

**P.O. Box 395  
PRETORIA  
1st April 1960**

Sir,

*I have pleasure in presenting to you the Fifteenth Annual Report of the Council for Scientific and Industrial Research. This Report covers the period from the 1st April, 1959, to the 31st March, 1960, 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, 1960, 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 1960**

*Waarde Heer,*

*Met genoëë lê ek die Vyftiende Jaarverslag van die Wetenskaplike en Nywerheidsnavorsingsraad aan u voor. Hierdie verslag dek die tydperk van 1 April 1959 tot 31 Maart 1960, 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 1960, deur die Kontroleur en Ouditeur-generaal gesertifiseer.*

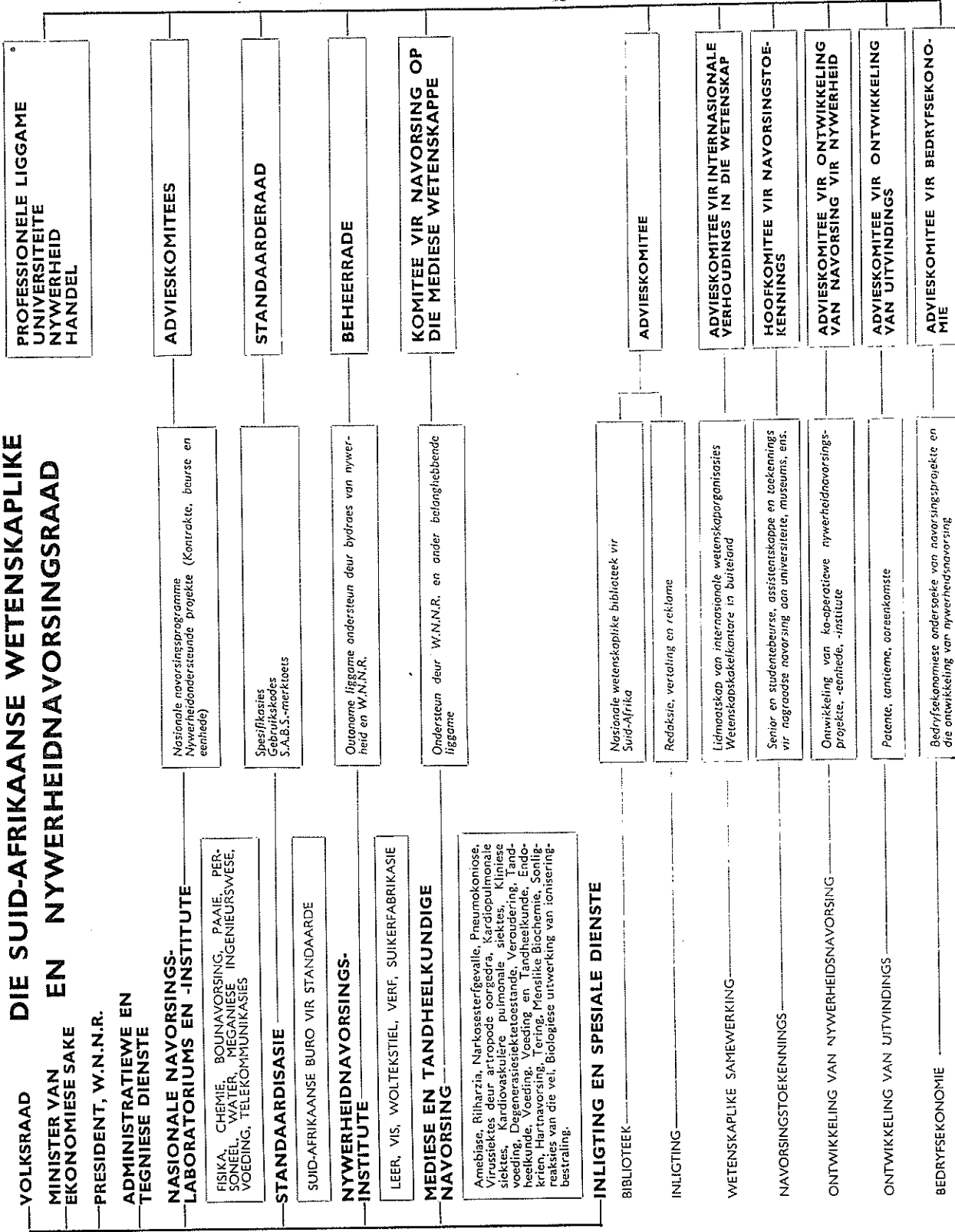
*Dienswillig die uwe,*

**S. M. NAUDÉ**

PRESIDENT: WETENSKAPLIKE EN  
NYWERHEIDNAVORSINGSRAAD

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

# DIE SUID-AFRIKAANSE WETENSKAPLIKE EN NYWERHEIDNAVORSINGSRAAD



# 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.e.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

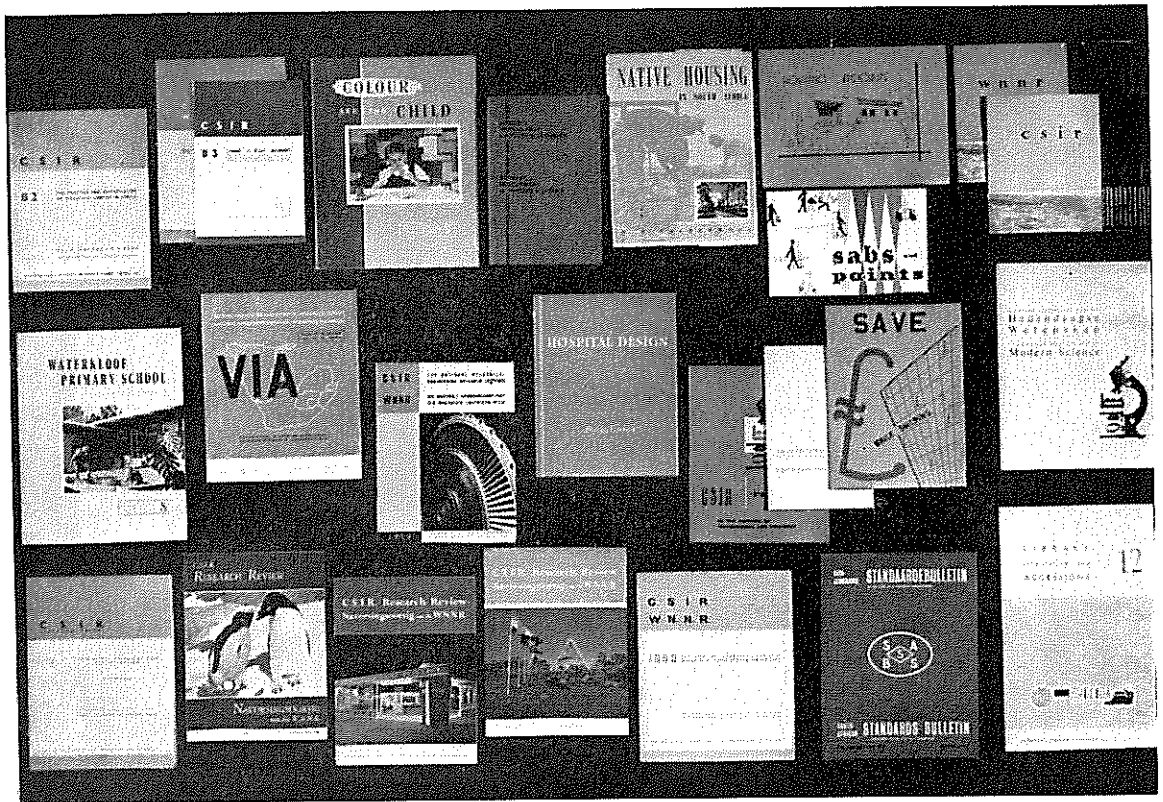
ADVISORY COMMITTEE ON INTER-  
NATIONAL RELATIONS IN SCIENCE

MAIN RESEARCH AWARDS COMMITTEE

ADVISORY COMMITTEE ON DEVELOP-  
MENT OF RESEARCH FOR INDUSTRY

ADVISORY COMMITTEE ON DEVELOP-  
MENT OF INVENTIONS

INDUSTRIAL ECONOMICS ADVISORY  
COMMITTEE



'n Versameling van onlangse publikasies van die W.N.N.R.

A selection of recent C.S.I.R. publications.

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

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1959-60 FIFTEENTH ANNUAL REPORT

VYFTIENDE JAARVERSLAG

SOUTH AFRICAN COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH PRETORIA  
SUID-AFRIKAANSE WETENSKAPLIKE EN NYWERHEIDNAVORSINGSRAAD PRETORIA

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## LEDELYS EN VERGADE- RINGS VAN DIE RAAD

Lede van die Raad op 31 Maart 1960, 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, F.R.S.	<i>Voorsitter van die Raad vir Wetenskaplike Navorsing in Afrika Besuide die Sahara en voormalige President van die W.N.N.R.</i>
Dr. T. Alty.....	<i>Prinsipaal en Vise-kanselier van die 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>Hoof van die Afdeling Bedryfs-ekonomie, Universiteit van Pretoria.</i>
Mnr. F. G. Hill.....	<i>Tegniese Bestuurder, Rand Mines Ltd.</i>
Dr. 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 Universiteits-adviesraad 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..	Mnr. A. J. Miller-Smit, B.A., M.Com.

In die onderhawige tydperk is ses Raadsvergaderings gehou.

Ledelys en Vergaderings van die Uitvoerende Komitee Onderstaande was op 31 Maart 1960 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, 1960, 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, F.R.S.	<i>Chairman of the Council for Scientific Research in Africa South of the Sahara 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>Head of the Industrial Economics Department, University of Pretoria.</i>
Mr. F. G. Hill.....	<i>Technical Manager, Rand Mines, Ltd.</i>
Dr. 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...	Mr. A. J. Miller-Smit, B.A., M.Com.

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

Membership and Meetings of the Executive Committee  
The membership of the Committee on 31st March, 1960, 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 and Prof. W. G. Sutton as floating alternates to both Drs. de Villiers and du Toit).

The Executive Committee held six meetings.

## INHOUDSOPGAWE

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# ALGEMENE OORSIG

## INLEIDING

In Suid-Afrika is daar binne die korte tydsbestek van vyftien jaar 'n tradisie van nywerheidsnavorsing en standaardisering opgebou. Die Staat het, deur die W.N.N.R., hierin 'n leidende rol gespeel waar hy nywerheidsnavorsing bevorder het deur inkomstebelasting op navorsingsuitgawes kwyt te skeld, geldelike steun aan koöperatiewe nywerheidsnavorsingsorganisasies te verleen en deur fasiliteite vir nywerheidsnavorsing en standaardisering in nasionale navorsingslaboratoriums en die Suid-Afrikaanse Buro vir Standaarde te skep. *Een van die beginsels waarop die Raad se beleid gegrond is, is dat die nywerheid self navorsingswerk moet verrig of steun en daar is dan ook reëlings getref waarvolgens die nywerheid geldelik kan bydra tot en volle seggenskap kan verkry in die navorsing wat die Raad namens hom verrig.* Nywerheids- en ander organisasies het gedurende die verslagjaar £519,749 bygedra ten opsigte van ondersoeke, toetse en dienste wat die W.N.N.R. se nasionale navorsingslaboratoriums en die Buro vir Standaarde verrig het.

Die Raad is in al sy ontwikkelingsstadiums bygestaan deur advieskomitees, projek- en loodskomitees en standaardkomitees. Deur bemiddeling van die komitees staan die Raad sy plek vol as 'n ware nasionale instelling, die middelpunt van navorsing en standaardisering in Suid-Afrika. Die Suid-Afrikaanse volk is baie verskuldig aan die lede van hierdie komitees—besige manne en vroue wat soveel van hulle tyd en kragte vrywillig aan die diens van die gemeenskap wy.

## Geldelike beperkings

Dit is des te jammerder dat die ontwikkeling van die W.N.N.R.-organisasie weens geldelike beperkings gestrem word. Die private fabriekswese se bydrae tot die geografiese inkomste van die Unie het van £155·6 miljoen in 1946/7 tot £498·8 miljoen in 1958/59 toegeneem. Gedurende dieselfde tydperk het die Staat se bydrae aan die W.N.N.R. vir nywerheidsnavorsing en standaardisering, asook vir die ondersteuning van navorsing aan universiteite en mediese navorsing van feitlik niks nie tot £1,905,000 p.j. gestyg. Daar is nie syfers beskikbaar in verband met die bedrag wat die nywerheid aan navorsing en standaardisering bestee het nie, maar daar kan gemeld word dat nywerheids- en ander organisasies in 1958 ongeveer £600,000 per jaar bygedra het ten opsigte van ondersoeke, toetse en dienste wat deur die W.N.N.R. behartig is, en nog £100,000 per jaar ten opsigte van nywerheidsnavorsingsorganisasies wat deur die W.N.N.R. en die nywerheid gesamentlik gesteun word. Daar kan redelikerwys aangeneem



# GENERAL REVIEW

In South Africa a tradition of industrial research and standardization has been built up in the short space of fifteen years. In this development the Government, through the C.S.I.R., has played a key-role in stimulating and encouraging industrial research through remission of income tax on research expenditure, providing financial support for co-operative industrial research associations and creating facilities for industrial research and standardization in national research laboratories and the South African Bureau of Standards. *A fundamental point in the Council's policy is that industry should undertake, or finance, its own research and arrangements have been devised through which industry participates financially and has a full say in the direction of research undertaken by the Council on its behalf.* During the financial year covered by this report, industrial and other organizations contributed £519,749 p.a. for investigations, tests and services undertaken in the C.S.I.R.'s national research laboratories and the Bureau of Standards.

At all stages of its development, the Council has been assisted by advisory committees, project and steering committees and standards committees. Through the agency of these committees the Council fulfils its rôle of a truly national institution, providing a focal point for the development of research

## INTRODUCTION



*Nasionale Bounavorsingsinstituut: verpleegsterspos in die eksperimentele saal vir neurochirurgiese gevalle, Baragwanath-hospitaal, Johannesburg; die saal is verbou ooreenkomstig die Nasionale Bounavorsingsinstituut se bevindings.*

*National Building Research Institute: nurses' station at experimental neurosurgery ward, Baragwanath Hospital, Johannesburg; the ward was altered in accordance with the findings of the National Building Research Institute.*

word dat daar minstens net soveel in nywerheid- en privaatanavorsingslaboratoriums bestee word, waar daar voor 1945 weinig of niks bestee is nie. Teen die einde van 1958, dus, *was die nywerheid se jaarlikse besteding aan nywerheidsnavorsing en -ontwikkeling reeds minstens £1½ miljoen teenoor die Regering se besteding, deur die W.N.N.R., van iets meer as £2 miljoen aan suiwer en toegepaste navorsing.*

Hierdie syfers dui daarop dat die W.N.N.R. teen die einde van 1958 die eerste stadium van sy ontwikkeling voltooi het. Hy het naamlik die agterstand begin inhaal. Die volgende stap wat die Raad beoog het, was hergroepering en konsolidering, iets wat nodig geword het weens die snelle ontwikkeling in die voorafgaande jare. Dit was op dié tydstip dat daar 'n geldelike perk van 7½% aan die W.N.N.R. se uitbreiding gestel is—die beperking het in die onderhawige boekjaar in werking getree ondanks die feit dat die produksie van ons nywerheid steeds toeneem.

Daar is vroeg in 1959 'n interne reorganisasiekomitee benoem met die doel om die werksaamhede van die verskillende vertakkinge van die organisasie te koördineer teneinde die hoogste moontlike mate van doeltreffendheid te bereik. Die onmiddellike uitwerking van die ietwat arbitrêre geldelike beperkings wat die Raad opgelê is, is dat dit die verbetering van die Raad se administratiewe, tegniese en professionele dienste aan bande gelê het. Laasgenoemde dienste het naamlik nie heeltemal so vinnig ontwikkel nie soos die navorsings-, standaardiserings- en toetsdienste waarvan die ontwikkeling onder meer regstreekse druk van die kant van die nywerheid geskied het. Die uitwerking daarvan sal op die lange duur ernstiger wees en sal eintlik eers duidelik gevoel word in die jare wat voorlê.

#### Navorsingseenhede

Die Raad het op aanbevelings van sy reorganisasiekomitee besluit om sy navorsings- en ander dienste vir bepaalde nywerhede te koördineer deur die instelling van „nywerheidsnavorsingseenhede” binne sy eie organisasie. Die bedoeling is dat al die navorsings- en ander dienste vir die betrokke nywerheid of belangegroep, onder die hoof van die bepaalde eenheid gekoördineer sal word. Iedere eenheid sal in een van die Raad se nasionale navorsingslaboratoriums fungeer, alhoewel sekere dele van dié werk aan ander laboratoriums, sowel binne as buite die W.N.N.R.-organisasie, uitbestee sal word. Sodra daar dan genoeg geldelike steun vir 'n bepaalde eenheid van buite verkry word om die oprigting van 'n afsonderlike en volwaardige nywerheidsnavorsingsinstituut te regverdig, kan die eenheid „op eie houtjie” ooreenkomstig die Raad se skema vir nywerheidsnavorsingsverenigings ontwikkel. Daar is vyf outonome nywerheidsnavorsingsinstitute wat as gesamentlike W.N.N.R.-nywerheidsondernemings onderskeidelik vir die vissery-, leer-, woltekstiel-, verf- en suiker-nywerheid ooreenkomstig dié skema in die lewe geroep is, en hulle fungeer reeds die afgelope tien tot vyftien jaar met groot welslae.

Navorsingseenhede vir hout, keramiek, wyn, kafferbier, sanitasie, lugbesoedeling en haaibestryding bestaan reeds of is in wording. Hierdie eenhede

and standardization in South Africa. The people of South Africa should indeed be grateful to the members of these committees—busy men and women who voluntarily give so much of their time and energy in the service of the community.

It is thus the more to be regretted that financial limitations have halted the development of the C.S.I.R. organization. The contribution of private manufacturing industry to the geographical income of the Union increased from £155·6 million in 1946/47 to £498·8 million in 1958/59. During the same period the Government's contribution to the C.S.I.R. for industrial research and standardization, as well as for the support of university and medical research, increased from virtually nothing to £1,905,000 p.a. While figures are not available for industry's expenditure on research and standardization, it can be noted that, during 1958, industrial and other organizations contributed approximately £600,000 p.a. for investigations, tests and services by the C.S.I.R. and a further £100,000 a year towards industrial research associations sponsored jointly by industry and the C.S.I.R. It is reasonable to assume that an equal amount, at least, is spent in industrial and private research laboratories, where very little if anything was spent before 1945. In other words, by the end of 1958 *industry was spending at least £1½ million every year on industrial research and development as compared with Government expenditure through the C.S.I.R. on fundamental and applied research amounting to slightly more than £2 million.*

### **Financial limitations**

These figures indicate that, by the end of 1958, the C.S.I.R. had completed the first stage of its development. It was beginning to catch up with the backlog. The next stage which the Council contemplated was regrouping and consolidation, which had become necessary as a result of the very rapid advance during preceding years. It was at this juncture that a financial limit of 7½% was placed on the expansion of the C.S.I.R. and became effective during the financial year now under review, despite the fact that the output of industry continues to increase.

An internal re-organization committee was appointed early in 1959 with a view to regrouping and co-ordinating the work of the various branches of the organization to ensure maximum effectiveness. The immediate, short-term effect of the rather arbitrary financial limitation imposed upon the Council has been to hinder the streamlining of the Council's administrative, technical and professional services. To some extent, these had lagged behind the research, standardization and testing services, which developed under more direct external pressures from industry. The long-term effects will be more serious and the full consequences will only become evident in years to come.

On the recommendation of its reorganization committee, the Council has decided to co-ordinate its research and other services for particular industries under "industrial research units", set up within its own organization. It is

### **Research units**

is deurgaans die uitvloei van suksesvolle navorsing binne die W.N.N.R., waar die behoefte aan en moontlikhede van uitgebreide navorsing in Suid-Afrika bewys is. Belangegroep op nywerheids- en ander gebiede is gevra om op 'n koöperatiewe grondslag aan hierdie werksaamhede mee te doen en dit te steun sodat die navorsing en die praktiese toepassing daarvan bespoedig kan word. Daar word vir iedere onderneming 'n afsonderlike fonds gestig en die bydraes kry dan deur bemiddeling van tegniese loodskomitees 'n aandeel in die bestuur van die fonds en die reëling van die navorsingswerk.

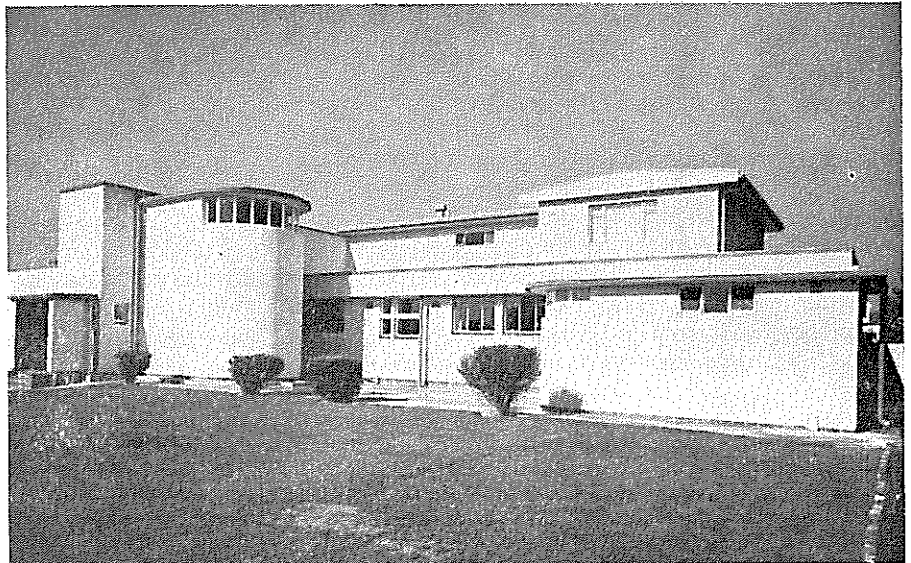
### Tekort aan wetenskaplikes

Hierdie interne hergroepering is begryplikerwys uiters moeilik waar die geld so beperk is en daar so skraps gewerk moet word dat daar nie juis speelruimte is nie. Een van die ongelukkige gevolge van hierdie toedrag van sake is dat dit 'n gevoel van verdeling by navorsers wek deurdat hulle weens die beperkings wat geld en toerusting betref, nie hulle gawes kan gebruik ter bereiking van hul goedomskrewe doelstellings nie. Hierdie dinge weeg by wetenskaplikes swaarder as persoonlike besoldiging en, hoewel die W.N.N.R. se salarisstruktuur ietwat verbeter is, gaan daar weens hierdie omstandighede heelwat ervare navorsers vir die Raad (en gewoonlik ook vir die land) verlore.

Waar die Raad dus daadwerklik stappe doen om doeltreffender koördinerings binne sy eie organisasie te bewerkstellig en sodoende te sorg dat sy werkkragte ten beste in belang van die land as geheel benut word, word hy dikwels hierin verdel deur onwilligheid aan die kant van sekere regeringsinstansies om mee te doen aan gesamentlike ondernemings. Daar is reeds heelwat geskryf

*Die W. N. N. R. se Streeklaboratorium vir die Westelike Provinsie. Die eiendom in Rosebank is onlangs deur die W.N.N.R. aangekoop en huisves die takkantoor van die S.A.B.S. en die Korrosie-eenheid van die Nasionale Chemiese Navorsingslaboratorium.*

*C.S.I.R. Western Province Regional Laboratory: the property in Rosebank purchased recently by the C.S.I.R., which accommodates the branch office of the S.A.B.S. and the Corrosion Unit of the National Chemical Research Laboratory.*



intended that under the head of each such unit all investigations and other services for the particular industries and interests concerned will be co-ordinated. Each unit will be set up in one of the Council's national research laboratories—even though some aspects of the work will be "farmed out" to other laboratories within and without the C.S.I.R. organization. If outside financial support for a research unit becomes sufficient to warrant the establishment of a separate, fully-fledged, industrial research institute, the units can "hive off" under the Council's industrial research association scheme, through which five autonomous industrial research institutes serving the fishing, leather, wool textile, paint and sugar milling industries, set up as joint C.S.I.R.-industry ventures, have been operating most successfully for the past ten to fifteen years.

Research units have been set up or are in the process of establishment in the following fields: timber, ceramics, wine, kaffir beer, sanitation, air pollution and anti-shark research. In all instances, these units are being set up against a background of successful research within the C.S.I.R., which has demonstrated the need and scope for extended research in South Africa. Industrial and other interests have been invited to support and participate in the work on a co-operative basis, in order to speed up the research and its practical applications. In each case a separate fund is maintained and contributors share, through technical steering committees, in the management of the fund and in direction of the research.

It will be readily appreciated that this internal regrouping is extremely difficult on a strictly limited budget, already stretched to limits which allow very little latitude for manipulation. One of the unfortunate consequences of this situation is that research staff become frustrated when they are denied the opportunity of applying their gifts to the attainment of well defined objectives through limitations on funds and equipment. These considerations normally weigh more heavily with scientists than personal emoluments, and, though the C.S.I.R.'s salary structure has been somewhat improved, experienced research workers continue to be lost to the Council (and usually to the country) as a result of these circumstances.

#### **Shortage of scientists**

Although the Council is taking positive steps to achieve more effective co-ordination within its own organization in order to ensure the most effective deployment of its resources in the national interest, the unwillingness of certain Government agencies to co-operate in joint projects is a frequent source of frustration. Much has been written about over-specialization in science, but it is generally recognized among scientists that the most valuable contributions are made in the so-called "interdisciplinary" fields by teams of scientists and engineers drawn from several different fields of specialization. The present organization of science in South Africa militates against the setting up of teams of scientists drawn from different agencies to investigate joint projects and, as efforts to achieve co-operation have met with limited success, representations have been made to the Government to set up co-ordinating machinery. The Council considers this to be a matter of the greatest national importance, for

oor te veel spesialisering op wetenskaplike gebied, maar daar word tog vry algemeen onder wetenskaplikes erken dat die waardevolste bydraes gelewer word op die sogenaamde „tussengebiede” en wel deur deskundiges op verskillende gespesialiseerde gebiede wat deesdae saamwerk. Die wyse waarop wetenskaplike werk tans in Suid-Afrika georganiseer is, verhinder egter die vorming van navorsingspanne bestaande uit deskundiges op verskillende gebiede wat gemeenskaplike projekte kan aanpak, en aangesien daar so min sukses behaal is met die pogings om samewerking te bewerkstellig, is die Regering versoek om die nodige masjinerie vir koördinerende daer te stel. Die Raad beskou dit as ’n saak van die allergrootste nasionale belang want, om die land se huidige ontwikkelings tempo te kan handhaaf, sal ons reeds beperkte wetenskaplike werkkragte ten beste benut moet word.

Daar is in hierdie opsig reeds groot welslae behaal op die gebied van mediese navorsing, ’n navorsingsgebied wat spesiaal aan die Raad opgedra is. Vandag is daar om en by die 20 mediese navorsingseenhede, -groepe en -projekte wat deur ervare navorsers aan hospitale, mediese skole en die Suid-Afrikaanse Mediese Navorsingsinstituut behartig word. Daar is, onder beskerming van die Raad se Komitee vir Navorsing in die Mediese Wetenskappe, pragtige samewerking met die Departement van Gesondheid, die provinsiale hospitale, die universiteite en die Suid-Afrikaanse Mediese Navorsingsinstituut bewerkstellig. Deur die steun wat aan onafhanklike navorsers verleen is, is die besondere geleenthede vir navorsing wat in Suid-Afrika bestaan by hulle tuisgebring en, na verneem word, heg hulle baie waarde aan die samewerking met die W.N.N.R. se laboratoriumsorganisasie.

Die Raad se skema vir steun aan individuele navorsers aan universiteite en museums, wat onder beheer van die Raad se Hoofkomitee insake Navorsingstoekennings ontwikkel is, staan ten nouste in verband met die samewerking op mediese gebied. Steun vir nagraadse navorsing aan universiteite word steeds deur die gebrek aan geld gestrem en die Raad moes noodgedwonge, net soos in vorige jare, ’n groot aantal verdienstelike aansoeke van die hand wys. Die ontoereikendheid van die steun wat vir navorsing aan universiteite beskikbaar is, tref die opleiding van wetenskaplike navorsers en gevolglik die ontwikkeling van die wetenskap en nywerheid in Suid-Afrika, uiters nadelig.

### Wetenskaplike onderrig

’n Ander vraagstuk wat hiermee in verband staan, is die tekort aan wetenskaponderwysers. ’n Organisasie soos die W.N.N.R. kan sy ware funksie slegs vervul as hy ons begaafte jong manne en vroue kan lok, maar hulle sal beswaarlik tot ’n wetenskaplike loopbaan aangetrokke voel as die wetenskaponderrig op skool oninteressant en sielloos is. Die W.N.N.R. het geleenthede vir ’n navorsingsloopbaan geskep nie net in sy eie organisasie nie maar ook daarbuite deur die prikkel wat hy aan navorsing in die nywerheid verskaf het. Daar het ook weens die snelle ontwikkeling van die nywerheid ’n groot vraag na wetenskaplikes en tegnisiërs ontstaan. Hierdie faktore, tesame met die wêreldwye tekort aan wetenskaplikes en ingenieurs, het ongetwyfeld bygedra tot die

if the country's present rate of development is to be maintained, it is clearly essential that the best possible use should be made of our already limited resources of scientific brainpower.

Great success in this direction has been achieved in the field of medical research which was assigned to the Council as a special responsibility. To-day there are some 20 medical research units, groups and projects organized under established research workers in hospitals, medical schools and the South African Institute for Medical Research. Under the auspices of the Council's Committee on Research in Medical Sciences, excellent co-operation has been achieved with the Union Health Department, Provincial Hospitals, Universities and the South African Institute for Medical Research. The support which has been provided for independent research workers has assisted them to realize the special opportunities for research which are found under South African conditions and it is understood that they value their association with the laboratory organization of the C.S.I.R.

Closely associated with this scheme is the Council's scheme for the support of individual research workers at universities and museums which has been developed under the Council's Main Research Awards Committee. Support for post-graduate research at universities continues to be hampered by the lack of funds and, as in previous years, the Council has been compelled to turn down many deserving applications. The inadequacy of support for university research is having grave consequences on the training of research workers and consequently on the development of science and industry in South Africa.

An associated problem is the shortage of science teachers at schools. An organization such as the C.S.I.R. can fulfil its true function only if it attracts to its ranks the most gifted of our young men and women, and these are hardly likely to be attracted to science as a career if the teaching of science at schools is dull and uninspired. Opportunities for careers in research have been opened up through the C.S.I.R., both within its own organization and through the stimulation of research in industry. At the same time the rapid development of industry has created a greatly increased demand for scientists and technicians. These factors, coupled with the general world-shortage of scientists and engineers, have doubtless contributed to the shortage of science teachers and, more particularly, the shortage of well-qualified and gifted science teachers. In these circumstances, it is improbable that the most talented children will be inspired to seek careers in scientific research which, on the whole, offer less opportunity for material reward than does the practice of the older professions such as law, medicine and engineering. Organizations such as the C.S.I.R. can fulfil their true function only by attracting scientists of outstanding ability to its service, and it is clear that positive action is required to break the vicious cycle which threatens to cause a breakdown in the entire scientific structure of the country. The corner stone of this structure is the science teacher, and it is to be hoped that all concerned will combine to seek a solution as soon as possible.

#### Teaching of science

tekort aan wetenskaponderwysers en veral aan behoorlik gekwalifiseerde en begaafde wetenskaponderwysers. Dit is dus onder die omstandighede onwaarskynlik dat die begaafte kinders besiel sal word met die ideaal van 'n navorsingsloopbaan, veral waar dit oor die algemeen minder geldelike gewin bied as die ouer beroep soos die regte, die geneeskunde en die ingenieurswese. Wetenskaplike organisasies soos die W.N.N.R. kan hulle ware doel slegs bereik as hulle oor die dienste van hoogs bekwame wetenskaplikes beskik, en daar sal daadwerklike stappe gedoen moet word om die bese kringloop wat die hele wetenskaplike struktuur van die land bedreig, te verbreek. Die wetenskap onderwyser is die hoeksteen van dié struktuur en alle betrokkenes sal moet saamstaan om so gou doenlik 'n oplossing te probeer vind.

### **Die Suid-Afrikaanse nywerheidsomwenteling**

Die snelle ontwikkeling van die fabriekswese in Suid-Afrika oor die afgelope tien jaar word dikwels as 'n nywerheidsomwenteling beskryf. Dit het plaasgevind in 'n tydperk waarin die ouer nywerheidslande 'n sogenaamde „tegnologiese omwenteling” deurgemaak het. Die omwenteling het ontstaan uit die skepping van 'n nuwe tegnologie deur wetenskaplike navorsing, wat self al as 'n nywerheid beskou word. Die wêreldtoestand het dan ook die ontwikkeling hier te lande baie versnel en gekompliseer.

Dit is met die oog hierop uiters belangrik dat wetenskaplike navorsing in Suid-Afrika met wêreldontwikkeling op wetenskaplike gebied moet tred hou. Daar moet vooruit gekyk word, want die wetenskap moet die nywerheid minstens 'n hele trap voor wees om sy behoeftes vooruit te kan bepaal, en die basiese wetenskaplike inligting wat vir nywerheidsontwikkeling nodig is, te kan verskaf. Daar kan op hierdie wyse geweldige geldbedrae bespaar word, deur omvattende navorsingsprogramme soos dié wat die W.N.N.R. op die volgende gebiede onderneem: goedkoop stedelike behuising; die aanleg, houding en vermoë van die Bantoe en die ontwikkeling van keurings- en indelingsmetodes op grond daarvan; die verryking van voedsel en die bestudering van siektes wat met voeding saamhang; opnames van riviere om vas te stel in hoeverre waterstrome sekere soorte uitvloeisel kan opneem; sanitasieprobleme; lugbesoedeling; die beweging van die see se oppervlakwaters met betrekking tot die ontlasting van uitvloeisel in die brandergebied; en grondstowwe vir die nywerheid o.a. klei, hout, chroom en mangaan. Dit is maar enkele voorbeelde.

Die W.N.N.R. lewer deur middel van hierdie en dergelike studies, asook deur sy toets- en standaardiseringsdienste, 'n belangrike bydrae tot die opbou van tegnologiese kundigheid in Suid-Afrika. Dit het veral betrekking op toestande in Afrika en dra veel daartoe by dat Suid-Afrika op tegnologiese gebied die voortou op hierdie vasteland kan neem. Waarskynlik van nog groter belang is die feit dat hierdie tegnologiese kundigheid Suid-Afrikaanse entrepreneurs in staat stel om al hoe meer mee te doen aan ondernemings hier te lande wat deur buitelandse belange op tou gesit word. Gesonde tegnologie wat op eersterangse navorsing gegrond is, is die beste waarborg vir ekonomiese onafhanklikheid.

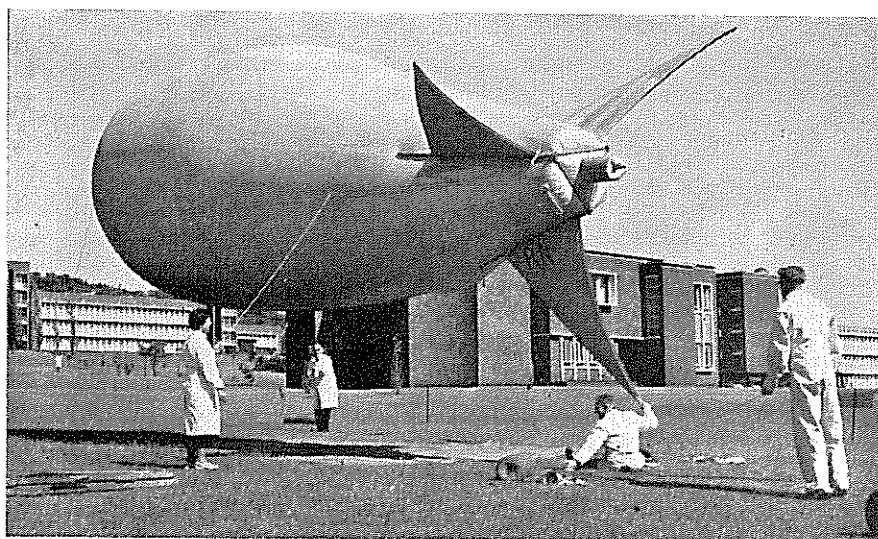


The rapid development of manufacturing industry in South Africa during the past decade is often referred to as a local industrial revolution. It has taken place at a time when the older industrial countries are passing through what has been described as a technological revolution. This has been brought about by scientific research, which is itself coming to be regarded as an industry, creating new technology. This world situation has greatly accelerated the tempo of local development, and increased its complexity.

In this situation, it is important that scientific research in South Africa should keep abreast of world developments in science. A forward-looking policy is essential, as science must be at least a jump ahead, if it is to anticipate the needs of industry and to be in a position to provide the basic scientific information required for industrial development. In this way vast sums of money can be saved through comprehensive research programmes such as those undertaken by the C.S.I.R. in the following fields: low-cost urban housing; the aptitudes, attitudes and abilities of the Bantu and the development of selection and classification procedures based on these studies; food enrichment and nutritional diseases; river surveys to determine the capacity of streams to accept particular types of effluent; sanitation problems; air pollution; the movement of sea surface waters in relation to the discharge of effluents into the surf zone; industrial raw materials, such as clays, wood, chromium and manganese. These are but a few examples.

Through these and related studies, and through testing and standardization services based on them, the C.S.I.R. is making an important contribution to the building up of technological know-how in South Africa. This is particularly applicable to conditions in Africa, and is contributing to South African technological leadership on this continent. What is perhaps of even greater significance is that this technological know-how enables South African enterprises to participate to an increasing extent in local ventures which are launched by overseas interests. Healthy technology, based on first class research, is the surest guarantee of economic self-sufficiency.

## **The South African industrial revolution**



*Nasionale Fisiese Navorsingslaboratorium: die ballon wat gebruik word om wisselende lugtemperatuur te meet in rookmisnavorsing*

*National Physical Research Laboratory: the balloon which is used for measuring changing air temperatures in smog research*

**NASIONALE  
NAVORSINGS-  
PROGRAMME IN  
NASIONALE  
NAVORSINGS-  
LABORATO-  
RIUMS EN  
INSTITUTE**

Langtermynnavorsingsprogramme in verband met vraagstukke van breë nasionale belang, is noodsaaklik as agtergrond vir ondersoeke wat van meer onmiddellike praktiese belang is. Hierdie studies maak dan ook deel uit van die basiese funksies van die Raad se nasionale navorsingslaboratoriums en -institute. Die funksies is, breed gestel, die bestudering van die natuurlike fisiese en biologiese omgewing, die fisiese en chemiese eienskappe van materie en natuurprodukte, asook die bestudering van die mens en die mate waarin hy deur sy omgewing beïnvloed word, of die kunsmatige aanpassing van die omgewing by die mense se behoeftes.

