanningskragte in betonyvloerblaaij en trappe soos volg:</i> (a) <i>'n Ondersoek van die „boogtrek” in vloerblaaij onder dwarsbelasting;</i> (b) <i>die wisselwerking tussen traparms en bordesse.</i> (Vorige toekening: 1960).
ROBINSON, J. T. D.Sc. Professional Officer	Transvaal Museum	Taxonomic, morphological and phylogenetic study of the Australopithecines and the associated fauna from the Pleistocene limestone caves of the Transvaal. (Previous awards: 1958, 1959, 1960). <i>Taksonomiese, morfologiese en filogenetiese studie van die Australopithecinae en die verwante fauna uit die Pleistocene kalkklipgrotte van Transvaal. (Vorige toekennings: 1958, 1959, 1960).</i>

(c) PERMANENT ASSISTANTSHIPS ON C.S.I.R. STAFF/
PERMANENTE ASSISTENTSKAPPE OP W.N.N.R.-PERSONEEL

DAY, J. H. Ph.D., F.R.S.S.A. Professor of Zoology	University of Cape Town	Oceanography. (Previous awards: 1956-1960). <i>Oseanografie. (Vorige toekennings: 1956-1960).</i>
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Name and Qualifications Naam en Kwalifikasies	Where tenable Waar geldig	Subject of Research Onderwerp van navorsing
ISAAC, W. E. B.Sc. Ph.D. F.R.S.(S.A.) F.L.S. Harry Bolus Professor and Head Dept. of Botany	University of Cape Town	The effect of geographical temperature gradients within the spheres of influence of the Benguela and Agulhas currents on the seaweed vegetation and especially on the geographical distribution of species and genera; the analysis of geographical elements in the South African Seaweed floras. (Previous awards: 1955-1958). <i>Die invloed van geografiese temperatuurgradiënte binne die invloedssfeer van die Benguela- en die Agulhas-stroom op die seewiergroei en veral op die geografiese verspreiding van soorte en geslagte; die ontleding van geografiese elemente in die Suid-Afrikaanse seewierflora. (Vorige toekennings: 1955-1958).</i>
PHILLIPS, W. E. D.Sc. Le D., M.I.E.E (Lond.) M. (S.A.) I.E.E., S.M.I.R.E. Professor of Electrical Engineering	University of Natal	The investigation of the propagation of radio waves in the ionosphere using the "Backscatter" technique. (Previous awards: 1957-1960). <i>Ondersoek van die voortplanting van radiogolwe in die ionosfeer met gebruikmaking van die „terugstrooiingsmetode“. (Vorige toekennings: 1957-1960).</i>

**MEDICAL, DENTAL AND PHARMACEUTICAL RESEARCH
GENEESKUNDIGE, TANDHEELKUNDIGE EN FARMASEUTIESE NAVORSING**

SENIOR BURSARIES/SENIOR BEURSE

JACOBS, P. M.B. Ch.B. House Surgeon. R2,040	University of the Witwatersrand	Studies into various aspects of iron metabolism. <i>Bestudering van die verskillende aspekte van ystermetabolisme.</i>
MUSPRATT, J. B.A. R400	S.A.I.M.R.	Arthropod-borne virus research. (Previous awards: 1951-1960). <i>Navorsing t.v.m. viruslekktes deur artropode oorgedra. (Vorige toekennings: 1951-1960).</i>

