

SUID-AFRIKAANSE  
WETENSKAPLIKE EN NYWERHEID-  
NAVORSINGSRAAD

SOUTH AFRICAN  
COUNCIL FOR SCIENTIFIC  
AND INDUSTRIAL RESEARCH

SESDE  
JAARVERSLAG

SIXTH  
ANNUAL REPORT

1950—1951

PRETORIA

UNIE VAN SUID-AFRIKA

UNION OF SOUTH AFRICA

*Posbus 395, Pretoria*

*5 Oktober 1951*

*Meneer,*

*Ek het die eer om hierby aan u voor te lê die Sesde Jaarverslag van die Wetenskaplike en Nywerheidsnavorsingsraad oor die jaar geëindig 4 Oktober, 1951.*

*'n Balansstaat en 'n staat van inkomste en uitgawe oor die boekjaar eindigend 31 Maart 1951, soos nagegaan deur die kontroleur en Ouditeur-Generaal, word ook voorgelê.*

*Dienswillig die uwe,*

*P. J. DU TOIT*

*President: Wetenskaplike en Nywerheidsnavorsingsraad*

*Sy Edele E. H. Louw,*

*Minister van Ekonomiese Sake,*

*Paul Hof,*

*Minnaarstraat,*

*PRETORIA.*

*P.O. Box 395, Pretoria*

*5th October, 1951*

*Sir,*

*I have the honour to present to you herewith the Sixth Annual Report of the Council for Scientific and Industrial Research for the year ended October 4th, 1951.*

*A balance sheet and statement of income and expenditure for the financial year ended 31st March, 1951, certified by the Controller and Auditor-General, is also presented.*

*I have the honour to be,*

*Sir,*

*Your obedient Servant,*

*P. J. DU TOIT*

*President: Council for Scientific and Industrial Research*

*The Hon. E. H. Louw,*

*Minister of Economic Affairs,*

*Paul Hof,*

*Minnaar Street,*

*PRETORIA.*

INHOUDSOPGAW

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**Dr. B. F. J. SCHONLAND, C.B.E., F.R.S.**

*President of the C.S.I.R. from its foundation in October 1945 until October 1951.*

*President van die W.N.N.R. vanaf die stigting daarvan in Oktober 1945 tot Oktober 1951.*

## Samestelling en Vergaderings van die Raad

Gedurende die jaar was die Raad as volg saamgestel:

DR. P. J. DU TOIT (PRESIDENT)  
 DR. T. B. DAVIE  
 DR. F. J. DE VILLIERS  
 MNR. F. J. DU TOIT  
 DR. M. S. LOUW  
 MNR. P. E. ROUSSEAU  
 DR. B. F. J. SCHONLAND  
 MNR. T. P. STRATTEN  
 DR. E. TABERNER  
 DR. H. J. VAN ECK  
 DR. R. W. WILCOCKS  
 MNR. J. E. WORSDALE

Dr. P. J. du Toit is aangestel as President vir 'n tydperk van een jaar, synde vanaf 5 Oktober, 1950. Dr. B. F. J. Schonland wat die Raad se President en hoof uitvoerende beampte was sedert die stigting daarvan in Oktober 1945, het op 5 Oktober, 1950 bedank en is benoem as lid van die Raad vir 'n tydperk van twee jaar vanaf 5 Oktober, 1950. Dr. F. J. de Villiers, mnr. T. P. Stratten en dr. E. Taberner is herbenoem as lede van die Raad vir 'n tydperk van drie jaar vanaf 5 Oktober, 1950. Dr. T. B. Davie is benoem as lid van die Raad vir 'n tydperk van een jaar vanaf 5 Oktober, 1950.

Die Raad het drie keer gedurende die jaar vergader. Twee vergaderings is in Pretoria gehou en die ander een in Port Elizabeth. By geleentheid van die vergadering in Port Elizabeth het die Raad die voorsitter en lede van sy Middellande -Streeksnavorsingskomitee ontmoet en is op 'n noenmaal deur die Middellandse Kamer van Nywerhede onthaal en op 'n skemerkelkparty deur die Burgermeester en Burgermeestersvrou van Port Elizabeth. Lede van die Raad het nege van die vernaamste nywerheidsfirmas in Port Elizabeth besoek.

Tydens die vergadering wat in September 1951 in Pretoria gehou is, het die Raad lede van sy Streeksnavorsingskomitees in Durban en Port Elizabeth, die direkteure van die vyf nywerheidsnavorsingsinstitute wat deur die W.N.N.R. ondersteun word en die direkteur van die Bitumineuse-Bindstof-Navorsingseenheid, wat uitgenooi is om die laboratoriums te besoek, ontmoet.

Die Uitvoerende Komitee het ses keer gedurende die jaar vergader. Hierdie komitee was as volg saamgestel:

DR. P. J. DU TOIT  
 DR. F. J. DE VILLIERS (Plaaservanger mnr. J. E. Worsdale)  
 DR. H. J. VAN ECK (Plaaservanger mnr. F. J. DU TOIT)

## Membership and Meetings of the Council

The membership of the Council during the year was:

DR. P. J. DU TOIT (PRESIDENT)  
 DR. T. B. DAVIE  
 DR. F. J. DE VILLIERS  
 MR. F. J. DU TOIT  
 DR. M. S. LOUW  
 MR. P. E. ROUSSEAU  
 DR. B. F. J. SCHONLAND  
 MR. T. P. STRATTEN  
 DR. E. TABERNER  
 DR. H. J. VAN ECK  
 DR. R. W. WILCOCKS  
 MR. J. E. WORSDALE

Dr. P. J. du Toit was appointed as President for one year as from 5th October, 1950. Dr. B. F. J. Schonland, who had been the Council's President and chief executive officer since its foundation in October 1945, resigned on 5th October, 1950, and was appointed as a member of the Council for two years from 5th October, 1950. Dr. F. J. de Villiers, Mr. T. P. Stratten and Dr. E. Taberner were re-appointed as members of the Council for three years from 5th October, 1950. Dr. T. B. Davie was appointed a member of the Council for one year from 5th October, 1950.

The Council met three times during the year, two meetings being held in Pretoria, and one in Port Elizabeth. In the course of its meeting in Port Elizabeth, the Council met the chairman and members of its Midland Regional Research Committee, and was entertained to lunch by the Midland Chamber of Industries, and to cocktails by the Mayor and Mayoress of Port Elizabeth. Members of the Council visited nine leading industrial firms in Port Elizabeth.

On the occasion of its meeting in Pretoria in September, 1951, the Council met members of its Regional Research Committees in Durban and Port Elizabeth, who had been invited to see the laboratories, as had the directors of the five C.S.I.R.-sponsored Industrial Research Institutes, and the director of the Bituminous Binder Research Unit.

The Executive Committee met six times during the year. Members of this committee were:

DR. P. J. DU TOIT  
 DR. F. J. DE VILLIERS (Alternate Mr. J. E. Worsdale)  
 DR. H. J. VAN ECK (Alternate Mr. F. J. DU TOIT)



Die hoeksteen van die gebou vir die Suikermeule-Navorsingsinstituut te Howardkollege, Universiteit van Natal in Durban, is op 8 Junie, 1951, gelê.

The foundation stone of the building for the Sugar Milling Research Institute at Howard College, University of Natal, Durban, was laid on 8th June, 1951.



Die laboratoriums van die Verfnywerheid-Navorsingsinstituut in die nuwe wetenskapgebou by Howardkollege, Universiteit van Natal in Durban, is op 15 Mei, 1951, geopen.

The laboratories of the Paint Industries Research Institute in the new Science block at Howard College, University of Natal, Durban, were opened on May 15th, 1951.

## Algemene Oorsig

### ADMINISTRASIE

Die Raad se werksaamhede het snel ontwikkel en het voortdurend toegeneem in omvang en veelsydigheid. Die administrasie se probleem was om gelyke tred te hou met ontwikkelings wat deur die laboratoriums aangevoer is, en om die buigsamheid deur wetenskaplikes vereis te behou en terselfdertyd te voldoen aan die volgens wet ingestelde ouditering van die Kontroleur en Ouditeur-generaal. Hierdie verantwoordelikheid rus op die Sekretaris/Tesourier en die administratiewe personeel wat die probleem moes oplos sonder 'n direkte president in Suid-Afrika.

### Personeeladministrasie en finansiële beheer

Die permanente personeel tel tans 350 en gedurende die jaar was daar nagenoeg 120 tydelike werknemers.

Die begroting word noukeurig beheer en geen geld mag leeg lê nie. Die laboratoriums word maandeliks i.v.m. hul finansiële toestand ingelig en inligting m.b.t. die beskikbaarheid van fondse kan dadelik verskaf word. Uitbetalings het gemiddeld £45,000 per maand bedra waarvan die salarisse en loonlys ongeveer £24,000 beloop het. Die koste van 215 ondersteunde projekte is bereken en die inkomste daarvan was £33,000.

### Voorraadrekords en aankope

Die laboratoriums hou hul eie voorrade aan maar die sentrale administratiewe kantoor hou die voorraadgrootboeke en rekords van kapitale toerusting. Ten voordele van die laboratoriums en ten einde duplikasie van voorrade te vermy, word voorraadkatalogusse aangehou. Hierdie katalogusse bevat sowat 16,000 verskillende items. Die laboratoriums se voorraadafdeling het omtrent 7,200 items gedurende die jaar uitgereik en het sowat 1,800 besendings ontvang. Uitgawes op verbruikbare stowwe en voorrade het nagenoeg £44,000 beloop. Die kapitale toerusting gewaardeer op £125,000 is op die inventaris ingeskryf, waardeur die waarde van die totale kapitale toerusting op byna £500,000 te staan kom.