**Geochronologie**

Die Nasionale Fisiese Navorsingslaboratorium het reeds, in samewerking met die Bernard Price-instituut, die Nasionale Chemiese Navorsingslaboratorium en Geologiese Opname, waardevolle bydrae gelewer in verband met die ontwikkeling van tegnieke waarvolgens die ouderdom van gesteentes bepaal kan word. Hierdie bepalings is, afgesien van die intrinsieke wetenskaplike belang daarvan, van groot praktiese waarde by die bepaling van die stratigrafiese verhoudings tussen rotsformasies as wetenskaplike grondslag vir mineraalprospekteerwerk.

**Ionosferiese studies**

Een van die vernaamste funksies van die Nasionale Instituut vir Telekommunikasienavorsing is om 'n studie te maak van toestande in die ionosfeer waarvan die voortplanting van radiogolwe en dus radioverbindinge, afhanklik is. Die instituut is sedert 1946 verantwoordelik vir die registreer van ionosferiese toestande in Johannesburg en Kaapstad en het ook vir kort tydperke en met die samewerking van plaaslike owerhede, opnames in Nairobi en Salisbury gedoen. Toe daar met die program begin is, was daar maar min registreerstasies in Afrika, en nie een besuide die ewenaar nie. Nou is daar ook stasies in suidelike en sentraal-Afrika, hoofsaaklik in die Belgiese Kongo en op Madagaskar, terwyl Afrika as geheel 'n hele aantal ionosferiese registreerstasies het.

Die Nasionale Instituut vir Telekommunikasienavorsing is ook verantwoordelik vir die ontleding van gegewens wat by sy poste vir ionosferiese waarnemings by vertikale invalshoek ingewin is en vir die opstel en publikasie van voorspellings in verband met „frekwensies vir optimum verkeer” vir ionosferiese radioverbindinge. Hierdie diens is onontbeerlik vir die Suid-Afrikaanse Uitsaaikorporasie, die Hoofposkantoor en vir die verdedigings- en lugvaartowerhede. Die Instituut se beampte wat vir hierdie ontledings- en voorspellingsdiens verantwoordelik is, het in Augustus 1959 'n vergadering van die Internasionale Wetenskaplike Radio-unie (U.R.S.I.) se Komitee vir Wêreldwye Waarneming in Brussel bygewoon. Die vergadering is gevolg deur 'n bespreking van die resultate van die program van ionosfeerwaarneming wat tydens die Internasionale Geofisiese Jaar gedoen is.

Long-term research programmes on subjects of broad, national interest are essential to provide a background to investigations of more immediate practical importance. These studies are among the basic functions of the Council's national research laboratories and institutes. In general terms, they are concerned with the study of the natural physical and biological environment, of the physical and chemical properties of matter and of natural products, as well as the study of man and the extent to which he is affected by his environment or the artificial modification of the environment to suit human requirements.

**NATIONAL  
RESEARCH  
PROGRAMMES  
IN NATIONAL  
RESEARCH  
LABORATORIES  
AND  
INSTITUTES**

The National Physical Research Laboratory, in co-operation with the Bernard Price Institute, National Chemical Research Laboratory and Geological Survey has made useful contributions to the development of techniques for determining the age of rocks. Quite apart from their intrinsic scientific interest, these determinations are of great practical value in establishing the stratigraphic relationships between rock formations, to provide a scientific basis for prospecting for mineral resources.

**Geochronology**

One of the main functions of the National Institute for Telecommunications Research is to study conditions in the ionosphere on which the propagation of radio waves, and thus radio-communications, depend. Since 1946 this Institute has been responsible for ionosphere recording at Johannesburg and Cape Town, and has taken recordings at Nairobi and Salisbury for short periods in co-operation with local authorities. When this programme commenced there were very few recorders in Africa and none south of the equator. Now there are other stations in southern and central Africa, in particular in the Belgian Congo and Madagascar, and Africa as a whole has a considerable number of ionospheric stations.

**Ionospheric studies**

The National Institute for Telecommunications Research is also responsible for the analysis of data from their vertical incidence ionospheric sounding stations and for the preparation and publication of predictions of "optimum traffic frequencies" for ionospheric radio communication. This is an essential service for the South African Broadcasting Corporation, the General Post Office, defence and aviation authorities. In August, 1959, the officer of the institute who is responsible for this data analysis and prediction service attended a meeting in Brussels of the World-wide Soundings Committee of the International Scientific Radio Union (U.R.S.I.) which was followed by a meeting to discuss the results of the ionosphere programme undertaken during the International Geophysical Year.

Since time immemorial, man has been at the mercy of the "elements", but modern science looks upon the weather as one of the natural resources

**Cloud physics**

**Atmosferiese fisika**

Die mens is sedert die vroegste tyd al aan die genade van die „elemente” blootgestel. Die moderne wetenskap beskou egter die weer as iets wat tot voordeel van die mens ingespan kan word. In die jongste tyd is cumuluswolke op kunsmatige wyse, met behulp van droë ys en silwerjodied geprikkel om reën te laat val. Die moontlikheid hiervan is bevestig deur proefnemings wat die W.N.N.R. in 1949 met die medewerking van die Weerburo en die Suid-Afrikaanse Lugmag gereël het. Die resultate van hierdie proefnemings tesame met soortgelyke resultate wat in ander lande verkry is, het bewys dat dit wel prakties moontlik is om klimaat te verander maar ook dat 'n baie deeglike begrip van die fisiese prosesse wat by wolkvorming en neerslag betrokke is, daartoe vereis word. Die huidige gebrek aan kennis is vir die weerkundige, wat wolkvorming met baie meer sekerheid as neerslag kan voorspel, net so tergend soos vir die boer wat moet toekyk hoe sy gesaaides verdroog terwyl die wolke daaglik saampak maar dan weer verdryf word sonder dat dit reën. Wat laat reën uit 'n wolk val? Baie van die antwoorde op dergelyke vrae is reeds bekend, maar daar is talle ander waarop die antwoorde nog gevind moet word en dit kan slegs deur middel van sorgvuldige navorsing en proefneming geskied.

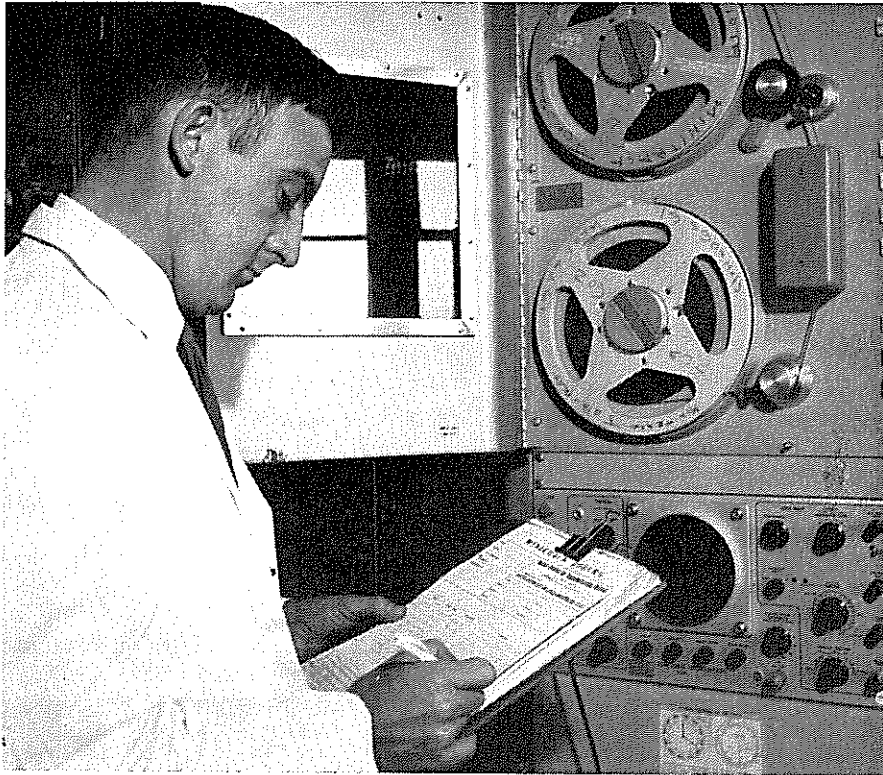
Die Nasionale Fisiese Navorsingslaboratorium het die afgelope vier jaar metings gedoen in verband met die konsentrasie vrieskerns in die atmosfeer. Hierbenewens is die groei-prosesse van stormwolke bestudeer met behulp van fotogegewens en metings van die hoogte van die boonste punte van wolke. Hierdie waarnemingswerk is vanjaar uitgebrei om ook 'n studie van hael te omvat.

Daar is in samewerking met die Weerburo 'n hele netwerk „haelwaarnemers” in die voorstede van Pretoria geplaas ten einde inligting te probeer inwin oor hoe dikwels haelstorms voorkom, hoe lank hulle duur en wat hulle omvang is en wat die verspreiding van die verskillende groottes haelkorrels is. Die haelkorrels self verskaf inligting oor toestande binne die wolke waarin hulle gevorm is en die „haelwaarnemers” het dan ook haelkorrels bymekaar gemaak om in die laboratoriums ondersoek te word as deel van 'n program wat gemik is op die uitbreiding van ons huidige kennis van haelstorms.

Daar gaan selde 'n somer verby waarin die een of ander plek in Transvaal nie deur 'n verwoestende haelstorm geteister word nie. Ook kom daar al om die twintig of dertig jaar sulke verskriklike haelstorms voor soos die wat Pretoria in November 1949 en Bloemfontein in Desember 1959 getref het. Die Nasionale Bounavorsingsinstituut is nou al jare lank besig om ondersoek na verskillende dakmateriale se bestandheid teen hael in te stel. 'n Drukluptoestel waarmee kunsmatige haelkorrels afgeskiet kan word by toetse op dak- en bekledingsmateriale is vanjaar ontwikkel. Met dié toestel kan die krag waarmee die yskorrels die betrokke voorwerp tref, baie goed beheer word.

**Sonenergie**

Die Nasionale Bounavorsingsinstituut en die Nasionale Instituut vir Meganiese Ingenieurswese het met die oog op die belangstelling wat die verwarming van water deur middel van sonenergie allerweë in Suid-Afrika uitlok,



*Nasionale Instituut vir  
Telekommunikasiena-  
vorsing: telemetriese  
gegevens oor die satel-  
liet 1959 Iota (Explorer  
VII) word met behulp  
van 'n Ampex Fr 1100-  
opnametoestel aange-  
teken*

*National Institute for  
Telecommunications  
Research: recording  
telemetry data on  
Satellite 1959 Iota (Ex-  
plorer VII) using Am-  
pex FR 1100 Recorder*

which can be exploited for the benefit of man. In recent years, cumulus clouds have been artificially stimulated to yield their rain by seeding them with dry ice and silver iodide. This was confirmed in experiments organized by the C.S.I.R. in co-operation with the Weather Bureau and the South African Air Force in 1949. These experiments, combined with similar results achieved in other countries, confirmed that the modification of climate is a practical possibility, but this possibility can be realized only when the physical processes involved in the formation of clouds and precipitation are more thoroughly understood. The present lack of knowledge is just as tantalizing to the meteorologist, who can predict cloud formation with much greater certainty than precipitation, as it is to the farmer, who sees his crops withering while day after day clouds form and disperse but it fails to rain. Why does a cloud shed rain when it does? Many of the answers are known but more remain to be found through painstaking research and experiment.

During the past four years, the National Physical Research Laboratory has carried out measurements on the concentration of freezing nuclei in the atmosphere. In addition, the growth processes of storm clouds have been studied using photographic records and height measurements on cloud tops. These observations were extended this year by a study of hail.

In co-operation with the Weather Bureau, a network of "hail-watchers" has been established in the suburbs of Pretoria in an effort to collect information on the frequency of occurrence of hailstorms, their duration and extent, and

saamgespan om son-waterverwarmingsinstallasies vir Suid-Afrikaanse toestande te ontwikkel. Die doel is naamlik om 'n installasie te ontwerp wat goedkoper en makliker vervaardig kan word en dus geredelik vir woonhuise beskikbaar is. Son-waterverwarmingsinstallasies word trouens reeds in die handel vervaardig.

Daar is ook 'n klein proeftoestel waarmee sneeu deur middel van sonhitte gesmelt kan word om water te verkry, vir die Suid-Afrikaanse Antarktiese Ekspedisie ontwerp en gebou.

#### **Gehalte van vloedwater**

Die bakteriologiese gehalte van afloopwater uit woonbuurte en nywerheidsdorpe word in die Nasionale Instituut vir Waternavorsing bestudeer. Daar is bevind dat vloedwater uit hierdie gebiede in hoë mate verantwoordelik is vir die besoedeling van waterstrome en riviere met drekstowwe, veral in die geval van oppervlakwater wat tydens die reënseisoen van Bantoe-woonbuurte afgespoel word. Die besoedeling is trouens so erg dat sommige riviere nie eens tydens die droë seisoen deur selfsuiwering weer kan regkom nie.

#### **Uitsettende kleigrond**

Barsvorming in geboue ten gevolge van die opwaartse beweging wat ontstaan wanneer die grond onder die gebou uitsit weens toename van die voginhoud daarvan in verhouding tot dié van die omliggende grond, is 'n vraagstuk wat hier in Suid-Afrika die eerste aan die lig gebring is deur die Nasionale Bounavorsingsinstituut.

Veldstudies in verband met die beweging van geboue op uitsettende kleigrond is voortgesit; gegewens is oor 'n tydperk van nege jaar versamel en in dié tydperk is daar bewegings van tot vier duim in die somerreënvalstreke op die Hoëveld aangeteken. Die beweging van fondamentgrond veroorsaak nog ernstige skade aan sommige nuwe geboue, ondanks die feit dat daar bewys is dat 'n oplossing daarvoor wel bestaan. Veral ankerheipale of gewapende baksteenwerk met driepuntersteuning is reeds met welslae in verskillende dele van die land gebruik.

Navorsing met die doel om 'n beter begrip van die beweging van vog in die grond te verkry, gaan voort. Die vogtigheidsveranderings in aktiewe kleigrond wat uitsetting of inkrimping veroorsaak, word tot op 'n diepte van 20 vt. bepaal met behulp van 'n vogtigheidsmeter wat met stadige neutrone werk.

Lede van die Nasionale Bounavorsingsinstituut se personeel het die tweede streekskonferensie oor grondmeganika vir Afrika besuide die Sahara wat in September 1959 in Lourenco Marques gehou is, bygewoon en drie referate namens die Instituut gelewer. Probleme in verband met grondmeganika en funderingstegniek in verskillende dele van Afrika kom baie ooreen, en die afgevaardigdes op die konferensie het verslag gedoen dat die Instituut se prestasies op hierdie gebied baie daartoe bygedra het om ook bouprobleme elders in Afrika te help oplos.

Ondersoeke in verband met die chemiese stabilisering van onbestendige fondamentgrond, sowel vir bouwerk as vir paaanleg, het voortgegaan.

the distribution of hailstones of various sizes. The hailstones themselves provide information on conditions within the clouds in which they form and the hail was collected by the "watchers" for examination in the laboratory as part of a programme to supplement and extend existing knowledge of hailstorms.

There is seldom a summer in which any particular place in the Transvaal is free of damaging hailstorms. At intervals of from twenty to thirty years, awesome hailstorms such as those which struck Pretoria in November 1949 and Bloemfontein in December 1959 may be expected. For many years, the National Building Research Institute has been investigating the hail-resistance of roofing materials. This year a compressed air device has been developed for firing artificial hailstones in tests on roofing and cladding materials. It was found to give excellent control of the velocity at which ice-spheres are projected at the target.

In view of the widespread interest in solar water heating in South Africa, the National Building Research Institute and National Mechanical Engineering Research Institute have been collaborating in the development of solar water heating installations to suit South African conditions. The aim is to develop cheaper and more easily-made solar water heating for domestic purposes. Solar water-heating units are now being manufactured on a commercial basis.

#### **Solar energy**

A small experimental unit for melting snow to obtain water by means of solar heating was designed and built for the South African Antarctic Expedition.

The bacteriological quality of run-off waters from residential areas and industrial townships is being studied in the National Institute for Water Research. It has been found that storm water run-off from these areas contributes substantially to the faecal pollution of streams and rivers, more especially where the surface drainage during the rainy season is from Bantu residential areas. In fact, the pollution is such that even during the dry season some rivers are not restored to their original condition by self-purification.

#### **Quality of storm water**

The cracking of buildings as the result of upward movement, caused by the swelling of the foundation soil due to increases in the moisture content of the soil under the buildings relative to the surrounding soil, was a problem first identified in South Africa by the National Building Research Institute.

#### **Expansive clays**

Field studies of the movement of buildings on expansive clays have continued. Some records now extend over nine years, during which time upward movements of as much as four inches have been recorded in the Highveld summer rainfall areas. Foundation movements are still causing severe damage in some newly-designed buildings, despite the fact that solutions to this problem have been well proved. In particular, the use of under-reamed pile foundations, or reinforced brickwork with three-point support, have been successfully applied in many parts of the country.

**Die fisika en  
meganika van vaste  
stowwe**

Met fundamentele studies op hierdie gebied is die aanvoerwerk gedoen vir die oplossing van talle probleme wat vir nywerheidsfirmas en ander organisasies van akuele belang is.

Daar is onder andere gebruik gemaak van elektron- en röntgenstraaldiffraksiemetodes wat in die Nasionale Fisiese Navorsingslaboratorium ontwikkel is, en in die Nasionale Navorsingsinstituut vir Meganiese Ingenieurswese is daar weer 'n studie gemaak van plastiese eienskappe, spanningskorrosie, vermoedheid en spanningsontleding in metale. 'n Groot deel van die toegepaste navorsingswerk wat namens die betrokke opdraggewers verrig is, het te doen gehad met toerusting wat tydens gebruik ingegee het; daar is getrag om die oorsake daarvan vas te stel en middels ter voorkoming daarvan te vind.

**Ontledingsmetodes**

Röntgenstraalfuoresensiemetodes het die afgelope sewe jaar so vinnig ontwikkel dat hulle tans die meeste ander metodes oortref wat snelheid en noukeurigheid betref. Hulle word dan ook al hoe meer toegepas by roetine-ontleding en installasiebeheer. Danksy werk wat onlangs in die Nasionale Fisiese Navorsingslaboratorium verrig is, kan die metodes nou ook aangewend word vir die snelle en akkurate bepaling van spoorverbindinge in bv. kopererts, konsentrate en afval, en bied dit ook 'n gerieflike metode van installasiebeheer.

Gas-chromatografie bied weer 'n ideale metode vir die bepaling van die talle produkte wat voortgebring word deur die inwerking van suurstof op koolwaterstofverbindinge soos die wat in die Fischer-Tropschproses (olie uit steenkool) geproduseer word. In die Nasionale Chemiese Navorsingslaboratorium is daar vinnig gevorder met die bestudering van die meganiese prosesse wat by die selfoksidering van hierdie koolwaterstofverbindinge plaasvind, danksy die ontwikkeling en verbetering van gas-chromatografiese metodes in die laboratorium.

**Metaalkunde**

Ontleding van die geometrie van invretings is 'n goedkoop en eenvoudige metode waarvolgens die meganisme van vervorming in metale en legerings bestudeer kan word. In die Nasionale Navorsingsinstituut vir Meganiese Ingenieurswese het die basiese navorsing op die gebied van metaalkunde te doen gehad met die ontwikkeling van nuwe etsmiddels wat invretings in sink, betayster, messing, koper en sagtestaal kan laat ontstaan.

**Foto-elastisiteit**

Die Nasionale Navorsingsinstituut vir Meganiese Ingenieurswese het ook nuwe meetmetodes gebruik om die meganisme van rotsbreuk te bestudeer volgens die tegniek van foto-elastiese spanningsontleding op ingewikkelde driedimensionele modelle. Die doel met dié ondersoek is om die waarde van die spanningsontledingstelsel en die omvang van rotsbreuk rondom diep mynuitgrawings in harde rots te bepaal.



Research to obtain a better understanding of the moisture movements in the soil, has continued. Field measurements of the moisture changes in active clays, causing swelling or shrinking, are being studied down to depths of 20 feet with the aid of a slow-neutron moisture meter.

Members of the staff of the National Building Research Institute attended the Second African (South of the Sahara) Regional Conference on Soil Mechanics held in Lourenco Marques in September, 1959, at which three papers from the Institute were presented. Soil mechanics and foundation engineering problems in various parts of Africa are very similar and delegates to the conference reported that the Institute's achievements in this field had proved valuable in solving building problems in different parts of Africa.

Investigations into the chemical stabilization of unstable foundation soils, both in relation to building and road construction, have continued.

Fundamental studies in these fields have provided the background to the solution of many problems of immediate practical importance to industrial firms and other organizations.

**Physics and  
mechanics of solids**

The techniques used included electron and X-ray diffraction techniques developed in the National Physical Research Laboratory and studies of plastic properties, stress corrosion, fatigue, and stress-analysis in metals in the National Mechanical Engineering Research Institute. Much of the applied work undertaken on behalf of outside sponsors concerned the investigation of service failures, establishing the causes of failure and devising corrective measures.

During the past seven years, X-ray fluorescence techniques have developed rapidly to the stage where they surpass most other methods as regards speed and accuracy and are finding increasing application in routine analysis and plant control. Recent work in the National Physical Research Laboratory has extended the field of application to the rapid and accurate determination of traces of compound in, for example, copper ores, concentrates and tailings and to provide a convenient method of plant control.

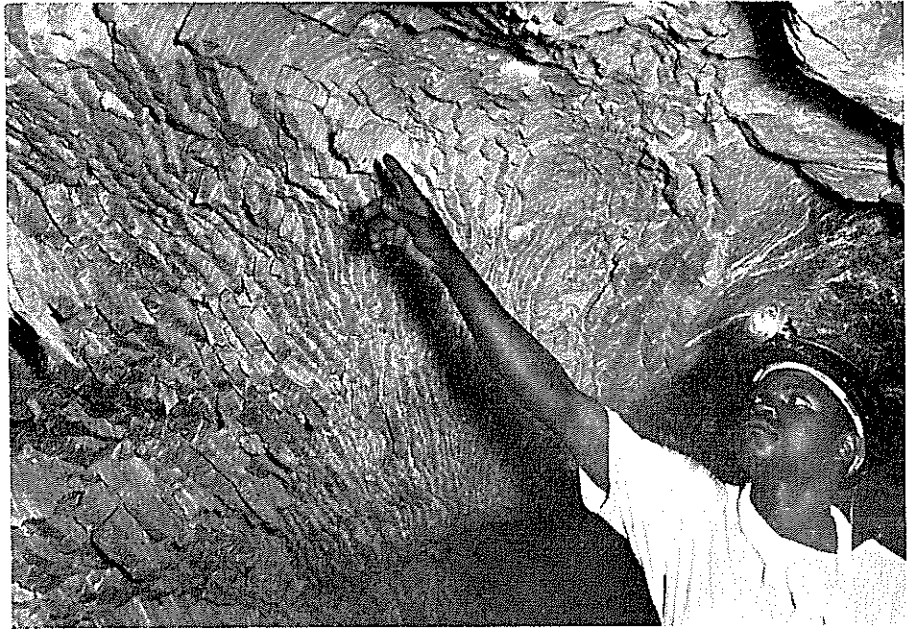
**Analytical  
techniques**

Gas-chromatography provides an ideal method for the estimation of the many products produced by the action of oxygen on hydrocarbons, such as those produced in the Fischer-Tropsch (oil-from-coal) process. In the National Chemical Research Laboratory rapid progress was made in the study of the mechanisms involved in the autoxidation of these hydrocarbons as a result of the development and improvement of gas-chromatographic techniques in the laboratory.

Analyzing the geometry of etch pits constitutes a cheap and simple method for microscopically studying the mechanism of deformation in metals and alloys.

**Metallurgy**

*Nasionale Navorsings-instituut vir Meganiese Ingenieurswese: patrone wat ontstaan deur die geleidelike breek van rots in 'n mynuitgraving. Hierdie breuke word nie deur skietwerk veroorsaak nie*



*National Mechanical Engineering Research Institute: patterns caused by the gradual fracturing of rock in a mine excavation. These fractures are not induced by blasting*

### **Outomatisasie by navorsing**

Outomatisasie by navorsing is bewerkstellig deur gegewens outomaties op geperforeerde band aan te teken sodat die gegewens dan regstreeks ontleed kan word deur die Nasionale Fisiese Navorsingslaboratorium se elektroniese rekenoutomaat *Zebra*. In een geval is weerkundige gegewens so aangeteken en in 'n ander geval weer gegewens oor verkeersbewegings. Daar is 'n steeds toenemende behoefte aan weerkundige gegewens in 'n vorm wat vir bounavorsings- en ontwerpdoeleindes bruikbaar is, en met die oog hierop is daar begin met 'n omvattende waarnemingsprogram t.o.v. sowel basiese as spesiale weers-elemente. Hiervoor is daar 'n waarnemingspos op die W.N.N.R. se terrein by Scientia opgerig waar toepaslike gegewens soos lugtemperatuur, bogrondse windsnelheidverspreiding, netto stralingswisseling, totale daglig en die intensiteit van wind, son en reën op vertikale vlakke aangeteken sal word. Die Nasionale Fisiese Navorsingslaboratorium het 'n metode ontwikkel waarvolgens alle gegewens outomaties in binêre kode op geperforeerde band aangeteken kan word. Hierdie band met gegewens word in die elektroniese rekenoutomaat ingesit en sodoende word al die nodige berekenings gedoen binne 'n baie korte tydbestek en teen 'n geringe deeltjie van die koste verbonde aan die aantekening en ontleding van dié gegewens volgens die gewone metode. Daar word groot moontlikhede vir hierdie soort registreermetode in die vooruitsig gestel, nie net vir navorsingsondernemings nie maar ook vir weerstasies en sekere nywerhede waar 'n massa inligting aangeteken moet word. Die Nasionale Bounavorsingsinstituut het op versoek van die C.C.T.A.\* se Inter-Afrikaanse Behuisingskomitee 'n voorlopige skema opgestel waarvolgens bestaande weerkundige

\*C.C.T.A.—Kommissie vir Tegniese Samewerking in Afrika Besuide die Sahara.

In the National Mechanical Engineering Research Institute, fundamental investigations in the field of metallurgy were concerned with the development of new etchants suitable for causing etch pits in zinc, beta-iron, brass, copper and mild steel.

In this Institute new measuring methods were used to study the mechanism of failure in rock models by the technique of photo-elastic stress analysis for analyzing complex three-dimensional models. The investigations are aimed at determining the stress analysis system and the extent of fracture around mining excavations in hard rock at great depths.

#### Photo-elasticity

Automation in research has been achieved by automatically recording data on punched tape so that these data can be directly analyzed by the National Physical Research Laboratory's electronic computer, *Zebra*. This involved weather data in one case and traffic flow data in another. In view of the growing need for meteorological data in a form suitable for use in building research and design, an extensive programme of observation of both basic and special weather elements was started. For this purpose an observation station was erected on the C.S.I.R. site at Scientia in which suitable measurements such as air temperature and wind speed distribution above ground and nett radiation exchange, total daylight and intensity of wind, sun and rain on vertical surfaces, will be recorded. An automatic technique for recording all information in binary code on punched tape was developed by the National Physical Research Laboratory. By feeding this information into the electronic computer all necessary computational procedures can be carried out in a minimum of time and at a fraction of the cost required for conventional methods of registration and analysis of such data. Great possibilities are seen for this type of recorder, not only for research purposes but also for weather stations and certain industries where the recording of a mass of information is required. At the request of the C.C.T.A.\* Inter-African Committee on Housing a draft scheme was worked out by the National Building Research Institute for the presentation of existing meteorological data for various stations in Africa south of the Sahara in a form suitable for use by engineers, architects and town planners.

#### Automation in research

The use of neutrons and gamma-rays to measure moisture content and the density of soil layers is being developed in several countries. The National Institute for Road Research, in co-operation with a commercial firm, Protea Holdings, Limited, has evolved a novel portable instrument which should prove invaluable to engineers responsible for earth work construction, particularly that concerned with roads. Its full description is a radiation back-scatter soil moisture and density gauge, Mark 1. The device permits rapid measurements of the density and moisture content of soils, which are both vital factors in the

#### Radio isotopes

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\*C.C.T.A.—Commission for Technical Co-operation in Africa South of the Sahara.

gegewens aan verskillende stasies in Afrika besuide die Sahara beskikbaar gestel kan word in 'n vorm wat vir ingenieurs, argitekte en stedeboekundiges bruikbaar is.

### Radio-isotope

Metodes vir die aanwending van neutrone en gammastrale by die meet van voggehalte en die digtheid van grondlae word in verskeie lande ontwikkel. Die Nasionale Instituut vir Padnavorsing het in samewerking met 'n handelsfirma, Protea Holdings Ltd., 'n nuwe soort draagbare instrument ontwerp wat uiters waardevol behoort te wees vir ingenieurs wat met grondwerk te doen het, veral by padbou. Dié instrument word beskryf as 'n stralingterugstrooiingsmeter vir grondvogtigheid en -digtheid, Merk I. Die waarde van die instrument lê daarin dat die digtheid en vogtigheid van grond, albei uiters belangrike faktore by die voorbereiding van padfondamente, baie vinnig daarmee bepaal kan word. Spoed is hier natuurlik noodsaaklik vir die doeltreffende benutting van arbeidskragte en duur padboumasjinerie, en die meeste konvensionele toetsmetodes is dan ook óf tydrowend óf onvoordelig wat die een of die ander aspek betref. Daar word jaarliks sowat £5 miljoen aan padfondamente bestee by die bou van gebitumineerde paaie in die Unie. *Na beraming sal daar altesaam sowat £120,000 per jaar bespaar kan word deur die nuwe instrument te gebruik.* Die ontwikkeling van dié instrument in samewerking met Protea Holdings Limited (wat dit gaan vervaardig en bemark) is in ooreenstemming met die Raad se beleid om vir die doeltreffende toepassing van navorsing te sorg en nuwe geleenthede vir Suid-Afrikaanse fabrikante te skep.

Daar word daagliks groot hoeveelhede water met vaste stowwe in suspensie uit die goudmyne gepomp. Dié vaste stowwe laat die pompe gou uitslyt en moet dus besink word voordat die water uitgepomp word. Die Nasionale Navorsingsinstituut vir Meganiese Ingenieurswese stel met die oog hierop ondersoek in na die verwydering van suspensiestowwe uit mynwater met behulp van vertikale besinkers, filters en hidrosiklone. Ook is daar met die hulp van die Nasionale Fisiese Navorsingslaboratorium se Afdeling Radioaktiwiteit proefnemings gedoen ten einde te bepaal hoe suspensiestowwe die slytasie van meertrap-sentrifugaalpompe beïnvloed. Die proefnemings was daarop gemik om die meganisme waarvolgens slytasie plaasvind, te kan bestudeer en om kwantitatief te bepaal hoe verskillende faktore soos die snelheid waarteen die water beweeg, die vorm van die vlak, die grootte van die deeltjies, die soort grint, die materiaal wat in die pomp gebruik is, ens., die slytasietyempo beïnvloed. In al dié proefnemings was die slytasietyempo die moeilikste kwantiteit om te bepaal, en in hierdie opsig was die toepassing van radioaktiwiteitsmetodes van besonder groot waarde. Afgesien daarvan dat dit voortdurende meting van slytasie moontlik maak, is die tyd wat vereis word om 'n meetbare slytasie te verkry, ook met 'n faktor van sowat tien verminder.

### Kernfisika

Die Raad se 45-duimsiklotron van 15 Mev. wat deur die Nasionale Fisiese Navorsingslaboratorium ontwerp en gebou is, word reeds 'n aantal jare lank gebruik by die bestudering van kernreaksies en vir die voortbrenging van radio-isotope met kort lewensduur. Daar is terselfdertyd spesiale toerusting met die

preparation of a road foundation. Speed is essential if efficient use is to be made of manpower and expensive road making machinery. Most tests which are at present available are either time consuming or disadvantageous from other aspects. An amount of approximately £5 million is spent annually on road foundations in the construction of bituminized roads in the Union. *It is estimated that the total potential savings that could be effected by using the new instrument will amount to about £120,000 per year.* The development of this instrument in association with Protea Holdings, Limited, by whom it will be manufactured and offered for sale, is another example of the Council's policy of insuring the effective application of research and creating new opportunities for South Africa's manufacturing industries.

Large quantities of water containing suspended solids are pumped daily from the gold mines. The pumps are rapidly worn by suspended solids and these can be settled prior to pumping. The National Mechanical Engineering Research Institute is therefore investigating the removal of suspended solids from mine water using vertical settlers, filters and hydro-cyclones. In addition, with the assistance of the Radio-activity Division of the National Physical Research Laboratory, experiments have been carried out to determine the influence of suspended particles on the rate of wear in multi-stage centrifugal pumps. The experiments were designed to permit study of the mechanism by which the wear takes place and to determine quantitatively how various factors such as water speed, shape of surface, size of particle, type of grit, materials used in the pumps, etc., influence the rate of wear. In all such experiments the most difficult quantity to measure is that of the rate of wear, and it is here that the application of radio-activity techniques has been of great value. In addition to allowing continuous measurement of the rate of wear, the time necessary to obtain a measurable amount of wear has been reduced by a factor of about ten.

The Council's 45 inch, 15 Mev. cyclotron which was designed and built by the National Physical Research Laboratory, has been used for some years in the study of nuclear reactions and for the production of short-lived radio-isotopes. At the same time, special equipment has been designed and built for use in extended studies in nuclear physics in an underground room adjacent to the cyclotron hall. In January, 1960, the staff of the laboratory succeeded in bringing the deuteron beam out of the cyclotron through a thin copper window. The beam, which gives an external current of 25 microamps, is now being used in a series of experiments using the special equipment in the adjacent underground room, which is shielded from the intense radiations in the cyclotron hall.

*This success is most gratifying, as it has been achieved with only a few of the hundred or so cyclotrons in the world.*

The analysis of fire statistics for 1958 obtained from the system of fire reporting on a national scale introduced by the National Building Research Institute, was completed. The statistics reflect amongst other things the value

#### **Nuclear physics**

#### **Fire research**

oog op voortsettingstudies op die gebied van kernfisika ontwerp en dié is in 'n ondergrondse kamer langs die siklotronsaal ingebou. In Januarie 1960 het die personeel van die laboratorium daarin geslaag om die deutronstraalbundel deur 'n venstertjie van dun koper by die siklotron te laat uitkom. Die straalbundel wat 'n eksterne stroomsterkte van 25 mikro-ampère afgee, word tans gebruik in 'n reeks proefnemings met behulp van die spesiale toerusting in die aangrensende ondergrondse kamer, wat van die hewige uitstraling in die siklotronsaal afgeskut is.

*Die prestasie is des te groter omdat dit nog net met 'n paar van die sowat honderd siklotrons in die wereld behaal is.*

### **Brandnavorsing**

Die ontleding van die brandstatistiek vir 1958 wat verkry is deur middel van die stelsel van landswye brandaanmelding wat die Nasionale Bounavorsingsinstituut ingevoer het, is afgehandel. Uit die statistiek blyk onder ander die waarde van hand-brandblustoerusting wat doeltreffend gebruik word. Verskeie plekke waar groot brande plaasgevind het, is besigtig ten einde die maatreëls te beoordeel wat getref is om die verspreiding van brand te voorkom. Daar is baie inligting op dié wyse ingesamel en op grond daarvan kan advies oor beter voorkomingsmaatreëls gegee word. Voorlopige toetse op modelle van grasdakke het gelei tot die ontwikkeling van 'n laboratoriummetode waarvolgens die doelmatigheid van chemiese behandeling of spesiale bouwyses om die verspreiding van brand te vertraag, bepaal kan word.

### **Studies in verband met die voeding van die bevolking**

Hoewel dit bekend is dat wanvoeding 'n ernstige probleem onder sekere dele van die Unie se bevolking is, is daar nog te min inligting beskikbaar om die volle omvang van die probleem te kan bepaal. Die kriteriums en tegniek van kliniese, radiologiese, somatometriese en biochemiese opnames is dus verder bestudeer met die oog daarop om dit later op meer uitgebreide skaal toe te pas. Die Nasionale Voedingnavorsingsinstituut wil ook graag dieetopnamemetodes bestudeer en toepas, maar dit kon weens gebrek aan personeel tot dusver nog nie gedoen word nie.

Die Instituut het onlangs probeer om meer inligting oor die bevolking se voedingspeil in te win deur 'n vraelys op te stel en aan meer as 6,000 praktiserende geneeshere in alle dele van die Unie te stuur. Daar word vertrou dat daar op grond van die inligting wat aldus ingewin word, maatreëls ter verbetering van die toestand getref sal kan word en ook, waar inligting ontbreek, vasgestel sal kan word waar opnames in verband met voedingspeil die noodsaaklikste is.

### **Verryking van voedsel**

Die Nasionale Voedingnavorsingsinstituut het gedurende die jaar die resultate van sy uitgebreide studies, wat oor etlike jare strek, in verband met die verryking van voedsel en veral die Departement Voeding se beoogde skema vir die verryking van brood met vismeel, in boekvorm gepubliseer. Die verslag behels 'n studie in verband met die grondbeginsels van voedselverryking, 'n uitvoerige oorsig van beskikbare inligting oor die voedingspeil van die verskillende bevolkingsdele, en 'n studie in verband met die biologiese waardebeoordeling

of efficiently used hand fire-fighting equipment. The sites of numerous major fires were inspected so that an idea could be obtained of the value of measures which had been taken to prevent the spread of flame. Much information was collected, which makes it possible to advise on improved preventative measures. Preliminary tests on models of thatched roofs have led to the development of a laboratory method for assessing the efficacy of chemical treatment or special construction techniques aimed at retarding the spread of fire.

Although malnutrition is known to be a serious problem among certain sections of the population of the Union, too little information is available to enable the full extent of the problem to be assessed. Further studies of the criteria and techniques of clinical, radiological, somatometrical and biochemical surveys were therefore made with a view to their application later on a wider scale. It was desired to study and apply dietary survey techniques, but lack of staff has, up to the present time, prevented such development.