STUDENT BURSARIES/STUDENTEBEURSE

BEARDWOOD, C. J. B.Sc., B.Sc. (Agric.) R500	University of the Witwatersrand	Some aspects of the endocrine control of protein metabolism. (Previous award: 1960). <i>'n Paar aspekte van die endokriëne beheer van proteïenmetabolisme. (Vorige toekening: 1960).</i>
COETZEE, J. H. B.Sc. R250	Potchefstroomse Universiteit vir C.H.O.	Die uitskeidingspatroon van toegediende oestrogene by sirrose en primêre kanker van die lewer. <i>The excretion pattern of oestrogens administered in cases of cirrhosis in primary cancer of the liver.</i>
KAPLAN, E. R. B.Sc. (Pharm.) R300	Rhodes University	A project in pharmacy. <i>'n Projek in farmasie.</i>
LOCHNER, J. DE V. M.Sc. R600	Universiteit van Stellenbosch	Die funksionele verband van die adeno- hipofisebynier-sisteem en die pankreas-eilandweefsel met betrekking tot sekere aspekte van die koolhidraat- en vetmetabolisme. (Vorige toekening: 1960). <i>The functional relationship between the adeno-hypophysis-adrenal system and the pancreas islets tissue with reference to certain aspects of the carbohydrate and lipid metabolisms. (Previous award: 1960).</i>
POTGIETER, W. A. B.Sc. R250	Potchefstroomse Universiteit vir C.H.O.	Die uitskeiding van 17-ketoste-rofede en 17-ketogene-hormoon by die Bantoe met spesiale verwysing na die uitskeiding by sirrose van die lewer. <i>The Excretion of 17-ketosteroids and 17-ketogenic-hormone in the Bantu, with special reference to excretion in cases of cirrhosis of the liver.</i>

**DIRECTED RESEARCH BURSARIES (OVERSEAS)/
GERIGTE NATORSINGSBEURSE (OORSEE)**

ELOFF, S. J. P. M.D., Arts Eksamen R1,200	Wilhelmina Gasthuis, Amsterdam	Die toepassing van atmosferiese drukverhoging in die kliniese chirurgie. <i>The application of increased atmospheric pressure in clinical surgery.</i>
NOSSEL, H. M.B. Ch.B. F.C.P. (S.A.) M.R.C.P. R1,200	Churchill Hospital, Oxford	Observations on the early stages of blood coagulation. (Previous award: 1960). <i>Waarnemings tydens die vroeë stadia van bloedstolling. (Vorige toekening: 1960).</i>
SHEAR, M. B.D.S., H.D.Dipl. R600 (for 6 months)	Hammersmith Hospital, London	Histo-chemical studies on tooth, bone and the soft tissues related to the oral cavity. <i>'n Histochemiese studie van tand- been- en die sagte weefsels met betrekking tot die mondholte.</i>

Name and Qualifications Naam en Kwalifikasies	Where tenable Waar geldig	Subject of Research Onderwerp van navorsing
VAN NIEKERK, W. A. M.B. Ch.B. R1,600	In die V.S.A.	Die gebruik van akridien-oranje fluorensiemikroskopie in ginekologiese eksfoliatiewe sitologie. <i>The use of acridine orange fluorescence microscopy in gynaecological exfoliative cytology.</i>

GRANTS FOR THE EMPLOYMENT OF SKILLED RESEARCH ASSISTANTS/
TOEKENNINGS VIR DIE INDIENSNEMING VAN GESKOOLDE NAVORSINGSASSISTENTE.