### Sekretariële en regs kundige dienste

'n Volledige sekretariële diens is vir die Raad self, vir die Uitvoerende Komitee, die Mediese en Tandheelkundige Navorsingskomitee, die Navorsingstoekenningskomitee en talryke onderkomitees wat handel met 'n verskeidenheid onderwerpe, verskaf. Hierdie diens het die voorbereiding van raadsdokumente wat inligting, of die analise van vraagstukke verskaf, ingesluit, en 40 dokumente was soms nodig vir een vergadering.

Negentig groot navorsingskontrakte en navorsings-beursooreenkomste is gedurende die jaar opgestel. In ooreenstemming met die Raad se beleid was hierdie dokumente nie in standaardvorm nie maar is opgestel om te voldoen aan die eise van elke afsonderlike geval.

## General Review

### ADMINISTRATION

The Council's activities have developed rapidly, increasing constantly in range and complexity. The problem of administration has been to keep pace with developments initiated by the laboratories and to retain the flexibility demanded by the scientists, at the same time satisfying the legislative audit of the Controller and Auditor General. This is the responsibility of the Secretary/Treasurer and administrative staff, who have had to deal with this problem without a direct precedent in South Africa.

### Staff administration and financial control

The Staff on the permanent establishment numbers 350, and during the year there were about 120 temporary employees.

The budget is carefully controlled and no money is allowed to lie idle. The laboratories are informed monthly of their financial states, and immediate answers can be given about the availability of funds. Payments averaged about £45,000 per month, of which the salaries and wages bill was approximately £24,000. 215 Sponsored projects were costed, the revenue from which was £33,000.

### Stores records and buying

The laboratories maintain their own stores, but the central administrative office keeps the stores ledgers and records of capital equipment. For the benefit of the laboratories and to avoid duplication of stores, stores catalogues are maintained. These contain some 16,000 separate catalogue items. The laboratories' stores issued about 7,200 items during the year, and received about 1,800 consignments. Expenditure on consumables and stores amounted to approximately £44,000. Capital equipment valued at £125,000 was taken on charge, bringing the total capital equipment on hand to a value of nearly £500,000.

### Secretarial and legal services

A complete secretarial service was provided for the Council itself, the Executive Committee, the Medical and Dental Research Committee, the Research Awards Committee and numerous sub-committees dealing with a variety of subjects. This service included the preparation of papers presenting information or analysing problems, and as many as 40 papers were sometimes required for one meeting.

Ninety major research contracts and research fellowship agreements were drafted during the year. In accordance with the Council's policy, these documents

Konstitusies is opgestel vir die Suid-Afrikaanse Woltekstiel-Navorsingsinstituut, wat waarskynlik in 1952 as 'n nie-winsgewende liggaam ingelyf sal word, en vir die Bitumineuse Bindstof Navorsingseenheid wat vroeg in hierdie jaar in werking getree het.

### Subsidies

Subsidies wat ongeveer £46,000 beloop het is uitbetaal aan ses nywerheidsnavorsingsverenigings en aan die Suid-Afrikaanse Mediese Navorsingsinstituut. Serifikate van uitgawes aan navorsing vir doeleindes van kwytskelding van inkomstebelasting, is uitgereik aan talryke firmas. Meeste van hierdie firmas is intekenaars tot nywerheidsnavorsingsverenigings of ondersteuners van navorsing wat onder kontrak deur die Raad se laboratoriums gedoen word, maar etlike van hul hul eie navorsingsdepartemente ingestel en het eise ingestel vir kapitale toerusting.

### Navorsingstoekennings

Navorsingstoekennings aan universiteite het 5 senior beurse, 59 studentebeurse, 21 navorsingsassistentkappe en talryke toekennings vir lopende koste, ingesluit. Reëlins is getref waardeur alle applikasies noukeurig gesif en oor gerapporteer word deur individuele deskundiges en spesiale komitees.

### Mediese navorsing

Die Raad is mediese navorsingseenhede behulpsaam deur spesiale assistente, beurse, kapitale toerusting en geld vir 'n verskeidenheid lopende behoeftes te verskaf. In die meeste gevalle is administrasie-reëlins ingewikkeld omdat die eenhede se personeel en toerusting deur verskillende ander organisasies, en ook die W.N.N.R. verskaf word en elkeen het 'n loodskomitee. Die Raad is die eenhede behulpsaam deur party van hul benodigdhede aan te koop en help om administratiewe moeilikhede uit die weg te ruim. 'n Administratiewe beampte het meeste van die eenhede vir hierdie doel gedurende die jaar besoek.

### NASIONALE LABORATORIUMS

In die Raad se nasionale laboratoriums word die tegnieke van moderne wetenskap toegepas tot Suid-Afrikaanse probleme. Die snelle ontwikkeling van hierdie laboratoriums—wat sowel te wyte is aan druk van buite as aan die inisiatief van die navorsingspersoneel—is 'n duidelike teken van die groot behoefte wat lank reeds bestaan vir die daarstelling van hierdie fasiliteite.

### Ontwikkeling

Veel aandag en studie is gewy aan die uitkies van toerusting wat die mees geskik sou wees vir die W.N.N.R. se doeleindes. Belangrike items is slegs aangeskaf nadat beamptes oorsee gestuur is om met die verskillende soorte toerusting in die laboratoriums van ander organisasies te

were not standard but were drawn up to suit the needs of each case. Constitutions were drafted for the S.A. Wool Textile Research Institute, which will probably be incorporated as a non-profit company in 1952, and for the Bituminous Binder Research Unit, which came into operation early in the year.

### Subsidies

Subsidies amounting to about £46,000 were paid to six industrial research associations and to the South African Institute for Medical Research. Certificates of research expenditure for the remission of income tax were issued to numerous firms. Most of these were subscribers to industrial research associations or sponsors of research done under contract by the Council's laboratories, but several of them have set up their own research departments and submitted claims for capital expenditure.

### Research grants

Research awards to universities included 5 senior bursaries, 59 student bursaries, 21 research assistantships and numerous grants for running expenses. Arrangements were made for all applications to be carefully screened and reported on by individual experts and special committees.

### Medical research

The Council assists medical research units by providing special assistants, bursaries, capital equipment and money for a variety of current needs. In most cases, administrative arrangements are complicated because the units are staffed and equipped by several other organizations as well as the C.S.I.R., and each one has a guiding committee. The Council helps the units by purchasing some of their requirements and by assisting them to overcome administrative difficulties. An administrative officer visited most of them during the year for this purpose.

### NATIONAL LABORATORIES

In the Council's national laboratories the techniques of modern science are applied to South African problems. The rapid development of these laboratories, as much due to pressure from outside as due to the initiative of the research staff, is a clear indication that the creation of these facilities was long overdue.

### Development

Much careful thought and study went into the selection of equipment which would be most suitable for the C.S.I.R.'s purposes. Major items were acquired only after officers had been sent overseas to work with the different types of equipment in the laboratories of other organizations, whose helpful co-operation has proved of

werk en die medewerking van hierdie organisasies is van onskatbare waarde vir die Raad. Meeste van die basiese toerusting is aangekoop en geïnstalleer in die Raad se tydelike laboratoriums in Visagiestraat, Pretoria. Hierdie huisvesting is nie besonder geskik nie en daar is groot gebrek aan ruimte. Desnieteenstaande, is die instrumente getoets en geëyk en in gebruik geneem vir die oplossing van baie praktiese nywerheidsprobleme en ook vir navorsingsprojekte van 'n langtermyn-aard. Aangesien al hierdie toerusting nuut is, daar dit gedurende die afgelope vyf jaar aangekoop is, het die Raad die voordeel gehad van die jongste ontwikkelings op die gebied van wetenskaplike instrumentasie en baie van die laboratoriums se onderafdelings is van die beste toegerustes in die wêreld.

Baie van die ondersoek verg besondere vaardighede eerder as instrumentasie en dié word ingevoer deur wetenskaplikes oorsee te stuur om in oorsese laboratoriums, wat besondere navorsingsgebiede ontwikkel het, te studeer.

### Praktiese toepassings

Terwyl die proses vir die opbou van die laboratoriums aan die gang was, het baie projekte wat as klein ondernemings begin het, snel ontwikkel. Navorsing op die benutting van lae-graadse kroomertse is tans by die prosesontwikkelingstadium en duur voort. Ondersoek op peilaanlegskaal na die behandeling van afvalwaters van wynstokerye volgens 'n anerobiese verteringsproses wat in die Nasionale Chemiese Navorsingslaboratorium ontwikkel is, word onder kontrak onderneem. Ontdekkings wat moontlik van kommer-siële waarde mag wees is gemaak in verband met die hidrolise van wolwas, die defluorinasie van watervoor-rade en die produksie van drogende olies uit olies wat normaalweg nie uitdroog nie, soos byvoorbeeld sonneblomsaadolie.

### Beurse

Navorsing wat in die laboratoriums aangevoer is het gelei tot die daarstelling van beurse deur nywerheids-firmas vir langtermynnavorsing op standolies van see-produkte, die verwerking van grondboontjies en die behandeling van afvalstowwe van die suiwelbedryf. Drie beurse is verskaf deur die Instituut vir Munisipale Ingenieurs vir die ondersoek van metodes waardeur die verwerking van beton rioolpype verhoed kan word. Die beurs vir navorsing na die produksie en benutting van bloukalk, wat deur die bloukalk-vervaardigers ondersteun word, is tans in sy derde en laaste jaar. Vyf beurse is deur die Nasionale Behuisings- en Beplanningsraad ingestel vir navorsing in verband met metodes waardeur die koste van Naturelle-behuising verminder mag word.