#### **Nutritional studies of the population**

In an attempt to obtain further information on the state of the population's nutrition, a questionnaire was recently drawn up by the National Nutrition Research Institute and sent to over 6,000 medical practitioners in all parts of the Union. It is hoped that the information supplied will provide a basis for the institution of remedial measures and, where information is found to be lacking, will indicate where nutritional status surveys are most required.

During the year the National Nutrition Research Institute published in book form the results of its extensive studies, carried out over several years, on food enrichment and, in particular, on the proposed scheme of the Department of Nutrition for the enrichment of bread with fish flour. The report contained a study of general principles of food enrichment, a lengthy review of available information bearing on the nutritional status of the different sections of the South African population, and a study of the biological evaluation of foodstuffs, with special reference to fish flour. It was concluded that there was no scientific justification for the proposed scheme for the enrichment of bread with fish flour.

#### **Food enrichment**

Research work on the aetiology and treatment of kwashiorkor, a nutritional disease of major importance among non-European infants and young children in South Africa, was continued in the C.S.I.R. non-European paediatric ward at the Pretoria General Hospital. Kwashiorkor can be cured by the feeding of skimmed milk and can be prevented if enough milk is included in the diet. A study was commenced and is still in progress to provide an indication of the minimum amount of skimmed milk powder needed by non-European children for the prevention of the disease. One of the recommendations made in the Institute's report on bread enrichment was that, in place of bread enrichment schemes, a programme for the distribution of skimmed milk powder to needy European and non-European infants and young children should be initiated. (See also under Medical Research: Clinical nutrition: page 35.)

#### **Kwashiorkor**

van voedselsoorte, veral wat vismeel betref. Daar is tot die gevolgtrekking geraak dat die beoogde skema vir die verryking van brood met vismeel vanuit 'n wetenskaplike oogpunt glad nie geregverdig is nie.

### **Kwashiorkor**

Daar is voortgegaan met navorsing in verband met die etiologie en behandeling van kwashiorkor, 'n siekte wat met voeding in verband staan en wat baie onder nie-blanke suigeling en kinders in Suid-Afrika voorkom. Die werk word in die W.N.N.R. se pediatriese saal in die Pretoriase Algemene Hospitaal verrig. Die pasiëntjies kan genees word deur hulle met afgeroomde melk te voer en die siekte kan voorkom word indien die kinders genoeg melk kry. Daar word tans 'n studie uitgevoer om te probeer bepaal wat die minimum hoeveelheid afgeroomde melk in poeiervorm is wat nie-blanke kinders moet kry om nie die siekte op te doen nie. Een van die aanbevelings wat die Instituut dan ook in sy verslag oor broodverryking doen, is dat daar, in plaas van met broodverrykingskemas, liever begin moet word met 'n skema vir die verskaffing van afgeroomde melk in poeiervorm aan hulpbehoewende blanke en nie-blanke suigeling en jong kinders. (Sien ook onder Mediese Navorsing: Kliniese voeding: bladsy 34.)

### **Koronêre hartsiektes**

Daar is voortgegaan met die bepaling van die bloedcholesterolpeil van blanke skoolkinders van verskillende ouderdomme in Pretoria as deel van studies oor die verband tussen dieet en die ontwikkeling van koronêre hartaandoenings. (Sien ook onder Mediese Navorsing: Kliniese voeding: bladsy 34.)

### **Voedseltegnologie**

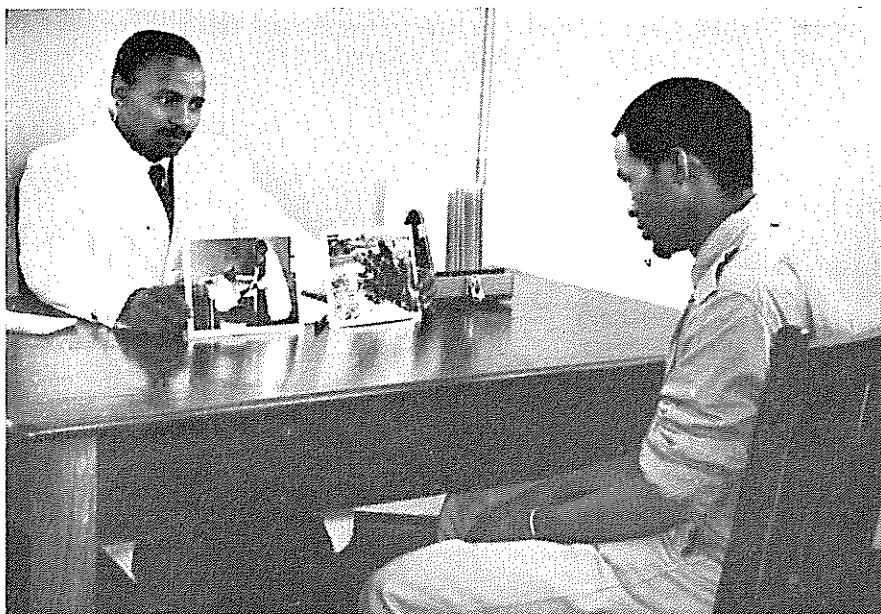
Voedseltegnologiese studies, veral met betrekking tot mielies, word deur die Nasionale Voedingnavorsingsinstituut voortgesit. Daar is in samewerking met die Nasionale Chemiese Navorsingslaboratorium werk in verband met die suurmaakproses by die brou van kafferbier verrig met die doel om produksie te verhoog en die gehalte te verbeter.

### **Opnames in verband met mannekrag**

Dit het uit ondersoek wat die Nasionale Instituut vir Personeelnavorsing namens die nywerheid en die staat gedoen het, weer geblyk hoe moeilik dit gaan om personeel te werf wat die regte aanleg, opleiding en uitkyk het. Die Instituut het, ten einde meer lig op die probleme te werp, ondersoek ingestel enersyds na die mate waarin die talente van begaafde kinders verlore gaan deurdat hulle die skool te vroeg verlaat, en andersyds na die mate waarin dié sonder werklike begaafdheid deur die vraag na hoogsgekwalfiseerde mannekrag genoop word om hulle vir universitêre en ander professionele loopbane te probeer bekwaam.

Studies in verband met beroepsmotivering op werks- en professionele vlak word uitgevoer met die doel om die houding van die individu ten opsigte van sy diensvoorwaardes, vooruitsigte en behandeling in sy werk te bepaal. Ander studies behels diensversuim en personeelwisseling en die werker se reaksie op aansporingskemas.





*Nasionale Instituut vir Personeel Navorsing: toets vir waardes geheg aan Bantoe-take. Toets word toegepas op Bantoe-werker*

*National Institute for Personnel Research: test of values attached to Bantu jobs. Administering test to Bantu worker*

In studies on the relationship between diet and the development of coronary heart disease, work on the determination of the blood cholesterol levels of European school children of different ages in Pretoria was continued. (See also under Medical Research: Clinical nutrition: page 35.)

#### **Coronary heart disease**

Food technological studies, particularly on maize, are being continued by the National Nutrition Research Institute. In collaboration with the National Chemical Research Laboratory, work was carried out on the souring process in Kaffir beer brewing, with the object of enabling production to be increased and better quality standards maintained.

#### **Food technology**

Investigations undertaken by the National Institute for Personnel Research on behalf of industry and government have emphasized the difficulty of recruiting staff with the right level of ability, training and outlook. In order to throw more light on these problems this Institute has been investigating the extent to which the abilities of gifted children are wasted as a result of early school-leaving and the extent to which those lacking real ability are induced by the demand for highly trained manpower to attempt to qualify for university and other professions.

#### **Manpower surveys**

Studies of occupational motivation at the operative and professional level are being carried out to determine attitudes and their relation to conditions of service, prospects and the way the individual is treated on the job. Other studies included absenteeism and labour turnover, and the reactions of workers to incentive schemes.

Die instelling van personeelkeuringstoetse vir Bantoe-arbeidskragte namens verskeie organisasies het bewys daarvan gelewer dat die toepassing van wetenskaplike personeelbestuursmetodes behoorlike benutting van mannekrag in die nywerheid, mynbou en plaaslike bestuur meebring. Die vernaamste doel met die keuringsprogramme is om kandidate in te deel in drie hoofberoepsgroepe naamlik nie-meganiese, meganiese en toesighoudende werk. Daar word tans ook toetse uitgewerk vir geskoolde, klerklike en hoëgraadse werk. Ander studies het weer te doen met die ontwikkeling van die talente en persoonlikheid van Afrika se inboorlingbevolking en die uitwerking van sosiale, kulturele en sosio-ekonomiese toestande, die ouerlike houding en opvoedingsgebruike op die verstandelike en persoonlikheidsontwikkeling van ons inboorlingrasse.

## MEDIESE NAVORSING

Die ontwikkeling van mediese navorsing het voortgegaan danksy die steun wat die Raad verskaf met die advies en leiding van die Komitee vir Navorsing in die Mediese Wetenskappe, die Raad se Adviseur insake Mediese Navorsing, professor S. F. Oosthuizen (bygestaan deur prof. J. Barnetson en prof. H. W. Snyman) en die navorsingssubkomitees en loodskomitees vir die W.N.N.R. se mediese navorsingseenhede en -groepe.

*(’n Uitvoerige verslag oor mediese navorsing sal binnekort deur die W.N.N.R. uitgegee word, en kan op aanvraag verkry word.)*

Dr. Robert M. Kark en dr. Graham Bull, die Raad se mediese ereskakel-beamptes in onderskeidelik die Verenigde State van Amerika en Brittanje, het weereens mediese en tandheelkundige navorsers in Suid-Afrika van waardevolle inligting oor buitelandse ontwikkeling op hierdie gebiede voorsien. Professor H. W. Snyman het gedurende Junie en Julie 1959 mediese navorsingsinstitute in Wes- en Sentraal-Afrika besoek. Sy besoek en die verslag wat hy daarna opgestel het, was besonder waardevol om skakeling met navorsers in hierdie gebiede te help bewerkstellig.

## Bilharzia

Gedurende Oktober 1959 is daar ’n konferensie oor bilharzia deur Portugese en Suid-Afrikaanse navorsers in Lourenco Marques gehou. Onder die konferensiegangers was daar dr. Fraga de Azevedo, Direkteur van die Instituut vir Tropiese Geneeskunde, Lissabon, en dr. Elmer Berry van die Verenigde State se Openbare Gesondheidsdiens, wat as waarnemer vir die Wêreldgesondheidsorganisasie opgetree het.

## Amebiase

Die Amebiase-navorsingseenheid het die nuwe Instituut vir Parasitologie langs die mediese skool en die King Edward VIII-hospitaal in Durban betrek. Die gebou is opgerig met behulp van milde geldelike bydraes van verskeie organisasies en fabrikante van geneesmiddels. Die eenheid het, onder leiding

The introduction of personnel selection tests for Bantu labour on behalf of many different organizations has demonstrated that the application of scientific personnel management procedures lead to adequate utilization of manpower in industry, mining and local government. The main purpose of the selection programmes has been to classify candidates into three major occupational categories, namely non-mechanical, mechanical and supervisory work. Tests for skilled, clerical and higher-grade duties are, however, being developed. Other studies have concerned the development of abilities and personality in the indigenous native population of Africa, and the effects of social, cultural and socio-economic conditions, parental attitudes and child-rearing practices on the intellectual and personality development of our native races.

The development of medical research has continued through support provided by the Council with the advice and guidance of the Committee for Research in Medical Sciences, the Council's Adviser on Medical Research, Professor S. F. Oosthuizen (assisted by Prof. J. Barnetson and Prof. H. W. Snyman) and the research sub-committees and steering committees for the C.S.I.R. medical research units and groups.

Dr. Robert M. Kark and Dr. Graham Bull, the Council's honorary medical liaison officers in the United States of America and the United Kingdom, continued to provide medical and dental research workers in South Africa with valuable information on overseas developments in these fields. During June and July 1959, Professor H. W. Snyman visited medical research institutes in West and Central Africa. Professor Snyman's visit and subsequent report have proved valuable in establishing liaison with medical research workers in these territories.

#### **MEDICAL RESEARCH**

*(A complete report on medical research will be published shortly by the C.S.I.R. and will be available on request.)*

During October 1959, a conference between Portuguese and South African research workers on bilharzia was held in Lourenco Marques. The conference was attended by Dr. Fraga de Azevedo, Director of the Institute of Tropical Medicine, Lisbon, and Dr. Elmer Berry of the United States Public Health Service, an observer for the World Health Organization.

#### **Bilharzia**

The Amoebiasis Research Unit occupied the new Institute for Parasitology next to the Medical School and King Edward VIII Hospital in Durban. The building was erected with funds made available by generous donations from various organizations and drug manufacturers. Under the director, Dr. R.

#### **Amoebiasis**

van sy direkteur, dr. R. Elsdon-Dew, sy werksaamhede uitgebrei, sodat dit ook die bestudering van ander parasiete as die ameba omvat. Daar word dan ook tans ondersoek ingestel na verskillende wurmparasiete en hulle uitwerking op die mens.

#### Tandsiektes

Professor C. J. Dreyer het in Februarie 1960 diens aanvaar as Direkteur van die Tandheelkundige Navorsingseenheid en professor in Eksperimentele Odontologie aan die Universiteit van die Witwatersrand. Professor J. T. Irving, wat Direkteur van die eenheid sedert sy stigting was, het die betrekking in Junie 1959 neergelê om 'n navorsingsbetrekking aan die Universiteit Harvard, V.S.A., te aanvaar. Die direkteurskap is intussen waargeneem deur professor J. Staz. Ondanks hierdie verwisselings van direkteure, het die eenheid goed gevorder met 'n aantal navorsingsprojekte wat daarop gemik is om meer lig op die fundamentele aard van die skeletmetabolisme te werp.

#### Voeding

Die Voedingnavorsingseenheid aan die Universiteit van die Witwatersrand, wat onder leiding van dr. Joseph Gillman staan, het sy program van navorsingswerk oor die verband tussen voeding en die buislose kliere, veral wat die probleme van mensesiektes in Afrika betref, voortgesit. Veral interessant is die feit dat daar met behulp van isotope bewys is dat vet in suikersiektetoestande aktief *gevorm* in plaas van *gemobiliseer* word. Dit is strydig met die huidige beskouings en die nuwe inligting sal ongetwyfeld lei tot 'n nuwe benadering van die metaboliese steuring by suikersiekte.

#### Kardio-pulmonale siektes

Die Kardio-pulmonale Navorsingseenheid aan die Universiteit van die Witwatersrand, wat onder leiding van professor G. A. Elliott staan, het voortgegaan met sy studies van aspekte van long-, hart- en bloedsomloopfunksies. Die noodsaaklikheid daarvan om skraal te bly en die gevare wat vetheid inhou word beklemtoon in 'n voorlopige ontleding van die resultate wat behaal is met 'n studie oor vetheid en die uitwerking daarvan op hart- en longfunksie, veral in verband met vlak asemhaling, hartverlamming en slaapaanvalle.

#### Fotobiologie van die vel

'n Fotobiologiese Navorsingsgroep aan die Universiteit van Pretoria onder leiding van dr. G. H. Findlay, is tans besig met 'n ondersoek in verband met skade aan die menslike vel ten gevolge van straling (son- en ioniseringswarmte) en die uitwerking van sonstrale op die lipiedsamestelling van die plasma in die mens. By studies in verband met primêre velpigmentasie is die uitwerking van verskillende chemikalieë (reduuseermiddels, anti-oksideringsmiddels, ens.) getoets, en die uitwerking van aktiewe golflengtes word tans ondersoek.

#### Virusse deur artropode oorgedra

Dr. K. C. Smithburne, wat direkteur van die Navorsingseenheid vir Virusse deur Artropode Oorgedra was sedert die stigting daarvan in 1953, moes weens

Elsdon-Dew, the unit has expanded its activities to include the study of parasites other than the amoeba and is now investigating various helminths and their effect on man.

In February 1960, Professor C. J. Dreyer assumed duty as Director of the Dental Research Unit and Professor of Experimental Odontology at the University of the Witwatersrand. Professor J. T. Irving who was appointed Director of the Unit at its inception, relinquished this post in June 1959 to take up a research appointment at the University of Harvard, U.S.A. During the interim period, Professor J. Staz acted as director. Despite this break in the continuity of the directorship, the unit made good progress in a number of research projects aimed at elucidating the fundamental nature of the skeletal metabolism.

#### **Dental diseases**

The Nutrition Research Unit at the University of the Witwatersrand, under the direction of Dr. Joseph Gillman, has continued its programme of research work on the relationship of nutrition to the endocrine glands, with special reference to the problems of human disease in Africa. A point of special interest is that, with the use of isotopes, it has been demonstrated that in diabetic states, fat is being actively *formed* instead of being *mobilized*. This is contrary to currently held views, and the new information will undoubtedly lead to a new approach to the problem of metabolic defect in diabetes.

#### **Nutrition**

The Cardio-Pulmonary Unit at the University of the Witwatersrand, under the direction of Professor G. A. Elliott, has continued with its studies of aspects of the functions of lung, heart and circulation. The need to keep thin and the perils of obesity are highlighted in a preliminary analysis of results in a study of obesity and its effect on heart and lung function, particularly in connection with problems of underbreathing, heart failure and attacks of sleep.

#### **Cardio-pulmonary diseases**

A Photobiology Research Group under the direction of Dr. G. H. Findlay at the University of Pretoria is investigating radiation damage (solar and ionizing) in the human skin, and the effects of solar radiation on the lipid composition of the plasma in man. In studies on primary skin pigmentation, the effects of various chemicals (reducing substances, anti-oxidants, etc.) were tested and the influence of active wavelengths is now being examined.

#### **Photobiology of the skin**

Dr. K. C. Smithburn, director of the Arthropod-borne Virus Research Unit since its establishment in 1953, was forced to return to the United States permanently because of ill-health and his place has been taken by Dr. R. H.

#### **Arthropod-borne viruses**

swak gesondheid permanent na die Verenigde State terugkeer, en dr. R. H. Kokernot is in sy plek aangestel. Hierdie eenheid word gefinansier deur die Suid-Afrikaanse Mediese Navorsingsinstituut, die Poliomiëlitisnavorsingstiging, die W.N.N.R. en die Rockefellerstiging gesamentlik met die medewerking van die Departement van Gesondheid en die Afdeling Veeartsenydiens van die Departement van Landbou. Dié groep navorsers het voortgegaan met die gekoördineerde program van laboratorium- en veldondersoek in verband met virusse wat deur artropode oorgedra word. Die resultate van veldstudies wat oor die afgelope vier jaar in Noord-Natal uitgevoer is, dui daarop dat die vernaamste virustipes en die vernaamste virusdraende muskiete nou aan die lig gebring is. Hierdie studies het heelwat gegewens opgelewer wat as agtergrond kan dien vir die volgende stadium, naamlik 'n ondersoek in verband met die meganisme waardeur virusse in die natuur aan die gang gehou en van jaar tot jaar bestendig word.

### **Menslike biochemie**

Die hoof van die Navorsingseenheid vir Menslike Biochemie aan die Suid-Afrikaanse Mediese Navorsingsinstituut het 'n toekening van £50,000 wat oor 'n tydperk van vyf jaar versprei sal word, van die National Heart Institute van die Verenigde State se openbare gesondheidsdiens ontvang vir navorsing om vas te stel waarom sterfgevalle weens kroonaarhartaandoenings so selde onder die Bantoebevolking van Suidelike Afrika voorkom. Dit is die voorneme om met behulp van hierdie toekening inligting in te win oor die veranderings wat by Bantoebevolkingsgroepe plaasvind wanneer hulle uit hul primitiewe staat tree en verwesters raak. Die veranderings sal, met gebruik van soveel kriteriums as moontlik en in samewerking met voedingsdeskundiges, kliniste, patoloë en ander spesialiste bestudeer word. Wat daar beoog word is, kortom, om uit te vind hoe na die Bantoe aan die blanke se leefwyse moet kom voordat hy sy beskerming teen die siekte begin verloor. Aan die anderkant weer, sal daar hopelik lig gewerp word op die vraag in hoeverre die blanke hier te lande die Bantoe se dieet en leefwyse moet volg om enigsins bestandheid teen die kwaal te kry.

### **Narkose-sterfgevälle**

Die navorsingsprojek in verband met narkose-sterfgevälle wat onder leiding van professor O.V.S. Kok van die Universiteit van Pretoria staan is voortgesit en daar is verder gegewens ingesamel oor gevälle waar pasiënte onder narkose en onder operasie sterf. Daar is gedurende die jaar 300 gevälle van skielike hartverlamming onder operasie ondersoek en daar is 'n referaat oor die resultate op die Mediese Kongres gelewer. Dit blyk uit die gegewens dat die behandeling van dergelike noodgevälle nie altyd doeltreffend is nie.

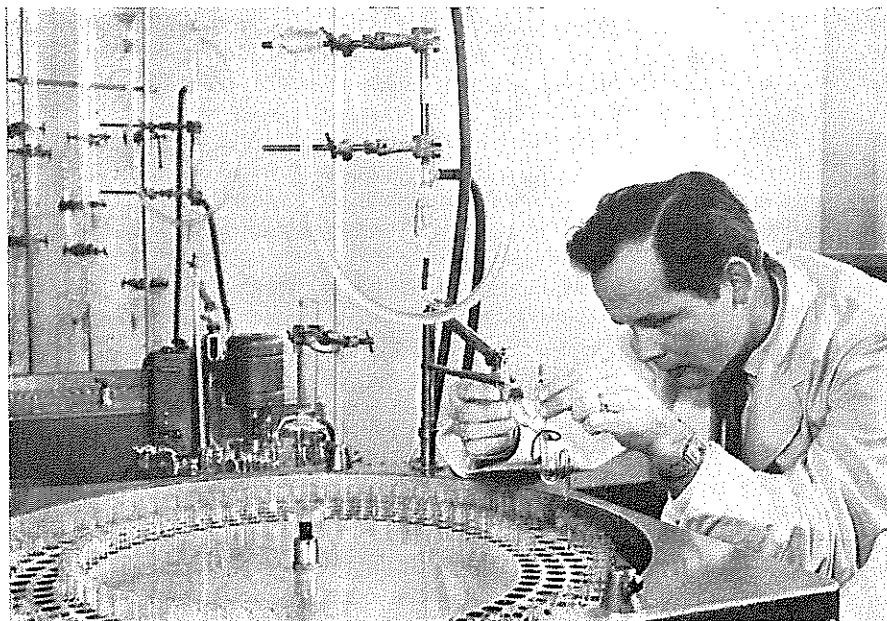
### **Pneumokoniose**

Dr. H. S. Gear, voormalige Assistent-direkteur-generaal van die Wêreld-gesondheidsorganisasie, het aan die begin van 1960 direkteur van die Pneumokoniose-navorsingseenheid geword in opvolging van dr. A. J. Orenstein wat aan die einde van 1959 afgetree het. Die referate en bevindings van die Internasionale Konferensie oor Pneumokoniose wat in Februarie 1959 in Johannesburg gehou is, was besonder waardevol by die bepaling van die Eenheid se beleid

Kokernot. This Unit is financed jointly by the South African Institute for Medical Research, the Poliomyelitis Research Foundation, the C.S.I.R., and the Rockefeller Foundation, with the collaboration of the Union Health Department and the Division of Veterinary Services of the Department of Agriculture. The team of workers has continued its co-ordinated programme of laboratory and field investigations into arthropod-borne viruses. Analysis of the results of field studies in northern Natal over the past four years indicates that the chief types of virus and the chief virus-carrying mosquitoes have now been disclosed. These studies have furnished a substantial background for the next stage, which is an inquiry into the mechanisms whereby viruses are maintained in nature and perpetuated from year to year.

The Head of the Human Biochemistry Research Unit at the South African Institute for Medical Research has been awarded a grant of £50,000 spread over five years by the National Heart Institute of the United States Public Health Service, for research to find out why deaths from coronary heart disease are rare among the Bantu of Southern Africa. With the aid of this grant it is planned to obtain information on the changes that occur in Bantu population groups as they emerge from the primitive state and become westernized. Using as many criteria as possible, changes will be studied in collaboration with nutritionists, clinicians, pathologists and other specialists. In brief, it is hoped to find out how nearly the Bantu must approach the White man in his way of life before he begins to lose his protection from this disease. Conversely, it is hoped to shed light on the extent to which indigent White people must conform to the Bantu diet and way of life before obtaining a modicum of protection against it.

### Human biochemistry



*Nasionale Voedingnavorsingsinstituut: outomatiese apparaat vir die versameling van fraksies na chromatografiese skeiding van aminosure*

*National Nutrition Research Institute: automatic fraction collector used in the chromatographic separation of amino acids*

gedurende die afgelope jaar en die konferensieverlag sal ongetwyfeld nog baie jare lank as 'n hoogsbelangrike naslaanwerk beskou word.

### **Kliniese voeding**

Die Navorsingseenheid vir Kliniese Voeding aan die Universiteit van Kaapstad, wat onder leiding van prof. J. F. Brock staan, bestaan nou reeds tien jaar. Dit is in 'n hoë mate aan die werk van dié eenheid te danke dat daar vasgestel is dat die siekte wat as kwashiorkor bekend staan hoofsaaklik met 'n tekort aan aminosure (proteïene) in verband staan, en dat die gebrek aan ander voedingstowwe ondergeskik is.

Waar daar die afgelope tien jaar al hoe meer tot die besef geraak is dat kroonaar-hartkwale met die bevoorregte westerse leefwyse in verband gebring kan word, het daar 'n nuwe benadering tot chroniese siektetoestande ontstaan. Faktore wat vermoedelik tot die kwale aanleiding gee, is onder andere verkeerde dieet, gebrek aan oefening, spanning en sigaretroky. Die eenheid het 'n belangrike rol gespeel by die ondersoek na die uitwerking van dieet in dié verband, en is grootliks verantwoordelik vir die beskouing dat onversadigde plante- en visvette voordelig is terwyl versadigde dierevette en vette wat volgens industriële hidrogeneringsprosesse versadig is, weer nadelig is. Hierdie navorsingsprogram is baie aangehelp danksy 'n toekenning van 28,000 dollar per jaar oor 'n tydperk van vyf jaar (d.w.s. altesaam 140,000 dollar) van die Verenigde State se Openbare Gesondheidsdiens, asook 'n kapitaaltoekenning van 28,000 dollar wat die koste van die heel modernste gaschromatografietoerusting gedek het.

### **Groei en veroudering**

Daar is 'n groep vir die Bestudering van Groei en Veroudering aan die Universiteit van Natal gestig met geldelike steun van die Nuffieldstigting, die Welcome Trust, die Natalse Radium-trustfonds van die Universiteit van Natal, 'n artsenyumiddelfabrikant en private individue asook van die W.N.N.R. Waar die groep deur verskeie instansies gesteun word, het sy werksaamhede dan ook verskillende vertakkinge wat egter ten nouste bymekaar ingeskakel is. Die werksaamhede omvat die basiese verskynsels in verband met die vernuwing, herstel en agteruitgang van weefsels, die meganisme van verkalking, en die twee saam, studies in verband met die ontleding van die meganisme van slagaargroei, -vernuwing, -herstel en -agteruitgang (d.w.s. slagaarverharding en -verkalking). Verskillende aspekte van veroudering by Bantoe- en Indiërpatiënte in die King Edward VIII-hospitaal is reeds in die verband bestudeer.

### **Ortopedie**

Daar is gedurende die jaar 'n Eenheid vir Ortopediese Ontwikkeling onder leiding van prof. C. E. Lewer Allen aan die Universiteit van Kaapstad gestig.

### **Finansieel**

Die W.N.N.R. het gedurende die jaar 'n bedrag van ongeveer £150,300 vir mediese navorsing toegewys. Hiervan was £22,500 vir ad hoc-toekennings aan individue wat navorsing aan universiteite en ander inrigtings doen, £7,500



The Research Project on Anaesthetic Deaths, under the direction of Professor O. V. S. Kok, of the University of Pretoria, has continued with the collection of statistics on the causes of deaths associated with anaesthetics and surgical operations. During the year, 300 cases of sudden heart-failure on the operating table were analyzed, and a paper on the results was read at the Medical Congress. From this series of records, it appears that the treatment of this emergency is not always effective.

**Anaesthetic deaths**

At the beginning of 1960, Dr. H. S. Gear, formerly Assistant Director General of the World Health Organization, took over direction of the Pneumoconiosis Research Unit, succeeding Dr. A. J. Orenstein who retired at the end of 1959. The papers and findings of the International Pneumoconiosis Conference held in Johannesburg in February 1959, have been of much value in guiding the policies of the Unit during the past year, and the report of the conference will undoubtedly be accepted as a most important reference work for many years to come.

**Pneumoconiosis**

The Clinical Nutrition Research Unit at the University of Cape Town under the direction of Professor J. F. Brock, has completed its tenth year. The work of the unit has played a large part in establishing that, in the disease known as kwashiorkor, the principal deficiency is of aminoacids (proteins) and that associated deficiencies of other nutrients are subordinate.

**Clinical nutrition**

Recognition during the last decade that differences in prevalence of coronary heart disease could be correlated with Western privileged living has opened up a new approach to chronic diseases. Factors under suspicion include diet, lack of exercise, tension and strain and cigarette smoking. This unit has been prominent in the investigation of the role of diet, and to a large extent has been responsible for the concept that unsaturated fats of vegetable and marine origin are favourable, while saturated fats of animal origin, and fats which have been saturated by industrial hydrogenation processes, are unfavourable. This programme has been greatly facilitated by a five-year grant of 28,000 dollars a year (i.e. a total of 140,000 dollars) from the United States Public Health Services, together with a capital grant of 28,000 dollars which has covered the cost of installation of the most modern gas chromatography equipment.

A Group for the Study of Growth and Ageing was established at the University of Natal with support from the Nuffield Foundation, the Welcome Trust, the Natal Radium Trust Fund of the University of Natal, a pharmaceutical company and private individuals, as well as from the C.S.I.R. Sponsored as it is by a number of agencies, the work of the group has several facets, all

**Growth and ageing**

vir die Navorsingsafdeling van die Suid-Afrikaanse Mediese Navorsingsinstituut en ongeveer £120,000 vir mediese navorsingseenhede en -groepe. Daar is egter altesaam £216,000 aangevra, en dit staaf die spesiale beoordelingskomitee se bevinding dat die geld wat vir mediese navorsing in Suid-Afrika beskikbaar is, ontoereikend is.

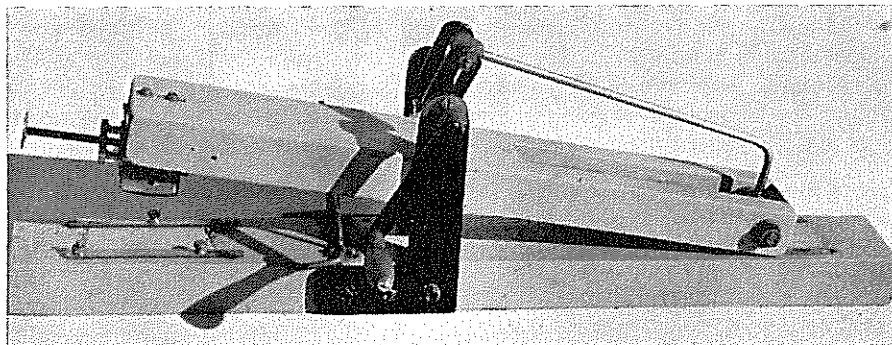
Afgesien van die gelde wat die Tesourie beskikbaar stel, administreer die Raad ook nog die £120,000 wat die Transvaalse en Oranje-Vrystaatse Kamer van Mynwese en die Departement van Mynwese vir die Pneumokoniose Navorsingseenheid beskikbaar stel, 'n toekenning van £8,800 aan die Amebiase-navorsingseenheid deur die Verenigde State se Openbare Gesondheidsdiens en twee toekennings van £2,000 elk deur die Transvaalse Provinsiale Administrasie vir navorsing in verband met narkose-sterfgevallen en bilharzia.

Die fondse wat die Raad administreer is so voordelig moontlik gebruik om die verskillende navorsingsgroepe en -projekte te bestendig en om samewerking tussen navorsers en ondersteuners op nasionale en internasionale vlak te bevorder.

In hierdie beknopte oorsig is net 'n paar van die interessante ontwikkelings van die jaar op die gebied van mediese navorsing aangeraak. Uitvoerige verslae oor die verskillende eenhede en projekte verskyn in die aparte verslag oor mediese navorsing deur die W.N.N.R. uitgegee.

*Leernywerheidsnavorsingsinstituut: apparaat vir afslyting van die nerfkante van bolear vir mynstewels*

*Leather Industries Research Institute: apparatus developed for abrading the grain of upper leathers of miners' boots*



## NAVORSING IN SAMEWERKING MET DIE NYWERHEID

### Nywerheidsnavorsingsinstitute

Die Raad het 'n Advieskomitee insake die Ontwikkeling van Navorsing vir die Nywerheid benoem en dié komitee moet help met die behandeling van beleidsake in verband met nywerheidsnavorsingsverenigings wat deur die Raad gesteun word, en met die stigting en ontwikkeling van nywerheidsnavorsingseenhede. (*Uitvoeriger inligting kan verkry word in die jaarverslae wat afsonderlik deur hierdie institute uitgegee word*). Die vyf koöperatiewe nywerheidsnavorsingsinstitute wat die Raad ingevolge sy skema vir nywerheidsnavorsingsverenigings steun, het steeds bevredigend ontwikkel. Die gesamentlike inkomste van hierdie institute beloop tans altesaam sowat £200,000 en hiervan word minder as die helfte deur die Regering, deur bemiddeling van die W.N.N.R., verskaf.

of which are closely integrated. These include the basic phenomena involved in the regeneration, repair and degeneration of tissues, the mechanisms of calcification, and a combination of these studies analyzing the mechanisms of arterial growth, regeneration, repair and degeneration (i.e. arterial sclerosis and calcification). Various aspects of ageing in African and Indian patients in King Edward VIII Hospital have been studied in relation to these studies.

During the year, an Orthopaedic Development Unit was set up at the University of Cape Town, under the direction of Professor C. E. Lewer Allen.

### Orthopaedics

A sum of approximately £150,300 was allocated by the C.S.I.R. during the year for medical research, of which £22,500 was for ad hoc grants to individuals at universities and other institutions, £7,500 to the Research Division of the South African Institute for Medical Research and about £120,000 for medical research units and groups. Requests totalling about £216,000 were received, which supports the finding of the Council's special reviewing committee that the funds available for medical research in South Africa are inadequate.

### Financial

In addition to the funds made available by the Treasury, the Council administers £120,000 provided for the Pneumoconiosis Research Unit by the Transvaal and O.F.S. Chamber of Mines and the Union Department of Mines, a grant of £8,880 to the Amoebiasis Research Unit by the United States Public Health Services and two grants of £2,000 each by the Transvaal Provincial Administration for research on anaesthetic deaths and bilharzia.

The funds administered by the Council have been used to the best advantage in providing stability for the various research groups and projects, and in promoting co-operation between research workers and sponsors at both the national and international level.

This brief review has merely touched on some of the more interesting highlights of the year. Detailed reports on the various units and projects will be found in the separate report on medical research published by the C.S.I.R.

The Council has appointed an Advisory Committee for the Development of Research for Industry to assist in reviewing matters of policy relating to industrial research associations supported by it and the initiation and development of industrial research units. (*More detailed information may be obtained from reference to the annual reports issued separately by these institutes*). The five co-operative industrial research institutes supported by the Council under its industrial research association scheme, have continued to develop satisfactorily. The total combined income of these institutes is now about £200,000 of which less than half is provided by the Government through the C.S.I.R.

### CO-OPERATIVE RESEARCH WITH INDUSTRY

### Industrial Research Institutes

**Leer en skoeisel**

Danksy die aanbouingswerk wat vroeg in 1959 voltooi is, kon die Leernywerheidsnavorsingsinstituut nog twee proefinstallasielaboratoriums, twee laboratoriums vir gespesialiseerde werk en 'n werkswinkel inrig. In een hiervan word skoenmaakmasjiene gehuisves; skoeisel word naamlik vervaardig om verskillende materiale en metodes op die proef te stel. Die Leernywerheidsnavorsing het getrag om die ewewig te bewaar tussen langtermynnavorsing van fundamentele aard enersyds en ondersoeke in verband met aktuele praktiese probleme andersyds. Die beskouing is naamlik dat belangrike ontwikkelings in die praktyk afhang van nuwe inligting oor die chemiese en fisiese aspekte van die betrokke prosesse. Met die proefinstallasiewerk is daar weer ten nouste met die fabriek se saamgewerk sodat nuwe prosesse wat ontwikkel word, so gou doenlik in die nywerheid toegepas kan word. Die personeel van die Leernywerheidsnavorsingsinstituut het op spesiale versoek gedurende 1959 vyf referate op plekke in die buiteland gelewer; vier daarvan, wat oor die chemie van die gekondenseerde looistowwe gegaan het, is in Londen, Stockholm, Heidelberg en München gelewer. Dit dui dan ook op die aansien wat die werk van die Instituut geniet.

**Die verwerking van vis**

Die Visnywerheidsnavorsingsinstituut moes noodgedwonge 'n groot deel van sy bedrywighede toespits op vraagstukke in verband met die afgee van reuke en die organiese besoedeling van seewater naby die kus wat aan sekere visbewerkingsprosesse toegeskryf word. Die behoefte hieraan het ontstaan deurdat sekere ontwikkelings in verband met visserybedrywighede digby die kus aanleiding gegee het tot nywerheidsbedrywighede in gebiede waar daar voorheen nie intensief visgevang is nie, en deurdat fabriek naby woonbuurte en kusvakansie-orde opgerig is of beoog word. Die aard en samestelling van die reuke is bestudeer, die grondbeginsels van reukverwydering is ondersoek en daar is proefinstallasies in die laboratoriums ontwerp, gebou en getoets. Twee reukverwyderingsinstallasies wat volgens die Visnywerheidsnavorsingsinstituut se spesifikasies gebou is, is by plaaslike vismeelfabriek in werking gestel en daar kan met voldoening gekonstateer word dat lugbesoedeling in die betrokke gebied heeltemal uitgeskakel is. Laboratoriums en visverwerkingsondernemings in die buiteland stel baie belang in die Instituut se stelsel en daar word 'n omvattende verslag opgestel.

**Suiker**

Die Suikerfabrikasienavorsingsinstituut het tans agt geaffilieerde lede buite die Unie van Suid-Afrika. Ses van die filiale is gedurende die jaar besoek, en daarbenewens is lede-fabriek vyf-en-sewentig keer besoek. Daar is op versoek van die Oos-Afrikaanse Hoëkommissariaat ook besoek gebring aan al die suikerfabriek in Oos-Afrika met die doel om basiese gegewens te versamel vir 'n verslag oor die gehalte van Oos-Afrikaanse witsuiker en oor ander aspekte van die nywerheid. Die Direkteur van die Instituut, dr. K. Douwes Dekker, het die 26ste Kongres van die Queensland Society of Sugar Cane Technologists (Australië) geopen.