ADAMS, E. B. B.Sc. M.D. F.R.C.P. (London) Professor of Medicine	University of Natal	Investigation of vitamin B12 absorption, serum vitamin B12 levels, changes which occur in such levels during treatment with folic acid, and the role of folic acid deficiency in the megaloblastic anaemias. (Previous awards: 1959, 1960). <i>Onderzoek van vitamien-B12-absorpsie, die gehalte aan serumvitamien B12, die veranderinge wat in daardie gehalte plaasvind gedurende behandeling met foliensuur, en die rol wat 'n tekort aan foliensuur by megaloblastiese bloedarmoedes speel. (Vorige toekennings: 1959, 1960).</i>
BOTHWELL, T. H. M.B. Ch.B. M.D. M.R.C.P. Tutorial Physician	University of the Witwatersrand	Disorders of iron transport. (Previous awards: 1958, 1959, 1960). <i>Ystervervoerabnormaliteite. (Vorige toekennings: 1958, 1959, 1960).</i>
COETZEE, J. N. M.D. Professor van Mikrobiologie	Universiteit van Pretoria	Genetika van mikro-organismes met spesiale verwysing na dié van die genus <i>Proteus</i> . (Vorige toekennings: 1957-1960). <i>Genetics of micro-organisms with special reference to those of the genus Proteus. (Previous awards: 1957-1960).</i>
DE VILLIERS, J. N. M.B., Ch.B., M.O.G., M.R.C.O.G. Professor in verloskunde en Ginekologie; en RETIFF, C. P. M.B., Ch.B., M.Med. (Path.) Hoof, Dept. Chemiese Patologie	Universiteit van Stellenbosch	Oestrogeen en Progesteron-waardes in disfunksionele menoragie. Korrelasie tussen Chemiese, Sitologiese en Histopatologiese bevindings. (Vorige toekening: 1960). <i>Estrogen and progesterone values in dysfunctional menorrhagia. Correlation between chemical, cytological and histopathological findings. (Previous award: 1960).</i>
ENGELBRECHT, F. M. S.O.D., D.Sc. Senior Lektor in Fisiologie	Universiteit van Stellenbosch	'n Onderzoek van bepaalde aspekte van die silikose probleem. (Vorige toekennings: 1957-1960). <i>An investigation of certain aspects of the silicosis problem. (Previous awards: 1957-1960).</i>
MEYER, B. J. D.Sc., M.B., Ch.B. Hoof Departement van Fisiologie-biochemie	Universiteit van Pretoria	Geografiese mediese probleme by Blankes en Bantoes: (a) Chemiese samestelling van die aorta, koronêre en serebrale vate. (b) Yster- en koper-metabolisme by Blankes en Bantoes. (Vorige toekennings: 1956, 1957, 1960). <i>Geographical medical problems in respect of Europeans and Bantu: (a) Chemical composition of the aorta, coronary and cerebral vessels. (b) Iron and copper metabolism in Europeans and Bantu. (Previous awards: 1956, 1957, 1960).</i>
MIBASHAN, R. S. B.Sc., M.D., M.R.C.P. Assistant Physician; and LACKNER, H. M.D., M.R.C.P. Assistant Physician	University of Cape Town	1. Blood fibrinolysis, its normal occurrence and its variation in physiological and pathological states. 2. Blood coagulation studies in health and disease. 3. Vitamin B12 and folic acid levels in health and disease. (Previous award to Dr. C. Mersky: 1960). <i>1. Bloedfibrinolise, sy normale voorkoms en sy variasie in fisiologiese en patologiese toestande. 2. Bloedstollingsstudies by gesonde en siek persone. 3. Gehalte aan vitamien B12 en foliensuur by gesonde en siek persone. (Vorige toekening aan dr. C. Mersky: 1960).</i>
TOBIAS, P. V. B.Sc. (Hons.) M.B., B.Ch., Ph.D. Professor of Anatomy	University of the Witwatersrand	Physical anthropological, genetical and nutritional study of some aboriginal races of Southern Africa. (Previous awards: 1954, 1960). <i>Fisiese, antropologiese, genetiese en voedingsstudie van 'n paar inboorlingrasses van Suidelike Afrika. (Vorige toekennings: 1954, 1960).</i>

PERMANENT ASSISTANTSHIPS ON C.S.I.R. STAFF/
PERMANENTE ASSISTENTSKAPPE OP W.N.N.R. PERSONEEL

PEPLER, W. J. D.Sc., M.D. Senior Lektor en Assistent-patoloog	Universiteit van Pretoria	Histochemiese prosedures. (Vorige toekennings: 1958-1960). <i>Histochemical procedures. (Previous awards: 1958-1960).</i>
PIIPER, A. M.D., D.Sc. (Hon. Causa), Emeritus Professor	Universiteit van Pretoria	Beweglikheid en flagella van bakterieë. (Vorige toekennings: 1946-1960). <i>Motility and flagella of bacteria. (Previous awards: 1946-1960).</i>