Langtermyn kontrakte wat deur die Nasionale Instituut vir Personeelnavorsing onderneem is het ten gevolge

inestimable value to the Council. Most of the basic equipment has been bought and installed in the Council's temporary laboratories in Visagie Street, Pretoria. This accommodation is unsuitable for laboratories, and extremely crowded. Nevertheless, the instruments have been tested and calibrated and put to use on many practical industrial problems as well as on long-term research projects. As all the equipment has been purchased during the past five years the Council has had the benefit of recent developments in scientific instrumentation, and some sections of the laboratories are among the best equipped in the world.

Many investigations require special skills, rather than instrumentation, and these are developed by sending scientists to work in overseas laboratories which have concentrated on special lines of research.

### Practical applications

During this process of building up the laboratories, many research projects have developed rapidly from small beginnings. Research on the utilization of low-grade chrome ores has reached the process-development stage and is proceeding. Pilot-plant investigations of the treatment of waste liquors from wine distilleries by an anaerobic digestion process developed in the National Chemical Research Laboratory are being undertaken on a sponsored basis. Discoveries of possible commercial value have been made in connexion with the hydrolysis of wool wax, the defluorination of water supplies, and the production of drying oils from semi-drying oils such as sunflower seed oil.

### Fellowships

Research initiated in the laboratories has led to the establishment of fellowships by industrial firms for long-term investigations into marine stand-oils, the processing of groundnuts, and the treatment of dairy wastes. Three fellowships have been provided by the Institution of Municipal Engineers for investigating methods of preventing the corrosion of cement sewers, and another, for research into the production and uses of blue lime, sponsored by the blue lime manufacturers, is in its third and final year. Five fellowships have been created by the National Housing and Planning Commission for research into methods of reducing the costs of Native housing.

Long-term contracts undertaken by the National Institute for Personnel Research have resulted in the establishment of selection and classification procedures which are now being applied as a normal recruiting routine by the Defence Forces and by several gold mining groups.

The results of research into radio noise-levels have been used in testing the performance

gehad die instelling van keurings- en klassifikasie prosedures wat tans as normale roetienetoetse gebruik word by die werwing van personeel deur die Verdedigingsmagte en deur etlike goudmynmaatskappye. Die resultate van navorsing op radiogeraaspele is gebruik om die prestasie van lugvaartkundigehulpmiddels wat in vliegtuie gebruik word onder Suid-Afrikaanse toestande te toets en hierdie diens was van groot nut vir die Departement van Vervoer. Outomatiese ionosfeerregistreerders, wat in die Telekommunikasie-Navorsingslaboratorium ontwerp en gebou is, is in werking by Johannesburg en Kaapstad, en 'n derde is gebou en na Nairobi gestuur. 'n Verteenwoordiger van die Belgiese Weerkundige Diens het spesiaal na Johannesburg gekom om 'n ionosfeerregistreerder, volgens dienselfde ontwerp, vir gebruik in die Belgiese Kongo te bou. 'n Nuwe soort radio-ontvangtoestel is uitgevind en gepatenteer en proefmodelle word deur 'n Suid-Afrikaanse firma vervaardig.

### Toetse en analises

Die gebruik van X-straal-diffraksie-apparate, die elektron mikroskoop, massa spektrometer en spektrochemiese toerusting, vir spesiale toetse en analises ten behoeve van nywerheidsfirmas en ander navorsingsinrigtings, vorm 'n steeds toenemende deel van die werk. Radioisotope word ingevoer en gedistribueer en mediese, biologiese en landbouwetenskaplikes word van advies bedien in verband met die aanwending van hierdie materiaal vir terapeutiese en navorsingsdoeleindes. In die volledige verslae van die laboratoria word voorbeelde gegee van die omvang van hierdie dienste wat bereken kan word uit die feit dat meer as 150 klein kontrakte, vir bedrae van minder as £30 elk, gedurende die jaar onderneem is.

### Personeel

Daar sou verwag kon word dat wanneer die aanvoerkonink vir die opbou van die laboratoria eers voltooi was, die behoefte aan verdere uitbreiding steeds sou verminder. In werklikheid word egter gevind dat die navorsingsprojekte waarmee in die aanvangstadium begin is, nou tot praktiese toepassings uitbrei. Onder dié omstandighede staan baie van die Raad se onderafdelings teenoor 'n dringende behoefte vir addisionele personeel.

### Bouprogram

Al die onderafdelings is oorvol en die gebrek aan laboratoriumakkommodasie is uiters stremmend. 'n Aanvang is geneem met die Raad se bouprogram op die 200 acre-perseel wat as 'n skenking van die Universiteit van Pretoria ontvang is, maar dit sal etlike jare duur voordat die toestand verlig sal word deur die nuwe laboratoria wat beplan is. Die geboue wat die siklotron en windtonnel sal huisves, word eerste verskaf aangesien hul nie in die Raad se huidige perseel gehuisves

of aircraft navigational aids under South African conditions, and this service has been of material assistance to the Department of Transport. Automatic ionosphere recorders designed and built by the Telecommunications Research Laboratory are in operation in Johannesburg and Cape Town, and a third has been built and sent to Nairobi. A representative of the Belgian Meteorological Service came to Johannesburg for the special purpose of building an ionosphere recorder to the same design for operation in the Belgian Congo.

A new type of radio receiver has been invented and patented and trial models are being manufactured by a South African firm.

### Tests and analyses

The use of X-ray diffraction apparatus, the electron microscope, mass spectrometer and spectrochemical equipment for special tests and analyses on behalf of industrial firms or other research institutions, forms an increasing part of the work. Radioisotopes are imported and distributed; and medical, biological and agricultural scientists are helped in the use of these materials for therapeutic and research purposes. Examples are given in the detailed reports of the different laboratories. The extent of this service may be gauged by the fact that more than 150 small contracts, of less than £30 each, were undertaken during the year.

### Staff

It might have been supposed that, once the laboratories had been established, there would be little need for expansion for some time to come. Many of the research projects which were started concurrently with the building-up programme are, however, branching out into practical applications, and there is an increasing demand for the Council's specialized services. The Council's urgent need for additional staff therefore continues.

### Building programme

The staff as a whole is overcrowded, and the lack of adequate space is a handicap. A start has been made on the Council's building programme on the 200-acre site which it received as a gift from the University of Pretoria, but it will be some years before any relief is provided by the new laboratories. The buildings for the cyclotron and the wind-tunnel are being erected first, as these cannot be housed in the present premises. The first major laboratory to be erected will be the National

kan word nie, en die eerste groot laboratoriumgebou wat opgerig sal word sal dié wees 'wat die Nasionale Bounavorsingsinstituut sal huisves. Dit sal nie voor 1953 voltooi wees nie.

### BIBLIOTEK EN- INLIGTINGSDIENSTE

Die hoof biblioteek van die W.N.N.R. groei gestadiglik aan en word tans beskou as die sentrale wetenskaplike en tegniese biblioteek in Suid-Afrika. Daar word tans vyfmaal soveel publikasies uitgeleen as wat vier jaar gelede die geval was, maar dit is nie net deur sy besit van naslaanboeke dat die Biblioteek- en Inligtingsafdeling Suid-Afrikaanse wetenskap dien nie. Hulp en advies aan nywerheidsfirmas en ander organisasies oor die organisasie en toerusting van spesiale biblioteke vorm 'n toenemende deel van die werk. 'n Kort leidraad tot die organisasie van klein tegniese biblioteke is in Julie 1951 gepubliseer, en 'n vierde skool vir nywerheidsbiblioteke is gehou — dié keer in Port Elizabeth.

### INDUSTRIËLE SKAKELDIENS

Aangesien die vormingsjare van die laboratorium nou feitlik agter die rug lê, is daar 'n toenemende behoefte om industrië op hoogte van sake te hou in verband met die fasiliteite wat beskikbaar is en die vordering wat plaasvind met hul ondersoeke. Om dié rede word 'n driemaandelikse *Navorsingsoorsig* deur die Skakelafdeling uitgegee. Hierdie afdeling het ook 'n fotografiese uitstalling van die Raad se werk tydens die 12de Nywerheidskou van die Noord-Transvaalse Kamer van Nywerhede in Pretoria, gereël.

Streeksnavorsingskomitees in Durban en Port Elizabeth was die Skakelafdeling behulpsaam met die bevordering van 'n beter besef van die Raad se werk en deur senior lede van die navorsingspersoneel in aanraking te bring met die tegniese personeel van nywerheidsorganisasies. Gehoop word dat dit moontlik sal wees om dergelike komitees in ander sentra in te stel. Hierdie komitees was ook behulpsaam deur navorsingsprobleme wat van besondere belang in hul betrokke omgewings is, en, wat andersinds oor die hoof gesien sou gewees het, aan die lig te bring. Die aantal projekte wat onderneem kan word is beperk tot die kapasiteit van die Raad se personeel — wat op sy beurt beperk word deur die beskikbaarheid van fondse en die noodsaaklikheid om die gehalte van die navorsing so hoog as moontlik te hou. Onder hierdie omstandighede beywer die Raad hom om te verseker dat alle pogings toegespits word op dié probleme wat van die grootste belang vir die land as geheel is, en wat in alle waarskynlikheid deur wetenskaplike navorsing opgelos kan word. Die Raad word vir hierdie doel bygestaan deur advieskomitees wat vir elk van die nasionale laboratoria ingestel is, en deur die Skakelafdeling wat opnames van tegniese en ekonomiese faktore in verband met uitgebreide navorsingsgebiede onderneem. Tegniese navrae is om dieselfde rede verwelkom aangesien dit dikwels gebeur dat navorsingsprobleme op hierdie manier aan die lig gebring word.