**Verf**

Die Verfnywerheidsnavorsingsinstituut het aan die begin van 1960 sy nuwe laboratoriums langs die Universiteit van Natal betrek. Die Instituut was

The building extensions which were completed early in 1959 enabled the Leather Industries Research Institute to equip two additional pilot plant laboratories, two specialist laboratories and a workshop. One of these houses machines for footwear construction which are needed for testing out new materials and methods. The Leather Industries Research Institute has endeavoured to strike a good balance between long range fundamental research and investigations of immediate practical application, taking the view that major developments depend on improved knowledge of the chemistry and physics of the processes involved. At the same time, the pilot plant work has been coupled with close liaison with factories, in order to reduce to a minimum the gap between the development of a new process and its industrial application. By special request the staff of the Leather Industries Research Institute read five papers at overseas centres during 1959; four of these, on the chemistry of the condensed tannins, were read at London, Stockholm, Heidelberg and Munich. This provides a gratifying indication of the status of the work of the Institute.

**Leather and  
footwear**

The Fishing Industry Research Institute was required to divert a large part of its resources to problems relating to odours and organic pollution on in-shore sea water which may be associated with certain types of fish processing. The need for this arose from recent developments in the South African in-shore fishery which have led to the advent of industrial activity in areas which were not formerly intensively fished and the erection or proposal to erect factories in the neighbourhood of residential areas and seaside resorts. The nature and composition of the offending odours was studied, basic principles in odour abatement were investigated and pilot plant equipment was designed, built and tested at the laboratory. Two odour abatement systems built to the Fishing Industry Research Institute specifications are now in operation at local fishmeal factories and it is gratifying to record that air pollution in the area concerned has been entirely eliminated. Great interest in the Fishing Industry Research Institute's system has been shown by overseas laboratories and fish processing firms and a full-scale report is being prepared.

**Fish processing**

The Sugar Milling Industry Research Institute now has eight affiliated members outside the Union of South Africa. Six of these were visited during the year, in addition to seventy-five visits to member factories. At the request of the East African High Commission, visits were paid to all East African sugar factories in order to collect basic data for a report on the quality of East African white sugars, and other aspects of the industry. The 26th Congress of the Queensland Society of Sugar Cane Technologists (Australia) was opened by the Director of the Institute, Dr. K. Douwes Dekker.

**Sugar**

At the beginning of 1960 the Paint Industries Research Institute which, since its establishment in 1946 had been provided with accommodation by the University of Natal, moved into its new laboratories adjacent to the University.

**Paint**

sedert sy stigting in 1946 gehuisves in 'n tydelike perseel wat deur die Universiteit aan hom beskikbaar gestel is. Die projekte waaraan die Instituut voorrang gegee het was dié in verband met die verf van geroeste staal, vergelykings tussen natuurlike en versnelde verwerking van verf en die gebruik van wattel-looistowwe in verfprodukte.

## **Wol**

Die ontwikkeling van die Suid-Afrikaanse Woltekstielfnavorsingsinstituut het voorlopig stilgestaan aangesien daar gewag is op die uitslag van onderhandelings met die oog op meer geldelike steun van die wolkwekers- en verwerkingsbedryf en van die staat (deur bemiddeling van die W.N.N.R.). Dit is dan ook verblydend om te verneem dat die gevraagde steun in die eersvolgende boekjaar beskikbaar sal wees. Danksy die groter geldelike steun sal skemas wat reeds jare lank beplan word, nou uitgevoer kan word.

Die navorsing is vanjaar, net soos in vorige jare, toegespits op die ontdekking van die beste metodes om die plaaslike skeersel, soos dit tans bemark word, te verwerk, en op die voorligting van wolkwekers oor middele ter verbetering van hulle wol met die oog op verwerkingsvereistes. Die projekte het onder andere die volgende omvat: die verwerking van wol; die aard van wol met te min karteling weens gebrek aan koper; die verviltingsseienskappe van Suid-Afrikaanse wolsoorte; die verband tussen veseldeursnee en karteling in die plaaslike skeersel; die ontwikkeling van 'n uitwasbare skaapmerkstof wat gou droog word en nie sal loop of strepe maak in nat weer nie; bepaling van die gehalte van kambol wat gemaak is van kortwol gemeng met blootwol en die ontwikkeling van 'n toestel waarmee die aantal knope (lasse) in 'n bol gladbreiwool van een ons getel en geregistreer kan word.

## **Navorsingseenhede**

Die instelling van navorsingseenhede was een van die belangrikste ontwikkelings in die W.N.N.R. die afgelope jaar. So 'n navorsingseenheid dien as kanaal waardeur die betrokke nywerheid die W.N.N.R. se hulpbronne ten beste kan benut.

### *Keramiek*

Die eerste een van die navorsingseenhede, naamlik die Keramiekeenheid, is tot stand gebring deur die arbeidskragte en toerusting op die gebied van keramiek waaroor die Nasionale Bounavorsingsinstituut en die Nasionale Chemiese Navorsingslaboratorium beskik het, in een groep saam te vat. Die eenheid is in die nuwe gebou van die Nasionale Chemiese Navorsingslaboratorium gehuisves. Dit is 'n hoogs doeltreffende navorsingsgroep en behoort nog van onskatbare waarde vir die Unie se snelgroeiende keramiekbedryf te wees.

### *Kafferbier en wyn*

Navorsing op die gebied van kafferbierbrouery en wynmakery is ook gereorganiseer in die vorm van twee navorsingseenhede binne die Nasionale Chemiese Navorsingslaboratorium. In die geval van die twee eenhede is daar, bo en behalwe die W.N.N.R. se eie bydrae in die vorm van personeel en toerusting, geldelike steun van die betrokke nywerhede vir 'n tydperk van drie tot vyf jaar gewaarborg.

### *Hout*

Daar is voorbereidings getref vir die stigting van 'n houtnavorsingseenheid binne die Nasionale Bounavorsingsinstituut. Dié eenheid sal in die

The projects which were given highest priority by the Institute were investigations into the painting of rusty steel, comparisons of natural and accelerated weathering of paint, and the use of wattle tannins in paint products.

Further development of the South African Wool Textile Research Institute was delayed pending the outcome of negotiations for increased financial support from the wool growing and processing industries and from the Government through the C.S.I.R. It is gratifying to report that this increased support, which will make it possible to put into operation schemes which have been planned for several years, will become available during the next financial year.

**Wool**

As in previous years, research work was directed towards discovering the best methods of processing the local clip as it is now being marketed and towards advising growers on ways of improving their wool to meet processing requirements. Projects included: the weathering of wool; the nature of crimp-lacking copper-deficient wools; the felting behaviour of South African wools; the relationship between fibre diameter and staple crimp in the local clip; the development of a scourable sheep marking fluid which will dry quickly and which will not run or streak in wet weather; the quality of wool tops made from short wool mixed with slipped wool, and the development of a device for counting and registering the number of knots (joins) in a one-ounce ball of fingering (knitting) yarn.

One of the major developments of the past year in the C.S.I.R. has been the inception of research units. Each research unit is set up to act as a channel whereby a particular industry can best utilize the resources of the C.S.I.R.

**Research units**

The first of these units, the Ceramic Unit, was set up by pooling the resources of staff and equipment in the field of ceramics which had been built up by the National Building Research Institute and the National Chemical Research Laboratory. The unit has been housed in the new building of the National Chemical Research Laboratory and represents a very effective team, which should be an indispensable asset to the rapidly growing ceramics industry in the Union.

*Ceramics*

Research on kaffir beer production and for the wine-making industry has also been re-organized in the form of two industrial research units within the National Chemical Research Laboratory. In these two cases, apart from the contribution of the C.S.I.R. in respect of staff and equipment, financial support from the industries concerned has been guaranteed over a period of three to five years.

*Kaffir beer and wine*

Preparations have been made for the formation of a timber research unit to be accommodated within the National Building Research Institute which, in future, will be responsible for all work within the C.S.I.R. directly concerned with timber or products derived from timber.

*Timber*

Following a Union-wide survey of sewage and sanitation problems, undertaken by the National Institute for Water Research, in collaboration with the National Building Research Institute, a sanitation research unit has been set

*Sanitation*

vervolg verantwoordelik wees vir al die W.N.N.R. se werksaamhede wat regstreeks met hout of produkte daarvan te doen het.

### *Sanitasie*

Daar is na aanleiding van 'n uniale opname in verband met rioolvuil- en sanitasieprobleme, wat die Nasionale Instituut vir Waternavorsing in samewerking met die Nasionale Bounavorsingsinstituut uitgevoer het, 'n sanitasie-navorsingseenheid binne eersgenoemde instituut gestig. Die doel daarmee is om 'n behoorlik georganiseerde en gekoördineerde ondersoekprogram aan te pak met die medewerking en geldelike steun van staatsdepartemente, plaaslike besture en ander organisasies wat met dié probleme te kampe het. Die ondersoek omvat onder andere septiese tenks, sypputte en rioolstelsels vir klein gemeenskappe, en sanitasiedienste vir naturelledorpe.

### *Lugbesoedeling*

Die Raad het onderneem om 'n Navorsingsgroep in verband met lugbesoedeling te stig. Die werksaamhede van die groep sal studies in verband met die vermindering van lugbesoedeling in Suid-Afrika behels. Die stap word gedoen na aanleiding van die aanbevelings van 'n konferensie wat op 11 Maart 1960 in Johannesburg gehou is. Die konferensie wat deur die Minister van Gesondheid geopen is, is gehou met die doel om die aanbevelings te oorweeg van die Nasionale Komitee insake Lugbesoedeling wat die Departement van Gesondheid in 1955 onder voorsitterskap van die Assistent-hoofgesondheidsbeampte van die Unie in die lewe geroep het. Die bedoeling is dat die navorsingsprogram en -beleid bepaal moet word deur die W.N.N.R. met die leiding en advies van 'n tegniese loodskomitee bestaande uit ses deskundiges van wie drie deur die W.N.N.R. en drie deur 'n vaste komitee van bydraers aangestel sal word.

### *Maatreëls in verband met haabestryding*

Daar is 'n komitee gestig met die doel om alle navorsing in verband met haabestryding wat deur die W.N.N.R., die Suid-Afrikaanse Vereniging vir See-biologiese Navorsing en ander belanghebbendes gedoen word, te koördineer.

### **Koöperatiewe projekte in nasionale laboratoriums**

Dit is die Raad se beleid om projekte in samewerking met die nywerheid en met staatsdepartemente, provinsiale administrasies, plaaslike owerhede en ander openbare en private organisasies aan te pak. Daar is verskeie van die projekte wat reeds 'n paar jaar lank aan die gang is, en hulle word uitvoerig beskryf in die verslae van die verskillende laboratoriums. Die voorbeelde wat hier genoem word, dien bloot as aanduiding van die aard van die ondersoeke wat uitgevoer word en omvat nie al die ondersoeke nie.

### *Die Tellurometer*

Die Nasionale Instituut vir Telekommunikasienavorsing het voortgegaan om tegniese hulp aan die Tellurometermaatskappy te verleen sowel in verband met afstandmeting vir landmeetdoeleindes as vir noukeurige posisiebepaling met behulp van radiogolwe. Die Tellurometerinstrument word nou feitlik oor die hele wêreld gebruik en gedurende die jaar het die Kaapstadse fabriek sy duisendste instrument gelewer. Die meeste van die instrumente is in dollarlade verkoop.

### *Posisiebepaling met behulp van radio*

'n Nuwe metode van posisiebepaling deur middel van kortgolfradio, waarby ligte verplaasbare toerusting wat in die Instituut ontwikkel is, gebruik word, is met welslae aan die Verenigde State se leër gedemonstreer. Na aanleiding van dié demonstrasies word produksiemodelle nou in samewerking



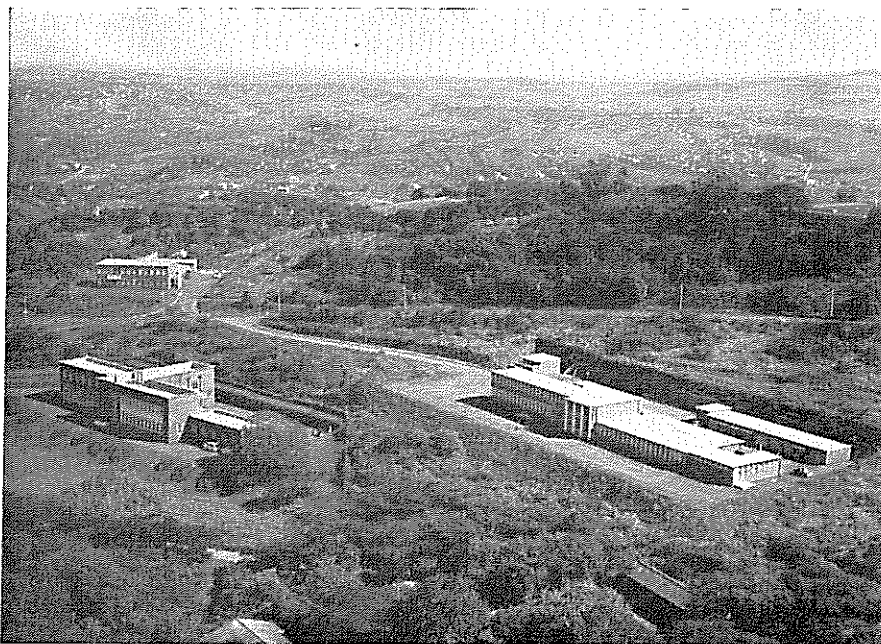
up within the former institute, in order to undertake a properly organized co-ordinated programme of investigation in collaboration with, and with the financial support of, Government departments, local authorities and other organizations which are concerned with these problems. These include the operation of septic tanks, French drains, sewage schemes for small communities and sanitary services to Native townships.

The Council has undertaken to establish an Air Pollution Research Group which will include within its scope studies aimed at finding ways of reducing air pollution in South Africa. This follows recommendations made by a conference held in Johannesburg on the 11th March, 1960, which was opened by the Minister of Health, to consider the recommendations of the National Committee for Air Pollution, which was set up in 1955 by the Department of Health under the chairmanship of the Assistant-Chief Medical Officer for the Union. It is intended that the research programme and policy should be directed by the C.S.I.R. under the guidance and advice of a technical steering committee of six technically qualified persons of whom three will be appointed by the C.S.I.R. and three by a standing committee of contributors.

A committee has been established under which anti-shark investigations by the C.S.I.R., the South African Association for Marine Biological Research in Durban and all other interested parties will be co-ordinated.

#### *Air-pollution*

#### *Anti-shark measures*



*Die nuwe gebou van die W.N.N.R. se Natalse Streeklaboratorium in Durban (regs op die foto) wat deur die Administrateur van Natal, sy Edele A. E. Trollip, geopen is. Links verskyn die Suikerfabrikasienavorsingsinstituut en op die agtergrond die Verfynerheidsnavorsingsinstituut*

*The new building for the C.S.I.R. Natal Regional Laboratory in Durban (right) which was opened by the Administrator, the Hon. A. E. Trollip. On the left is the Sugar Milling Research Institute and in the background the Paint Industries Research Institute*

met Tellurometer (Pty.) Ltd. van Kaapstad ontwikkel. Hierdie stelsel se aanwendingsmoontlikhede is nie tot militêre doeleindes beperk nie.

#### *Fosfate*

Die studie in verband met die vervaardiging van superfosfaat uit die Phalaborwa-konsentrate is voortgesit met behulp van die nywerheidsnavorsingsbetrekking wat Foskor reeds verskeie jare lank in die Nasionale Chemiese Navorsingslaboratorium instandhou. Foskor het nou besluit om hierdie navorsingsbetrekking die kern van sy navorsingsafdeling te maak en om dit in die Nasionale Chemiese Navorsingslaboratoriums aan te hou totdat die tyd ryp is vir die ontwikkeling daarvan. Hierdie soort ontwikkeling, waar 'n nywerheid aangemoedig word om navorsing te laat doen en dan uiteindelik sy eie navorsingsafdeling in die lewe te roep, pas besonder goed in by die W.N.N.R. se strewe.

#### *Kaoliene*

Die ondersoek in verband met kaolienafsettings, wat uitgevoer is met behulp van 'n nywerheidsnavorsingsbetrekking wat in die Nasionale Chemiese Navorsingslaboratorium ingestel is, is gedurende die jaar afgesluit en daar is 'n uitvoerige verslag oor die hoeveelheid en gehalte van die betrokke afsettings voorgelê. Daar is ook 'n ekonomiese opname van die afsetgebied hier te lande en in die buiteland, die benefisiëring van die kaolien en die koste van 'n wastoestel gedoen.

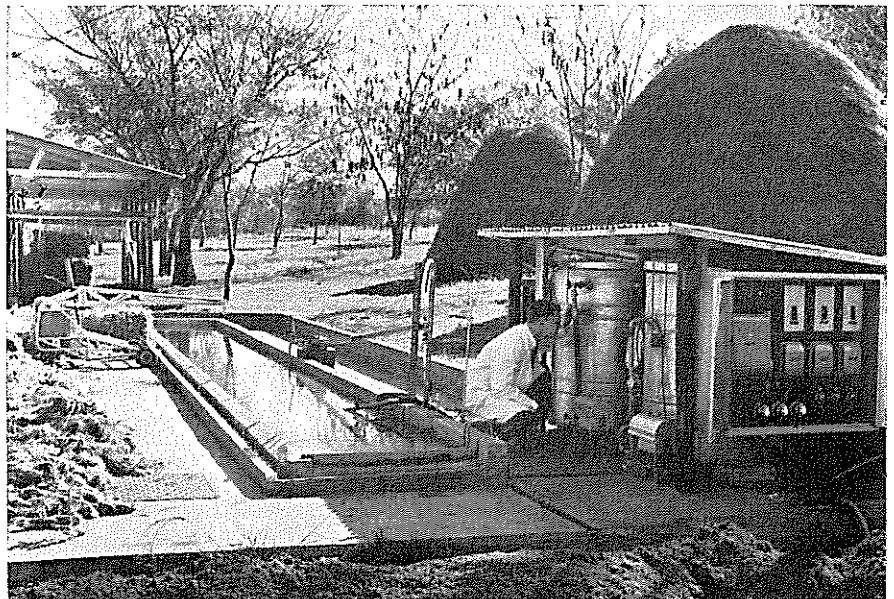
#### *Katalisators*

Navorsingswerk in verband met katalisators vir die olie-uit-steenkoolproses wat uitgevoer is met behulp van navorsingsbourse wat deur Sasol ingestel is, is ook gedurende die jaar afgesluit.

#### *Alkaloïde*

Die opname van Suid-Afrikaanse plante met die oog op alkaloide, waarmee daar vroeg in 1959 begin is met behulp van 'n nywerheidsnavorsingsbeurs van die farmaseutiese firma Smith, Kline & French van Philadelphia, V.S.A., is voortgesit. Verskeie stowwe wat in hedendaagse geneesmiddels gebruik word, word óf uit plante gehaal óf berei volgens die samestelling van geneeskragtige stowwe wat in plante aangetref word. Die afgelope jaar is daar meer as 800

*Nasionale Chemiese Navorsingslaboratorium: proefinstallasie vir die rotting van kenaf (stokroos). Kenaf wat in Suid-Afrika gekweek word is 'n puik plaasvervanger vir ingevoerde juut by die vervaardiging van graansakke*



*National Chemical Research Laboratory: pilot plant for retting of kenaf (stokroos). Kenaf grown in South Africa serves as an excellent alternative to imported jute for the manufacture of grain bags*

It is the policy of the Council to foster collaborative projects with industry and with Government departments, Provincial Administrations, local authorities and other public and private organizations. Many of these have been in progress for a number of years and are reported in detail by the various laboratories. Examples given here must therefore be seen as illustrative of the nature and type of investigation and not as a comprehensive list of such investigations.

**Co-operative  
projects in national  
laboratories**

The National Institute for Telecommunications Research has continued to provide technical assistance to the Tellurometer Company, both in the field of distance measurement for survey purposes and in the field of precision position fixing, using radio waves. The use of the Tellurometer instrument throughout the world has continued and during the year the thousandth instrument was delivered from the Cape Town factory. The majority of these instruments have been sold in dollar countries.

*Tellurometer*

A new method of short range radio position-fixing, using highly portable equipment developed in the Institute, was successfully demonstrated in the United States of America to the United States Army. As a result of these demonstrations, work is proceeding in association with Tellurometer (Pty.) Ltd. of Cape Town on the development of production models. Applications of this system are not restricted to military use.

*Radio  
position-fixing*

The study of the production of super-phosphate from the Phalaborwa concentrates was continued under the industrial research fellowship which has been maintained in the National Chemical Research Laboratory by Foskor for several years. Foskor has now decided to regard this fellowship as the nucleus of its research department and until this reaches a suitable stage of growth, it will be situated in the National Chemical Research Laboratory. This type of development in which an industry is encouraged to undertake research and eventually to set up its own research department is one which fits admirably into the objectives of the C.S.I.R.

*Phosphates*

During the year an investigation on kaolin deposits under an industrial research fellowship established in the National Chemical Research Laboratory, was brought to an end and a detailed report was presented on the quantity and quality of the deposits concerned. An economic survey of the local and overseas markets, the beneficiation of the kaolin and the costs of a washing plant were also prepared.

*Kaolins*

Fellowships established by Sasol for investigations into the oil-from-coal catalysts to which reference was made in previous reports, were also brought to an end during the year.

*Catalysts*

A survey of South African plants for alkaloids which was initiated at the beginning of 1959 under an industrial research fellowship sponsored by the pharmaceutical firm of Smith, Kline and French of Philadelphia, U.S.A., was continued. Many modern drugs used in medicine are either derived from plants or are modelled on substances found in plants which have a pharmacological action. In the past year approximately 800 plants collected all over South Africa were tested for alkaloids and extracts from a number of plants, rich in alkaloids, were sent to the U.S.A. for pharmacological testing.

*Alkaloids*

plante van oor die hele Suid-Afrika getoets met die oog op alkaloïde en uit-treksels uit 'n paar plantesoorte wat ryk aan alkaloïde is, is na die V.S.A. gestuur om farmakologies getoets te word.

*Wattelhout*

Daar word met behulp van 'n navorsingsbeurs van die Suid-Afrikaanse Wattelkwekersvereniging voortgegaan met die ondersoek in verband met die moontlike benutting van wattelhout vir die bereiding van hoëgraadse sellulose.

*Papier*

Navorsing in verband met die verpapeienskappe van die verskillende houtsoorte waarvan papierpap in Suid-Afrika berei word, is voortgesit met behulp van 'n navorsingsbeurs van S.A. Pulp and Paper Industries Limited. Daar sal hopelik op grond van gegewens wat oor Suid-Afrikaanse houtsoorte ingewin word, bepaal kan word waar die verskillende boomsoorte gekweek en wanneer hulle afgekap moet word om die geskikste paphout te verkry.

*Stokroos*

Daar is in samewerking met die Departement van Landbou begin met 'n nuwe navorsingsprojek in verband met die root van die vesel van wilde stokroos op 'n semi-skaalse grondslag, die spinbaarheid van dié vesel en die geskiktheid daarvan vir die vervaardiging van graansakke. Hierdie projek het ontwikkel uit vroeëre ondersoeke in verband met die grondbeginsels van die roting van wilde stokroos, wat in die Nasionale Chemiese Navorsingslaboratorium uitgevoer is.

*Essensiële olies*

Die Nasionale Chemiese Navorsingslaboratorium, in samewerking met die Afdeling Tuinbou van die Departement van Landbou, het voortgegaan met die soektog na plante met essensiële olies wat kommersieel geëksploiteer kan word. Die vordering was oor die algemeen maar teleurstellend, maar daar word voortgegaan met die ondersoek van verskillende soorte laventelbos en malva. Die proefnemings met peperment plantsoorte is gestaak.

*Cucurbitaceae  
(komkommers, ens.)*

Nog 'n projek waaraan daar met groot welslae met die Afdeling Tuinbou saamgewerk is, is die bestudering van die kukurbitasiene, 'n groep uiters giftige bitter bestanddele wat na verwant is en tot dusver slegs by plante van die familie *cucurbitaceae* (komkommers, ens.) geïsoleer is. Belangstelling in die chemie van hierdie stowwe het ontstaan weens die feit dat hulle soms in gekweekte variëteite van dié familie voorkom en dat sommige van hulle gewasvorming in die menslike liggaam teëwerk. Namate die molekulêre struktuur van hierdie ingewikkelde stowwe duideliker word, kry die Afdeling Tuinbou meer helderheid in sy werk op die gebied van die genetika van die familie *cucurbitaceae*.

*Giftige plante*

Die ondersoekwerk in verband met giftige plante wat vee laat vrek, het voortgegaan. Plante waaraan daar veral aandag geskenk is, is dié wat verantwoordelik is vir die siektes wat as geeldikkop, gousiekte, vermeersiekte en krimpsiekte bekend staan.

*Spysvertering van  
herkouers*

Daar is, in samewerking met die veeartsenykundige navorsingslaboratoriums op Onderstepoort, voortgegaan met die werk in verband met die spysvertering en metabolisme van die herkouers.

*Wolvesel*

Die ondersoekwerk in verband met geoksideerde merinowol se proteïenbestanddele met 'n hoë swawelinhoud is uitgebrei. Die werk word uitgevoer met behulp van 'n navorsingsbeurs wat deur die Wolraad ingestel is. Hierdie navorsing op die gebied van wolvesel, wat reeds 'n geruime tyd aan die gang is, het 'n ernstige terugslag gekry deurdat die Instituut een van sy vooraanstaande navorsers verloor het, maar vorder tans weer bevredigend.

Under a fellowship agreement with the South African Wattle Growers' Union, investigations are continuing into the possibility of producing high grade cellulose as a possible outlet for wattle wood.

*Wattle wood*

The pulping qualities of the various timbers used for producing paper pulp in South Africa continued to be investigated under a fellowship agreement with S.A. Pulp and Paper Industries Ltd. It is hoped that data can be assembled on South African timbers from which it may be possible to determine factors such as the best time for felling and the most suitable regions for growing any particular species in order to obtain the most favourable pulp wood.

*Paper*

In co-operation with the Department of Agriculture, a new project has been started to investigate the retting of kenaf (wilde stokroos) fibre on a semi-scale basis and the suitability of the fibre for spinning and the manufacture of grain bags. This project has developed out of earlier work carried out in the National Chemical Research Laboratory, into the fundamental aspects of kenaf retting.

*Stokroos*

Collaboration between the Division of Horticulture of the Department of Agriculture and the National Chemical Research Laboratory in the search for essential oil plants which can be exploited commercially has continued. Although progress on the whole has been disappointing, work is continuing on lavender varieties and also on geranium. Experiments with peppermint varieties have been discontinued.

*Essential oils*

Another project in which collaboration with the Division of Horticulture has been very profitable, is in the study of the chemistry of the cucurbitacins, a group of highly toxic closely related bitter principles isolated so far only from the family *cucurbitaceae* (cucumbers). Interest in the chemistry of these substances arose from the fact that they sometimes occur in cultivated varieties of this plant family and that some of them possess anti-tumor activity. As the molecular structure of these complex substances becomes clearer, a better understanding of genetic work in the *cucurbitaceae* family in the Division of Horticulture is possible.

*Cucurbitaceae  
(cucumbers, etc.)*

Investigations of poisonous plants responsible for stock losses have continued. The plants which received particular attention were those responsible for diseases known as geeldikkop, gousiekte, vermeersiekte and krimpsiekte.

*Poisonous plants*

In collaboration with the veterinary research laboratories at Onderstepoort, work on the digestion and metabolism of the ruminant animals has continued.

*Ruminant digestion*

Under a fellowship supported by the Wool Board, investigations into the high-sulphur protein components from oxidized merino wool was extended. This long-standing research on wool fibres suffered a serious setback due to the loss of the leading research officer, but is once again proceeding satisfactorily.

*Wool fibres*

The phases of the research programme into the composting of municipal wastes which have already been completed, include composting of refuse entirely by itself and also in combination with varying quantities of sewage sludge. The phases to be undertaken now include studies on the incorporation of night soil. The pilot plant which went into operation towards the end of 1958 was primarily intended to facilitate studies on the advantages and economics of a modern mechanized system of converting municipal wastes into compost.

*Municipal wastes*

*Stadsafval*

Skere fases van die navorsingsprogram in verband met die omsetting van stadsafval in kompos is reeds voltooi, naamlik die omsetting van stadsafval op sigself en die omsetting daarvan saam met verskillende hoeveelhede riool-slyk. Die fases wat nou nog aandag moet geniet, is onder andere studies in verband met die toevoeging van nagvuil. Die proefinstallasie wat teen die einde van 1958 in werking gestel is, is hoofsaaklik bedoel as hulpmiddel by die bestudering van die voordele verbonde aan 'n moderne gemeganiseerde stelsel vir die omsetting van stadsafval in kompos. Hierdeur is heelwat nuttige gegewens ingewin en is belangstelling van handelsweë aangewakker met die gevolg dat verskeie firmas agentskappe vir ander gemeganiseerde stelsels vir die bereiding van kompos verkry het. Ook is die munisipaliteite nou gretiger as ooit tevore om stadsafval in kompos om te sit ten einde die uitgooi van afval, wat ernstige moeilikhede oplewer, uit te skakel. Die ondersoek word uitgevoer deur die Nasionale Instituut vir Waternavorsing en die Nasionale Navorsings-instituut vir Meganiese Ingenieurswese met die medewerking van die Munisipaliteit van Pretoria en met die geldelike steun van die Nasionale Veldtrust.

*Ontsouting van water*

Die Nasionale Chemiese Navorsingslaboratorium het voortgegaan met die ontwikkeling en toets van eenvoudige elektrodialitiese waterontsoutings-toestelle (die sg. „boeretoestelle”). Wat betref die ontsouting van baie brak ondergrondse water sodat dit as drinkwater vir vee gebruik kan word, het die laboratorium hom toegespits op verbetering van die ontwerp van eenvoudige toestelle en op toetswerk te velde.

Daar is tegniese ten nouste met die mynmaatskappye geskakel by die inwerkingstelling en werking van die installasie vir die ontsouting van brakwater (2½ miljoen gelling per dag) by die Free State Geduld-myn op Welkom in die Oranje-Vrystaat. Hierdie installasie werk ononderbroke sedert die begin van Januarie 1959.

Daar is in samewerking met die Administrasie van Suidwes-Afrika by Luderitz proefnemings gedoen met 'n ontsoutingsinstallasie van dieselfde basiese ontwerp as dié by die myn in Welkom. Hierdie proefnemings is uitgevoer met die doel om ondervinding op te doen in verband met die ontsouting van seewater deur middel van elektrodialise en om sodoende vas te stel in hoe 'n mate die proses ekonomies met behulp van 'n bepaalde soort installasie toegepas kan word. Die werkzaamhede het ook in verband gestaan met die Munisipaliteit van Luderitz se behoefte aan meer vars water; die munisipaliteit moet naamlik sy hele voorraad vars water uit die see kry, en dit geskied op die huidige tydstep deur middel van distillasie met meertrappige toestelle.

*Rivieropnames*

Die opnames het gedurende die jaar weer een van die Nasionale Instituut vir Waternavorsing se vernaamste werkzaamhede uitgemaak, omdat dit gebiedend noodsaaklik is om soveel gegewens as moontlik oor Suid-Afrikaanse waterbronne in te samel. Rivieropnames is ook deel van die werk wat die Instituut en die Buro vir Standaarde ten behoewe van die Departement vir Waterwese verrig in verband met permitte vir die ontlasting van afvalwater in riviere en standarde vir die beheer daarvan. Daar is by die rivieropnames meer aandag geskenk aan die bestudering van besinsel met die oog op adsorpsie- en ioneuittreileenskappe, aangesien hierdie faktore 'n rol speel by die selfsuiweringsverskynsels. Daar is ook verkenningswerk verrig met die oog op die tipe-indeling van riviergebiede waarvan daar nog nie voorheen opnames gemaak is nie. Studies in verband met die giftigheid van afvalstowwe vir visse is in samewerking met die Transvaalse Provinsiale Administrasie uitgevoer.

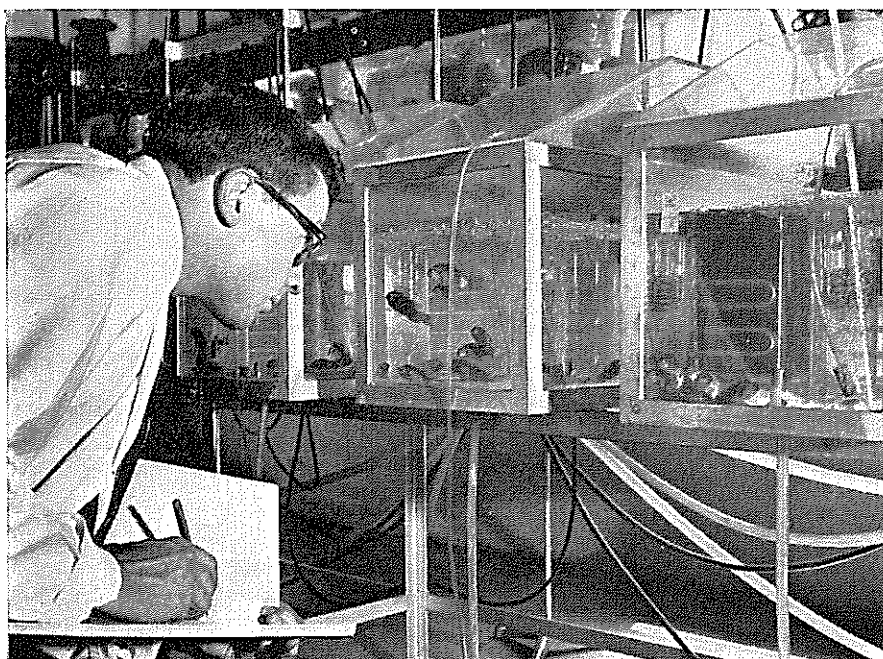
This has made possible the collection of much useful data, and has stimulated commercial interest, with the result that several firms have acquired agencies for other systems of mechanized composting. At the same time, municipalities have become more anxious than ever to revert to composting in order to overcome the serious problem of refuse dumping. The investigations are being undertaken by the National Institute for Water Research and the National Mechanical Engineering Research Institute, in collaboration with the Municipality of Pretoria and with financial support from the National Veld Trust.

The National Chemical Research Laboratory has continued the development and testing of simple electro-dialytic water de-salting units (so-called "farmers' units"). For the production of drinking water for cattle from very brack underground waters, the emphasis was placed on simple improved designs of apparatus together with field testing.

Close technical liaison was maintained with the mining companies concerning the commissioning and operation of the two-and-a-half million gallon per day brack water demineralization plant at the Free State Geduld Mine at Welkom, Orange Free State. This plant has been in continuous operation since early January, 1959.

In collaboration with the South West Africa Administration, a desalting unit of the same basic design as that used in the Free State Geduld demineralization plant was operated at Luderitz, South West Africa. The purpose of these tests was to gain some experience on the desalting of sea water by electro-dialysis so that the economics of this process, using a particular design of apparatus, could be assessed. The programme was also associated with the

### *Water desalting*



*Nasionale Instituut vir Waternavorsing: in hierdie tenks word daar bepaal in hoe 'n mate Transvaalse inheemse visse verskillende omgewingsfaktore kan verdra*

*National Institute for Water Research: these tanks are used to determine the tolerances of indigenous Transvaal fishes to environmental conditions*

Die Instituut se twee streekslaboratoriums in Windhoek en Durban is druk besig gehou deur die waterprobleme van die onderskeie twee provinsies.

*Die uitstort van  
uitvloeiels in die see*

Rioolwater en nywerheidsuitvloeiels word op taamlik willekeurige wyse in die see al langs die Unie se kus gestort. Die gevaar wat hierdeur ontstaan nl. dat baastrandse besoedel kan word, word nog verder verhoog deur die feit dat riviere wat deur digbewoonde en geïndustrialiseerde gebiede loop in die see uitmond. Aangesien daar tans maar min bekend is oor die uitwerking hiervan, is dit uiters moeilik, indien nie onmoontlik nie, om spesifieke antwoorde te verstrek op die vrae waarom daar soveel botsende beskouings bestaan. Sonder die nodige feitelike inligting oor die huidige uitvloeiels kan die heersende wanbegrippe nie uit die weg geruim word nie en kan daar ook nie besluit word watter soort uitvloeiels wel in die see gestort kan word nie. Omdat dit so 'n aktuele vraagstuk aan die Natalse Suidkus geword het, het die Natalse Provinsiale Administrasie die voortou geneem en geld beskikbaar gestel vir 'n voorlopige ondersoek deur die W.N.N.R.

*Paaie*

Die Nasionale Instituut vir Padnavorsing werk steeds ten nouste met die Provinsiale Administrasie saam en gedurende die afgelope jaar is daar dan ook veral klem gelê op ondersoekte ter plase. Basiese gegewens moet naamlik op die paaie self ingesamel word om die probleem behoorlik te kan bepaal en om die grondslag vir deurtastende laboratoriumwerk te lê. Daar is trouens baie projekte in die navorsingsprogram waarby sorgvuldig ontwerpte en beheerde proefnemings ter plase die vernaamste deel van die ondersoek uitmaak en nie deur suiwer laboratoriumtoetse vervang kan word nie.

*Bou-ekonomie*

Die Nasionale Bounavorsingsinstituut skenk al hoe meer aandag aan die ekonomiese aspek van boukunde met die oog op die toenemende belangrikheid van die boubedryf in die landse ekonomie. Daar word dan ook vertrou dat hierdie navorsing regstreeks sal help om die koste van bouwerk af te bring. Die drie projekte wat reeds in dié verband aangepak is, gaan oor die ekonomiese aspek daarvan om holstene in plaas van soliede stene vir bouwerk te gebruik. Bouregulasies wat te streng is, het dikwels 'n nadelige uitwerking op die boukoste. Daar word getrag om 'n ontledingsmetode te ontwikkel waarvolgens ontwerpers en bouers maklik sal kan bepaal watter uitwerking die tyd wat aan ontwerp- en bouwerk bestee word, op die boukoste het.