Bylaag II

Appendix II

FINANSIËLE STATE — FINANCIAL STATEMENTS

BALANSSTAAT SOOS OP 31 MAART 1961

Laste		1960-61		1959-60		Bats	
1959-60		R	R	R	R	R	R
	KAPITAAL						
4,137,286	Kapitaalfonds—sien Staat No. 2		4,996,301.91	4,032,152			4,553,382.53†
5,412,269	Geboue en Reserwekapitaalfonds.....		6,043,180.97	4,701,905			5,138,751.07
	Toerustingkapitaalfonds.....			R8,734,037			R9,692,133.60
R9,549,555			R11,039,482.88				
	LOPENDE LASTE						
259,360	Vooruitbetaalde geide vir—						
	Ondersoeke, toetse en dienste.....	212,968.10		35,724			28,482.34
	Permitgelde vir standaardmerk.....	96,316.45		142,956			530,288.78
	Diverse Krediteure—		309,284.55	348			
274,486	Departement van Handel en Nywerheid			305,090			291,283.46
	Ander.....	10,717.06*		1,036,466			1,615,461.55
		366,342.95		154,240			
20,000	Reserwefonds vir die stabilisering van voor-		371,060.01				
291,338	gestelde Pensioenskema		20,000.00				
	Vorsening vir vaste verpligtings teen		252,125.86				
	Lopende Uitgawerekening op 31 Maart						
21,050	1961						
	Appropriasierekening.....		232,584.76				66,888.33
R866,234			R1,185,055.18	R1,681,732			R2,532,404.46
R10,415,789			R12,224,538.06	R10,415,789			R12,224,538.06

† R4,553,382.53 vir grond en geboue sluit nie die waarde in van die terrein deur die Universiteit Pretoria aan die Raad geskenk nie en vir oordrag doeleindes teen R41,800 gewaardeer.

* Onbestede saldo van toekenning vir navorsingsprojekte ten behoewe van Staatsdepartemente wat teruggestort moet word (sien ook Staat No. 3).

Pretoria, 20 Oktober 1961

S. M. NAUDÉ
President

A. J. MILLER-SMIT
Sekretaris/Tesourier

Die balansstaat is ingesolge die bepaling van artikel 56 van die Skatkris- en Oudfiwet, No. 23 van 1956, gelees met artikel 13(1) (d) van die Wet op die Wetenskaplike Navorsingsraad, No. 33 van 1945, geoudfiwet, en ek sertifiseer dat dit 'n juiste weergawe is van die rekenings van die Wetenskaplike en Nywerheidsnavorsingsraad.

H. S. v. d. WALT.

Pretoria, 29 November 1961.

Kontroleur en Oudfiwet-generaal

BALANCE SHEET AS AT 31st MARCH 1961

Liabilities		Assets	
1959-60	1960-61	1959-60	1960-61
R	R	R	R
	CAPITAL		FIXED ASSETS
4,157,286	Capital Fund—see Statement No. 2	4,032,152	Land and Buildings (at cost)—see Statement No. 2
5,412,269	Building and Reserve Capital Fund	4,701,905	Equipment Capital Account
R9,569,555	Equipment Capital Fund	R8,734,057	Assets (at cost)—see Statement No. 2
259,360	CURRENT LIABILITIES		CURRENT ASSETS
	Advances received for—	35,724	Investigations and Tests in Progress
	Investigations, tests and services	142,956	Sundry Debtors
	Standardisation mark permit fees	6,908	Unsatisfactory deliveries
		309,284.55	Disallowances
274,486	Sundry Creditors—	305,090	Research Grants paid in advance
	Department of Commerce and Industries	1,036,466	Investments with Public Debt Commissioners
	Other	154,240	Cash—
20,000	Reserve for stabilization of proposed Pension Scheme	371,060.01	(1) S.A. Reserve Bank—Current Account
251,338	Provision for firm commitments on Running Expenses Account as at 31st March, 1961	20,000.00	(2) On Imprest Account
21,050	Appropriation Account	252,125.86	(3) On Deposit
R866,234		R1,185,055.18	
R10,415,789		R1,681,732	56,818.03
		R10,415,789	2,017.20
			8,053.10
			66,888.33
			R2,532,404.46
			R12,224,538.06

† R4,553,382.53 for land and buildings does not include the value of site donated by the Pretoria University to the Council, valued at R41,800 for transfer purposes.
 * Unexpended balance of grant for research projects on behalf of Government Departments to be surrendered (see also Statement No. 3).