Building Research Institute which will be completed in 1953.

### LIBRARY AND INFORMATION SERVICES

The main C.S.I.R. library is growing steadily and is becoming recognized as the central scientific and technical library in South Africa. The rate at which publications are borrowed has increased five times during the past four years. But it is not only through its holdings of reference books that the Library and Information Division is serving South African science. Help and advice to industrial firms and other organizations on the organization and equipment of special libraries forms an increasing part of its work. A brief guide to organizing small technical libraries was published in July 1951, and a fourth school for industrial libraries was held in Port Elizabeth.

### INDUSTRIAL LIAISON

With the national laboratories emerging from the formative stage, there has been a growing need to keep industry informed of the facilities which they offer and of the progress of their investigations. Accordingly, *Research Review* is being issued quarterly by the Liaison Division, which also staged a photographic exhibition of the Council's work at the 12th Industrial Exhibition of the Northern Transvaal Chamber of Industries in Pretoria.

Regional research committees in Durban and Port Elizabeth have helped the Liaison Division to promote better understanding of the Council's work, and to bring senior members of the research staff into contact with the technical staffs of industrial organizations. It is hoped that it will be possible to establish similar committees elsewhere. These committees have also helped to bring to light research problems of particular importance to their respective areas, which might otherwise have been overlooked.

The number of projects which can be undertaken is restricted by the capacity of the Council's staff, which is limited in turn by the availability of funds, and the need for keeping the quality of research as high as possible. The Council therefore does its best to concentrate on problems of great importance to the country as a whole, particularly those which scientific research is likely to solve. In this the Council is assisted by advisory committees attached to each of the national laboratories, and by the Liaison Division, which has surveyed technical and economic factors related to broad fields of research. Technical inquires are welcomed, for they often bring research problems to light.



## NYWERHEIDNAVORSING

Die laboratoriums vir die Verfnwyerheid-Navorsings-instituut in die nuwe wetenskapgebou by Howardkollege, Universiteit van Natal, Durban, is in Mei 1951 geopen, en die hoeksteen van die gebou in die gronde van Howardkollege wat die Suikermeule-Navorsingsinstituut sal huisves, is in Junie, 1951 gelê. Die Bitumineuse Bindstof-Navorsingseenheid het vroeg in die jaar in tydelike huisvesting, wat deur die Brandstof-Navorsings-instituut verskaf is, in werking getree. Sedertdien is dit verplaas na 'n gebou in Strubenstraat, Pretoria wat verander en toegerus is ten einde laboratorium-fasiliteite te verskaf wat vir etlike jare in die toekoms voldoende sal wees. Die direkteur van die Suid-Afrikaanse Woltekstiel-Navorsingsinstituut het op 12 Mei 1951 in Suid-Afrika aangekom en was sedertdien besig om die instituut te organiseer. Tydelike huisvesting is deur Rhodes Universiteit, Grahamstad, verskaf.

Die W.N.N.R. ondersteun industriële bydraes wat vir tydperke van vyf jaar gewaarborg is, op 'n £ vir £ basis. Die vier ouer navorsingsinstitute het almal aan die einde gekom van die eerste tydperk van vyf jaar en hul het almal waarborge vir groter industriële bydraes vir die volgende tydperk ontvang. Dit is 'n verblydende teken van die sukses van hierdie ko-operatiewe nywerheidsnavorsingsinstitute. Bedrae wat aan die begin en vir die huidige tydperk gewaarborg is (insluitende die W.N.N.R. se subsidie) is nagenoeg soos volg:

Leernywerheid-Navorsingsinstituut: £15,000—£20,000  
Visnywerheid-Navorsingsinstituut : £10,000—£20,000  
Suikermeule-Navorsingsinstituut : £10,000—£12,000  
Verfnwyerheid-Navorsingsinstituut : £5,000—£ 8,000

## NAVORSING AAN DIE UNIVERSITEITE

Een van die grootste wetenskaplike probleme wat die land vandag voor die deur staan is die tekort aan gekwalifiseerde navorsingspersoneel wat voldoende opleiding geniet het. Die Raad beseft dat dit party van sy personeellede moet verloor deurdat hul betrekkinge aan die universiteite of in nywerhede aanvaar aangesien dit een van die maniere is waardeur die Raad 'n bydrae tot die wetenskap in hierdie land mag lewer, maar die Raad is uiters besorg oor die feit dat dit besonder moeilik is om hul te vervang met geskikte jong gegradueerdes. Om dié rede heg die Raad groot waarde aan die toekennings wat dit vir nagraadse navorsing aan die universiteite beskikbaar stel.

## MEDIËSE NAVORSING

Baie van die moeilikhede in verband met administratiewe reëlins waarvolgens die Raad agt mediese navorsingseenhede by ander inrigtings ondersteun, is uit die weg geruim en die stelsel funksioneer glad en bevredigend. 'n Negende navorsingseenheid, wat handel met toegepaste fisiologie is in sy geheel deur die Transvaalse Kamer van Mynwese oorgeneem. Laas-

## INDUSTRIAL RESEARCH

The laboratories of the Paint Industries Research Institute, in the new science block at Howard College, University of Natal, Durban, were opened in May 1951, and the foundation stone of the building for the Sugar Milling Research Institute, in the grounds of Howard College, was laid in June, 1951. The Bituminous Binder Research Unit started operations early in the year in temporary accommodation provided by the Fuel Research Institute. It has since moved to a building in Struben Street, Pretoria, modified and equipped satisfactorily for some years to come. The director of the South African Wool Textile Research Institute arrived from England on 12th May, 1951, and has been engaged in setting up the institute. Temporary accommodation has been provided by Rhodes University, Grahamstown.

The C.S.I.R. pays £ for £ subsidies on industrial subscriptions guaranteed for five-year periods. All four of the older research institutes reached the end of their first five years, and all have received guarantees of increased industrial contributions for the ensuing period. This is a heartening indication of their success.

Approximate figures for the initial and current guaranteed incomes (including C.S.I.R. subsidy, are as follows:

Leather Industries Research Institute : £15,000—£20,000  
Fishing Industry Research Institute : £10,000—£20,000  
Sugar Milling Research Institute : £10,000—£12,000  
Paint Industries Research Institute : £ 5,000—£ 8,000

## UNIVERSITY RESEARCH

One of the greatest scientific problems facing the country to-day is the shortage of adequately trained and qualified research staff. The Council expects to lose some of its staff to the universities and industry, as this is one of the ways in which it can contribute to science in this country, but it is gravely concerned about the difficulty of replacing them with suitable young graduates. In consequence, the Council attaches great importance to the grants which it makes for post-graduate research at universities.

## MEDICAL RESEARCH

Eight medical research units supported by the Council are working smoothly and well, partly because pains have been taken to overcome administrative difficulties. A ninth unit, dealing with applied physiology, has been taken over completely by the Transvaal Chamber of

genoemde is 'n voorbeeld van 'n ondersoek wat hoofsaaklik mee begin is omdat dit wetenskaplik van belang was en waarvan binnekort gevind is dat dit tot belangrike praktiese toepassings uitgebrei het.

## WETENSKAPLIKE RAAD VIR AFRIKA SUID VAN DIE SAHARA

Die Wetenskaplike Raad vir Afrika suid van die Sahara (C.S.A.) het vir die eerste keer gedurende November 1950 in Nairobi vergader, onder die voorsitterskap van dr. P. J. du Toit van Suid-Afrika, en was bygewoon deur

Prof. J. Millot .. .. .	Madagascar.
Dr. F. J. Cambournac .. .. .	Portugal
Sir Alexander Carr-Saunders .. .. .	Verenigde Koninkryk/United Kingdom.
Dr. B. A. Keen .. .. .	Brits Oos-Afrika/British East Africa.
Dr. A. Mendes Corrêa .. .. .	Portugal.
Prof. T. Monod .. .. .	Frans Wes-Afrika/French West Africa.
Kol./Col. H. W. Mulligan .. .. .	Nigeria.
Dr. B. F. J. Schonland .. .. .	Suid-Afrika/South Africa.
Mr. N. P. Sellick .. .. .	Suid-Rhodesië/Southern Rhodesia.
Dr. Georges J. Bone .. .. .	Belgiese Kongo/Belgian Congo.
Prof. Trochain .. .. .	Frans Ekwatoriaal Afrika/French Equatorial Africa.