*Skoolgeboue*

Die eksperimentele hoërskoolgebou op Lyttelton is 'n voorbeeld van vryer beplanning op grond van navorsing. Die Bounavorsingsinstituut was vir die ontwerp en vir die toesig van die bouwerk verantwoordelik. Die gebou wat reeds heelwat belangstelling uitgelok het, sal waarskynlik teen Junie 1960 voltooi wees. Daar is heeltemal weggebreek van die beginsel van rye eenselwige klaskamers terwyl die klaskamers self ook aantrekliker, ruimer en beter toegerus as die konvensionele tipe is. Dit is veelseggend dat hierdie gebou, waarvoor die tenderprys (met inbegrip van die elektriese installasie), £89,448 beloop het, waarskynlik heelwat beter gaan wees as skoolgeboue met dieselfde ruimte wat die afgelope jare teen tussen £115,000 en £135,000 gebou is.

*Behuisingsbehoeftes*

Die Nasionale Instituut vir Personeelnavorsing het 'n opname van die sosio-ekonomiese status en behuisingsvoorkeur onder die Kleurlinge in Wes-Kaapland vir die Nasionale Bounavorsingsinstituut uitgevoer. Die voorlopige resultate van dié opname is gebruik as leidraad by die ontwerp van geskikte huise vir dié bevolkingsgroep. Verskeie tipes is ontwerp en daar kan nou reeds proefwonings in sommige gevalle gebou word.



necessity for the Luderitz Municipality to increase its output of fresh water, all of which is at present obtained from the sea by multi-effect distillation units.

River surveys still constituted a major responsibility of the National Institute for Water Research because of the urgent necessity for collecting as much data on South African water resources as possible. Furthermore, river surveys have also figured in the obligations of the Institute and of the South African Bureau of Standards towards the Department of Water Affairs in connection with permits for the discharge of effluents into rivers and the establishment of standards controlling such discharges. In these river surveys more attention was devoted to studies of bottom sediments for adsorption and ion exchange properties since these factors are involved in self-purification phenomena. Work on exploratory surveys to type unsurveyed river regions has also been undertaken. In collaboration with the Transvaal Provincial Administration, fish toxicity studies have been organized.

*River surveys*

The two regional laboratories at Windhoek and Durban have been fully occupied with the water problems of the respective provinces.

Along the Union's coast, sewage and industrial effluents are discharged into the surf zone on a rather haphazard basis. The risk of pollution of bathing beaches is further increased by rivers which drain densely populated and industrialized areas. The present state of knowledge of the effect this has on the disposal of effluents which are discharged into the sea is very inadequate. As a result it is exceedingly difficult, if not impossible, to give specific answers to the many conflicting views on the matter. Without factual information on existing discharges it is impossible to dispel erroneous conceptions or to consider reasonable relaxations for effluent disposal into the sea. Because of the urgency of the problem on the Natal South Coast, the Natal Provincial Administration took the initiative by providing funds for a preliminary investigation, which has been undertaken by the C.S.I.R.

*Marine disposal of effluents*

All the work of the National Institute for Road Research is undertaken in close collaboration with the Provincial Road Authorities and during the past year there was particular emphasis on field investigations. Basic information must come from the road to provide, in the first instance, a proper definition of the problem and also a basis for further more detailed laboratory work. Moreover, in many projects on the research programme, carefully designed and controlled field experiments provide the principal research tool and purely laboratory experimentation cannot be used as a substitute.

*Roads*

In view of the considerable and increasing economic importance of the building industry, the National Building Research Institute is giving increasing attention to the economic aspects of building. It is hoped that this research will be of direct value in reducing the cost of building. Three such projects were undertaken. These deal with the economic consequences of the use of hollow, rather than solid, bricks for building. Where building regulations are unnecessarily restrictive, there are often undesirable effects on costs. An endeavour is being made to develop a method of analysis which will enable designers and builders to determine readily the effects of the time spent on design and construction on building costs.

*Building economics*

A new concept of flexible planning based on research has been introduced in the experimental high school building in Lyttelton, which was designed and

*School buildings*

Op versoek van die Loodskomitee vir Behuisingsnavorsing is daar met die Munisipaliteit van Witbank onderhandel in verband met die bou van verskeie goedkoop proefwonings vir Blankes. Daar is aanvanklik gemeen dat die nood die hoogste is in die geval van die groep met 'n inkomste van £25 tot £35 per maand, maar dit blyk uit die N.I.P.N. se 1955-opname van gesinsuitgawe en die ontleding van die behuisingsbehoefte van die stedelike Blankebevolking dat die probleem eintlik veel ernstiger is in die geval van die groepe met 'n inkomste van £35 tot £50 per maand. Daar is derhalwe begin met die ontwerp van huise vir gesinne in laasgenoemde inkomstegroep. 'n Belangrike aspek van die werk is die strewende daarna om met dieselfde grondplan soveel afwisseling as moontlik in die voorkoms van die huise te verkry sonder aanmerklike verhoging in die koste.

*Nasionale Padnavorsingsinstituut: die aanbring van rubberbevattende flodderseels op proefoppervlakke naby Pretoria*



*National Institute for Road Research: spreading rubberized slurry seal on experimental surfacings near Pretoria*

## PROFESSIONELE DIENSTE

Die Departement Inligting en Spesiale Dienste is verantwoordelik vir die Raad se professionele dienste op die gebied van dokumentasie, wetenskaplike samewerking en nywerheidsamewerking. Dokumentasie word behartig deur twee afsonderlike afdelings van die departement, naamlik biblioteek en inligting. Laasgenoemde afdeling se werksaamhede omvat ook reklame- en redaksiewerk, vertaalwerk en bibliografiese inligtingswerk. Samewerking op wetenskaplike gebied word gereël deur twee ander afdelings, naamlik dié vir wetenskaplike samewerking (waaronder buitelandse skakelwerk ressorteer) en navorsingstoekennings. Eersgenoemde behartig Suid-Afrikaanse lidmaatskap van internasionale wetenskaplike organisasies en die reëlings vir deelname aan hulle bedrywighede deur Suid-Afrikaanse wetenskaplikes en wetenskaplike organisasies. Die drie afdelings vir nywerheidsamewerking het weer hoofsaaklik te

supervised during construction by the Institute. This building, which has attracted considerable interest, will probably be completed by June, 1960. The monotony of rows of similar classrooms has been overcome, a more interesting environment in classrooms has been created, and larger teaching spaces with more fittings than normal have been provided. It is very significant that this building, for which the tender price was £89,448 including the electrical contract, is likely to be superior to schools providing for similar accommodation and which have been built in recent years at costs of between £115,000 and £135,000.

A survey of the socio-economic status and housing preferences of the Coloureds in the western Cape was carried out for the National Building Research Institute by the National Institute for Personnel Research, and preliminary results were used for designing suitable houses. Several types have been designed and the stage has been reached where some of them can be built experimentally.

*Housing  
requirements*

Acting upon a request by the Housing Research Steering Committee, negotiations were successfully completed with the Witbank Municipality for the building of several experimental low-cost houses for Europeans. It was originally thought that the problem was most severe in the £25 to £35 per month income group, but findings by the National Institute for Personnel Research from the 1955 survey of family expenditures and the analysis of the housing requirements of the urban White population, have shown that the problem is more acute in the £35 to £50 per month income group. Accordingly, designs of houses for families in the latter income group have been started. A major feature of the work will be to investigate the possibility of achieving considerable variety in the appearance of houses with similar plan forms without significantly increasing the cost.

The professional services required by the Council in the fields of documentation, scientific co-operation and industrial co-operation are provided by the Information and Special Services Department. Documentation is dealt with in two separate divisions, library and information, the latter including publicity and editorial, translation and bibliographic inquiry services. Scientific co-operation is organized by two other divisions—science co-operation (including scientific liaison overseas) and research grants; the former manages membership of international scientific organizations and arrangements for participation in their activities by South African scientists and scientific organizations. The three industrial co-operation divisions are concerned primarily with the development of research for industry, the development of inventions, and industrial economics.

**PROFESSIONAL  
SERVICES**

doen met die ontwikkeling van navorsing vir die nywerheid, die ontwikkeling van uitvindings en met bedryfseksonomie.

## Dokumentasie

### *Biblioteek*

Die Biblioteek se verteenwoordigers het 'n aktiewe aandeel gehad in die stigting die afgelope jaar van 'n Pretoriase werkgroep vir dokumentasie van die Suid-Afrikaanse Biblioteekvereniging, Tak Noord-Transvaal, en het die sekretariële dienste vir die liggaam gedurende sy eerste bestaansjaar verskaf. Die Biblioteek het met die biblioteek van die Raad op Atoomkrag saamgewerk en oorleg gepleeg en het ook by verskillende geleenthede advies en leiding aan nywerheidsbibliotekaris gegee.

Verskeie groepe en individue het die biblioteek gedurende die jaar besoek en in 'n paar gevalle is daar spesiale uitstallings gereël. Die besoekers het onder andere die Eerste Minister van Brittanje en studente in die biblioteekwese van die Potchefstroomse en Witwatersrandse universiteite ingesluit.

Die besteldienste is verbeter deur van plaaslike boekhandelagente gebruik te maak. Altesaam 1,732 publikasies is gedurende die verslagjaar bestel en ontvang.

Daar is altesaam 2,234 publikasies geklassifiseer, 2,513 gekatalogiseer en 1,090 op bestaande kaartjies aangeteken. Die aantal boeke in die versameling het gedurende die jaar met 5,148 gestyg tot 36,177. (Ingebiede tydskrifte is hierby ingesluit).

Die maandelikse bulletin *C.S.I.R. Information* is gedurende die jaar vervang deur *Library Information and Accessions*. In die gedeelte oor aanwinste word die titels van elke publikasie binne 'n omlysting van 5 dm. x 3 dm. (die formaat van biblioteekindekskaartjies) aangegee sodat lesers hulle eie indekse kan saamstel.

Altesaam 45,936 publikasies is uitgeleen—dit is byna 3,000 meer as verlede jaar se totaal. Hiervan is 2,200 uitgeleen aan individue en liggame buite die W.N.N.R.

Van die 835 fotokopieë wat deur lesers aangevra is, kon 352 uit plaaslike bronne verskaf word. Die res is deur bemiddeling van die drie buitelandse skakelkantore verkry.

### *Inligting*

Al die gedrukte stukke van die W.N.N.R. word tans in een van onderstaande kategorieë uitgereik:

- Boeke en monografieë.
- Navorsingsverslae.
- Spesiale tegniese verslae.
- Kontrakverslae (vertroulik)
- Reklamebrosjures.
- Vraelyste.
- Gidse en verwysingslyste.
- Gereelde publikasies en tydskrifte.

**Documentation***Library*

An active role was played in the formation of a local Documentation Working Group of the South African Library Association, Northern Transvaal Branch, in Pretoria during the past year. Secretarial facilities were provided during the initial year of existence. Consultative co-operation was maintained with the Atomic Energy Board's Library as well as advice and guidance on numerous occasions provided to industrial librarians.

Various groups and individuals visited the library during the year and in some cases special displays were organized. Among the visitors were the Prime Minister of the United Kingdom, and the students of librarianship at the Potchefstroom and Witwatersrand Universities.

A successful attempt was made to improve order services by making use of local bookselling agents. A total of 1,732 publications were ordered and received.

Altogether 2,234 publications were classified, 2,513 catalogued and 1090 entered on existing records. The collection of books rose to 36,177, an increase of 5,148 during the year. (This figure includes bound periodicals).

The monthly bulletin *C.S.I.R. Information* was superseded during the year by *Library Information and Accessions*. In the accessions section of this publication entries now appear within the framework of 5 in. x 3 in. cards, which makes it possible for readers to build up their own bibliographic indexes.

Altogether 45,936 publications were issued on loan—an increase of nearly 3,000 on last year's total. Of this number, 2,220 were lent to non-C.S.I.R. individuals and institutions.

Of the 835 photographic copies requested by readers, 352 could be supplied from local sources while the rest were obtained through the three liaison offices overseas.

All C.S.I.R. printed matter is now issued in one of the following categories:

*Information*

- Books and Monographs.
- Research Reports.
- Special Technical Reports.
- Contract Reports (Confidential).
- Publicity Brochures.
- Questionnaires.
- Directories and Reference Lists.
- Periodical Publications and Journals.

The various periodical publications have been re-organized to conform with the recommendations made by the International Organization for Standardization (I.S.O.)

Publicity publications included two descriptive booklets, one dealing with the National Institute for Water Research and the other with the National Mechanical Engineering Research Institute. A booklet containing Afrikaans summaries of papers read at the 1959 Pneumoconiosis Conference in Johannesburg was produced for the Pneumoconiosis Research Unit. A book entitled

Die gereelde publikasies is nou anders ingedeel in ooreenstemming met die aanbevelings van die Internasionale Standaardiseringsorganisasie (I.S.O.)

Onder die reklamepublikasies was daar twee beskrywende boekies, een oor die Nasionale Instituut vir Watervorsing en die ander oor die Nasionale Navorsingsinstituut vir Meganiese Ingenieurswese. 'n Boekie met opsommings in Afrikaans van referate wat in 1959 op die Pneumokoniosekonferensie in Johannesburg gelewer is, is vir die Pneumokoniosenavorsingseenheid saam gestel. Daar is ook 'n boek met die titel *Food Enrichment in South Africa* vir die Nasionale Voedingnavorsingsinstituut gepubliseer, en die eerste eksemplaar daarvan is aan die Eerste Minister van Brittanje geskenk by geleentheid van sy besoek aan Scientia.

Daar is vier navorsingsverslae vir verskillende laboratoriums gepubliseer en die eerste uitgawe van 'n nuwe sesmaandelikse tydskrif *VIA* (Samevattinge van vertroulike padnavorsingsverslae) is vir die Nasionale Padnavorsingsinstituut saamgestel.

Die formaat van die *Jaarverslag* is verander. Dit word nou vrygestel in veertien afsonderlike dele, wat almal uitvoeriger besonderhede as in die verlede bevat. Diegene wie se name op die algemene adreslys voorkom, ontvang net die Algemene Oorsig—maar die omvattender verslae van die verskillende laboratoriums en institute kan ook gratis op aanvraag verkry word.

Daar is „persvystellings” uitgereik in verband met sake wat van belang vir die publiek geag is. Ook is verteenwoordigers van die pers, die S.A.U.K. en verskillende tydskrifte gehelp om inligting oor die W.N.N.R. te bekom.

Die Onderafdeling Vertaaldienste behartig vertaalwerk uit die een amptelike landstaal in die ander, asook uit vyftien vreemde tale. Gedurende die jaar is 251 stukke vir die W.N.N.R. self en 10 vir staatsdepartemente en ander buitelandse vertaal.

Meer as 200 persone het 'n kursus in Russies vir beginners, wat gedurende 1959 aangebied is, gevolg. Onder diegene wat vir die kursus ingeskryf het, was daar W.N.N.R.-personeellede, staatsamptenare, werknemers van verskillende nywerhede en mynmaatskappye en dosente en studente van die Universiteit van Pretoria. Daar was ongeveer 35 studente wat ingeskryf het vir die gevorderde kursus van ses maande.

Die vernaamste funksie van die Onderafdeling Bibliografiese Navrae is om te help met die opsporing van inligtingsbronne en om dan bronnegidse en ander bibliografiese publikasies op te stel. Navrae in verband met spesifieke wetenskaplike of tegniese onderwerpe word sover doenlik verwys na deskundiges in die Raad se personeel of na ander wetenskaplike of tegniese organisasies hier te lande of in die buiteland (in laasgenoemde geval deur bemiddeling van die Raad se wetenskapskakekantore in Londen, Washington en Keulen). Waar dit nie moontlik is nie, word navraers voorsien van die name van geskryfte oor die bepaalde onderwerp wat verkry word uit die indeks- en uittreksel-tydskrifte, pamflette en ander bronnegidse in die W.N.N.R.-biblioteek.

Daar is as deel van hierdie werk 180 tegniese navrae in besonderhede behandel en 17 literatuurlyste met aantekeninge uitgegee. Een van dié lyste het 5,000 verwysings bevat.

Die ontwikkeling van fotokopieermetodes ten einde die opstel van bibliografieë te bespoedig, het ook aandag geniet. Daar sal hopelik langs dié weg

*Food Enrichment in South Africa* was published for the National Nutrition Research Institute, the first copy being presented to the Prime Minister of Great Britain when he visited Scientia.

Four research reports were published on behalf of different laboratories and the first issue of a new half-yearly journal, *VIA*—confidential summaries of road research reports—was produced for the National Institute for Road Research.

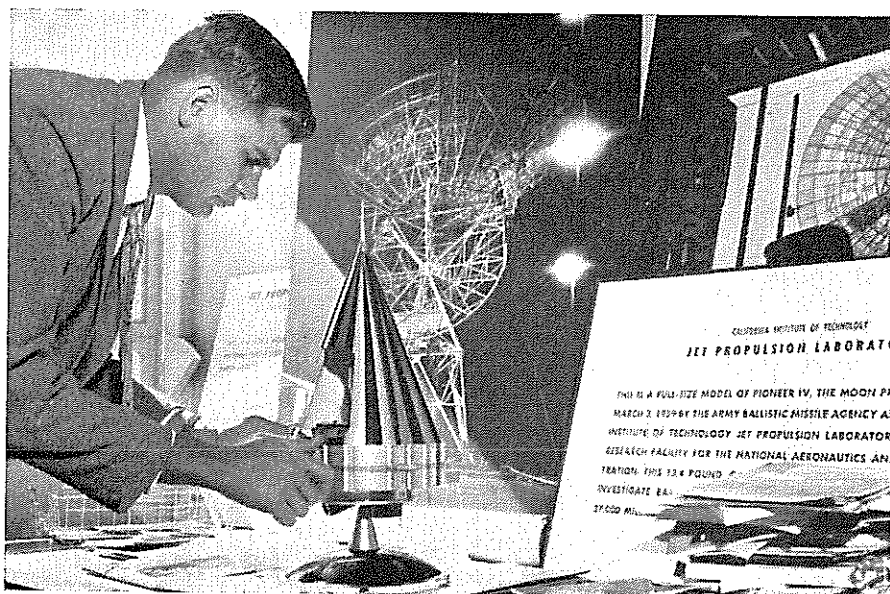
The format of the *Annual Report* was revised. It is now issued in fourteen separate sections, all in greater detail than in the past. Readers on the general mailing list receive only the General Review—but the more comprehensive laboratory reports are also available free of charge on request.

“Press Releases” were issued on events considered to be of public interest. In addition, representatives of the press, the S.A.B.C., and various journals were assisted in obtaining information on the C.S.I.R.

The Translation Section makes translations between the official languages of the Union and can, in addition, undertake translations from fifteen foreign languages. During the year 251 translations were made for use by the C.S.I.R., and 10 for Government departments and other outside bodies.

A twelve-week course of instruction in Russian for beginners given during 1959, was attended by more than 200 students. These included not only C.S.I.R. personnel but also members of the Public Service, industrial and mining companies and members of the teaching staff and students from the University of Pretoria. An advanced course lasting six months was attended by approximately 35 students.

The main function of the Bibliographic Inquiries Section is to assist in the location of sources of information and to disseminate this knowledge through the compilation of directories, reference lists and other bibliographic publications. As far as possible, inquiries for information on specific scientific or



'n Wetenskaplike van die W.N.N.R. verstel 'n volskaalse model van die Amerikaanse maanvuurpyl Pioneer IV. Die model was te sien by 'n algemene vertoning van die W.N.N.R. se werk op 'n onlangse wetenskaplike uitstalling in Natal

A scientist of the C.S.I.R. adjusts a full size model of Pioneer IV—the American moon probe rocket. The model formed part of a general display of C.S.I.R. work at a recent science exhibition in Durban

nie net tyd bespaar word deurdat professionele personeel nie soveel afskryfwerk hoef te doen nie, maar daar sal ook noukeuriger gewerk kan word.

### **Wetenskaplike samewerking**

#### *Navorsings-toekennings*

Daar is ses onderkomitees insake navorsingstoekennings waarin universiteite en ander belanghebbende liggame verteenwoordig is. Die onderkomitees adviseer die Raad in verband met die toekenning van bedrae vir navorsing op die gebiede van die Biologie, Fisika en Wiskunde, Chemie, Ingenieurswese, Landmeting en Argitektuur, Geologie en Argeologie, en die Mediese Wetenskappe.

Die bedrae wat vir wetenskaplike navorsing (afgesien van mediese navorsing) gedurende die kalenderjaar 1960 by die Raad aangevra is, beloop altesaam £214,000. Daar is 'n bedrag van ongeveer £117,000 toegewys: hiervan was £108,800 bestem vir ad hoc-toelaes aan individue wat navorsing aan universiteite en ander inrigtings verrig en £8,200 vir navorsingseenhede en -groepe.

Die Raad het sy goedkeuring geheg aan die stigting van 'n Eenheid vir Oseanografiese Navorsing aan die Universiteit van Kaapstad en 'n Navorsingsgroep insake die Fisika van die Vaste Toestand aan die Universiteit van die Witwatersrand.

'n Lys van die beurse en assistentskappe wat vir die jaar 1960/61 toegeken is, word as bylae by hierdie verslag aangeheg.

#### *Internasionale betrekkinge op wetenskaplike gebied*

Die Internasionale Geofisiese Jaar (I.G.Y.) het die bedrywighede in verband met internasionale betrekkinge op wetenskaplike gebied geweldig laat toeneem. By 'n groot deel van die bedrywighede was daar sowel staatkundige as wetenskaplike oorwegings en dit het tot waardevolle en noue samewerking met die Departement van Buitelandse Sake gelei.

Die Raad het sy goedkeuring geheg aan die stigting van 'n Advieskomitee insake Internasionale Samewerking op Wetenskaplike Gebied. Die komitee het in Julie 1959 en Februarie 1960 vergader, en lede van die komitee het die Internasionale Unies van die Internasionale Raad van Wetenskaplike Verenigings (ICSU), die Spesiale Komitees van ICSU, die mediese wetenskap, CCTA/CSA en Standaardisering verteenwoordig, en het self die Nasionale Komitee vir ICSU geword.

Ter voortsetting van die bedrywighede van die IGY-1957-58 en dié van IGC-1959 (die Internasionale Geofisiese Samewerking—waarmee die IGY-bedrywighede een jaar lank voortgesit is) het ICSU oorgegaan tot die stigting van 'n vaste spesiale komitee bekend as die Internasionale Komitee insake Geofisika (International Committee on Geophysics—CIG) wat uit sy internasionale verenigings bestaan en wat geofisiese navorsing op internasionale vlak moet koördineer. Suid-Afrika het op grond van sy lidmaatskap van ICSU outomaties lid geword van die liggaam, en die W.N.N.R. is verantwoordelik vir die koördinering van CIG se bedrywighede in Suid-Afrika.

Die IGC-1959 het op 31 Desember 1959 ten einde geloop. Die werksaamhede gedurende die jaar het dieselfde gebiede gedek as die IGY, naamlik Wêrelddae en Kommunikasies, Meteorologie, Geomagnetisme, Aurora, Ionosfeer, Sonaktiwiteit, Kosmiese Strale, Oseanografie, Seismologie, Swaartekrag,



technical subjects are dealt with by referring inquirers to specialists on the Council's staff or to other scientific and technical organizations—either in South Africa or overseas (through the medium of the Council's scientific liaison offices in London, Washington and Cologne). If this is not possible, inquirers are provided with references to the literature through consultation of the indexing and abstracting journals, pamphlets and other publications held by the C.S.I.R. Library.

As part of this work, 180 technical inquiries were dealt with in detail and 17 annotated reference lists were published. One such list which was compiled included 5,000 references.

Some attention was given to the development of photographic techniques for speeding up the compilation of bibliographies. The objective is to increase accuracy and to reduce the time spent by professional staff in writing out references.

Six Research Awards sub-committees, on which universities and other interested bodies are represented, assist the Council in making its awards in the fields of Biology, Physics and Mathematics, Chemistry, Engineering, Surveying and Architecture, Geology and Archaeology, and Medical Sciences.

Applications totalling £214,000 were received by the Council for the support of research in the non-medical sciences during the calendar year 1960. A sum of approximately £117,000 was allocated, of which £108,800 was for the support of ad hoc grants to individuals at universities and other institutions and £8,200 for research units and groups.

The Council agreed to the establishment of an Oceanographic Research Unit at the University of Cape Town and a Solid State Physics Research Group at the University of the Witwatersrand.

A list of the bursaries and assistantships awarded for 1960/61 appears as an appendix to this report.

The International Geophysical Year (IGY) has been directly responsible for greatly increased activity in the field of international relations in science. Much of this activity has involved both scientific and political considerations and has led to valuable and close co-operation with the Department of External Affairs.

Council agreed to the establishment of an Advisory Committee on International Co-operation in Science, which met in July 1959, and February 1960. Members of the committee represented the International Unions of the International Council for Scientific Unions (ICSU), the Special Committees of ICSU, Medical Science, CCTA/CSA and Standardization, and itself became the National Committee for ICSU.

To continue the activities of the IGY-1957-58 and IGC-1959 (The International Geophysical Co-operation—an extension of the IGY for one year), ICSU established a permanent special committee known as the International Committee on Geophysics (CIG), composed of its International Unions, to co-ordinate geophysical research at the international level. South Africa

**Science  
co-operation**

*Research grants*

*International  
relations in science*

Kernuitstraling en Satellietwaarneming. Daar is 'n maanwaarnemingspos by Scientia opgerig en die spesiale teleskoopvoetstukke hiervoor is deur die W.N.N.R. se Sentrale Werkplaas ontwerp en vervaardig.

Nasionale komitees van die Spesiale Komitee vir Oseaniese Navorsing, die Spesiale Komitee vir Antarktiese Navorsing en die Spesiale Komitee vir Ruimtenavorsing is gestig. Daar is sekretariële dienste vir die liggame verskaf en daar is gereël dat die W.N.N.R. daarin verteenwoordig word.

Die Suid-Afrikaanse Nasionale Komitee vir Antarktiese Navorsing het gedurende die jaar vyf keer vergader en was verantwoordelik vir die stigting van die Suid-Afrikaanse Antarktiese pos by die Noorweegse basis (Queen Maud Land). Die W.N.N.R. is gevra om die wetenskaplike werksaamhede in Antarktika op die verskillende vakgebiede (behalwe weerkunde) te koördineer, en daar is toe koördineerders vir die vakgebiede benoem. Daar is ook gereël dat wetenskaplikes sekere werksaamhede aan boord die „Shackleton” uitvoer tydens sy reise na die eilande Marion, Gough en Tristan da Cunha om aflospersoneel daarheen te neem.

Op versoek van SCOR (die Spesiale Komitee insake Oseanografiese Navorsing) is daar 'n tussentydse werksgroep in verband met oseanografie saamgestel met die doel om planne vir Suid-Afrikaanse deelname aan die Internasionale Indiese Oseaan-ekspedisie (IIOE). Daar is 'n program opgestel en goedgekeur deur SCOR se Nasionale Komitee (die Koördineringskomitee vir Oseanografiese Navorsing).

Die National Aeronautical and Space Agency (NASA) het die Unieregering genader in verband met die oprigting van 'n ruimteverkenningpos in Suid-Afrika. Nadat die W.N.N.R. met die Departement van Buitelandse Sake onderhandel het, is daar besluit om die moontlikheid te ondersoek en is daar gereël dat vier verteenwoordigers van NASA Suid-Afrika besoek met die doel om moontlike terreine te besigtig.

Daar is reëlings in verband met die bywoning van ondergenoemde internasionale vergaderings getref:

Vergadering van die Komitee i.s. Ruimtenavorsing, Nice, Januarie 1960	Mnr. D. Hogg, N.I. vir Telekommunikasie-navorsing.
Kongres van die Internasionale Vereniging vir Suiwer en Toegepaste Chemie, München, 1959	Dr. C. J. Liebenberg, Universiteit van Pretoria. Dr. P. le R. Malherbe, Keulense Skakelkantoor.
Simposium van SCAR, Buenos Aires, November 1959	Prof. E. S. W. Simpson, Universiteit van Kaapstad. Dr. W. Hofmeyr, Weerburo.
Oseanografiese Kongres en vergadering van SCOR, New York, September 1959	Prof. J. H. Day, Universiteit van Kaapstad. Mnr. C. Stravopoulos, W.N.N.R. se Oseanografiese Navorsingseenheid. Dr. D. H. Davies, S.A. Seebiologiese Vereniging, Durban.

automatically became a member of this body by virtue of its membership in ICSU and the Council is responsible for co-ordinating CIG activities in South Africa.

The IGC-1959 came to an end on the 31st December 1959. During the year work was carried out in the same disciplines as the IGY, viz., World Days and Communications, Meteorology, Geomagnetism, Aurora, Ionosphere, Solar Activity, Cosmic Rays, Oceanography, Seismology, Gravity, Nuclear Radiation and Satellite Observations. A moonwatch station was established at Scientia and special telescope mountings for this purpose were designed and made by the C.S.I.R. Central Workshops.

National committees were set up for the Special Committee on Oceanic Research, the Special Committee for Antarctic Research and the Special Committee for Space Research. Secretarial services were provided and representation of the C.S.I.R. on these bodies was arranged.

The South African National Committee for Antarctic Research met on five occasions during the year and was responsible for the establishment of the S.A. Antarctic station at the Norwegian base (Queen Maud Land). The C.S.I.R. was requested to co-ordinate the scientific programme in Antarctica of disciplines other than meteorology, and co-ordinators for these disciplines have been appointed. Arrangements were made for scientists to carry out programmes of work on the "Shackleton" during its voyages to relieve men on the islands of Marion, Gough and Tristan da Cunha.

At the request of SCOR (Special Committee on Oceanographic Research), an Interim Working Group on Oceanography was called together to discuss a proposed plan for South African participation in the International Indian Ocean Expedition (IIOE). A programme was worked out and agreed to by the SCOR National Committee (Co-ordinating Committee for Oceanographic Research).

An approach was made to the South African Government by the National Aeronautical and Space Agency (NASA) to set up a space probe station in South Africa. After negotiations between the C.S.I.R. and the Department of External Affairs, it was agreed that the possibility should be explored and arrangements were made for a team of four persons from NASA to visit South Africa to see possible sites.

Arrangements were made for attendance at the following international meetings:

Committee on Space Research Meeting, Nice, January 1960	Mr. D. Hogg, N.I. Telecommunications Research.
International Union of Pure and Applied Chemistry Congress, Munich, 1959	Dr. C. J. Liebenberg, University of Pretoria. Dr. P. le R. Malherbe, Cologne Liaison Office. Prof. E. S. W. Simpson, University of Cape Town. Dr. W. Hofmeyr, Weather Bureau.
SCAR Symposium, Buenos Aires, November 1959	



Die W.N.N.R. het sy Komitee vir Navorsing in die Mediese Wetenskappe wat onder voorsitterskap van dr. S. F. Oosthuizen staan, namens die United States Public Health Service versoek om geskikte kandidate in die nadoktorale navorsingsbeurse van laasgenoemde liggaam uit te soek. Dié Komitee het gedurende die jaar vergader en daar is drie kandidate gekies. Ook die spesiale navorsingsbeurse van Harwell is deur die Raad geadministreer.

Lede van die European Southern Observatory se organisasie het die W.N.N.R. in April besoek om reëlings te tref vir die „besigtigingsekspedisie” wat in Januarie 1960 in die Kaap sou plaasvind. Die W.N.N.R. het heelwat administratiewe hulp aan die ekspedisie verleen in verband met die invoer en vervoer van toerusting en met die reëling van vervoer vir die lede van die ekspedisie.

*Wetenskaplike  
Skakelkantoor,  
Londen*

Daar word al hoe meer van hierdie kantoor se dienste gebruik gemaak namate die rol van die wetenskap in nasionale en internasionale sake in belangrikheid toeneem. Die groep Statebondswetenskapkantore wat as B.C.S.O. (London) bekend staan en waarmee hierdie kantoor verbind is, het 'n belangrike sentrum vir die uitruiling van wetenskaplike inligting en ervaring geword. Dat dit ook openbare erkenning geniet, blyk onder andere uit die feit dat S.K.H. die Hertog van Edinburgh besoek daar afgelê het.

Al hoe meer organisasies buite die W.N.N.R., onder andere die Raad op Atoomkrag, maak gebruik van die diens wat die kantoor aan besoekende wetenskaplikes uit die Unie lewer. Verskeie wetenskaplikes het die kantoor vroeëtydig in verband met die beplanning van hulle besoeke geraadpleeg. So-doende word daar verseker dat die groot geldbedrae wat vir buitelandse reise nodig is, ten beste bestee word.

Die kantoor het gedurende die jaar uitvoerige reëlings in verband met die besoeke van sowat sewe-en-vyftig beamptes van die Raad getref. Daarbenewens het vyf-en-dertig ander Suid-Afrikaanse besoekers van die Raad op Atoomkrag, die nywerheidsnavorsingsverenigings, universiteite, munisipaliteite en private nywerheidsondernemings die kantoor se diens benut. Daar is ook hulp verleen aan vyf buitelandse wetenskaplikes wat Suid-Afrika wou besoek.

Belangstelling in wetenskaplike ontwikkelings in Rusland het steeds toegeneem, en waardevolle hulp in dié verband is van die D.S.I.R. se leenbibliotheekentheid ontvang. Die B.C.S.O. se afdeling vir gemeenskaplike dienste het, met die hulp van die B.B.C. Monitoring Services, opsommings van Russiese en Sjinese radio-uitsendings in verband met wetenskaplike ontwikkelings gepubliseer.

Die Wetenskaplike Hoofskakelbeampte was lid van die Suid-Afrikaanse afvaardiging na die Statebondsonderwyskonferensie en het 'n studiereis wat die British Council gereël het en wat die konferensie voorafgegaan het, meege maak. Hy het ook vergaderings van die Loodskomitee van die Internasionale Demineraliseringsprojek in Algiers en Londen, en die Internasionale Konferensie insake Skoon Lug, wat die National Society for Clean Air by geleentheid van sy diamantjubileum in die Verenigde Koninkryk gereël het, bygewoon. Die skakelbeamptes het gehelp met die vergadering van die Commonwealth Advisory Aeronautical Research Council in Londen en was voorts gemoeid met die reëlings vir vergaderings van die British Commonwealth Scientific Committee

Oceanography Congress and SCOR meeting, New York, September 1959

Prof. J. H. Day,  
University of Cape Town.  
Mr. C. Stravopoulos,  
C.S.I.R. Oceanographic  
Research Unit.  
Dr. D. H. Davies,  
S.A. Marine Biological  
Association, Durban.

On behalf of the United States Public Health Service, the Council's Committee for Research in Medical Sciences, under the chairmanship of Dr. S. F. Oosthuizen, was requested by the C.S.I.R. to select suitable persons for the United States Public Health Post Doctoral Fellowships. This Committee met during the year and three candidates were selected. In addition, the Harwell Special Research Fellowships were administered by the Council.

Members of the European Southern Observatory organization visited the C.S.I.R. in April to make arrangements for the proposed "seeing" expedition in the Cape in January 1960. The C.S.I.R. gave considerable administrative assistance to the expedition in importing and transporting equipment, and in arranging transport for the team.

The growing importance of science in national and international affairs has resulted in an increased demand for the services provided by this office. The group of independent Commonwealth Scientific Offices with which it is associated, called B.C.S.O. (London), has become an important centre for the exchange of scientific information and experience, a fact which was given public recognition by the visit of H.R.H. the Duke of Edinburgh.

*Scientific Liaison  
Office, London*

The services which the office makes available to visiting scientists from the Union are being used by more organizations outside the C.S.I.R. including the Atomic Energy Board. A number of scientists have consulted the office at early stages in the planning of their visits, a practice which ensures that the best use is made of the large sums of money required for travel overseas.

During the year, detailed arrangements were made for visits by some fifty-seven officers of the Council. In addition thirty-five other South African visitors from the Atomic Energy Board, Industrial Research Associations, Universities, Municipalities and private industry used the facilities of the office. Five scientists from overseas who wished to visit South Africa were also given assistance.

Increasing interest has been taken in scientific developments in Russia and in this connection valuable assistance has been received from the D.S.I.R.'s Lending Library Unit. The Common Services Section of B.C.S.O., with assistance from the B.B.C. Monitoring Services, has published summaries of Russian and Chinese Broadcasts dealing with Scientific Developments.

The Chief Scientific Liaison Officer was a member of the South African delegation at the Commonwealth Education Conference and participated in a pre-conference study tour arranged by the British Council. He also attended meetings of the Steering Committee of the International Demineralization Project in Algiers and London, and the International Clean Air Conference organized by the National Society for Clean Air in the United Kingdom on the occasion of its Diamond Jubilee. The Liaison Officers assisted with the meeting of the Commonwealth Advisory Aeronautical Research Council in London,

en die Commonwealth Advisory Committee on Defence Science asook dié van 'n paar ander statebonds- en internasionale wetenskaporganisasies waarvan die sekretariate in Londen gesetel is. Die beamptes het vergaderings van die Institute of Information Scientists, die Parliamentary and Scientific Committee, die Society for Visiting Scientists en die Royal Society bygewoon en was teenwoordig by die amptelike inwyding van die Warren Spring-laboratorium, die nuwe laboratoriums van die Cambridge Instrument Company, die A.E.I. Merlin-reaktor, die Hawker Siddeley Jasonreaktor. Hulle het ook as wetenskaplike verteenwoordigers van Suid-Afrika opgetree op 'n hele aantal sosiale byeenkomste wat gedurende die jaar in Brittanje gehou is.

*Wetenskaplike  
Skakelkantoor,  
Washington*

Die Wetenskaplike Skakelbeampte wat sewe jaar lank aan die hoof van die Washingtonse kantoor gestaan het, het kort voor die einde van die verslagjaar na Suid-Afrika teruggekeer, en sy plek is deur 'n nuwe attaché ingeneem.

Weens die toenemende belangrikheid van die wetenskap op internasionaal staatkundige gebied, is al hoe meer tyd en kragte aan werksaamhede op die gebied gewy, hetsy in samewerking met die ambassade of onafhanklik. Die skakelbeampte het gehelp met die samesprekings tussen die Raad op Atoomkrag se Komitee insake Uraanverkope en verteenwoordigers van die U.S. Atomic Energy Commission. Die bedrywighede op hierdie algemene gebied het onder andere ook die volgende ingesluit: samesprekings met die National Aeronautics and Space Administration in verband met die bestaande „Minitrack"-pos op Esselenpark en die beoogde oprigting van 'n pos vir die verkenning van die buiteste ruimte en die waarneming van satelliete; verteenwoordiging van Suid-Afrika by samesprekings met Kanada en die Verenigde State in verband met 'n stelsel waarvolgens atoomkragmateriaal en -toerusting internasionaal beveilig kan word ten einde te sorg dat dit net vir vreedsame doeleindes aangewend word; sake in verband met internasionale samewerking op die gebied van mediese navorsing na aanleiding van die werksaamhede en aanbevelings van die U.S. Scientific Committee on Africa South of the Sahara. Die belangrikste bedrywigheid was waarskynlik deelname, as Suid-Afrika se tegniese verteenwoordiger, aan die Antarktiese Konferensie wat gedurende Oktober en November 1959 in Washington gehou is en na aanleiding waarvan die twaalf betrokke volke 'n omvattende internasionale verdrag aangegaan het waarvolgens die Suidpool gedemilitariseer word en vrye beweging en werksaamhede aldaar vir wetenskaplike doeleindes gewaarborg word.