Pretoria, 20 October, 1961

S. M. NAUDE
 President

A. J. MILLER-SMIT
 Secretary/Treasurer

The above Balance Sheet has been audited in accordance with the provisions of section 56 of the Exchequer and Audit Act, No. 23 of 1956, read with section 13(1) (c) of the Scientific Research Council Act No. 33 of 1945, and I certify that it is a true reflection of the accounts of the Council for Scientific and Industrial Research.

Pretoria, 29th November, 1961.

H. S. v. d. WALT.
 Controller and Auditor-General

KAPITAALFONDS
STAAT VAN TRANSAKSIES VIR DIE JAAR GEËINDIG 31 MAART 1961

Besonderhede	Uitgawes			Netto uitgawe			Totale op			Besonderhede			Ontvangste			Totale op			
	R	R	c	R	R	c	R	R	c	R	R	c	R	R	c	R	R	c	
(A) <i>Gebove- en Reserve-kapitaalrekening</i>																			
Grond en geboue.....	800,000	4,032,151.77		521,230.76			4,553,382.53			800,000	3,555,200.00		800,000.00			4,555,200.00			
Onbestede saldo.....	—	105,134.09		337,785.29			442,919.38			—	67,599.23		20.00			67,619.23			
											358,149.82		58,996.05			417,145.87			
											156,336.81		—			156,336.81			
TOTALE.....	R800,000	R4,137,285.86		R859,016.05			R4,996,301.91			R800,000	R4,137,285.86		R859,016.05			R4,996,301.91			
(B) <i>Toerusting Kapitaalrekening</i>																			
Meubels, toebehore en kantoor-toerusting.....	27,600	431,651.45		34,180.32			465,831.77			594,000	4,412,496.00		594,000.00			5,006,496.00			
Laboratorium en werkwinkeltoerusting.....	529,210	3,603,705.10		327,822.36			3,931,527.46			—	74,203.74		1,092.56			75,296.30			
Voorrade voorhande.....	2,000	225,014.56		6,026.66			231,041.22			—	3,215.97		—			3,215.97			
Voertuie en reise.....	15,430	170,864.63		36,536.34			207,400.97			21,800	128,259.98		35,819.64			164,079.62			
Gesubsidieerde motorvoertuie (teen koste van min terogbelangs).....	—	5,552.97		(—) 2,074.42			3,478.55			—	794,093.08		—			794,093.08			
Boeke en tydskrifte.....	41,560	256,673.70		32,279.57			288,953.27			—	—		—			—			
Voorafvervaardigde Bouwerk.....	—	8,442.79		2,075.04			10,517.83			—	—		—			—			
Koste van bate.....	615,800	4,701,905.20		436,845.87			5,138,751.07			—	—		—			—			
Onbestede saldo.....	—	710,363.57		194,066.33			904,429.90			—	—		—			—			
TOTALE.....	R615,800	R5,412,268.77		R630,912.20			R6,043,180.97			R615,800	R5,412,268.77		R630,912.20			R6,043,180.97			
TOTALE VAN (A)	R1,415,800	R9,549,554.63		R1,489,928.25			R11,039,482.88			R1,415,800	R9,549,554.63		R1,489,928.25			R11,039,482.88			
TOTALE VAN (B)																			

OPMERKING.—R4,553,382.53 vir grond en geboue sluit nie die waarde in van die terrein deur die Universiteit Pretoria aan die Raad geskenk nie, en vir oordragdoelendes teen R41,800 gewaardeer.