Hierdie openings-vergadering het hoofsaaklik te doen gehad met metode- en organisasie probleme. Drie-en-vyftig besluite in verband met wetenskaplike samewerking in Afrika (geneem tydens die Wetenskaplike Streekskonferensie vir Afrika wat gedurende Oktober 1949 in Johannesburg, gehou is) is deeglik gesif en die vernaamste is aangedui om regerings- en ander outoriteite te help om hierdie aanbevelings uit te voer. Die volgende is van die probleme wat die Raad as uiters belangrik beskou en wat in besonderhede ondersoek sal word:

- Die instelling van 'n Intra-Afrikaanse Streeksburo vir Geologie;
- Die daarstelling van kartografiese eenvormigheid in die kaarte van Afrika, en die voorbereiding van spesiale streekskaarte vir geologie, klimatologie, plantegroei, siektes wat deur draers oorgedra word, ens.,
- Die uitbreiding van ge-koördineerde ontwikkeling in hidrologie en waterbewaring;
- Die sameroep van 'n vergadering van spesialiste op die gebied van behuising en bounavorsing;
- Die koördinering van wetenskaplike biblioteeks- en bibliografiese dienste.

Die Raad het gevind dat aansienlike vooruitgang alreeds gemaak is met die uitvoer van verskeie voorstelle wat deur die Johannesburgse Konferensie gemaak is. Reëlins is getref vir die aanstelling van ere-streeks-

Mines. This is an example of an investigation which was started because of its scientific interest, and proved to have important practical implications.

## SCIENTIFIC COUNCIL FOR AFRICA SOUTH OF THE SAHARA

The Scientific Council for Africa south of the Sahara (C.S.A.) met for the first time in Nairobi in November 1950, under the Chairmanship of Dr. P. J. du Toit of South Africa, and was attended by

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This inaugural meeting was chiefly concerned with problems of organization and method. Fifty-three resolutions on scientific collaboration in Africa, adopted at the African Regional Scientific Conference in Johannesburg in October 1949, were sifted and priorities allocated to assist governmental and other authorities to carry them out. Among the proposals which were examined in detail as a first priority were:

- Establishment of an Intra-African Regional Bureau of Geology;
- Achievement of cartographic uniformity in the maps of Africa, and preparation of special regional maps on geology, climatology, vegetation, vector-borne diseases, etc.;
- Extension of co-ordinated development in hydrology and water-conservation;
- Calling of a specialist meeting on housing and building research;
- Co-ordination of scientific library and bibliographical services.

The Council found that considerable progress had been made in carrying out several of the proposals of the Johannesburg Conference. Arrangements were made for the appointment of honorary regional consultants

adviseurs en korrespondente in Afrika om al die hoof wetenskaplike afdelings te verteenwoordig.

Besondere aandag is geskenk aan die aanbevelings gemaak deur die wetenskaplike konferensies wat gedurende die afgelope paar jaar in Afrika op gespesialiseerde gebiede gehou is, byvoorbeeld trypanosomiase, rinderpes en grondbewaring, sodat die funksies wat deur ander organisasies onderneem is, nie oorvleuel sal word nie.

Alhoewel die Raad onderwerpe vir bespreking sal oopstel op wetenskaplike en tegniese konferensies in Afrika wat reeds beplan is vir die volgende twee of drie jaar, is dit nogtans van mening dat internasionale tegniese konferensies nie op dieselfde skaal belê moet word as wat dit die geval in die afgelope drie of vier jaar was nie. Belangrike tegniese konferensies op besondere gebiede word as waardevol beskou wanneer tydperke van vyf of meer jaar tussenin verloop, maar die nodige beraadslaging en kontinuïteit kan gedurende hierdie tussenposes deur die vergadering van klein groepe spesialiste verkry word.

Toe die uitvoerende komitee op 8 en 9 Junie onder voorsitterskap van dr. P. J. du Toit, F.R.S. in Suid-Afrika in Londen vergader het, is dit besluit dat die Raad van 20 tot 23 November, 1951, in Dakar sou vergader. Verhoudings tussen C.S.A. en C.C.T.A. (Kommissie vir Tegniese Samewerking in Afrika suid van die Sahara) is deur die uitvoerende komitee bespreek, en, op 25 en 26 Junie deur 'n buitengewone konferensie van verteenwoordigers van die regerings wat deelneem aan hierdie twee skemas. Die verteenwoordigers van regerings op C.C.T.A. het hoofsaaklik te doen met die administrasie van tegniese sake, terwyl die C.S.A. wat bestaan uit vooraanstaande wetenskaplikes wat deur die deelnemende regerings gesamentlik benoem is, te doen het met die wetenskaplike probleme van Afrika. Hierdie liggame vul mekaar dus aan en dit is van die grootste belang dat daar 'n noue samewerking tussen die twee sal wees.

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Attention was given to the recommendations of scientific conferences held in Africa during the last few years on specialized subjects, e.g. trypanosomiasis, rinderpest and soil conservation, so that the functions of other organizations would not be duplicated.

The Council will submit items for discussion to African scientific and technical conferences already planned for the next two or three years, but considers that international technical conferences should be held less frequently than during the past three or four years. Major technical conferences in particular fields are regarded as valuable if held at intervals of five years or more, provided that during the intervals consultation and continuity are achieved through meetings of small groups of specialists.

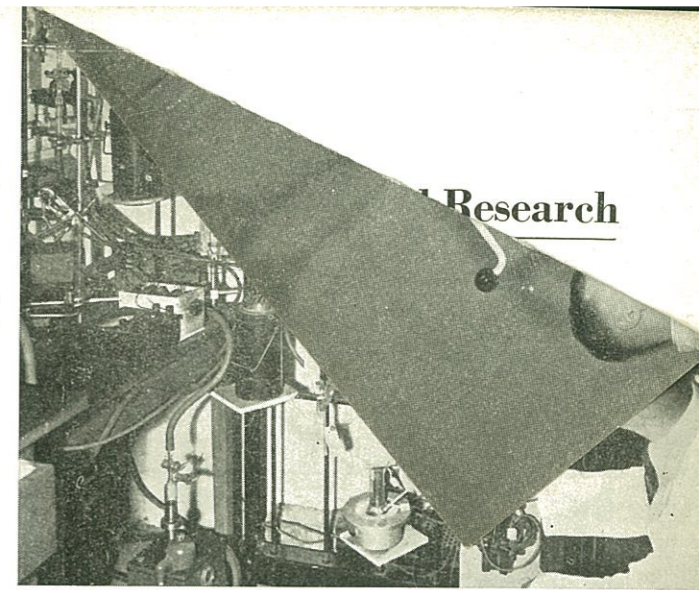
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*Pilot plant at Stellenbosch for investigating the anaerobic digestion of residues from the distillation of wine, so as to render them suitable for discharge into streams. These trials of a process developed in the laboratory were sponsored by industrial firms and the Municipality of Stellenbosch.*

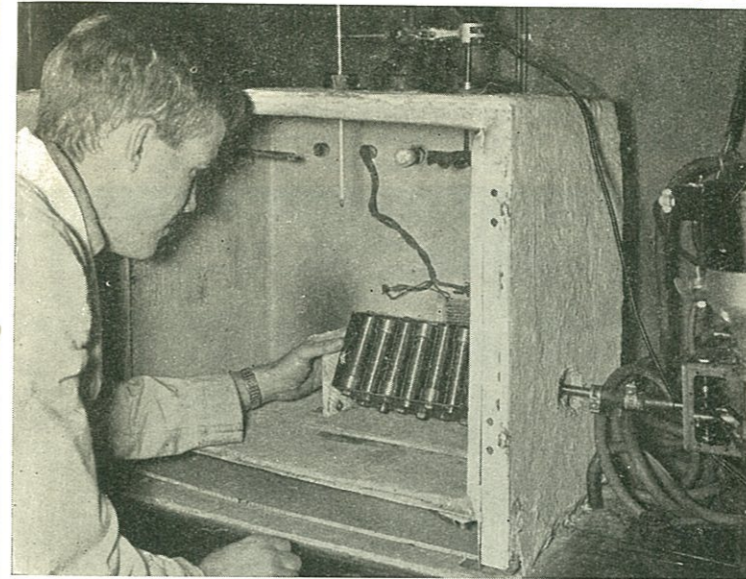
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*'n „Spinning band“-distilleerapparaat wat spesiaal geadaptee is vir die skeiding van die bestanddele van wolvet.*

*A 'spinning band' still, specially adapted for the separation of the components of wool-grease.*



## Research

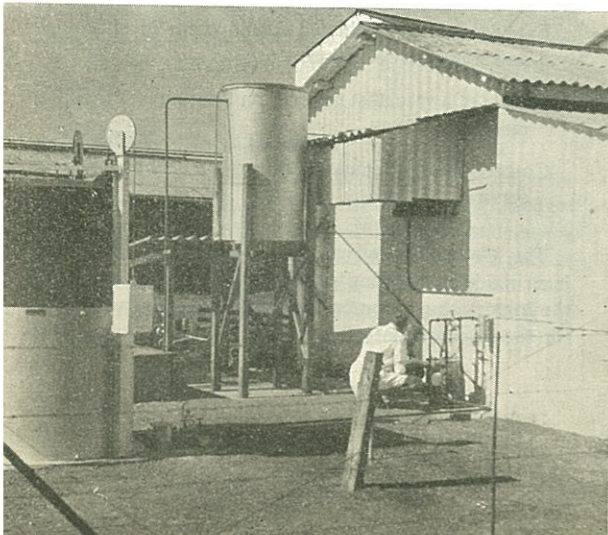
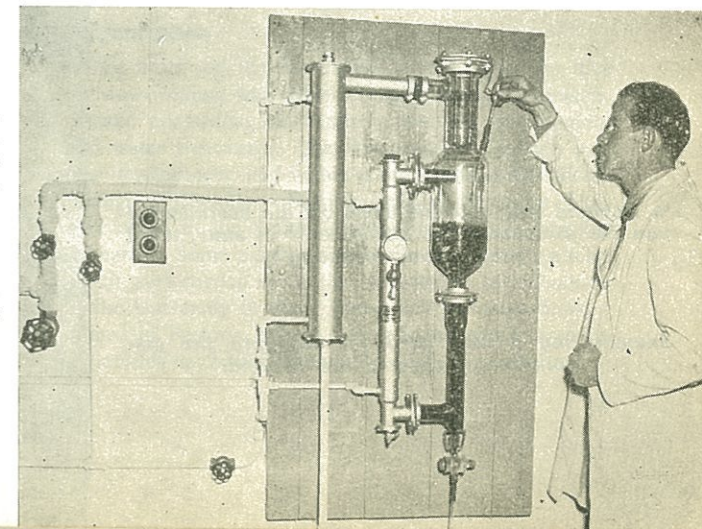