*Wetenskaplike  
Skakelkantoor,  
Keulen*

Die huidige hoof het die kantoor op 1 Oktober 1959 van sy voorganger oorgeneem. Daar was geen ander personeelveranderings nie.

Hierdie kantoor se vernaamste bedrywigheid was, net soos in vorige jare, die reëlings van besoeke aan Duitsland, Oostenryk, Holland, België, Switserland en Italië vir Suid-Afrikaanse wetenskaplikes, tegnisi en in 'n mindere mate nywerheidsmense. Daar is hulp verleen aan altesaam agt-en-twintig besoekers, naamlik drie-en-twintig werknemers van die W.N.N.R., vier staatsamptenare en een nyweraar.

Die volgende wetenskaplike konferensies is bygewoon:

Die Internasionale Konferensie in verband met die wegruiming en benutting van stadsafval (Scheveningen, April/Mei 1959).

and have been concerned with arrangements for meetings of the British Commonwealth Scientific Committee and the Commonwealth Advisory Committee on Defence Science, and a number of other Commonwealth and International scientific organizations whose Secretariats are in London. Meetings of the Institute of Information Scientists, the Parliamentary and Scientific Committee, the Society for Visiting Scientists and the Royal Society were attended. Liaison officers were present at the official openings of the Warren Spring Laboratory, the new laboratories of the Cambridge Instrument Company, the A.E.I. Merlin Reactor, the Hawker Siddeley Jason Reactor, and also represented South African science at a large number of social functions held in Britain during the year.

Shortly before the end of the year under review the Scientific Liaison Officer, who had been head of the Office in Washington for seven years, returned to South Africa and his place was taken by a new Attaché.

*Scientific Liaison  
Office,  
Washington*

As a result of the growing importance of scientific activities and affairs in the international political sphere, the amount of time and effort expended in association with the Embassy or independently in this field, continued to increase. The Liaison Officer assisted in the discussions held between the Uranium Sales Committee of the S.A. Atomic Energy Board and representatives of the U.S. Atomic Energy Commission. Other activities in this general sphere included: discussions with the National Aeronautics and Space Administration on matters relating to the existing Minitrack Station at Esselen Park, and to the proposed establishment of a deep-space-probing and satellite-tracking station; representation of South Africa in discussions with Canada and the U.S. in connection with a system for internationally safeguarding atomic energy materials and equipment, so as to ensure their use for peaceful purposes only; matters relating to co-operation in international medical research, following the activities and recommendations of the U.S. Scientific Committee on Africa South of the Sahara. Perhaps the most significant activity was participation as South Africa's technical representative in the Antarctic Conference held in Washington during October and November, 1959, which resulted in the acceptance by the twelve nations concerned of a comprehensive international treaty demilitarizing the Antarctic and guaranteeing free movement and activity for scientific purposes.

The present head of the office took over from his predecessor on 1st October, 1959. There have been no other changes of staff.

*Scientific Liaison  
Office, Cologne*

As in previous years, the main activity of this office was the organization of visits in Germany, Austria, Holland, Belgium, Switzerland and Italy for South African scientists, technicians, and to a lesser extent, people from industry. In all, twenty-eight visitors were given assistance: twenty-three C.S.I.R. employees, four members of Government Departments, and one industrialist.

The following scientific conferences were attended:

The International Conference on the disposal and utilization of town refuse (Scheveningen, April/May 1959).

The Twentieth Conference and Seventeenth International Congress of the International Union of Pure and Applied Chemistry (Munich, September 1959).

Die twintigste konferensie en die sewentiende internasionale kongres van die Internasionale Vereniging vir Suiwer en Toegepaste Chemie (München, September 1959).

'n Seminar oor die aanwending van radio-isotope by navorsing en in die Nywerheid, wat in Oktober 1959 deur die Internationale Studiengesellschaft in Berlyn gehou is.

'n Simposium oor verskillende aspekte van die besoedeling van riviere deur die uitvloei van olieraffinaderye, gereël deur die Föderation Europäischer Wasserschutz (Bad Godesberg, Februarie 1960).

'n Deel van 'n simposium oor reinigingsmiddels, veral met betrekking tot hul uitwerking op rioolvuilverwydering (Essen, Februarie 1960).

Sedert die begin van hierdie jaar is daar gereelde maandvergaderings saam met die wetenskaplike attachés van die Amerikaanse, Britse en Franse ambassades gehou. Hierdie byeenkomste waarop sake van aktuele wetenskaplike belang in Duitsland en Europa bespreek word, het uiters waardevol en prikkelend geblyk te wees en sal in die vervolg ook gereeld plaasvind.

#### *Openbare betrekkinge*

Die Raad se jaarlikse besoekdae het op 2, 3 en 4 September 1959 geval. Kabinets- en Volksraadslede en sowat 7,000 lede van die publiek het die W.N.N.R. se laboratoriums besoek. Hierbenewens is byna 2,000 skoolkinders deur die geboue by Scientia geneem.

Daar is ook besoeke aan die navorsings- en standaardlaboratoriums gereël. Vir spesiale groepe onder andere die Administrateur en Uitvoerende Komitee van Transvaal, lede van 'n studiekursus in organisasie en bestuur, bosboustudente, Normaalkollege-studente, 'n groep van die Departement van Buitelandse Sake en onderwysers van tegniese kolleges oor die hele Unie wat 'n kursus in biblioteekwese in Pretoria gevolg het.

Onder die W.N.N.R. se hooggeplaaste buitelandse besoekers was daar die Britse Eerste Minister en die Koreaanse Ambassadeur in Parys. Hierbenewens het vooraanstaande wetenskaplikes uit die V.S.A., Groot Brittanje, Swede en Frankryk ook die W.N.N.R. besoek en lesings voor uitgelese gehore gegee. Verskeie Suid-Afrikaanse en buitelandse joernaliste is ook deur die verskillende laboratoriums geneem.

Daar is 'n wetenskaprolprentbiblioteek in die wetenskapskakekantoor in Keulen gestig. Die kern van die versameling is die rolprente oor die W.N.N.R. se navorsingsbedrywighede en die S.A.B.S. se toetsfasiliteite wat op 'n wetenskaprolprentfees in Oostenryk vertoon is. Verskeie rolprente wat deur plaaslike nywerhede geskenk is, is ook aan die versameling toegevoeg.

Toonstukke in verband met die W.N.N.R. se bedrywighede is in September op die Pretoriase tentoonstelling uitgestal.

#### **Samewerking op nywerheidsgebied**

##### *Ontwikkeling van navorsing vir die nywerheid*

Die Raad se beleid in verband met die ontwikkeling van nywerheidsnavorsing word deur die Advieskomitee insake die Ontwikkeling van Navorsing vir die Nywerheid hersien. Daar is 'n nuwe afdeling van die Departement geskep met die doel om aan die Komitee die nodige professionele dienste te verskaf met betrekking tot die ondersteuning van outonome nywerheidsnavorsingsinstitute en van nywerheidsnavorsingseenhede binne die Raad se organisasie. Hierdie



A seminar on the Application of Radio-isotopes in Research and Industry, held by the Internationale Studiengesellschaft in Berlin in October 1959.

A symposium on various aspects of the pollution of rivers by effluents from oil refineries, organized by the Föderation Europäischer Wasserschutz (Bad Godesberg, February 1960).

Part of a symposium on detergents, with special reference to their effect on sewage disposal (Essen, February 1960).

Since the beginning of this year, regular monthly meetings have been arranged with the scientific attachés at the American, British and French Embassies. These gatherings, at which matters of current scientific interest in Germany and Europe are discussed, have proved most useful and stimulating, and will continue.

The Council's annual open days were held from the 2nd to 4th September, 1959. Members of the Cabinet and Parliament and some 7,000 members of the public visited the C.S.I.R.'s laboratories. In addition, nearly 2,000 school children were also shown over the site at Scientia.

*Public relations*

Arrangements were made for special groups to visit the research and standards laboratories. These included the Administrator and Transvaal Executive Committee, members of an Organization and Management course, Forestry students, Normal College students, a group from the Department of External Affairs and teachers representing technical colleges throughout the Union who were attending a library course.

Distinguished overseas visitors to the C.S.I.R. included the Prime Minister of Great Britain, and the Korean Ambassador in Paris. In addition, distinguished scientists from the U.S.A., Great Britain, Sweden and France were shown over the C.S.I.R. and gave talks to special audiences. Several local and overseas journalists were also conducted round the laboratories.

Arrangements were made to establish a science film library in the Scientific Liaison Office of Cologne after the films had been shown in Austria at a Science Film Festival. These scientific films showed the research functions of the C.S.I.R., and testing facilities of the South African Bureau of Standards. Several films donated by local industries were added to this library.

Exhibits representing activities of the C.S.I.R. were on display at the Pretoria Show during September.

The Council's policy on development of industrial research is reviewed by the Advisory Council for the Development of Research for Industry. A separate division of the Department has been created to provide the professional services required by this Committee, in relation to support for existing autonomous industrial research institutes, and industrial research units set up within the

**Industrial  
co-operation**  
*Development of  
research for  
industry*

afdeling moet die behoeftes van die nywerhede wat nie reeds deur navorsings-institute of -eenhede bedien word nie, in oënskou neem, aanbevelings in die verband doen en die ontwikkeling van nuwe institute of eenhede met die ondersteuning van nywerheidsverenigings bevorder.

*Ontwikkeling van uitvindings*

Wanneer W.N.N.R.-uitvindings deur middel van patentlisensiering in die handel gebring word, word daar voorkeur aan Suid-Afrikaanse firmas gegee ten einde nuwe geleenthede vir die plaaslike fabriekswese te skep. By die nakoming van sy wetlike verpligting om nywerheidsontwikkeling te bevorder, kry die Raad langs die weg ook iets terug van die bedrag wat hy aan navorsing bestee. Die beleid wat tans gevolg word is om die inkomste uit patentlisensies aan te wend ter ontwikkeling van nuwe uitvindings tot op die stadium waar dit in die handel gebring kan word.

Sedert die huidige beleid in verband met patentlisensiering aanvaar is, is 45 uitvindings vir eksploitasie aangeneem. Op die huidige tydstip is daar 22 uitvindings ten opsigte waarvan lisensie-ooreenkomste aangegaan is. Daar is twaalf verskillende firmas hierby betrokke. Die Tellurometer en die Kristal-ontvangtoestel werp nog steeds goeie winste af. Na verwagting sal daar in die loop van die volgende jaar nog uitvindings wees wat die winsgewende stadium bereik.

*Bedryfseconomie*

Die ekonomiese aspekte van probleme in verband met toegepaste navorsing op nywerheidsgebied word deur die Afdeling Bedryfseconomie ondersoek met die doel om die direkteure van nasionale navorsingslaboratoriums en -institute te help om hulle navorsingsdoelwitte behoorlik te omskryf en om die waarde van beoogde navorsings in verhouding tot die ekonomiese behoeftes van die nywerheid te bepaal.

Die belangrikste ondersoeke in hierdie verband het gegaan oor die ekonomiese aspekte van probleme in die boubedryf, in verband met die stedelike Bantoeedorpe, op die gebied van padbou en -onderhoud, die houtnywerheid en in verband met oorproduksie van aartappels.

**STANDAARDISERING**

**Standaardmerk**

Daar is gedurende die verslagjaar nege-en-sewentig permitte in verband met die gebruik van die S.A.B.S.-merk uitgereik teenoor agt-en-dertig die vorige jaar. Sewentien van die permitte was ten opsigte van handelsartikels waarvoor daar nog nie voorheen permitte uitgereik is nie, 'n duidelike bewys dat die S.A.B.S. se sertifiseermerkskema al hoe gewilder word.

**Aannametoetse**

Die afgelope jaar is veral gekenmerk deur toenemende gebruik van die Suid-Afrikaanse Buro vir Standaarde se aannametoetsfasiliteite deur staatsdepartemente en ander groot kopers (daar is onder andere groot uitvoerbestellings geplaas onderworpe aan die S.A.B.S. se aannametoets en inspeksie) en die groot aantal vergelykende toetse wat ten behoeve van die plaaslike nywerheid uitgevoer is om die plaaslike produk teen die ingevoerde op te weeg.

**Hout**

Verbruikers begin nou klaarblyklik al hoe meer die waarde van die Buro se standaardmerk op hout en die Buro se inspeksiediens besef. Die Unie-

Council's organization. This division is required to review the needs of industries not served by existing research institutes or units, to make recommendations and to foster the development of new institutes or units supported by associations of industries.

In securing the commercial exploitation of C.S.I.R. inventions through patent-licensing, priority is given to South African firms in order to create new manufacturing opportunities for local industry. In fulfilling its statutory obligations to promote industrial development, the Council also achieves a financial return on its research investment. The policy has now been adopted of using the income from patent licences to support development work on further inventions to the stage where industry can be approached.

*Development of inventions*

Since the inception of the present patent-licensing policy, 45 inventions have been accepted for exploitation. At present 22 inventions are covered by licence agreements with 12 different firms. The Tellurometer and the Crystal Controlled Receiver continue to yield handsome financial returns. It is anticipated that further inventions will reach a profitable stage during the course of the coming year.

The economic aspects of research problems of an applied industrial nature are investigated by the Industrial Economics Division with a view to assisting the Directors of National Research Laboratories and Institutes in the definition of research objectives and in their assessment of the relative merits of research proposals in relation to the economic needs of industry.

*Industrial economics*

The more important of these studies involved investigations of the economic aspects of problems in the building industry, in urban Bantu townships, in the field of road construction and maintenance, the timber industry and in connection with surplus potato production.

Seventy-nine permits to use the S.A.B.S. mark were issued as against thirty-eight for the previous year. These included seventeen commodities for which permits had not been issued previously, clearly demonstrating the growing popularity of the S.A.B.S. certification mark scheme.

**STANDARDIZATION**  
**Standardization mark**

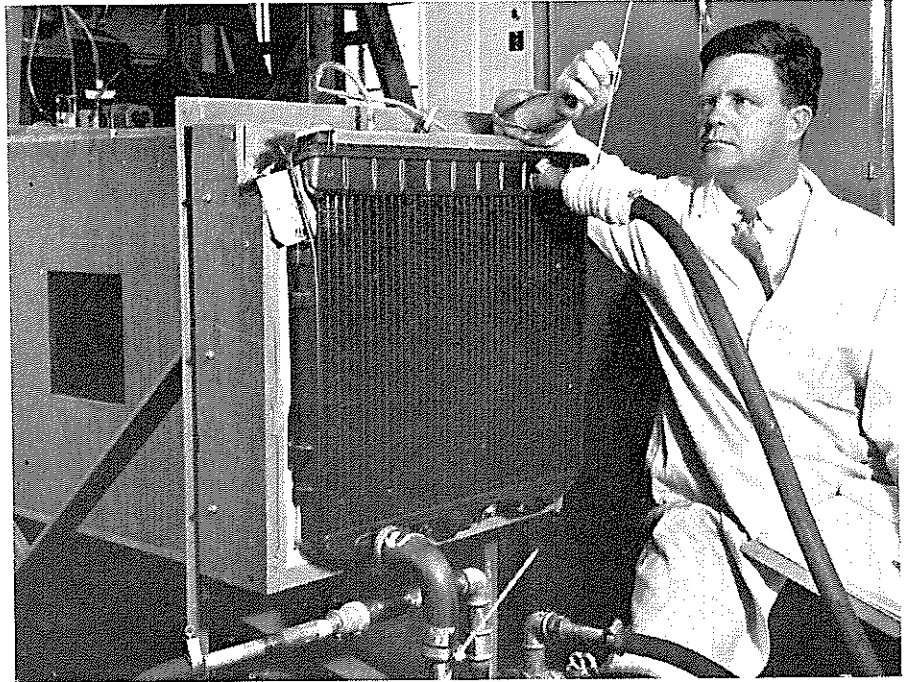
Among features of particular interest were the increasing use made by government departments and large-scale purchasers of the acceptance testing facilities of the South African Bureau of Standards (large export orders were also placed subject to S.A.B.S. acceptance testing and inspection) and the number of comparative tests carried out for local industries against imported products.

**Acceptance testing**

It is apparent that consumers are beginning to appreciate to an increasing extent the value of the standardization mark on timber and the inspection services offered by the Bureau. The Union Tender Board adopted the principle of buying only mark-bearing floor blocks or floor blocks covered by an affidavit stating that the blocks complied with the relevant S.A.B.S. standard specifica-

**Timber**

*Suid-Afrikaanse Buro vir Standaarde: 'n verkoeler word vooraan 'n klein windtonnel getoets*



*South African Bureau of Standards: a radiator under test is mounted at the end of a small wind tunnel*

tenderraad het die beginsel aanvaar om net vloerblokkies te koop wat die standaardmerk op het of vergesel gaan van 'n beëdigde verklaring wat lui dat die blokkies aan die toepaslike S.A.B.S.-standaardspesifikasie voldoen. Die staatsaagmeule produseer reeds die afgelope twee jaar kispalkies en timmerhout ingevolge die standaardmerkskema en dit lyk asof private saagmeuleienaars hulle voorbeeld volg. Die aantal permithouers ten opsigte van hout is tans tagtig.

### Tekstielstowwe

Die Tekstielinspeksie-afdeling het gedurende die jaar 1,036 besendings ten behoeve van die Unietenderraad, die Administrasie van die Suid-Afrikaanse Spoorweë, die Kamer van Mynwese en die S.A. Koöperatiewe Sitrusbeurs ondersoek. Veral die ontledingswerk wat uitgevoer is op monsters wat die Departement Doëane en Aksyns ingestuur het (om te bepaal of die stowwe aan sekere voorgeskrewe definisies voldoen met die oog op tariefindeling) was ingewikkelder van aard as voorheen; die mate van merserisering, waterafweervermoë en vastheid van embosseerafwerkings moes naamlik bepaal word. Daar is ook 'n aantal spesiale ontledings ten behoeve van die Speurdiens van die Suid-Afrikaanse Polisie gedoen.

### Smeerolie

'n Belangrike ontwikkeling op die gebied van kontraktoetswerk is dat alle smeerolie wat die regering en die provinsiale administrasies aankoop nou eers met die oog op aanname deur die Buro ondersoek word.

tion. The State Sawmills have been producing box shooks and structural timber under the standardization mark scheme for the past two years and indications are that private sawmillers are following this example. The number of permit holders for timber has reached eighty.

The Textile Inspectorate carried out inspections of 1,036 consignments on behalf of the Union Tender Board, the South African Railways Administration, the Chamber of Mines and the S.A. Co-operative Citrus Exchange. In particular, many analyses on samples of textile materials submitted by the Department of Customs and Excise (for tariff classification, to determine their compliance with prescribed definitions) were of a more involved nature than formerly, necessitating analyses in respect of degree mercerization, water repellency and permanence of embossed finishes applied to the fabrics. Numbers of special analyses were carried out on behalf of the Criminal Investigation Department of the South African Police.

**Textiles**

A major development in contract testing was the acceptance inspection of all lubricating oil purchased by the government and the provincial administrations.

**Lubricating oil**

Whereas, in the past, government departments and local authorities were the chief users of civil and mechanical engineering services in connection with bulk buying, consulting engineers, mining groups and industrial concerns have shown a greater appreciation of the advantages to be gained by reference to trained testing personnel and accurately conducted tests in the award of tenders. An interesting sidelight on this work was the number of requests for tests from beyond the Union's borders (particularly from the Federation of Rhodesia and Nyasaland) which increased considerably. Requests were received from the United Kingdom and Germany, among other countries. A noteworthy feature of the year's work was the result achieved in the standardization programme for hospital equipment.

**Civil and  
Mechanical  
Engineering**

Particularly important were the tests carried out for the motor industry in order to assist the development of local manufacture of components. Apart from the normal routine tests on cylinder sleeves and piston rings, comparative tests were done on motor and tractor radiators. Inspection on oil filters for an assembly plant which now purchases locally manufactured oil filters not only for local consumption but also for export, were carried out on a consignment basis. Some 110,000 oil filters were inspected, tested and released for use.

**Motor industry**

The way in which the Bureau keeps abreast of industrial development is illustrated by the services now offered by the High Voltage Laboratory. Because some of the transformers now manufactured in South Africa are too large to be accommodated in the laboratory as at present constituted, the 1.4 million volt impulse generator was modified so that it could be transported to factories

**Transformer tests**

**Siviele en  
Meganiese  
Ingenieurswese**

Die Buro se dienste op die gebied van siviele en meganiese ingenieurswese is in die verlede hoofsaaklik deur staatsdepartemente en plaaslike owerhede benut in verband met grootskeepse aankope, maar vandag besef ook raadgevende ingenieurs, mynmaatskappye en nywerheidsondernemings al hoe meer die voordele wat daaraan verbonde is om hulle op deskundige toetspersoneel en noukeurige toetse te verlaat wanneer tenders aangeneem moet word. Interessant in hierdie verband was die groot en toenemende aantal toetsopdragte wat van buite die Unie se grense ontvang is (veral uit die Federasie van Rhodesië en Njassaland). Daar is ook opdragte uit Brittanje, Duitsland en ander oorsese lande ontvang. 'n Belangrike aspek van die jaar se werksaamhede is die resultaat wat met die standaardiseringsprogram vir hospitaaltoerusting behaal is.

**Motornywerheid**

Van besondere belang was die toetse wat vir die motornywerheid uitgevoer is met die doel om die vervaardiging van onderdele hier te lande te help ontwikkel. Benewens die gewone toetse op silindervoerings en suierringe, is daar vergelykende toetse met motor- en trekkerverkoelers uitgevoer. Ook is oliefilters besendingsgewyse ondersoek ten behoeve van 'n monterfabriek wat nou plaaslik vervaardigde oliefilters koop, nie net vir gebruik hier te lande nie maar ook vir uitvoer. Daar is altesaam sowat 110,000 oliefilters ondersoek, getoets en vir gebruik vrygestel.

**Transforma-  
tortoetse**

Dat die Buro steeds met nywerheidsontwikkeling tred hou, blyk uit die diens wat die Hoogspanningslaboratorium tans aanbied. Omdat sommige van die transformators wat tans in Suid-Afrika vervaardig word te groot is vir die laboratorium soos dit tans ingerig is, is die stootspanningsgenerator van 1.4 miljoen volt só gewysig dat dit na fabriek geneem kan word en die stootspanningstoetse ter plase uitgevoer kan word. Hierdie diens word baie gewild en die stootspanningsgenerator word al hoe verder vervoer.

**Nie-vernietigende  
toetse**

Die werk van die Laboratorium vir Nie-vernietigende Toetse is nou alombekend en is hoog in aanvraag, nie net in die Unie nie maar ook in die Federasie. Gedurende die jaar is daar benewens noodsaaklike dienste vir die suiker-, mynbou-, skeepsherstel- en ingenieursnywerheid ook 'n nuwe diens gelewer, naamlik nie-vernietigende toetse op pypleidings ten behoeve van munisipaliteite.

**Mikrobiologiese  
opnames in  
fabrieke**

Daar is 'n nuwe diens vir die voedsel- en dranknywerheid ingestel, naamlik „mikrobiologiese opnames” in voedselbewerkingsfabrieke—'n soort fabriek wat uit die aard van sy werksaamhede gevaar van bakterievorming inhou. Die reaksie aan die kant van die nywerheid was besonder gunstig en so ook die resultate wat met die opnames behaal is. Die omvang van dié werk blyk daaruit dat hoewel die helfte van die opnames nog maar net ses maande aan die gang is, daar reeds 218 verslae oor 6,459 getoetste monsters uitgereik is.

**Verbruikers-  
goedere**

Daar is verder hulp verleen in verband met die veldtog vir „beter hantering van voedsel” en in verband met die verbetering van verbruikersprodukte. Ook

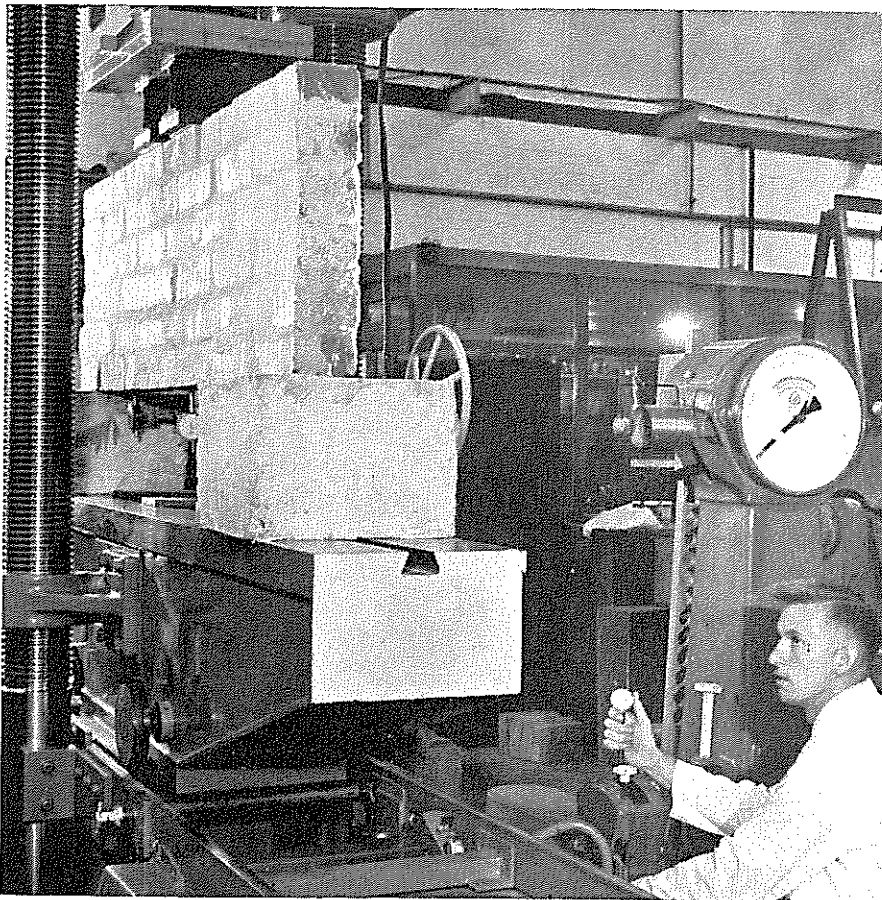
and the impulse tests carried out on site. This service is becoming very popular and the impulse generator is being transported further and further afield.

The work of the Non-destructive Testing Laboratory is now widely known and much in demand, not only in South Africa but also in the Federation. In addition to carrying out vital services for the sugar, mining, ships repair and engineering industries, a new application during the year was the non-destructive testing of pipelines for municipalities.

A new service was introduced to the food and beverage industries in the form of "microbiological surveys" of the production lines of industrial plants, which, by virtue of their operation, can become bacterial hazards. There has been an excellent response from industry, with equally satisfactory results from its application. The magnitude of the work entailed is reflected in the fact that although half the surveys have been in operation for six months only, 218 reports dealing with 6,459 tested samples have been issued.

### Non-destructive testing

### Microbiological surveys of factories



*Suid-Afrikaanse Buro vir Standaarde: 'n gewapende baksteenmuur ondergaan 'n buigtoets in die druktoetsmasjien, met 'n vermoë van 300 ton*

*South African Bureau of Standards: a reinforced brick wall undergoes a bending strength test in the 300-ton compression machine*

is 'n veldtog van stapel gestuur wat daarop gemik is om die verbruiker 'n beter begrip te gee van die wyse waarop insektmiddels vir huishoudelike en ander doeleindes veilig gebruik kan word. Daar was 'n toenemende aanvraag vir die toets van alle soorte ingemaakte voedsel, snelbevrore voedsel, verwerkte en voorafverpakte vleisprodukte, diere- en pluimveevoer, farmaseutiese produkte en vitamienpreparate asook insektmiddels. Die toepassing van die verpligte spesifikasies vir ingemaakte vis- en vleisprodukte in die Unie en Suidwes-Afrika het goed gevlot en daar is heelwat meer as 100,000 monsters in fabriek oor die hele land ondersoek. Daar is bevind dat die kwaliteit van dié produkte oor die algemeen goed was.

Die hoë kwaliteit wat gehandhaaf word deur fabrikante wat vrugte en groente ingevolge die standaardmerkskema inmaak, het steeds meer erkenning in die buiteland gekry sodat die verkope van hierdie produkte toegeneem het.

#### Leer en skoeisel

Belangrike werk op hierdie gebied was die versameling van grondstowwe, die uitsny van alle bo-dele en die vervaardiging van 120 paar skoene en 80 paar stewels vir gebruik in grootskeepse draproewe wat met die oog op standaardisering in samewerking met die Departement van Verdediging uitgevoer word.

Daar word getrag om laboratoriumtoetse met draproewe te korreleer en terselfdertyd 'n standaardlees, wat in die Leër, die Lugmag en die Polisiemag gebruik kan word, te ontwikkel

#### Streeksdienste

Die Streekskantore van die S.A.B.S. in Kaapstad, Port Elizabeth en Durban was weer besonder bedrywig. Hierdie kantore dien as agentskappe vir die wisseling van inligting en vir skakeling met die nywerheid, en as basisse vir die inspeksie van tekstielstowwe, voedsel, skoeisel en hout. Die nywerheid het die fasiliteite dan ook ten volle benut en dring steeds op uitbreiding daarvan aan.



Continued assistance was given to the "better food handling" campaign and for improved consumer products, and a campaign for the better understanding by the consumer of the safe handling of insecticides for domestic and other purposes was launched. There was an increased demand for the testing of all varieties of canned food, quick-frozen food products, processed pre-packaged meat products, animal and poultry feeds, pharmaceutical products and vitamin preparations, as well as insecticides. The administration of the compulsory specifications for canned fish and canned meat products in South Africa and South West Africa continued satisfactorily and well over 100,000 samples were examined at factories all over the country, the general quality being good.

**Consumer  
commodities**

The consistently high quality attained by manufacturers canning fruits and vegetables under the standardization mark scheme gained increasing recognition overseas and assisted the sale of these products.

Important work was the collecting of raw materials, the cutting out of all upper components, and the making of 120 pairs of shoes and 80 pairs of boots to be used in large-scale Army wear trials in collaboration with the Department of Defence for purposes of standardization.

**Leather and  
Footwear**

A determined effort is being made to correlate laboratory tests with actual wear, at the same time endeavouring to arrive at a standard last for use in the Army, Navy, Air Force and Police Force.

The regional offices of the S.A.B.S. at Cape Town, Port Elizabeth and Durban remained extremely busy, acting as they do as clearing houses for information, maintaining local contact with industry, and serving as bases for textile, food, footwear and timber inspection. Industry made full use of their facilities and is constantly pressing for their extension.

**Regional Services**



## RESEARCH BURSARIES and ASSISTANTSHIPS

awarded by the C.S.I.R. during 1960

## NAVORSINGSBEURSE en ASSISTENTSKAPPE

wat deur die W.N.N.R. gedurende 1960 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, Dr. K. H. M.A., D.Sc. £650	University of Cape Town	Revision of the South African Marine Mollusca. (Previous awards 1957-1959). <i>Herstelling van S.A. Seeweekdiere. (Vorige toekennings 1957-1959).</i>
EWER, Dr. (Mrs.) R. F. B.Sc., D.Sc., Ph.D. Senior Bursar £500	Rhodes University	Study of the fossil reptile Genus <i>Euparkeria</i> . (Previous awards 1953-1957, 1959). <i>Studie van die fossielreptielgenus Euparkeria. (Vorige toekennings 1953-1957, 1959).</i>
JUBB, R. A. B.Sc. Scientific Assistant £300	Rhodes University	Freshwater fishes of Southern Africa, with special reference to the biology of the freshwater eels. (Previous awards 1957-1959). <i>Die varswatervisse van Suidelike Afrika met spesiale aandag aan die studie van die biologie van die varswaterpalings. (Vorige toekennings 1957-1959).</i>
OMER-COOPER, Dr. (Mrs.) J. B.A., Ph.D. Lecturer in Zoology £550	Rhodes University	Dytiscidae of Southern Africa. (Previous awards 1955-1959). <i>Dytiscidae van Suidelike Afrika. (Vorige toekennings 1955-1959).</i>
PILLANS, N. S. Research worker Bolus Herbarium £600	University of Cape Town	Taxonomic revision of the genus <i>Hermannia</i> . (Previous awards 1958 and 1959). <i>Taksonomiese hersiening van die genus Hermannia. (Vorige toekennings 1958 en 1959).</i>
SMITH, Prof. J. L. B. B.A., M.Sc., Ph.D., F.R.S. (S.A.) Research Professor £1,620	Rhodes University	Fishes. (Previous awards 1947-1959). <i>Visse. (Vorige toekennings 1947-1959).</i>
WINTERBOTTOM, Dr. J. M. B.Sc., Ph.D. Senior Bursar £600	University of Cape Town	Distribution of Land and Fresh Water Birds of the Western Cape. (Previous awards 1957-1959). <i>Versepreiding van die land- en varswatervoëls van die Westelike Kaapprovinsie. (Vorige toekennings 1957-1959).</i>
VAN DER MERWE, Prof. J. H. M.Sc., Ph.D., Professor of Mathematics £178	University of Cape Town	Ontwikkelinge in Eigenfunksies in een of twee veranderlikes en die eienskappe van die differensiaalvergelykinge daarin gebruik. <i>Developments in Eigenfunctions in one or two variables and the properties of the differential-equations used therein,</i>
VAN DEN BOS, Dr. W. H. Dr. Maths. & Phys. Retired Union Astronomer £600	Union Observatory, Johannesburg	Double Star Astronomy. (Previous award 1959). <i>Dubbelsterre. (Vorige toekenning 1959).</i>
MEYER, Dr. M. A. B.Sc., M.Sc., D.Sc. Senior Lecturer £500	Potchefstroomse Universiteit vir C.H.O.	Verstrooiing van Mu-mesone in lood en ander elemente. (Vorige toekennings 1949-1951, 1959). <i>Scattering of Mu-mesones in lead and other substances. (Previous awards 1949-1951, 1959).</i>
BOK, Dr. L. D. C. M.Sc., Dr. rer. Nat. D.I.C. Professor of Chemistry £300	University of Bordeaux	Applications of infra-red Spectroscopy and X-Ray Diffraction on Anorganic Chemistry. (Previous awards 1954-56). <i>Toepassings van infrarooi spektroskopie en X-straal diffraksie op die Anorganiese Chemie. (Vorige toekennings 1954-56).</i>

Name and Qualifications Naam en Kwalifikasies	Where tenable Waar geldig	Subject of Research Onderwerp van navorsing
<i>Botany   Plantkunde</i>		
DE KIEWIET, D. G. B.Sc. £150	University of the Witwatersrand	A project in biochemistry. <i>'n Biochemiese projek.</i>
GODFREY, A. E. B.Sc. £150	University of the Witwatersrand	A project in plant physiology. <i>'n Projek in plantfisiologie.</i>
GREATHEAD, S. K. B.Sc., B.Sc. (Hons.) £250	Rhodes University	Investigation of the aquatic fungi in Eastern Cape Province. <i>Onderzoek van die waterswamme in die Oostelike Kaap.</i>
HOUGH, M. C. B.Sc. £150	Universiteit van Pretoria	'n Studie van die atmosferiese stikstofbinding en stikstof metabolisme van wortels in steriele kulture. <i>A study of the fixation of atmospheric nitrogen and nitrogen metabolism of roots in sterile cultures.</i>
MURISON, G. L. B.Sc. £150	University of the Witwatersrand	A subject in biochemistry. <i>'n Biochemiese onderwerp.</i>
OSHREY, I. B.Sc. £150	University of the Witwatersrand	A subject in biochemistry. <i>'n Biochemiese onderwerp.</i>
VAN DEN HEEVER, M. B.Sc. £150	Universiteit van Pretoria	Invloed van daglengte en hormone op die blomvorming van plante. <i>The effect of diurnal length and hormones on the flowering of plants.</i>
VAN DER WALT, J. J. A. B.Sc. £250	Universiteit van Pretoria	'n Morfologiese-ekologiese studie van S.A. Liane (Vorige toekennening 1959). <i>A morpho-ecological study of S.A. Lianas. (Previous award 1959).</i>
VAN WYK, J. G. L. B.Sc. £150	Universiteit van Pretoria	'n Studie van die binding van atmosferiese stikstof deur inheemse blou-groen alge en moontlike ander mikro-organismes op gronde wat periodiek aan bevloeding blootgestel word. <i>A study of the fixation of atmospheric nitrogen by indigenous blue-green algae and other micro-organisms, if any, in soils periodically exposed to flooding.</i>
MAUVE, A. A. B.Sc. £150	University of the Witwatersrand	A project in botany. <i>'n Plantkundige projek.</i>
NEWMARK, D. B.Sc. £110	University of Natal	A project in botany. <i>'n Plantkundige projek.</i>
<i>Chemical Engineering   Chemiese Ingenieurswese</i>		
BUZZARD, J. L. B.Sc. £65	University of Natal	Equilibrium relationships in the production of sodium bicarbonate from sodium carbonate. <i>Ewewigsverhoudings in die produksie van natriumbikarbonaat uit natriumkarbonaat.</i>
CROSS, W. J. B.Sc. £54	University of Natal	The development of inclined overfire V jets for the control of smoke in small-boiler furnaces. <i>Die ontwikkeling van skuins V-strale bo die vuur in oonde met klein ketels vir die beheer van rook.</i>
JACKSON, A. G. M. B.Sc. £65	University of Natal	An investigation into the efficiency of various filter cloths in the filtration of fine fumes. <i>'n Onderzoek na die doeltreffendheid van verskillende filterdoeke by die filtrering van fyn rookdampe.</i>
TE RIELE, W. A. M. B.Sc. £65	University of Natal	An investigation in the efficiencies of various filter cloths for fine fumes. <i>'n Onderzoek na die doeltreffendheid van verskillende filterdoeke vir fyn rookdampe.</i>
WARREN, D. R. B.Sc. £65	University of Natal	An investigation into the behaviour of a small cooling tower. <i>'n Onderzoek na die gedrag van 'n klein koeltoring.</i>
<i>Chemistry   Chemie</i>		
BARBOUR, R. A. B.Sc. £250	University of Natal	Purification of effluent from Bakers yeast manufacture. <i>Die suiwering van afvalwater van bakkersgisvervaardiging.</i>
BREDIN, J. T. B.Sc. £65	University of Natal	A project in chemistry. <i>'n Chemiese projek.</i>