TOEWYSING VAN ONBESTEDE SALDO

- (i) Vaste verpligings teen toerustingkapitaalfondse (geskatte).....
- (ii) Genou deur Universiteit vir die aankoop van kapitaaltoerusting.....
- (iii) Voorsiening vir die kapitaalrekening van toerusting deur die W.N.R. vervaardig.....
- (iv) Geskiede oordrag na 1961/62.....
- (v) Voorsiening vir onbestede-kapitaal Uitvindingsontwikkelingskorporasie.....
- (vi) Nie op 31 Maart 1961 verbind nie, maar toegewys in afwagting van prysopgawes of verdere ondersoek in verband met geskiktheid van toerusting.....

R244,670.00
66,342.07
114,786.47
80,000.00
50,000.00
348,631.36
R904,429.90

S. M. NAUDE
President

A. J. MILLER-SMIT
Sekretaris-treasourier

CAPITAL FUND
STATEMENT OF TRANSACTIONS FOR THE YEAR ENDED 31st MARCH 1961

Details	Expenditure			Receipts			Totals as at		
	Accepted Estimates	Totals as at 1st April, 1960	1960-61 Nett Expenditure	Totals as at 31st March, 1961	Accepted Estimates	Totals as at 1st April, 1960	1960-61	Totals as at 31st March, 1961	
	R	R	R	R	R	R	R	R	
(A) <i>Building and Reserve Capital Account—</i> Land and Buildings... Balance Unexpended...	800,000	4,032,151.77 105,134.09	521,230.76 337,785.29	4,553,382.53 442,019.38	800,000	3,555,200.00 67,599.23	880,000.00 20.00	4,355,200.00 67,619.23	
TOTALS.....	R800,000	R4,137,285.86	R859,016.05	R4,996,301.91	R800,000	3,555,200.00 156,336.81	—	4,171,45.87 156,336.81	
(B) <i>Equipment Capital Account</i> Furniture, Fittings and Office Equipment... Laboratory and Workshop Equipment... Stores on Hand... Vehicles and Cycles... Subsidized Cars (at cost less repayments) Books and Journals... Prefabricated Structure	27,600 529,210 2,000 15,430 — 41,560 —	431,651.45 3,603,705.10 225,014.56 170,864.63 5,532.97 256,673.70 8,442.79	34,180.32 327,822.36 6,026.66 36,536.34 (-) 23,074.42 32,279.57 2,075.04	465,831.77 3,931,527.46 231,041.22 207,400.97 3,478.55 288,953.27 10,517.83	594,000 — — — 21,800 —	4,412,496.00 74,203.74 — — 3,215.97 128,259.98 794,093.08	594,000.00 1,092.56 — — 35,819.64 —	5,006,496.00 75,296.30 — — 164,079.62 — 794,093.08	
Cost of Assets..... Balance Unexpended...	615,800 —	4,701,905.20 710,363.57	436,845.87 194,066.33	5,138,751.07 904,429.90	—	—	—	—	
TOTALS.....	R615,800	R5,412,268.77	R630,912.20	R6,043,180.97	R615,800	R5,412,268.77	R630,912.20	R6,043,180.97	
TOTALS OF (A) AND (B).....	R1,415,800	R9,549,554.63	R1,489,928.25	R11,039,482.88	R1,415,800	R9,549,554.63	R1,489,928.25	R11,039,482.88	

NOTE.—R4,553,382.53 for land and buildings does not include value of site donated by Pretoria University which was valued at R41,800 for transfer purposes.

ALLOCATION OF UNEXPENDED FUNDS

(i) Firm commitments against Equipment Capital Fund (estimated).....	R244,670.00
(ii) Held by Universities for purchase of capital equipment.....	66,342.07
(iii) Reserved for Capitalisation of equipment manufactured within C.S.I.R.....	114,786.47
(iv) Budgeted carry-forward at 1961/62.....	80,000.00
(v) Reserved for share capital in S.A. Inventions Development Corporation.....	50,000.00
(vi) Not committed at 31st March, 1961 but earmarked pending receipt of quotations or further investigations regarding suitability of equipment.....	348,631.36
	<u>R904,429.90</u>

Pretoria, 20th October, 1961

S. M. NAUDÉ
President

A. J. MILLER-SMIT
Secretary/Treasurer