*Studying the break-down of wool grease with lime which is a first step in its industrial processing.*

*Die bestudering van die ontbinding van wolvet met kalk wat slegs die eerste stap is in die industriële verwerking daarvan.*

*Lymwaters met 'n hoë proteïne-inhoud, 'n afvalprodukt van walvisstasies, word in hierdie verdampingsapparaat gekonsentreer as voorloper tot eksperimente i.v.m. hul herwinning en benutting.*

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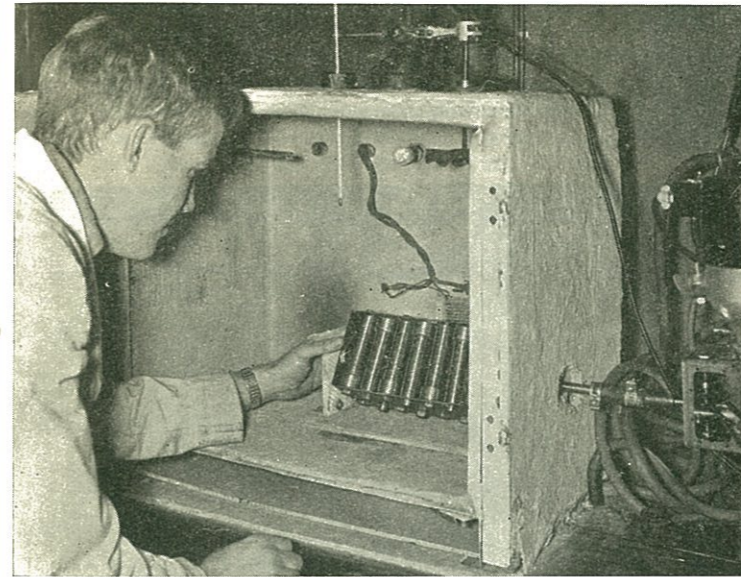
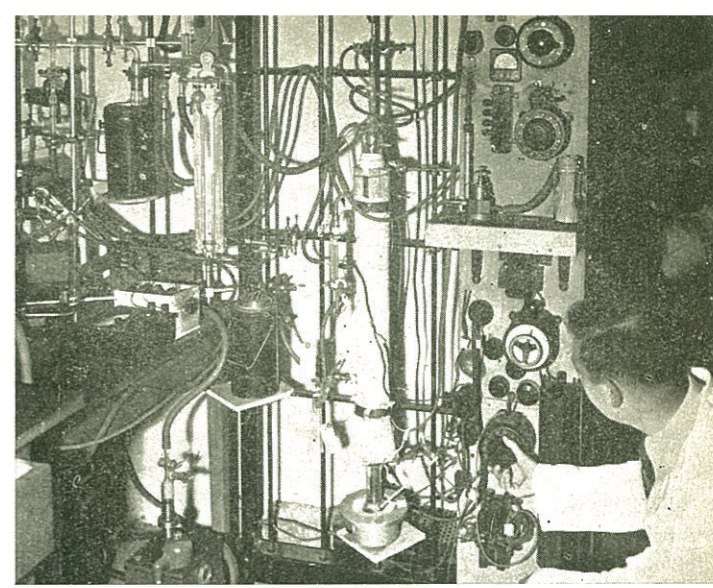
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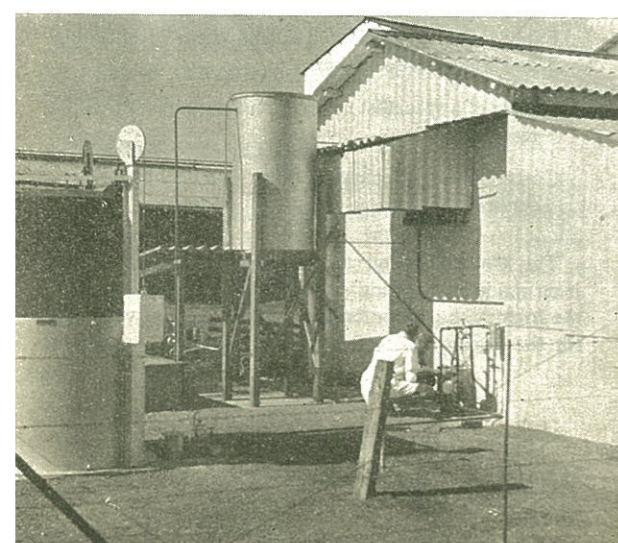
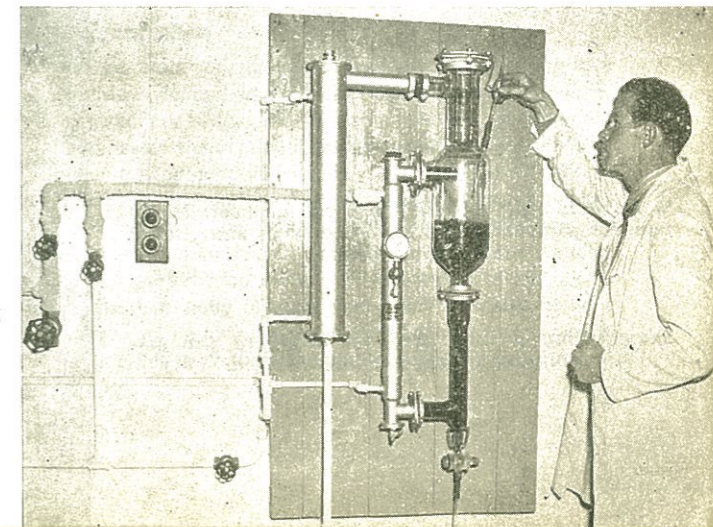
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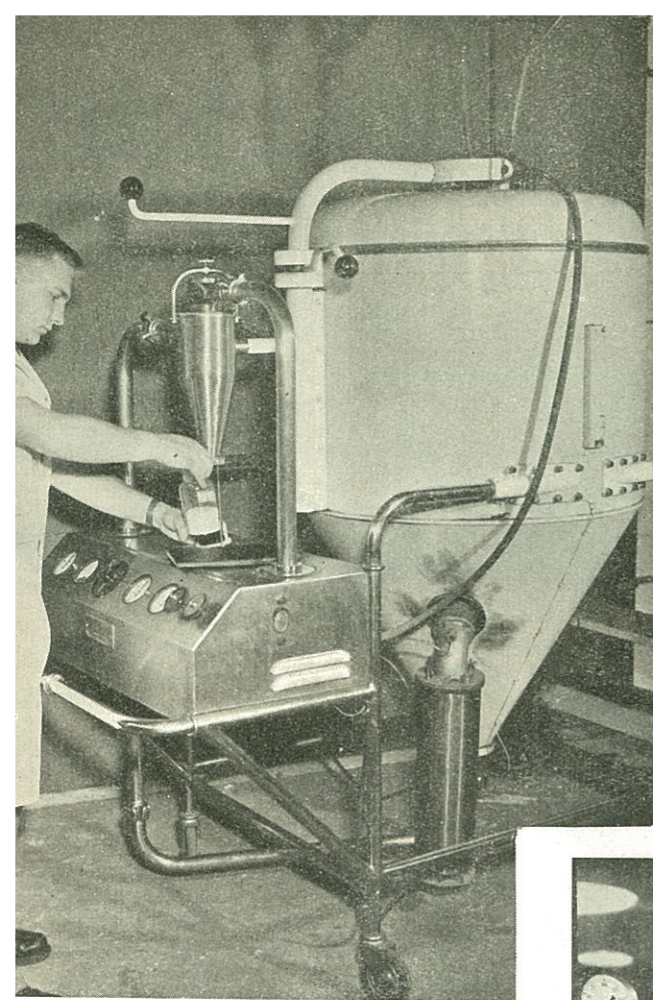
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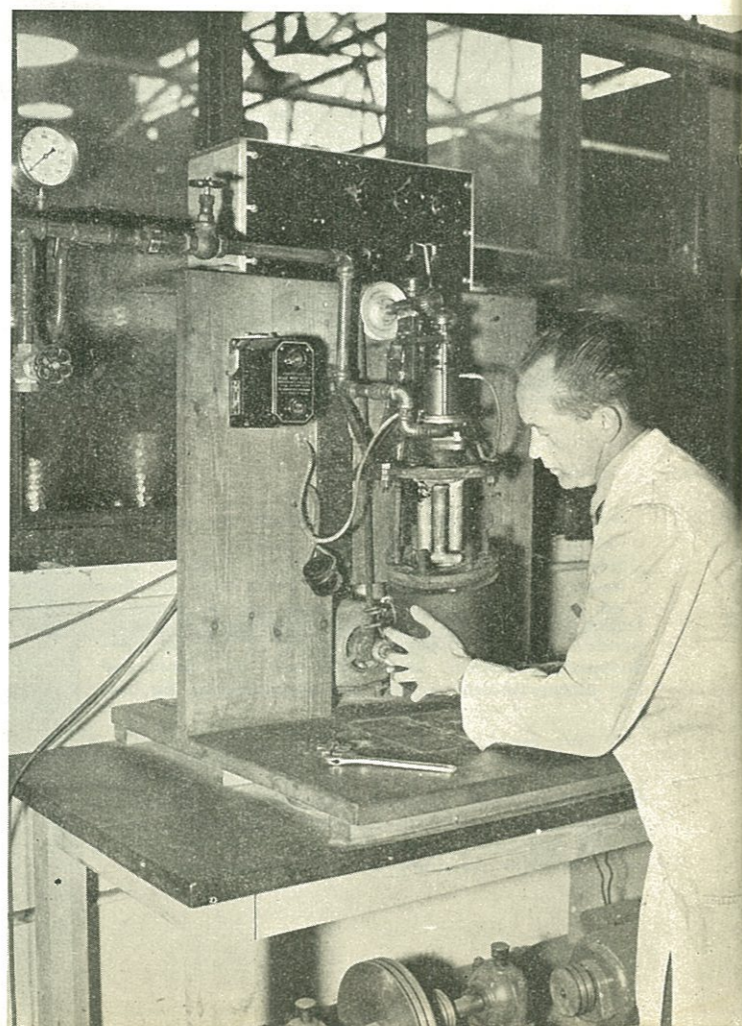
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*Concentrated whale glue-waters are converted in a spray-drier to a free-flowing powder. Experiments have shown that this powder is suitable for incorporation in certain animal feeds.*