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BRANDT, P. J. B.Sc., B.Sc. (Hons.) £250	Rhodes University	A study of errors in spectrographic methods for trace element analysis. <i>'n Studie van foute in spektrografiese metodes vir die ontleding van spoorelemente.</i>
BRINK, D. W. B.Sc. £65	University of Natal	A project in chemistry. <i>'n Chemiese projek.</i>
BROWN, M. E. B.Sc. (Hons.) £250	University of the Witwatersrand	Critical micella concentration in relation to ion flotation. (Previous award 1959). <i>Kritiese miselkonsentrasie in verhouding tot ionflotasie. (Vorige toekening 1959).</i>
BULL, J. R. B.Sc. (Hons.) £250	University of Natal	Wood extractives. (Previous award 1959). <i>Houtuittloogniddels. (Vorige toekening 1959).</i>
BURGER, B. V. B.Sc., M.Sc. £300	Universiteit van Stellenbosch	Die verwantskap tussen struktuur en vitamien A aktiwiteit van poliëne. (Vorige toekening 1959). <i>The relationship between structure and vitamin A activity of polyenes. (Previous award 1959).</i>
CHANCELLOR-MADDISON, J. A. B.Sc. £150	University of the Witwatersrand	A project in organic chemistry. <i>'n Projek in organiese Chemie.</i>
COETZEE, C. J. B.Sc., M.Sc. £300	Universiteit van Stellenbosch	Ioonuitruilereienskappe van sekere anorganiese verbindings. (Vorige toekening 1959). <i>Ion exchange properties of certain inorganic compounds. (Previous award 1959).</i>
CONRADIE, W. J. B.Sc., B.Sc. (Hons.) £250	Universiteit van Stellenbosch	Die sintese en eienskappe van Cis—B—formielkrotonsuur en sy derivate. (Vorige toekening 1959). <i>The synthesis and properties of Cis—B—formyl crotonic acid and its derivatives. (Previous award 1959).</i>
COTTON, T. H. B.Sc. (Hons.) £250	University of the Witwatersrand	Investigation of complexes formed by chromous ions. (Previous award 1959). <i>Onderzoek van komplekse deur chromione. (Vorige toekening 1959).</i>
CROWTHER, P. B.Sc., B.Sc. (Hons.) M.Sc., Ph. D. student £300	University of Natal	Thermal diffusion in liquid mixtures. (Previous awards 1958, 1959). <i>Warmteverspreiding in vloeistofmengsels. (Vorige toekennings 1958, 1959).</i>
DE BEER, W. H. J. B.Sc. £250	Universiteit van Pretoria	Alkaloïede of bitterstowwe. <i>Alkaloids or bitter principles.</i>
FARRER, H. N. B.Sc. (Hons.) £250	University of Natal	Determination of trace residues after anionic complex extraction using a polarograph. (Previous award 1959). <i>Bepaling van spoorreste na anioniese kompleksestraksie met gebruik van 'n polarograaf. (Vorige toekening 1959).</i>
FROST, J. B. B.Sc. (Hons.) £250	University of the Witwatersrand	Exchange reactions of cobalt complexed with organic ligands. (Previous award 1959). <i>Uitruillingsreaksies van kobalt met organiese ligande. (Vorige toekening 1959).</i>
FROST, P. J. B.Sc. £150	University of the Witwatersrand	A project in organic chemistry. <i>'n Projek in organiese skeikunde.</i>
FOURIE, J. N. B.Sc. £150	Universiteit van Pretoria	Bitterstowwe, alkaloïede of diënkomplesse. <i>Bitter principles, alkaloids or diene complexes.</i>
GARBUTT, D. C. F. B.Sc. (Hons.), M.Sc. £250	University of Natal	Alkaloids of the amaryllidaceae. (Previous awards 1958, 1959). <i>Alkaloïede van die amaryllidaceae. (Vorige toekennings 1958, 1959).</i>
GATENBY, A. M. B.Sc. £65	University of Natal	Project in chemistry. <i>Projek in chemie.</i>
GORDON, R. I. B.Sc. £65	University of Natal	Project in chemistry. <i>Projek in chemie.</i>
GRAVETT, M. J. B.Sc. £150	University of the Witwatersrand	A project in organic chemistry. <i>'n Projek in organiese chemie.</i>
GROENEWALD, T. B.Sc. (Hons.) £250	University of the Witwatersrand	Kinetics of the decomposition of ammonia by the group 5 binary compounds. (Previous award 1959). <i>Kinetika van die ontbinding van ammonia deur die groep 5 binêre verbindings. (Vorige toekening 1959).</i>

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GROSSERT, J. S. B.Sc. (Hons.) £250	University of Natal	Alkaloids of the amaryllidaceae. (Previous award 1959). <i>Alkaloïede van die amaryllidaceae. (Vorige toekening 1959).</i>
HAINES, R. J. B.Sc. £110	University of Natal	A project in chemistry. <i>'n Projek in chemie.</i>
HARRIS, G. C. B.Sc. £110	University of Natal	Wood chemistry. <i>Houtchemie.</i>
HELFER, W. E. B.Sc. (Hons.), M.Sc. £250	University of Natal	Thermal conductivity of gas mixtures. (Previous awards 1958, 1959). <i>Termiese geleivermoë van gasmengsels. (Vorige toekennings 1958, 1959).</i>
HERLEY, P. J. B.Sc., B.Sc. (Hons.) M.Sc. £300	Rhodes University	The thermal decomposition of irradiated solids. (Previous award 1959). <i>Die termiese ontbinding van bestraalde vaste stowwe. (Vorige toekening 1959).</i>
HOEK, W. J. B.Sc. £65	University of Natal	Wood extractives. <i>Geëkstraheerde stowwe uit hout.</i>
HOLME, R. R. B.Sc. £65	University of Natal	A project in chemistry. <i>'n Projek in chemie.</i>
HOPE, C. J. B.Sc. (Hons.) £250	University of the Witwatersrand	Investigation into the analytical aspects of ion flotation. <i>Ondersoek van die analitiese aspekte van loonflottering.</i>
KENWAY, C. H. B.Sc., B.Sc. (Hons.) £250	University of Natal	Submerged vinegar fermentation. (Previous award 1959). <i>Diepkultuur-asynsuurgisting. (Vorige toekening 1959).</i>
KING, D. A. B.Sc. £150	University of the Witwatersrand	A project in organic chemistry. <i>'n Projek in organiese chemie.</i>
KORT, M. J. B.Sc. £150	University of Cape Town	A research project in chemistry. <i>'n Navorsingsprojek in chemie.</i>
LAING, M. J. B.Sc. (Hons.) £250	University of Natal	Action of light on silver salts. (Previous award 1959). <i>Inwerking van lig op silwersoute. (Vorige toekening 1959).</i>
LOMBAARD, J. H. B.Sc., B.Sc. (Hons.) £250	Universiteit van Stellenbosch	Involvement of perchlorate ions on the separation of cations by means of anion exchangers. (Previous award 1959). <i>Influensie van perchlorate ions on the separation of cations by means of anion exchangers. (Vorige award 1959).</i>
LOURENS, L. C. F. B.Sc. £100	Universiteit van Stellenbosch	'n Projek in chemie. <i>A research project in chemistry.</i>
MALHERBE, A. G. B.Sc. £150	Universiteit van die O.V.S.	Ondersoek in verband met Suid-Afrikaanse visgifstowwe. <i>Investigation into South African fish poisons.</i>
MCGILL, W. J. B.Sc. (Chem. Eng.) £250	University of the Witwatersrand	Kinetic study of $\text{NH}_3$ decomposition using nitride catalysts. (Previous award 1959). <i>Kinetiese studie van <math>\text{NH}_3</math> ontbinding met behulp van nitriedkatalisators. (Vorige toekening 1959).</i>
MCMILLAN, R. F. G. B.Sc. £65	University of Natal	A project in chemistry. <i>'n Projek in chemie.</i>
MEISEL, H. R. F. B.Sc. £65	University of Natal	Chemistry of wood extractives. <i>Skeikunde van geëkstraheerde stowwe uit hout.</i>
NICOL, M. J. B.Sc. £150	University of the Witwatersrand	A project in physical chemistry. <i>'n Projek in fisiese chemie.</i>
PEGEL, K. H. B.Sc., B.Sc. (Hons.) £250	University of the Witwatersrand	The molecular structure of cucurbitacin B. (Previous awards 1957, 1958). <i>Die molekulêre struktuur van kukurbitasien B. (Vorige toekennings 1957, 1958.)</i>
PHILLPOTTS, C. A. R. B.Sc., B.Sc. (Hons.) £250	Rhodes University	Construction of a polarograph sensitivity and selectivity and application to the determination of certain trace elements. (Previous award 1959). <i>Konstruksie van die gevoeligheid en selektiwiteit van 'n polarograaf en die toepassing daarvan op die bepaling van sekere spoorelemente. (Vorige toekening 1959).</i>

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PRETORIUS, J. L. B.Sc., H.O.D. £150	Universiteit van Pretoria	Bitterstowwe van <i>Solanum</i> spp., alkaloiëde of diënkomplesse. <i>Bitter principles of Solanum spp., alkaloids or diene complexes.</i>
PRICE, P. B.Sc. £150	University of the Witwatersrand	A project in organic chemistry. <i>'n Projek in organiese chemie.</i>
RAVNÖ, A. B. B.Sc. £65	University of Natal	A project in chemistry. <i>'n Projek in chemie.</i>
ROLLE, R. B.Sc. £150	Universiteit van Pretoria	'n Projek in fisiese chemie. <i>A project in physical chemistry.</i>
SAAYMAN, H. M. B.Sc., B.Sc. (Hons.) £250	Rhodes University	Molecular orientation at the water-air interface (Previous award 1959). <i>Molekulêre orientasie op die water-lugtussenvlak. (Vorige toekening 1959).</i>
SMITH, A. J. H. B.Sc., B.Sc. (Hons.) U.E.D. £250	Rhodes University	A critical investigation of the determination of sulphur in plant material. <i>'n Kritiese ondersoek van die bepaling van swawel in plante materiaal.</i>
SMITH, W. M. B.Sc. £150	Rhodes University	Investigation of the essential oil of a local species of <i>Barosma</i> . <i>Onderzoek van die essensiële olie van 'n plaaslike Barosmasoort.</i>
TORRANCE, J. D. M.Sc. £250	University of the Witwatersrand	A chemical investigation of cucurbitacin P. (Previous awards 1958, 1959). <i>'n Skeikundige ondersoek van kukurbitasien P. (Vorige toekennings 1958, 1959).</i>
WEIDEMA, E. B.Sc. £150	Universiteit van Pretoria	Diënkomplesse, alkaloiëde of bitterstowwe ( <i>Solanum</i> spp.). <i>Diene complexes, alkaloids or bitter principles (Solanum spp.).</i>
WELKE, H. J. F. B.Sc. (Hons.) £250	University of Natal	Polarographic determination of Rubidium in rocks. (Previous award 1959). <i>Polarografiese bepaling van Rubidium in rotse. (Vorige toekening 1959).</i>
WOOD, G. H. B.Sc. £110	University of Natal	A project in chemistry. <i>'n Projek in chemie.</i>
WRIGHT, D. S. B.Sc. (Chem. Eng.) £250	University of the Witwatersrand	Solvent extraction of thorium lanthanum and cerium. <i>Ekstrahering van torium, lantaan en serium d.m.v. 'n oplosmiddel.</i>
WRIGHT, W. G. B.Sc., Ph.D., D.I.C. Research Student £250	University of Natal	The alkaloids of the amaryllidaceae guttatine. The new alkaloid from <i>Boöphane Guttata</i> . (Previous awards 1958, 1959). <i>Die alkaloiëde van die amaryllidaceae guttatine. Die nuwe alkaloiëde uit Boöphane Guttata. (Vorige toekennings 1958, 1959).</i>
YATES, K. C. B.Sc. (Hons.) £250	University of Natal	Alkaloids of the amaryllidaceae. (Previous award 1959). <i>Alkaloiëde van die amaryllidaceae. (Vorige toekening 1959).</i>
<i>Civil Engineering / Siviele Ingenieurswese</i>		
BARNARD, C. J. B.Sc. (Eng.) £250	University of the Witwatersrand	An investigation of the relationship between thrust on a thick walled soil sampler and the shear strength of the soil. <i>'n Onderzoek van die verband tussen die druk op 'n di.wandige grondmonsternemer en die skuifvastheid van die grond.</i>
BURLAND, J. B. B.Sc. £250	University of the Witwatersrand	The measurement of negative pore water pressures with a view to determining the effective stresses on partially saturated soils. (Previous award 1959). <i>Die bepaling van negatiewe porieëwaterdruk ter bepaling van die effektiewe spannings op gedeeltelik versadigde grond. (Vorige toekening 1959).</i>
DE BEER, D. F. B. B.Sc., B. Eng. (Civil) £250	Universiteit van Stellenbosch	Navorsingswerk in hidroulika. <i>Research in hydraulics.</i>
DE LEEUW, C. P. B.Sc. (Civ. Eng.) £250	University of the Witwatersrand	A study of the methods of extending South African stream flow data. <i>'n Studie van metodes ter uitbreiding van die gegewens van stroomvloei in S.A.</i>
KIRCHMANN, P. F. B.Sc. (Eng.) £250	University of the Witwatersrand	An examination of the criterion of shear failure in soils with particular reference to the Mohr hypothesis. <i>'n Onderzoek van die kenmerk van skuifswigling in grond veral m.b.t. die Mohr-hipotese.</i>

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MULLER, J. R. B.Sc. (Civ. Eng.) A.M.I. Struct. Eng. M.I.C.E. £250	University of the Witwatersrand	Scour criteria in South African rivers with particular reference to structures in river beds. <i>Kenmerke van spoelsteuring in S.A. riviere, veral m.b.t. die struktuur van rivierbeddings.</i>
WAGENER, F. v. M. B.Sc. (Civ. Eng.) £250	University of the Witwatersrand	Study of strength of soils under repetitive loading as experienced in a road foundation. <i>Studie van die sterkte van grond onder die herhaalde belasting wat by 'n padfondament voorkom.</i>
<i>Electrical Engineering / Elektriese Ingenieurswese</i>		
ASHPOLE, F. V. B.Sc. (Elect. Eng.) £250	University of Cape Town	Development of a reed frequency analyzer for harmonic analysis. <i>Ontwikkeling van 'n analisator vir rietfrequentie vir die ontleding van bostrillings.</i>
BAKER, D. J. B.Sc. (Elect. Eng.) £250	University of the Witwatersrand	Harmonic fields and torques in induction motors. <i>Harmoniese velde en torsies by induksiemotore</i>
DEIST, F. H. B.Sc. (Elect. Eng.)	University of the Witwatersrand	A theoretical study of digital computation. <i>'n Teoretiese studie van syferberekening.</i>
MARLOTH, G. R. B.Sc. (Elect. Eng.) £250	University of the Witwatersrand	A study of a shunt connected AC commutator motor using condensers in the field circuit. <i>Studie van 'n WS-kommutatormotor met ontakverbinding met behulp van kondensators in die veldstroomkring.</i>
<i>Geology / Geologie</i>		
BOTHA, B. J. V. B.Sc., M.Sc. £150	Universiteit van Pretoria	'n Studie van die sandrige sedimente van die Otavibergland en die pseudoapliet van die Tsumebmyn en omgewing. <i>A study of the sandy sediments of the Otavi Highlands and the pseudo-apliet of the Tsumeb mine and vicinity.</i>
FOWLER, A. B.Sc. £150	University of the Witwatersrand	Preliminary petrological investigation of the Ventersdorp lavas south of Johannesburg. <i>Voorlopige petrologiese ondersoek van die Ventersdorpse lawas ten suide van Johannesburg.</i>
GOUWS, L. C. B.Sc. £250	Universiteit van die O.V.S.	Sedimentêr-petrologiese studie van die Dwyka serie van die suidelike Kaapprovinsie. <i>Sedimentary-petrological study of the Dwyka series of the Southern Cape Province.</i>
JENNINGS, R. P. B.Sc. £110	University of Natal	The geology of the Munyke River area in the southern province of Northern Rhodesia. <i>Die geologie van die Munykeriviergebied in die suidelike provinsie van Noord-Rhodesië.</i>
KING, R. B. B.Sc. (Hons.) £250	University of Natal	Microgeomorphology: a quantitative and qualitative study of erosion on a small scale (i.e. dongas) in order to understand better the processes of macromorphology (large scale erosion). <i>Mikrogeomorfologie: kwantitatiewe en kwalitatiewe studie van kleinskaalse erosie (d.w.s. dongas) met die oog op 'n beter begrip van die prosesse van makromorfologie (grootskaalse erosie).</i>
KING, L. A. B.Sc. (Hons.) £250	University of Natal	Geomorphology of Port Natal. <i>Geomorfologie van Port Natal.</i>
MANSON, D. M. V. B.Sc. (Hons.) £250	University of the Witwatersrand	Petrological and mineralogical investigation of auriferous-pyritic quartzites in the Witwatersrand area. <i>Petrologiese en mineralogiese ondersoek van goudbevattende pirietkwartsiet in die Witwatersrandgebied.</i>
MANTON, W. I. B.Sc. £150	University of the Witwatersrand	Examination of rocks of the Bushveld igneous complex intersected in a borehole north of Bethal. <i>Ondersoek van die rotse van die Bosveldse stollingskompleks wat in 'n boorgat ten noorde van Bethal deurgesny is.</i>
MIDDLEMOST, E. A. K. B.Sc., B.Sc. (Hons.) £300	University of Cape Town	Petrological and structural studies in the Stinkfontein area of the Richtersveld, Namaqualand. (Previous award 1959.) <i>Petrologiese en struktuurstudie in die Stinkfontein gebied van die Richtersveld, Namakwaland. (Vorige toekening 1959).</i>
MIHÁLIK, P. G. V. B.Sc., B.Sc. (Hons.) £150	Universiteit van Pretoria	Verskillende tipes van amosiet in die omgewing van Penge. <i>Various types of amosite in the vicinity of Penge.</i>
MORTON, P. B.Sc. £110	University of Natal	Direction of alignment of boulders in the Dwyka tillite. <i>Rigtingslyn van die rolblokke in die Dwykatilliet.</i>



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SEIDNER, C. B.Sc., B.Sc. (Hons.) £250	University of Cape Town	The geology of the Paresis igneous complex, S.W.A. <i>Die geologie van die Paresis-stollingskompleks in S.W.A.</i>
VAN RENSBURG, W. C. J. B.Sc. £150	Universiteit van Pretoria	Die geologie van die omgewing van Die Berg—Distrik Lydenburg. <i>The geology of the vicinity of The Berg, District Lydenburg.</i>
VAN ZYL, J. S. V. B.Sc., M.Sc. £300	University of the Witwatersrand	Paleomagnetic studies on Karoo and post-Karoo igneous rocks. <i>Paleomagnetiese studie van Karoo- en na-Karoostollingsgesteente.</i>
WATSON, M. D. B.Sc., B.Sc. (Hons.) £150	Universiteit van Pretoria	Bouksiet as moontlike verweringsprodukt van nefeliengesteentes in Suid-Afrika. <i>Bauxite as a possible weathering product of nepheline rock in South Africa.</i>
WURZEL, P. B.Sc. £65	University of Natal	Field study of basement rocks in Valley of a Thousand Hills. <i>Veldstudie van oergesteente in die Vallei van Duisend Heuwels.</i>
<i>Mechanical Engineering / Meganiese Ingenieurswese</i>		
ABRAMOV, I. B.Sc. (Mech. Eng.) £250	University of the Witwatersrand	An analogue solution of field problems with particular reference to heat transfer. <i>'n Analoooplossing van veldprobleme veral m.b.t. warmte-oordrag.</i>
LUDEWIG, H. B.Sc. (Mech. Eng.) £250	University of Natal	1. Momentum transfer in diverging and converging jet systems. 2. Determination of flow round wing sections of arbitrary shape. <i>1. Momentumoordrag by divergerende en konvergerende straalstelsels. 2. Bepaling van die stroming rondom vlerkdele van arbitrêre vorm.</i>
<i>Mathematics /Wiskunde</i>		
BAUMLAG, B. B.Sc. £150	University of the Witwatersrand	A project in modern algebra. <i>'n Projek in moderne algebra.</i>
DE KOCK, G. DE V. B.Sc. £150	Universiteit van Stellenbosch	'n Projek in die wiskunde. <i>A project in mathematics.</i>
JANSEN, L. P. C. B.Sc. £75	Universiteit van Stellenbosch	'n Projek in toegepaste wiskunde. <i>A project in applied mathematics.</i>
JOUBERT, G. R. B.Sc., B.Sc. (Hons.) £250	Universiteit van Stellenbosch	Die stabiliteit van liniêre eindige differensievergelykings. <i>The stability of linear finite difference equations.</i>
KOTZE, W. J. B.Sc., B.Sc. (Hons.) £250	Universiteit van Stellenbosch	Die eenduidigheid by Cauchy se aanvangswaardeprobleem van 'n elliptiese differensiaalvergelyking van die tweede orde. <i>The uniqueness in Cauchy's initial value problem of an elliptical differential equation of the second order.</i>
LEMMER, G. B.Sc. £110	University of Natal	A project in mathematics. <i>'n Projek in die wiskunde.</i>
LEMMER, H. H. B.Sc. £250	Universiteit van Pretoria	Wiskundige statistiek. (Vorige toekening 1959). <i>Mathematical statistics. (Previous award 1959).</i>
SWART, J. H. B.Sc. £150	Universiteit van Stellenbosch	'n Projek in die wiskunde. <i>A project in mathematics.</i>
VAN DER WALT, A. P. J. B.Sc. £150	Potchefstroomse Universiteit vir C.H.O.	'n Onderwerp uit moderne algebra. <i>A subject from modern algebra.</i>
<i>Physics /Fisika</i>		
ANDERSEN, E. C. B.Sc. £150	Universiteit van Pretoria	Studie i.v.m. die elektrone-mikroskoop. <i>Studies on the electron microscope.</i>
BARRETT, D. M. B.Sc. £110	University of Natal	A project in chemistry or physics. <i>'n Projek in chemie of fisika.</i>
BERGH, H. W. B.Sc. £110	University of Natal	A project in physics. <i>'n Projek in fisika.</i>

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BORNMAN, C. H. B.Sc. £150	Potchefstroomse Universiteit vir C.H.O.	Analise van Wilsonkamerfotos vir sekondêre effekte van Mu-mesone in loodplate. <i>Analysis of Wilson chamber photographs for secondary effects of mu-mesons in lead sheets.</i>
BOTHA, A. H. B.Sc. £150	Universiteit van Stellenbosch	Navorsingswerk op die gebied van kernfisika. <i>Research in the field of nuclear physics.</i>
BREDENKAMP, D. B. B.Sc. £150	Universiteit van die O.V.S.	'n Projek in fisika. <i>A project in physics.</i>
DAMERELL, C. J. S. B.Sc. £150	University of Cape Town	A research project in physics. <i>'n Navorsingsprojek in fisika.</i>
DANGOR, A. E. B.Sc. £150	University of the Witwatersrand	Ohm's law in a plasma placed in a magnetic field. <i>Die wet van Ohm in 'n plasma in 'n magnetiese veld geplaas.</i>
DORMEHL, I. C. B.Sc. £150	Universiteit van Pretoria	'n Projek in kernfisika. <i>A project in nuclear physics.</i>
DREW, N. E. B.Sc. £65	University of Natal	The production of a concentrated silica sol by ion exchange. <i>Die produksie van 'n gekonsentreerde silikasol d.m.v. ionuitruiling.</i>
EDWARDS, B. M. B.Sc. £65	University of Natal	A project in physics. <i>'n Projek in fisika.</i>
ENGEL, D. W. B.Sc. (Hons.) £250	University of Cape Town	A research project in physics. <i>'n Navorsingsprojek in fisika.</i>
FOURIE, P. J. B.Sc. £150	Universiteit van Stellenbosch	Navorsingswerk op die gebied van kernfisika. <i>Research in the field of nuclear physics.</i>
GOODHEAD, D. T. B.Sc. £110	University of Natal	A project in physics. <i>'n Projek in fisika.</i>
HERBST, P. H. B.Sc., B.Sc. (Hons.) £250	Universiteit van Stellenbosch	'n Studie van die eienskappe van die bekende elementêre partikels en sommige van die teorieë wat dit sistematiseer en probeer verklaar. (Vorige toekenning 1959). <i>A study of the properties of the well known elementary particles and some of the theories which systematize and attempt to explain them. (Previous award 1959).</i>
HEYNS, H. N. B.Sc. £150	Universiteit van Stellenbosch	Navorsingswerk in kernfisika. <i>Research in nuclear physics.</i>
HOEMEYR, C. B.Sc. £250	Potchefstroomse Universiteit vir C.H.O.	Ondersoek i.v.m. die elektron-positron paarvorming deur $\mu$ -mesone van verskillende energieë in lood m.b.v. in Wilson-kamer. <i>An investigation into electron-positron pairing by <math>\mu</math>-mesons of various energies in lead by means of a Wilson chamber.</i>
HOUGH, J. H. B.Sc. £150	Universiteit van die O.V.S.	'n Projek in fisika. <i>A Project in physics.</i>
JACOBSON, J. L. B.Sc. £150	University of the Witwatersrand	Radio astronomy. <i>Radio-astronomie.</i>
KLEIN, K.P. B.Sc. £150	University of Cape Town	A research project in physics. <i>'n Navorsingsprojek in fisika.</i>
LEWIN, I. B.Sc. £150	University of Cape Town	A research project in physics. <i>'n Navorsingsprojek in fisika.</i>
MAVER, R. M. B.Sc. £150	University of Cape Town	A research project in physics. <i>'n Navorsingsprojek in fisika.</i>
MILLS, S. J. B.Sc. £150	Universiteit van Stellenbosch	Navorsingswerk in die breë veld van teoretiese kernfisika. <i>Research in the broad field of theoretical nuclear physics.</i>
MORGAN, G. S. B.Sc. £65	University of Natal	A project in physics. <i>'n Projek in fisika.</i>
NAUDÉ, W. J. B.Sc. £150	Universiteit van Stellenbosch	Navorsingswerk op die gebied van spektrochemie. <i>Research in the field of spectrochemistry.</i>

Name and Qualifications Naam en Kwalifikasies	Where tenable Waar geldig	Subject of Research Onderwerp van navorsing
POTGIETER, J. M. B.Sc. £150	Universiteit van Stellenbosch	Navorsingswerk in die breë veld van kernfisika. <i>Research in the broad field of nuclear physics.</i>
SPOELSTRA, B. B.Sc., B.Sc. (Hons.) £250	Universiteit van Stellenbosch	Beplanning van 'n meetopstelling en voorbereidende ondersoek vir die meting van neutrone-polarisasie vanaf die D-D reaksie. (Vorige toekening 1959). <i>Planning of a measuring setup and preparatory investigations for the measurement of neutron polarization from the D-D reaction. (Previous award 1959).</i>
TÉPEL, J. W. B.Sc. £150	Universiteit van Pretoria	'n Projek in kernfisika. <i>A Project in nuclear physics.</i>
VAN DER MERWE, P. B.Sc., B.Sc. (Hons.) £250	Universiteit van Stellenbosch	Konstruksie van 'n deutroneversneller. <i>Construction of a deuteron accelerator.</i>
VAN DER WALT, A. J. B.Sc. £250	Potchefstroomse Universiteit vir C.H.O.	Die verstrooiing van mu-mesone in lood en ander elemente gemeet met behulp van 'n hodoskopopstelling van telbuise. (Vorige toekennings 1958, 1959). <i>The scattering of mu-mesons in lead and other elements measured by means of a hodoscope set-up of countertubes. (Previous awards 1958, 1959).</i>
VAN DER WALT, C. M. B.Sc., B.Sc. (Hons.) £250	Universiteit van Stellenbosch	Verdere studies van die werking van die Omegatron en die gebruik daarvan as massaspektrometer in die bepaling van $N^{14}$ : $N^{15}$ verhoudings. <i>Further studies on the operation of the Omegatron and its use as a mass spectrometer in the determination of <math>N^{14}</math>: <math>N^{15}</math> ratios.</i>
VAN RYNEVELD, W. P. B.Sc., B.Sc. (Hons.) £250	Universiteit van die O.V.S.	Magnetiese tydseffekte in nikkel. <i>Magnetic time effects in nickel.</i>
VON LUDWIG, T. C. B.Sc. £100	Universiteit van Stellenbosch	Navorsingswerk op die gebied van kernfisika. <i>Research in the field of nuclear physics.</i>
WILD, P. A. T. B.Sc., B.Sc. (Hons.) M.Sc. £300	Rhodes University	Research in the field of radio astronomy. (Previous award 1958). <i>Navorsing op die gebied van radio-astronomie. (Vorige toekening 1958).</i>
WILLIAMS, P. G. B.Sc. £150	University of the Witwatersrand	Cerenkov radiation. <i>Cerenkov-straling.</i>
WOLMARANS, N. S. B.Sc. £150	Potchefstroomse Universiteit vir C.H.O.	Uitgebreide buie van kosmiese strale van baie hoë energie. <i>Extensive showers of very high energy cosmic rays.</i>
<i>Physiology   Fisiologie</i>		
BEARDWOOD, C. J. B.Sc. (Agric.) £250	University of the Witwatersrand	Amino acid metabolism in baboons in various nutritional and endocrine states. <i>Aminosuurmetabolisme in bobefane by verskillende toestande t.o.v. voeding en die buislose klier.</i>
LOCHNER, J. de V. B.Sc., M.Sc. £250	Universiteit van Stellenbosch	Die funksionele verband van die hormone van die hipofise voorlob en die biniere met die hiperglusemiese faktor van die pankreaseilandweefsel, m.b.t. sekere aspekte van die koolhidraat en vetmetabolisme. <i>The functional relationship of the hypophysis frontal lobe and adrenal hormones to the hyperglucaemic factor of the pancreatic islet tissues in certain aspects of carbohydrate and fat metabolism.</i>
<i>Wood Technology   Houttegnologie</i>		
MONK, T. H. B.Sc. (Forestry) £250	Universiteit van Stellenbosch	Beskerming van hout teen vertering. <i>Protection of wood against weathering.</i>
<i>Zoology   Dierkunde</i>		
DE VRIES, J. B. B.Sc. £150	Universiteit van Stellenbosch	Die morfologie en histologie van nudibranchia <i>melibe rosea</i> . <i>The morphology and histology of nudibranchia melibe rosea.</i>
ELS, A. J. B.Sc. £100	Universiteit van Stellenbosch	Die skedelmorfologie van schistometopum thomensis. <i>The skull morphology of schistometopum thomensis.</i>
GRAHAM, P. J. (Miss) B.Sc. £150	University of Cape Town	A research project in zoology. <i>'n Navorsingsprojek in dierkunde.</i>

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HULLEY, P. E. B.Sc., B.Sc. (Hons.) £250	Rhodes University	Studies on the behaviour of scale insects. (Previous award 1958). <i>Studie van die gedrag van skaalinsekte. (Vorige toekenning 1958).</i>
MATHIAS, J. G. B.Sc. £150	University of Cape Town	A research project in zoology. <i>'n Navorsingsprojek in dierkunde.</i>
MILNE, W. M. B.Sc. £150	University of the Witwatersrand	Study of the thoracic muscles in mantids and phasmids. <i>Studie van die borsspiere by mantidae en phasmidae.</i>
SÜLTER, M. M. B.Sc. £72. 10s.	Universiteit van Stellenbosch	Die skedel morfologie van <i>causis rhombeatus</i> . (Vorige toekenning 1959). <i>The cranial morphology of causis rhombeatus. (Previous award 1959).</i>
TAYLOR, F. J. R. B.Sc. £150	University of Cape Town	A research project in zoology. <i>'n Navorsingsprojek in dierkunde.</i>
WALTHER, H. B.Sc. £150	University of the Witwatersrand	An electron microscopic study of the primitive streak in birds. <i>'n Elektronmikroskopiese studie van die primitiewe eienskap in voëls.</i>
WEBER, A. E. B.Sc., B.Sc. (Hons.) £250	University of Cape Town	Research in animal physiology. (Previous award 1959). <i>Navorsing in dierefsiologie. (Vorige toekenning 1959).</i>
ALEXANDER, DR. A. J. B.Sc., B.Sc. (Hons.) Ph.D. 1951 Exhibition Scholar £200	University of Cambridge	1. Locomotion mechanisms in scorpions. 2. Chemosensory physiology of Arachnids. (Previous awards 1955, 1956 and 1959). 1. <i>Bewegingsmeganismes by die skerpioen.</i> 2. <i>Chemosensoriese fisiologie van die Arachnidae. (Vorige toekennings 1955, 1956 en 1959).</i>
BLIGHT, G. E. M.Sc. (Eng.) Research Student £125	Imperial College, London	Consolidation and shear of partly saturated compacted soils. (Previous awards 1956, 1958). <i>Konsolidasie en skuifspanning van gedeeltelik versadigde vasgestampte grond. (Vorige toekennings 1956, 1958).</i>
BOUWER, I. Z. M.Sc. £125	University of Toronto	Representations of Lie Groups. <i>Voorstelling van Lie-groepe.</i>
BUSH, B. M. H. M.Sc. Research Student £300	University of Cambridge	Reflex inhibition in decapod crustacea in particular in <i>carcinus moenas</i> . (Previous awards 1955, 1956, 1958). <i>Refleksinhibering in dekapoodskaaldiere, veral in carcinus moenas. (Vorige toekennings 1955, 1956, 1958.)</i>
DEKKER, J. B.Sc., B.Sc. (Hons.) M.Sc. £250	Organic Institute, Karlsruhe	Herstellung und Umsetzungen von halogenurten cyclobutanen. <i>Preparation and conversion of halogenated cyclobutanes. (Previous awards 1957, 1959).</i> <i>Bereiding en omsetting van gehalogeneerde siklobutane. (Vorige toekennings 1957, 1959).</i>
HALBICH, J. N. B.Sc., M.Sc. Geologist, Department of Water Affairs. £300	University of Bonn	Morfologiese aspekte van die Pleistoseen ysafsettings van Noord-Duitsland. (Vorige toekenning 1958). <i>Morphological aspects of the Pleistocene ice deposits of Northern Germany. (Previous award 1958).</i>
KURE, J. B.Sc. (Surv.) £250	International Training Centre for Aerial Survey in Delft	Photogrammetric mapping methods. <i>Fotogrammetriese karteringsmetodes.</i>
LA GRANGE, L. E. B.Sc., B.Eng. £300	Engineering Laboratories, Cambridge	The redivision of bending moments in statically undefined prestressed concrete structure. <i>Die herverdeling van buigmomente in staties onbepaalde voorspanbetonstruktuur.</i>
PRETORIUS, P. J. B.Sc., B.Sc. (Hons.) M.Sc. Lecturer, Department of Physiology. £300	University of Amsterdam	Kardiografiese metodes om die invloed van estrogene en kardiovaskulêre stowwe op die sirkulasie te ondersoek, en die invloed daarvan by arteriosklerose na te gaan. <i>Cardiographic methods for the investigation of the effects of estrogene and cardiovascular matter on the circulation, and tracing their influence in arteriosclerosis.</i>
STEYN, T. J. B.Sc., M.Sc. T.O.D. Director of Nature Conservation £300	Cornell University, U.S.A.	Problems, methods and techniques in nature conservation. <i>Probleme, metodes en tegnieke van natuurbewaring.</i>
VAN DER MERWE, K. J. B.Sc., M.Sc. £300	Georg-August University, Göttinge	Konstitusiebepaling van actinorhodin vir antibiotiese werksame kleurstof uit streptomycete coelicolor. <i>Constitution determination of actinorhodin for antibiotic active dyes from streptomycete coelicolor.</i>

Name and Qualifications Naam en Kwalifikasies	Where tenable Waar geldig	Sub'ect of Research Onderwerp van navorsing
<i>DIRECTED RESEARCH BURSARIES (OVERSEAS)/ GERIGTE NAVORSINGSBEURSE (OORSEE)</i>		
CRYER, C. W. B.Sc., M.Sc. £500	University Mathematical Laboratory, Cambridge	The application of digital computers to the numerical solution of partial differential equations of elliptic type. (Previous award 1959). <i>Die gebruik van die syferrekenmasjien vir die oplossing van partiële differensiaalvergelykings van elliptiese vorm. (Vorige toekennings 1959).</i>
DE KOCK, M. O. B.Sc. (Civ. Eng.) £500	Road Research Laboratory, Harmondsworth, Middlesex, England	Traffic Engineering (Road Safety): Geometric lay-out of roads and traffic intensity studies as related to accident rate. <i>Padverkeerkunde (Padveiligheid): Geometriese aanleg van paaie en die studie van verkeersintensiteit met betrekking tot die ongeluk-syfer.</i>
GLASSER, L. B.Sc. (Applied & Industrial Chemistry) £500	Imperial College, London	Some studies of hydrogen bonds in crystals. (Previous award 1959). <i>Studie in verband met waterstofbindings in kristalle. (Vorige toekennings 1959).</i>
FORMAN, A. B.Sc., B.A. £500	University of Cambridge	Physical properties of transition metal complexes. (Previous award 1959). <i>Fisiese eienskappe van oorgangsmetaalkomplekse. (Vorige toekennings 1959).</i>
HARDIE, L. A. M.Sc. £800	Northwestern University, Chicago	An investigation of the lowermost part of sundry sedimentary series to determine the paleogeography of the source rock areas and the initial conditions of deposition. <i>Onderzoek van die onderste deel van verskeie sedimentêre reekse ter bepaling van die paleogeografie van die bronrotsgebiede en die oorspronklike afsettings toestande.</i>
KEDDY, R. J. B.Sc., M.Sc. £500	Royal Marsden Hospital, London	The production of radio-active isotopes applicable to medical use using a 30-Mev. electron synchrotron. (Previous awards 1958 and 1959). <i>Die produksie van radioaktiewe isotope vir mediese gebruik met behulp van 'n elektronsinchronon van 30 Mev. (Vorige toekennings 1958 en 1959).</i>
LAUBSCHER, N. F. M.Sc. £800	Cornell University	Information theory and/or design of experiments. <i>Informasieteorie en/of ontwerp van eksperimente.</i>
MASILELA, A. M. B.A., B.A. (Hons.) U.E. Dipl. £600	Northwestern University, Chicago	Context of judgment and the quasiperceptual illusions of contrast and assimilation. <i>Beoordelingsverband en die kwasiwaarnemingsillusies van kontras en assimilasie.</i>
PRETORIUS, Dr. C. W. F. T. B.Sc., M.Sc., Ph.D. £800	U.C.L.A., Los Angeles and Harvard	High pressure physics and geophysics. (Previous award 1959). <i>Hoëdrukfisika en geofisika. (Vorige toekennings 1959).</i>
ROPER, H. B.Sc., B.Sc. (Hons.) £200	Portland Cement Association Laboratory, Skokie, U.S.A.	Study of dimensional changes in concrete aggregate. (Previous award 1959). <i>Studie van dimensionele veranderinge in betonagregate. (Vorige toekennings 1959).</i>
SCHUTTE, Dr. C. J. H. B.Sc., B.Sc. (Hons.) D.Sc. £300	Laboratorium voor Algemene & Anorganiese Chemie, Amsterdam	Die invloed van kristalveld op die vibrasies van $BH_4$ ion; aard van die faseverandering in $NaBH_4$ . (Vorige toekennings 1958 en 1959). <i>The influence of crystal field on the vibrations of <math>BH_4</math> ion; nature of the phase change in <math>NaBH_4</math>. (Previous awards 1958 &amp; 1959).</i>
VAN HUYSTEEN, C. N. L. A.M.I.C.E., A.M.I. (Struct) E., M.S. (Struct) E. £300	Stanford University, California	(a) Research on internal pressures in vertical silos. (b) Limit analysis of the Unit as cylindrical shells. <i>(a) Navorsing i.v.m. die inwendige druk in vertikale voerkulle. (b) Limietontleding van die Eenheid as silindriese hulse.</i>
VERSTER, T. C. B.Sc., B.Eng. £500	Imperial College of Science and Technology, London	Temperature stabilization of Transistor. <i>Temperatuurstabilisasie van Transistor-gelykstroomversterkers.</i>
WHITCUTT, Dr. J. M. B.Sc. (Hons.) Ph.D. £500	Institute of Cancer Research, London	Chemical Carcinogenesis. (Previous award 1954). <i>Chemiese Karsinogenese. (Vorige toekennings 1954).</i>
<i>DIRECTED RESEARCH BURSARIES (IN THE COUNCIL LABORATORIES)/ BEURSE VIR GERIGTE NAVORSING (IN DIE RAAD SE LABORATORIA)</i> None for 1960 Geen vir 1960		

Name and Qualifications Naam en Kwalifikasies	Where tenable Waar geldig	Subject of Research Onderwerp van navorsing
<b>ASSISTANTSHIPS/ASSISTENTSKAPPE (£540-£1,020)</b> <b>(a) GRANTS FOR THE EMPLOYMENT OF SKILLED RESEARCH ASSISTANTS/</b> <b>TOEKENNINGS VIR DIE INDIENSNEMING VAN GESKOOI DE NAVORSINGSASSISTENTE</b>		
AHRENS, Prof. L. H. B.Sc., M.A. D.Sc., F.G.S. 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 award 1959). <i>Onderzoek om vas te stel in watter mate verskeie seldsame elemente in rotsse en meteoriete voorkom en die verspreiding daarvan. (Vorige toekenning 1959).</i>
BALINSKY, Prof. B. I. D. Biol. Sci., F. Intern. L. Embryol Professor of Zoology	University of the Witwatersrand	Electron-microscopic investigation of the ultrastructure of early embryos of amphibians, fishes and sea urchins. (Previous awards 1957-1959). <i>Elektronemikroskopiese ondersoek van die ultrastruktuur van vroeë embryos van amfibieë, visse en see-egels. (Vorige toekennings 1957-1959).</i>
BOZZOLI, Prof. G. R. D.Sc. (Eng.) Professor of Electrical Engineering	University of the Witwatersrand	1. Long sparks in air. 2. Effects of dust on the gap and on electrodes. (Previous awards 1955-1959). <i>1. Lang vonke in die lug. 2. Uitwerking van stof op die spleet en op elektrodes. (Vorige toekennings 1955-1959).</i>
DART, Prof. R. A. M.Sc., M.D., Ch.B. Hon. D.Sc. Professor Emeritus	University of the Witwatersrand	Recovery of breccia and fossils from Makapansgat Limeworks. (Previous awards 1957-1959). <i>Oprgraving van breccia en fossiele by die Kalkgroewe te Makapansgat. (Vorige toekennings 1957-1959).</i>
DE WAAL, Dr. H. L. M.Sc., D.Phil., D.Sc. Hoof: Departement Organiese Chemie	Universiteit van Pretoria	1. Bitterstowwe en alkalioiede van Solanum melongena en ander aktiewe Suid-Afrikaanse plante. 2. Diënkomplekse van vitamien A en karotene. <i>1. Bitter principles and alkaloids of Solanum melongena and other active S.A. plants. 2. Diene complexes of vitamin A and carotenes.</i>
GOULD, Prof. A. J. Ph.D., D.Sc., M.I. Mech.E., M.I.C.E., M.I.N.A. Professor of Electrical Engineering	University of Natal	(a) Fatigue corrosion—Fatigue of a light alloy. (b) Engine wear by a range of lubricants. (c) Correlation of asymmetrically stressed fatigue properties of steels. (Previous awards 1954-1959). <i>(a) Vermoedheidskorrosie—vermoedheid van 'n ligte legering. (b) Enjinslytiasie deur 'n reeks smeerolies. (c) Korrelasie van die vermoedheidseienskappe van staal onder asimmetriese spanninge. (Vorige toekennings 1954-1959).</i>
GROBELAAR, Dr. N. B.Sc., M.Sc., Ph.D. (Senior Lektor) # TAGER, Dr. J. M. B.Sc. (Landboukunde) Ph.D. (Lektor)	Universiteit van Pretoria	1. Die invloed van temperatuur en ander faktore op die oorlewing van Rhizobium. 2. Oorsake van jaarlikse variasies in die groei en metaboliese aktiwiteit van hawerkiemplante. 3. Die invloed van klimaat op die groei van plante. 4. Studies oor saadontkieming. 5. Die metabolisme van rypwordende vrugte. <i>1. The influence of temperature and other factors on the survival of Rhizobium. 2. Causes of annual variations in the growth rate and metabolic activity of oat germ plants. 4. Studies on seed germination. 5. The metabolism of ripening fruit.</i>
HALES, Dr. A. L. M.A., M.Sc., Ph.D. Director, Bernard Price Institute for Geophysical Research	University of the Witwatersrand	Crustal structure and paleomagnetic investigation in Southern Africa. (Previous awards 1952-1959). <i>Korsstruktuur en paleomagnetiese ondersoeke in Suidelike Afrika. (Vorige toekennings 1952-1959).</i>
HOLLIMAN, Dr. F. G. B.A., M.A., Ph.D. Professor of Organic Chemistry	University of Cape Town	The pigment of pseudomonas aeruginosa. <i>Die pigment van pseudomonas aeruginosa.</i>
IRVING, Prof. J. M.A., Ph.D. Professor of Theoretical Physics	University of Cape Town	The high current "pinch" effect. <i>Die insnoeringseffek by strome van hoë intensiteit.</i>
ISRAELSTAM, Prof. S. A. M.Sc., Ph.D. Associate Professor of Chemistry	University of the Witwatersrand	The application of cation exchange resins in organic synthesis. (Previous awards 1957-1959). <i>Die aanwending van katioonuitruillingsharze by organiese sintese. (Vorige toekennings 1957-1959).</i>
JENNINGS, Prof. J. E. B. B.Sc. (Eng.) S.M. (M.I.T.) M. (S.A.) I.C.E. M.I.C.E. Professor of Civil Engineering	University of the Witwatersrand	A study of earth pressure coefficients. (Previous award 1959). <i>'n Studie van aardrukkoeffisiënte. (Vorige toekenning 1959).</i>
KOCH, Dr. C. Ph.D. Scientific Professional Officer	Transvaal Museum	Monograph of the Tenebrionidae of Southern Africa. (Previous awards 1953, 1958, 1959). <i>Monografie oor die Tenebrionidae van Suidelike Afrika. (Vorige toekennings 1953, 1958, 1959).</i>

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LAUF, Prof. G. B. D.Sc. (Eng.), L. (S.A.), F.R.I.C.S. Professor of Surveying	University of the Witwatersrand	An investigation into the accuracy and cost with which soil maps can be prepared from air photographs using different methods and the use to which these maps might be put in the selection of possible routes for roads. (Previous award 1959). <i>'n Ondersoek van die juistheid waarmee grondkaarte van lugfoto's, volgens verskillende metodes opgestel kan word en die koste daarvan, benewens die gebruik wat van die kaarte gemaak kan word by die keuse van moontlike roetes vir paaie. (Vorige toekennings 1959).</i>
PRETORIUS, Prof. V. B.Sc., M.Sc., D.Phil. Professor in Fisiese Chemie	Universiteit van Pretoria	Bou van massa-spektrometer en gebruik daarvan vir studie van reaksiekinetika. (Vorige toekennings 1958, 1959). <i>Construction of mass spectrometer and its use for reaction kinetics. (Previous awards 1958, 1959).</i>
SCHAEFFER, Prof. W. M.Sc., Ph.D. Professor of Physics	University of Cape Town	Electric structure factor computer and X-ray crystallographic studies of complex organic molecules. <i>Elektriese struktuurfaktorrekenoutomaat en die kristallografiese studie m.b.v. roentgenstrale van komplekse organiese molekule.</i>
SEARS, Prof. D. B. Ph.D., D.Sc. Professor of Mathematics	University of Cape Town	Stability, oscillation problems and spectral theory of differential equations. <i>Stabiliteit, ossilasieprobleme en die spektrale teorie van differensiaal-vergelykings.</i>
SMITH, Prof. J. L. B. B.A., M.Sc., Ph.D. F.R.S. (S.A.) Research Professor	Rhodes University	Fishes. (Previous awards 1954-1959). <i>Visse. (Vorige toekennings 1954-1959).</i>
STEYN, Prof. H. S. M.Sc., Ph.D., D.Sc. Professor in Wiskundige Statistiek	Universiteit van Suid-Afrika	1. Meer veranderlike diskrete en kontinue kansverdeling. 2. Ekonometrisse modellistudies. (Vorige toekennings 1959). <i>1. Multivariate discrete and continuous probability distributions. 2. Econometric studies on models. (Previous award 1959).</i>
STOKER, P. H. B.Sc., M.Sc., D.Sc. Hoof van die Departement van Fisika	Potchefstroomse Universiteit vir C.H.O.	Verskeie projekte i.v.m. kosmiese strale. (Vorige toekennings 1953-1959). <i>Various projects on cosmic rays. (Previous awards 1953-1959).</i>
VAN ZINDEREN-BAKKER, Dr. E. M. B.Sc., M.Sc., Phil. Nat.D. Lektor in Plantkunde	Universiteit van die O.V.S.	Palynologie. (Vorige toekennings 1953-1959). <i>Palynology. (Previous awards 1953-1959).</i>
WARREN, Dr. F. L. D.Sc., Ph.D., A.R.C.S., D.I.C. F.R.I.C., F.R.S. (S.A.) Professor of Chemistry	University of Natal	The isolation and structural studies of South African toxic and medicinal plants. (Previous awards 1950-1959). <i>Die isolering en struktuurstudie van S.A. giftige en geneeskragtige plante. (Vorige toekennings 1950-1959).</i>
ZEEMAN, Dr. P. B. B.Sc., M.Sc., D.Sc., Professor in Eksperimentele Fisika	Universiteit van Stellenbosch	1. Die vlamfotometrisse bepaling Na, K en Ca in wynprodukte soos mos, droë wyn, soetwyn en spiritualie. 2. Die bepaling van die elemente Cu, Mg, Fe, Pb, en As in wynprodukte m.b.v. die multibron- of gelykstroombuig waar nodig. 3. Die bepaling van Germanium in sulfietertse van Ca, Pb en Zn. 4. Die bepaling van goud in ertse. (Vorige toekennings 1949-1955, 1958). <i>1. The flame photometric determination of Na, K and Ca in wine products such as musts, dry wines, sweet wines and spirits. 2. The determination of the elements Cu, Mg, Fe, Pb and As in wine products by means of the multisource or DC current where necessary. 3. Determination of Germanium in sulphite ores of Ca, Pb and Zn. 4. Determination of gold in ores. (Previous awards 1949-1955, 1958).</i>
KING, Dr. J. W. B.Sc., B.Sc. (Hons.) M.Sc., Ph.D. Senior lecturer in Physics	University of Natal	Further analysis of I.G.Y. ionosphere data, including correlation of ionosphere data with other relevant data. (Previous awards 1958, 1959). <i>Verdere ontleding van ionosfeer-gegevens vir die I.G.J. met inbegrip van die korrelasie van ionosfeergegewens met ander toepasslike gegewens. (Vorige toekennings 1958, 1959).</i>
PHILLIPS, Prof. W. E. D.Sc. (Eng.), M.I.E.E., S.M.I.R.E. Professor of Electrical Engineering	University of Natal	The investigation of the propagation of radio waves in ionosphere using the "Backscatter" technique. (Previous awards 1957, 1958, 1959). <i>Ondersoek van die voortplanting van radiogolwe in die ionosfeer met behulp van die terugstrooiingstechniek. (Vorige toekennings 1957, 1958, 1959).</i>
RUND, Dr. H. B.Sc., Ph.D., Dr. Habil. Professor of Applied Mathematics	University of Natal	1. Metric differential geometry and non-linear field theories. 2. Invariant variational principles and spin phenomena of elementary particles. <i>1. Metrieke differensiaalmeetkunde en teorieë i.v.m. die nie-lineêre veld. 2. Invariante variasionele prinsipes en spinverskynsels van elementêre deeltjies.</i>

Name and Qualifications Naam en Kwalifikasies	Where tenable Waar geldig	Subject of Research Onderwerp van navorsing
DAVIES, Dr. D. H. B.Sc., M.Sc., Ph.D., Director, Oceanographic Research Institute	University of Natal	Biological survey of polluted sea bottom and comparison with unpolluted area. (Previous award 1959). <i>Biologiese opname van besoedelde seebodem en vergelyking met onbesoedelde gebiede. (Vorige toekening 1959).</i>
KING, Prof. L. C. D.Sc., F.R.S. (S.A.) Professor of Geology	University of Natal	The morphology of the earth. <i>Die morfologie van die aarde.</i>
(b) GRANTS FOR THE EMPLOYMENT OF UNSKILLED RESEARCH ASSISTANTS/ TOEKENNING VIR DIE INDIENSNEMING VAN ONGESKOOLDE NAVORSINGSASSISTENTE		
JURITZ, J. W. F. M.Sc. Senior Lecturer <i>and</i> CHERRY, R. D. M.Sc. Lecturer	University of Cape Town	Nuclear emulsion research project. <i>Navorsingsprojek i.v.m. kernemulstie.</i>
LIEBENBERG, A. C. B.Sc. (Eng.) A.M.I.C.E. A.M.I. Struct. Eng. A.M.A.S.C.E. 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; (b) the interaction of stair flights and landings. <i>Rekspanningskragte in betonyvloerblaie en trappe soos volg: (a) 'n ondersoek van die "boogtrek" in vloerblaie onder dwarsbelasting; (b) die wisselwerking tussen traparms en bordesse.</i>
McLACHLAN, Dr. M.Sc., Ph.D. Director, Port Elizabeth Museum and Snake Park	Port Elizabeth Museum and Snake Park	S.A. Ornithological Society bird ringing scheme. <i>Voëlberingskema van die S.A. Ornitologiese Vereniging.</i>
ROBINSON, Dr. J. T. D.Sc. Professional Officer	Transvaal Museum	Study of the South African Australopithecines. <i>'n Studie van die S.A. Australopithecine.</i>
CLARENCE, Prof. N. D. M.A., Ph.D. Professor of Experimental Physics	University of Natal	(a) Whistling atmospherics. (b) Scintillations from radio stars. (a) <i>Fluitlugstoringe.</i> (b) <i>Sintillasies van radiosterre.</i>
(c) PERMANENT ASSISTANTSHIPS ON C.S.I.R. STAFF/ PERMANENTE ASSISTENTSKAPPE OP W.N.N.R.-PERSONEEL		
BADENHUIZEN, Prof. N. P. D.Sc. (cum laude) Professor of Botany	University of the Witwatersrand	Starch metabolism. <i>Styselmetabolisme.</i>
BOZZOLI, Prof. G. R. B.Sc., D.Sc. Professor of Electrical Engineering	University of the Witwatersrand	(a) Continued study of long sparks in air. (b) Continued study of effects of dust on the gap and on electrodes. (a) <i>Verdere studie van lang vonke in die lug.</i> (b) <i>Verdere studie van die uitwerking van stof op die spleet en op elektrodes.</i>
DAY, Prof. J. H. Ph.D., F.R.S. (S.A.) Professor of Zoology	University of Cape Town	Oceanography. <i>Oseanografie.</i>
HALES, Dr. A. L. M.A., M.Sc., Ph.D. Director, Bernard Price Institute of Geophysical Research	University of the Witwatersrand	Crustal structure and paleomagnetic investigations in Southern Africa. <i>Korsstruktuur en paleomagnetiese ondersoeke in Suidelike Afrika.</i>
HOLLIMAN, Prof. F. G. B.A., M.A., Ph.D. F.R.S. (S.A.) Professor of Organic Chemistry	University of Cape Town	The pigment of <i>Pseudomonas Aeruginosa</i> . <i>Die pigment van Pseudomonas Aeruginosa.</i>
ISAAC, Dr. W. E. B.Sc., Ph.D. Harry Bolus Professor (Botany)	University of Cape Town	The ecology and flora of the marine algae of the coasts of Southern Africa. <i>Die ekologie en flora van die see-alge van Suidelike Afrika.</i>
KRUGSMAN, Prof. B. J. Ph.D. Associate Professor of Zoology	University of Cape Town	(a) Sensory mechanisms in aquatic animals. (b) Physiology of invertebrate hearts. (c) Osmoregulation on aquatic animals. (a) <i>Gevoelsmeganismes van waterdiere.</i> (b) <i>Hartfisiologie van ongewerweldere diere.</i> (c) <i>Osmoregulering by waterdiere.</i>



Name and Qualifications Naam en Kwalifikasies	Where tenable Waar geldig	Subject of Research Onderwerp van navorsing
SMITH, Prof. J. L. B. B.A., M.Sc., Ph.D. F.R.S. (S.A.) Research Professor	Rhodes University	Fishes. <i>Visse.</i>
WARREN, Prof. F. L. A.R.C.S., B.Sc., Ph.D. D.Sc. Professor of Chemistry and Chemical Technology	University of Natal	South African plants of toxic and medicinal interest with special reference to alkaloids of hypertensive significance. <i>Suid-Afrikaanse plante van toksikologiese en geneeskundige belang met spesiale verwysing na alkalotiede van betekenis by hoë bloed- druk.</i>
<b>MEDICAL, DENTAL AND NUTRITIONAL RESEARCH</b> <b>MEDIÛSE- TANDHEELKUNDIGE EN VOEDINGSNAVORSING</b> <b>SENIOR BURSARIES/SENIOR BEURSE</b>		
MARKS, I. N. B.Sc., M.B., Ch.B. M.R.C.P. £1,000	University of Cape Town	Gastric and pancreatic secretion in pancreatic lithiasis. <i>Maag- en alvleesklierafskeiding in steensiekte van die alvleesklier.</i>
MUSPRATT, J. B.A. £800	S.A.I.M.R., Johannesburg	Arthropod-borne virus research. (Previous awards 1951-1958). <i>Navorsing i.v.m. virusiektes deur arthropode oorgedra. (Vorige toekennings 1951-1958).</i>
<i>Grants for the employment of skilled research assistants / Toekennings vir die indiensneming van geskoolde navorsingsassistentie.</i>		
ADAMS, Prof. E. B. B.Sc. (S.A.) B.Sc. (Oxon.) M.B., B.Ch. M.D., M.R.C.P. (Lond.) F.R.C.P. (Lond.) Professor of Medicine	University of Natal	Investigation of serum vitamin B12 levels and the role of folic acid deficiency in non-Addisonian megaloblastic anaemias. (Previous award 1959). <i>Onderzoek van die gehalte aan serumvitamien B12 en die rol wat foliensuurgebrek in nie-Addisoniese megaloblastiese bloedarmoede speel. (Vorige toekening 1959).</i>
BOTHWELL, Dr. T. H. M.B., B.Ch., M.R.C.P. M.D. Tutorial Physician	University of the Witwatersrand	Disorders of iron transport. (Previous awards 1951-1953, 1958, 1959). <i>Ystervoerabnormaliteite. (Vorige toekennings 1951-1953, 1958, 1959).</i>
COETZEE, Prof. J. N. M.B., Ch.B., M.D. Professor in Mikrobiologie	Universiteit van Pretoria	Genetika van mikro-organismes met spesiale verwysing na dié van die genus <i>Proteus</i> . (Vorige toekennings 1957, 1958, 1959). <i>Genetics of micro-organisms with special reference to those of the genus Proteus. (Previous awards 1957, 1958, 1959).</i>
COMBRINK, J. E. M.B., Ch.B., D.A. Senior Narkotiseur <i>en</i> BREMER, J. K. M.B., Ch.B., F.R.C.S. Lektor in Chirurgie	Universiteit van Pretoria	Onderzoek i.v.m. verkoeling tot lae temperatuur (10-15°C) en daar- opvolgende verwarming met gebruik van 'n hartlongapparaat. <i>Investigation of cooling to low temperatures (10-15°C) and sub- sequent warming by the use of a heart lung apparatus.</i>
DE VILLIERS, J. N. M.B. Ch.B., M.O. & G., M.R.C.O.G. Professor in Verloskunde en Gine- kologie <i>en</i> RETEF, C. P. M.B. Ch.B., M.O. & G. M.R.C.O.G. Hoof, Departement van Chemiese Patologie	Universiteit van Stellenbosch	Oestrogeen- en progesterone waardes in disfunksionele menorrhagie. Korrelasie tussen chemiese, sitologiese en histopatologiese bevindings. <i>Estrogen and progesterone values in disfunctional menorrhagia. Correlation between chemical, citological and histopathological findings.</i>
ENGELBRECHT, Dr. F. M. B.Sc., M.Sc., D.Sc. Senior Lektor in Fisiologie	Universiteit van Stellenbosch	'n Onderzoek van bepaalde aspekte van die silikose probleem. (Vorige toekennings 1957-1959). <i>An investigation of certain aspects of the silicosis problem. (Previous awards 1957-1959).</i>
KARK, Prof. A. E. B.Sc., M.B.B.Ch. F.R.C.S. Professor of Surgery	University of Natal	Renal calculus formation in African and Indian patients. Clinical and bio-chemical aspects. <i>Niersteenvorming by Bantoe- en Indierpasiente. Kliniese en bioche- miese aspekte.</i>
MARCHAND, Dr. P. E. M.D., Ch.M., F.R.C.S. M.B.Ch.B. 2nd Thoracic Assistant	University of the Witwatersrand	Surgery of aorta and aortic arch. (Previous awards 1956-1959). <i>Die chirurgie van die slagaar en die slagaarboog. (Vorige toeken- nings 1956-1959).</i>

Name and Qualifications Naam en Kwalifikasies	Where tenable Waar geldig	Subject of Research Onderwerp van navorsing
1. MERSKY, Dr. C. M.D., M.R.C.P. Assistant, Department of Medicine and 2. LACHNER, Dr. H. M.D., M.R.C.P. Assistant Physician	University of Cape Town	(a) Blood fibrinolysis, its normal occurrence and its variation in physiological and pathological states. (b) Blood coagulation studies in health and disease. (c) Vitamin B12 and folic acid levels in health and disease. (Previous awards (1) 1956-1959). <i>(a) Bloedfibrinolise, die normale voorkoms daarvan en die wisseling in fisiologiese en patologiese toestande.</i> <i>(b) Studie van bloedstolling in gesonde en siektetoestande.</i> <i>(c) Die gehalte aan vitamien B12 en foliensuur in gesonde en siekte-toestande.</i> <i>(Vorige toekennings (1) 1956-1959).</i>
MEYER, Dr. B. J. B.Sc., M.Sc., D.Sc., M.B.Ch.B. Hoof, Departement van Fisiologie	Universiteit van Pretoria	Geografiese en rasprobleme in die geneeskunde met spesiale verwysing na die rol van sekere sporelemente en die plasma--proteïene en tocopherol. (Vorige toekennings 1956-1957). <i>Geographical and racial problems in medicine with special reference to the part played by certain trace elements and the plasma--proteins and tocopherol. (Previous awards 1956-1957).</i>
OETLE, A. G. B.Sc. (Hons.) M.B.Ch.B. Cancer Research Officer	S.A.I.M.R., Johannesburg	Studies of tumours in the multimammate mouse, <i>Rattus (Mastomys) Natalensis</i> . (Previous awards 1955-1959). <i>Studie van gewasse in die vaalveldruis of moederhuis Rattus (Mastomys) Natalensis. (Vorige toekennings 1955-1959).</i>
PEPLER, Dr. W. J. B.Sc., M.B.Ch.B., M.D. Senior Lektor	Universiteit van Pretoria	1. Ondersoek aangaande kroonslagaarsiektes in blankes en bantoes. 2. Ensiemhistochemiese ondersoek na die oorsprong van Kaposi se hemangiosarkoom. 3. Ensiemhistochemiese ondersoek van fibreuse displasie en ossifiserende fibrome. (Vorige toekennings 1958, 1959). 1. <i>Investigation of coronary diseases in Europeans and Bantu.</i> 2. <i>Enzyme histochemical investigation of the origin of Kaposi's hemangiosarcoma.</i> 3. <i>Enzyme histochemical investigation of fibrous displasia and ossifying fibromes. (Previous awards 1958, 1959).</i>
TOBIAS, Prof. P. V. B.Sc. (Hons.), Ph.D. M.B.Ch.B. Professor of Anatomy	University of the Witwatersrand	Physical, anthropological, genetical and nutritional study of some aboriginal races of Southern Africa. <i>Fisiese, antropologiese, genetiese en voedingstudie van sommige inboorlingrasses van Suidelike Afrika.</i>

*BYLAAG II*

*APPENDIX II*

**FINANSIËLE STATE—FINANCIAL STATEMENTS**

BALANSSTAAT SOOS OP 31 MAART 1960

Laste			Bates					
1958-59			1959-60		1958-59		1959-60	
£	£	s. d.	£	s. d.	£	s. d.	£	s. d.
					<b>VASTE BATES</b> Grond en geboue (teen kosprys)—sien Staat No. 2 Toerustingkapitaalrekening..... Bates (teen kosprys)—sien Staat No. 2			
1,868,742	2,068,642	18 6	1,539,426				2,016,075	17 8
2,432,792	2,706,134	7 10	2,187,139				2,350,952	12 1
4,301,534	4,774,777	6 4	3,726,565				4,367,028	9 9
					<b>LOPENDE BATES</b> Ondersoekte en toetse aan die gang..... Diverse debiteure..... Goedere onbetroëdig gelewer..... Afkeurings..... Navorsingstoekennings vooruitbetaal Beleggings by Staatskuldkommissarisse Kontant (1) S.A. Reserwebank — Lopende Rekening..... (2) Kasvoorskotrekennings..... (3) Depositos.....			
138,262	83,865	8 3	19,085				17,861	16 9
	45,814	13 3	61,902				71,478	6 4
			—				3,454	7 7
			129,476				173	16 3
	129,680	1 6	670,803				152,545	3 3
	137,242	17 10	180,532				518,232	15 0
	10,000	0 0						
	145,669	5 11						
	10,525	2 10						
	433,117	8 1	1,061,801				55,185	15 8
	£5,207,894 14 5		£4,788,366				1,012	19 2
							20,921	4 8
							840,866	4 8
£4,788,366							£5,207,894 14 5	5

OPMERKING.—£2,016,075, 17, 8 vir grond en geboue sluit nie die waarde in van die terrein deur die Universiteit Pretoria aan die Raad geskenk nie en vir oordragdoeleindes teen £20,900 gewaardeer.

Pretoria, Augustus 1960  
 Die bestaande Balansstaat is ingevolge die bepalinge van artikel 56 van die Skatkis- en Ouditwet, No. 23 van 1956, gelaas met artikel 13 (1) (c) van die Wet op die Wetenskaplike Navorsingsraad, No. 33 van 1945, geouditeer, en ek sertifiseer dat dit 'n juiste weergawe is van die rekeninge van die Wetenskaplike en Nywerheidsnavorsingsraad.

Pretoria, 11 Oktober 1960

A. J. MILLER-SMIT  
 Sekretaris-treasurier

(Gec.) C. A. van de VEN  
 Wnd. Kontroleur en Ouditteur-Generaal  
 A.O.R. 46/1

S. M. NAUDÉ  
 President



KAPITAALFONDS  
STAAT VAN TRANSAKSIES VIR DIE JAAR GEËINDIG 31 MAART 1960

Besonderhede	Uitgawes			Ontvangste				
	Aanvaarde Begroting	Totale op 1 April 1959	1959-60 (Netto uitgawe)	Totale op 31 Maart 1960	Aanvaarde Begroting	Totale op 1 April 1959	1959-60	Totale op 31 Maart 1960
	£	£ s. d.	£ s. d.	£ s. d.	£	£ s. d.	£ s. d.	£ s. d.
(A) Geboue- en Reservekapitaal-fonds	170,000	1,539,425 12 10	476,650 4 10	2,016,075 17 8	170,000	1,607,600 0 0	170,000 0 0	1,777,600 0 0
Grond en geboue...	—	329,316 14 1	(-)-276,749 13 3	52,567 0 10	—	31,328 13 7	2,470 18 8	33,799 12 3
Onbestede saldo....	—	—	—	—	—	151,645 5 3	27,429 12 11	179,074 18 2
TOTALE.....	£170,000	£1,868,742 6 11	£199,900 11 7	£2,068,642 18 6	£170,000	£1,868,742 6 11	£199,900 11 7	£2,068,642 18 6
(B) Toerustingkapitaal-fonds	233,100	187,276 5 3	28,549 9 3	215,825 14 6	233,100	1,973,148 0 0	233,100 0 0	2,206,248 0 0
(1) Parlementêre toekennings.....	—	1,679 792 11 7	122,059 19 5	1,801,852 11 0	—	29,155 1 9	7,946 15 8	37,101 17 5
(2) Skenkings.....	205,625	121,656 9 0	(-)-19,129 3 2	112,507 5 7	—	1,607 19 9	—	1,607 19 9
(3) Rente op beleggings.....	3,800	78,616 16 10	6,813 9 6	85,432 6 4	21,928	46,334 7 0	17,795 12 10	64,129 19 10
(4) Inkomste.....	6,065	—	—	—	—	—	—	—
(5) Oordrag van Appropriasierekening.....	17,670	4,576 7 9	(-)-1,799 18 0	2,776 9 9	14,500	382,546 10 10	14,500 0 0	397,046 10 10
TOTALE.....	£269,528	£2,432,791 19 4	£273,342 8 6	£2,706,134 7 10	£269,528	£2,432,791 19 4	£273,342 8 6	£2,706,134 7 10
TOTALE VAN (A) EN (B).....	£439,528	£4,301,534 6 3	£473,243 0 1	£4,774,777 6 4	£439,528	£4,301,534 6 3	£473,243 0 1	£4,774,777 6 4

OPMERKING.—£2,016,075, 17, 8 vir grond en geboue sluit nie die waarde in van die terrein deur die Universiteit Pretoria aan die Raad geskenk nie, en vir oordragdoeleindes teen £20,900 gewaardeer.

TOEWYSING VAN ONBESTEDE SALDO

	£	s. d.
(i) Vaste verpligtings teen Toerustingkapitaal-fonds (geskatte).....	121,228	0 0
(ii) Gebou deur Universiteit vir die aankoop van kapitaaltoerusting.....	17,448	0 0
(iii) Voorziening vir die kapitalisering van toerusting deur die W.N.N.R. vervaardig.....	85,260	0 0
(iv) Nie op 31/3/60 verbind nie, maar toegewys in afwagting op ontvangs van prysopgawes of verdere ondersoek in verband met geskiktheid van toerusting.....	131,245	9 0
TOTAAL.....	£355,181	15 9

S. M. NAUDE,  
President

A. J. MILLER-SMIT  
Sekretaris-voorsitter

CAPITAL FUND

STATEMENT OF TRANSACTIONS FOR THE YEAR ENDED 31ST MARCH, 1960

Details	Expenditure			Receipts			Totals as at		
	Accepted Estimates	Totals as at 1st April, 1959	1959-60 (Nett Expenditure)	Totals as at 31st March, 1960	Accepted Estimates	Totals as at 1st April, 1959	1959-60	Totals as at 31st March, 1960	
	£	£	£	£	£	£	£	£	
(A) Building and Reserve Capital Account—Land and Buildings Balance unexpended	170,000	1,539,425 12 10 329,316 14 1	476,650 4 10 (-)-276,749 13 3	2,016,075 17 8 52,567 0 10	170,000	1,607,600 0 0 31,328 13 7	170,000 0 0 2,470 18 8	1,777,600 0 0 33,799 12 3	
TOTALS.....	£170,000	£1,868,742 6 11	£199,900 11 7	£2,068,642 18 6	£170,000	£1,868,742 6 11	£199,900 11 7	£2,068,642 18 6	
(B) Equipment Capital Account Furniture, Fittings and Office Equipment Laboratory and Workshop Stores on Hand..... Vehicles and Cycles Subsidized Cars (at cost less repayments) Books and Journals Prefabricated Structures	36,368	187,276 5 3	28,549 9 3	215,825 14 6	233,100	1,973,148 0 0 29,155 1 9	233,100 0 0 7,946 15 8	2,206,248 0 0 37,101 17 5	
	205,625	1,679,792 11 7	122,059 19 5	1,801,852 11 0	—	1,607 19 9	—	1,607 19 9	
	3,800	121,636 9 0	(-)-99,129 3 5	112,507 5 7	—	46,334 7 0	—	64,129 19 10	
	6,065	78,616 16 10	6,815 9 6	85,432 6 4	21,928	—	17,795 12 10	—	
	17,670	4,576 7 9	(-)-1,799 18 0	2,776 9 9	14,500	382,546 10 10	14,500 0 0	397,046 10 10	
	—	114,043 9 1	14,293 7 11	128,336 17 0	—	—	—	—	
	—	1,196 17 11	3,024 10 0	4,221 7 11	—	—	—	—	
Cost of Assets... Balance unexpended	209,528	2,187,138 17 5	163,813 14 8	2,350,952 12 1	—	—	—	—	
	—	245,653 1 11	109,528 13 10	355,181 15 9	—	—	—	—	
TOTALS.....	£269,528	£2,432,791 19 4	£273,342 8 6	£2,706,134 7 10	£269,528	£2,432,791 19 4	£273,342 8 6	£2,706,134 7 10	
TOTALS OF (A) AND (B).....	£439,528	£4,301,534 6 3	£473,243 0 1	£4,774,777 6 4	£439,528	£4,301,534 6 3	£473,243 0 1	£4,774,777 6 4	

NOTE.—£2,016,075. 17. 8 for land and buildings does not include value of site donated by the Pretoria University, and valued at £20,900 for transfer purposes.

ALLOCATION OF UNEXPENDED FUNDS

(i) Firm commitments against Equipment Capital Fund (estimated).....	£	s.	d.
(ii) Held by Universities for purchase of capital equipment.....	121,228	0	0
(iii) Reserved for capitalisation of equipment being manufactured within the C.S.I.R.....	17,448	6	9
(iv) Not committed at 31/3/60 but earmarked pending receipt of quotations or further investigations regarding suitability of equipment.....	85,260	0	0
	131,245	9	0
	£355,181	15	9

Pretoria, August, 1960

S. M. NAUDE  
President

A. J. MILLER-SMIT  
Secretary/Treasurer

LOPENDE UITGAWES- EN APPROPRIASIEREKENINGE VIR DIE JAAR GEËINDIG 31 MAART 1960

1958-59	Aanvaarde Begroting		1959-60		1958-59		1959-60		Aanvaarde Begroting	1959-60	
	£	s. d.	£	s. d.	£	s. d.	£	s. d.			
1,601,430	1,823,447	1,810,549	9 3	1,728,760	Parlementêre toekenning.....			1,924,900	0 0	1,924,900	0 0
151,007	204,514	214,759	18 4	488,501	Ondersoek, Toets en Dienste.....			554,675	14 4	590,628	14 4
89,826	81,784	73,902	7 3	67,713	Permitgelde vir Standaardmerk.....			62,000	13 1	68,289	13 1
58,294	62,368	62,613	19 0	13,954	Heffings: Verpligte Standaardspesifikasies.....			14,700	0 3	11,109	0 3
293,719	317,871	325,564	18 8		Bydraes vir—						
229,380	283,074	227,869	14 2		Opstel van spesifikasies.....				9,725	0 0	
					Navorsingsbedryfignede.....				2,985	0 0	
2,423,656	2,773,058	2,715,260	6 8	14,575	Tantêre.....			10,725	0 0	12,710	0 0
14,580				61,549	Administratiewe dienste aan laboratoriums deur ondersteuners finansier.....			27,713		51,096	14 7
47,442	48,549	24,877	14 1	8,137	Publikasies.....			4,590		10,526	7 3
2,361,634	2,724,509	2,690,382	12 7	4,045	Diverse inkomste.....			1,625		6,839	2 9
178,082	40,000	156,194	8 9	149,407	Toewysing uit Appropriasiesrekening ingevolge Artikel 14 (4) van Wet No. 33 van 1945.....			163,581		6,895	11 9
										163,581	17 4
£2,539,716	£2,764,509	£2,846,577	1 4	£2,539,716				£2,764,509		£2,846,577	1 4
430,949	Toewysing deur Raad aan—	351,180	16 2		Saldo op 1/4/59.....					178,081	17 4
	(a) Gebou- en Reserwekapitaalrekening...	27,429	12 11		Saldo oorgedra van Rekening van Lopende Uitgawes					156,194	8 9
	(b) Toerustingkapitaalrekening.....	14,500	0 0		Rente op beleggings vir toewysing aan Gebou- en Reserwekapitaalrekening.....					27,429	12 11
	(c) Rekening van Lopende Uitgawes, 1959/60.....	163,581	17 4								
	(d) Voorsiening vir vaste verpligings op 31 Maart 1960.....	145,669	5 11								
34,684	Saldo vir toewysing deur Raad ingevolge artikel 14 (4) van Wet No. 33 van 1945.....	10,525	2 10								
£465,633		£361,705	19 0	£465,633						£361,705	19 0

S. M. NAUDE  
President

A. J. MILLER-SMIT  
Sekretaris-resourier

Pretoria, Augustus 1960