*Gekonsentreerde walvis lymwaters word in 'n sproeidroër omskep tot 'n vry-vloeiende poeier. Eksperimente het getoon dat hierdie poeier geskik is om ingesluit te word in sekere voedselsoorte vir diere.*



*Benheid wat gebruik word vir die bestudering van die dissolusie van chroomerts in suur, word uitmekaar gehaal.*

*Smantling a unit used for studying the dissolution of chrome ore in acid.*

## Nasionale Chemiese Navorsingslaboratorium

### INLEIDING

#### Advieskomitees

Die program vir navorsing op Suid-Afrikaanse grondstowwe wat met behulp van 'n Nasionale Advieskomitee onder voorsitterskap van dr. T. J. Wilken Jordan, hoofseikundige van die Suid-Afrikaanse Yster en Staal Industriële Korporasie, ontwikkel is, bied 'n aantal toepassings in die praktyk. Hierdie komitee ontvang elke twee maande omvattende, vertroulike verslae i.v.m. die vooruitgang wat gemaak word op alle projekte, behalwe dié wat onder kontrak aan industriële firmas onderneem is. Advies oor individuele projekte word deur onderkomitees verskaf en hul verslae is deur die nasionale komitee tydens sy vergadering op 26 Julie, 1951, oorweeg. By hierdie jaarvergadering word die direkteur van die laboratorium geadviseer betreffende die projekte wat voorrang behoort te geniet op grond van vooruitgang wat reeds gemaak is, en, van wat van die land se behoeftes bekend is. Die aantal projekte van 'n langtermyn-aard wat gelei het tot ondersteunde projekte — en dus tot toepassing in die praktyk — is 'n mate van die deeglikheid van die komitee se advies.

#### Industriële skakeldiens

Die Skakelafdeling onderneem die versameling en ontleding van inligting wat die direkteur van die laboratorium, die Nasionale Advieskomitee vir Chemiese Navorsing en sy onderkomitees sal help om navorsing op 'n bepaalde gebied op die beste manier aan te pak. Twee skakelbeampies is vir hierdie doel vir die laboratorium toegewys en hul hanteer ook alle navrae vir tegniese inligting. As gevolg van hierdie noue samewerking tussen die personeel van die laboratorium en die skakelbeampies het etlike nywerheidsnavrae tot navorsingsprojekte ontwikkel.

#### Organisasie

Die laboratorium se werk word deur vyf afdelings, wat handel met fisiese en analitiese chemie, organiese chemie, biochemie, prosesontwikkeling en waterbehandeling, onderneem. Die Afdeling vir Biochemie is 'n nuwe een waaronder die Onderafdeling vir Mikrobiologiese Chemie en 'n Voedingsnavorsingseenheid, verbonde aan die Suid-Afrikaanse Mediese Navorsingsinstituut, ressorteer. Sommige aspekte van navorsing op olie en proteïne wat voorheen in die Afdeling vir Chemie van die Universiteit van Kaapstad gedoen is, sal nou in Pretoria, waar al die laboratorium se werk op hierdie gebied saamgetrek is ten einde duplikasie van duur toerusting te vermy, voortgesit word. Navorsing op

## National Chemical Research Laboratory

### INTRODUCTION

#### Advisory committees

The programme of research on South African raw materials, which has been developed with the help of a National Advisory Committee on Chemical Research under the chairmanship of Dr. T. J. Wilken Jordan, chief chemist of the South African Iron and Steel Industrial Corporation, is leading to many practical applications. Every two months this committee receives comprehensive confidential reports on the progress of all projects other than those undertaken under contract to industrial firms. Advice on individual projects has been provided by sub-committees, whose reports were considered by the national committee at its annual meeting on July 26th, 1951. At these annual meetings the director of the laboratory is advised on the priorities which should be allocated to projects suggested for inclusion in the research programme, both in relation to the progress made and to what is known of the country's needs. The number of long-term investigations which have led to sponsored projects, and thus to practical applications, is a good measure of the soundness of the committee's advice.

#### Industrial liaison

Collection and analysis of information to help the director of the laboratory, the National Advisory Committee on Chemical Research and its sub-committees in determining the best approach to research in specific fields, is undertaken by the Liaison Division. Two liaison officers have been assigned to the laboratory for this purpose, and they also deal with all inquiries for technical information. Through this close association between the laboratory staff and liaison officers, many research projects have developed out of inquiries from industrial firms.

#### Organization

The work of the laboratory is conducted by five divisions dealing with physical and analytical chemistry, organic chemistry, biochemistry, process development and water treatment. The Biochemistry Division is a new development, and within it are included the Microbiological Chemistry Section, and a Nutrition Unit maintained at the South African Institute for Medical Research. Some aspects of research on oils and proteins which were carried on in the Department of Chemistry of the University of Cape Town, will in future be conducted in Pretoria, where all the laboratory's work in these fields has been concentrated, so as to avoid duplica-

Suid-Afrikaanse seegrasse is aangevoer en dit is voornemens om met hierdie werk by die Universiteit van Kaapstad aan te gaan.

## MINERALE PRODUKTE

### Kleisoorte en verwante stowwe

Die minerale samestelling van kleimonsters van alle dele van die Unie word ondersoek om basiese gegewens wat nodig is vir 'n kennis van die eienskappe van hierdie kleisoorte in gebruik, en vir die ontdekking van plaaslike neerslae van kleisoorte wat tans ingevoer moet word, te verskaf. Deur middel van die tegnieke van X-straal diffraksie en differensiale termiese analise, en, indien nodig die elektronmikroskoop in die Nasionale Fisiese Laboratorium, word identifikasie vinnig en akkuraat uitgevoer. 'n Apparaat wat differensiale termogramme outomaties registreer, blyk bevredigend te wees. Aangesien sommige eienskappe daarvan nuut is, is 'n beskrywing vir publikasie voorberei.

Een van die interessantste resultate van hierdie werk was die identifikasie van 'n voorkoms van attapulgië, 'n kleisoort met baie industriële gebruike. Verdere studies is gemaak van 'n Suid-Afrikaanse montmorilloniet — waarvan die identifikasie verlede jaar aangekondig is — en van Suid-Afrikaanse illiete.

Grondkolloïede van Suid-Afrikaanse laterietiese grondgroepe is in besonderhede met die medewerking van die Afdeling vir Skeikundige Diens van die Departement Landbou ondersoek, en ander grondgroepe word op dieselfde manier ondersoek. Waarnemings van aktuele belang was dié wat in verband staan met die aandeel van ferri-oksied in vogsorpsie in laterietiese grondsoorte, en met 'n bodemprofiel wat die direkte ontbinding van illiet tot gibbsiet aandui.

### Chromium

'n Opname van Transvaalse chromiete is feitlik voltooi. Die suiwer mineraal is uit elke monster geskei, ontleed, en in baie gevalle, ook deur X-strale ondersoek. 'n Bevredigende metode vir die bepaling van aluminium wanneer yster en chromium teenwoordig is, is ontwikkel.

Bestudering van die oplos van chroomertse in swael-suur is voltooi en ook studies van die elektrolitiese deposisie van chromium-metaal uit chroom-aluinoplossings. Ingevolge hierdie studies en 'n deeglike ondersoek van ander moontlikhede, geskied werk nou volgens ander beginsels onder kontrak aan 'n industriële ondersteuner.

### Steenkool

Fundamentele navorsing in verband met die probleem van die selfontbranding van steenkool duur voort ten behoeve van die Brandstof-Navorsingsinstituut. Opper-vlakte, soos vasgestel deur die adsorpsie van argon op Suid-Afrikaanse steenkool by lae temperatuur, blyk baie kleiner te wees as die oppervlakte wat bepaal is deur benattingswarmte in methiel alkohol. Daar is tot die

tion of expensive equipment. Research on South African seaweeds has been initiated, and it is proposed to continue with this work at the University of Cape Town.

## MINERAL PRODUCTS

### Clays and related materials

The mineral composition of clay samples from all parts of the Union is being determined to provide the basic data necessary for understanding the properties of these clays in use, and to discover local deposits of clays which at present are imported. Identifications are made by using techniques of X-ray diffraction and differential thermal analysis and, when necessary, the electron microscope in the National Physical Laboratory. An apparatus for recording differential thermograms automatically has worked well and, as several features are new, a description has been sent for publication.

One of the most interesting results of this work has been the identification of an occurrence of attapulgië, a clay with many industrial uses. Further studies have been made of a South African montmorillonite, identification of which was reported last year, and of South African illites.

Soil colloids of South African lateritic soil groups have been surveyed in detail in collaboration with the Division of Chemical Services of the Department of Agriculture, and other soil groups are being surveyed in the same way. Observations of particular interest have been the part played by ferric oxide in moisture sorption in lateritic soils, and a soil profile in which there appears to be clear evidence of direct decomposition of illite to gibbsite.

### Chromium

A survey of Transvaal chromites has been nearly completed. The pure mineral has been separated from each sample, analyzed and, in many cases, also examined by X-ray analysis. A satisfactory method has been evolved for determining aluminium when iron and chromium are present.

Studies of the dissolution of chrome ores in sulphuric acid have been completed, as well as studies of the electrodeposition of chromium metal from chrome-alum solutions. In the light of these studies and of a detailed consideration of other possibilities, work is now proceeding along other lines under contract to an industrial sponsor.

### Coal

Fundamental research into aspects of the problem of spontaneous combustion of coal has been continued on behalf of the Fuel Research Institute. Internal surface, determined by low temperature adsorption of argon on South African coals, was many times smaller than that determined by heat-of-wetting in methyl alcohol. It has been concluded that methyl alcohol

gevolgtrekking gekom dat methiel alkohol veroorsaak dat steenkool swel en dus nie 'n juiste maat van die interne oppervlakte gee nie. Hierdie gevolgtrekking weerlê dié van oorsese navorsers, maar dit is van belang dat werk wat onlangs in Amerika gedoen is tot dergelyke gevolgtrekkings gelei het, en hierdie werk duur dus voort.

Die gebruik van swewende-bedtegnieke vir die produksie van gas uit steenkool is in 'n reeks aanvooreksperimente ondersoek. In 'n reeks eksperimente op twee soorte Suid-Afrikaanse steenkool (die een 'n tipiese nie-kooksvormende en die ander 'n tipiese kooksvormende steenkool) is vormfaktore, minimum vloeistof-ledigings en vervloeiingsfaktore (of afwykingsfaktore) vir verskeie reekse partikelgroottes ondersoek.

### Dolomiet

Die proses waardeur dolomiet ontbind by temperatuur van 600°C tot 900°C is verklaar. Verskillende ondersoekmetodes het dieselfde resultate gelever, maar die betekenisvolste waarneming is met X-strale gemaak van die verandering wat plaasvind wanneer 'n enkelkristal dolomiet tot kalsiet en magnesia ontbind is. Hierdie proses het die formasie van kalsiet kristalliete wat as kwasie-enkelkristalle van dolomiet ge-oriënteer is, aangedui. Dit word op 'n meer kwantitatiewe basis bestudeer en die oppervlakeienskappe van dolomiet wat by verskillende temperatuur ontbind is, word gemeet. Differensiale termogramme wat vir dolomiet onder beheerde druk van koolsuurgas van 1 mm tot 760 mm verkry is, is bestudeer.

### Mangaan

Mangaanertse word ondersoek ten einde die verwerking van lae-graadse ertse, waarvoor daar tans geen uitvoermark is nie, te bevorder. Op die oomblik, en hangende die voltooiing van studies van die mineralogie van ysterhoudende ertse van die Postmasburgse distrik deur die Staats Metallurgielaboratorium, word neerslae mangaan „wad” wat voorkom in die Graskop gebied van die Oos-Transvaal bestudeer. Hierdie neerslae bevat nagenoeg 30% mangaandioksied. Die produksie van mangaansulfaat waaruit beide mangaanmetaal en mangaandioksied vervaardig kan word, is ondersoek. In aanvangseksperimente in verband met die loog van die „wad” deur bytsure, is tegniese moeilikhede i.v.m. die hanteer van eersgenoemde ondervind. Hoewel hittebehandeling van die „wad” voordat dit geloog is die filtrasie-eienskappe verbeter het en die loog doeltreffend was, het die filtrate aansienlike hoeveelhede yster bevat wat die verdere eksploitasie deur elektrolise benadeel het.

Gevind is egter dat wanneer die erts met ysterpiriet verhit is, 'n residu gelaat is waaruit mangaan-sulfaat direk geloog kan word. Die fisiese chemie van hierdie reaksie word bestudeer en die gegewens wat nodig is vir die beplanning van peilaanlegsondersoeke word versamel.

causes swelling of the coal and does not therefore give a true measure of internal surface. Although this conclusion is opposed to that of certain workers overseas, it is interesting that recent work in America has since led to similar conclusions, and this work is continuing.

The use of fluidized-bed techniques for producing gas from coal has been the subject of preliminary experiments. In a series of experiments on two South African coals (one a typical non-coking and the other a typical coking coal), shape factors, minimum fluid voidages and fluidization efficiencies (or deviation factors) were investigated for several ranges of particle size.

### Dolomite

The process by which dolomite decomposes at temperatures ranging from 600°C to 900°C has been elucidated. Various methods of investigation yielded concordant results, but the most significant observation was made in X-ray studies of the changes which occur when a single crystal of dolomite was decomposed to calcite and magnesia, revealing the formation of calcite crystallites oriented as a quasi-single crystal. This is being studied on a more quantitative basis; and the surface properties of dolomite decomposed at various temperatures are also being measured. Differential thermograms obtained for dolomite under controlled pressures of carbon dioxide from 1mm to 760mm have been studied.

### Manganese

An objective of work on manganese ores is to promote the processing of low grade ores for which there is at present no export market. At present, and pending the completion of studies of the mineralogy of iron-bearing ores from the Postmasburg district by the Government Metallurgical Laboratory, deposits of manganese „wad” occurring in the Graskop area of the Eastern Transvaal are being studied. These contain about 30% of manganese dioxide and the production of manganese sulphate, from which both manganese metal and manganese dioxide could be produced, has been investigated. In initial experiments on leaching the wad by pickle liquors, technical difficulties in handling the slurry were encountered. Although heat-treatment of the wad before leaching improved its filtration characteristics, and the efficiency of leaching was good, the filtrates contained appreciable quantities of iron, which were a serious disadvantage in their further exploitation by electrolysis.

It has been found, however, that on heating the ore with iron pyrites, a residue is produced from which manganese sulphate of greater purity can be leached directly. The physical chemistry of this reaction is being studied, and the data necessary for the planning of investigations are being accumulated.

## PLANTPRODUKTE

### Suikerrietwas

Die wasopbrengs uit die modder wat afsak in die suiwering van suikersappe deur 'n suurproses, is gedurende 'n hele meulseisoen in samewerking met mnr. G. C. Dymond van die firma G. M. Hulett en Kie., by Darnall, en die Suikermeule-Navorsingsinstituut, ondersoek. Die was-inhoud, wat ongeveer 20% tot 30% beloop het, was deurgaans hoër as dié van modder wat afsak gedurende die huidige proses en moontlike maniere om die suur-suiweringsmetode tot die ekonomiese herwinning van sukrose en was toe te pas, word ondersoek.

### Seegrassie

Aangesien die handel steeds meer belangstelling in die kommersiële ontginning van seegrassie wat by die Kaap gevind word toon, is 'n aanvang geneem met navorsing op hierdie materiaal. Reëlins is getref vir 'n navorsingsbeampte om 'n jaar oorsee deur te bring by 'n moderne inrigting vir navorsing op koolhidrate, en die Afdeling vir Plantkunde van die Universiteit van Kaapstad het toegestem om behulpsaam te wees met die plantkundige aspekte van hierdie werk. Die soorte wat versamel word, word op 'n seisoensbasis ge-analiseer ten einde die kennis wat vir nywerheidsdoeleindes vereis word op te bou. As voorloper tot meer fundamentele werk word die strukturele- en ander eienskappe van agars uit *Gracilaria*-spesies, in verhouding tot veranderinge in die gel-krag na insameling bestudeer.

### Sitroensuur

Die produksie van sitroensuur deur die gisting van beide suikerrietmelasse en sukrose is bestudeer deur gebruik te maak van stamme van *Aspergillus niger* in voedingsboedems in vloeistofmedium. Omtrent twintig soorte is uit die laboratorium se groot kultuurversameling en ook van oorsese bronne gekies. Verskillende media en gasfases is met hierdie stamme op die proef gestel ten einde die mees geskikte omstandighede vir die formasie van sitroensuur te bepaal. Konsentrasies van sitroensuur wat in die finale gegiste vloeistof verkry is, is bemoedigend hoog.

### Hout hidrolise

Ekstraerbare bestanddele van die hout van die swartwattle, *Acacia mollissima*, is taamlik volledig ondersoek, en die struktureenhede van die hout-tannien en houtflobafeen is uitgeken. Die lignien van wattlehout word tans bestudeer. Voorlopige analises van wattlehout-monsters het betreklik groot verskille in persentasiesamestelling aangedui.

Hierdie werk is onderneem om as agtergrond te dien vir ondersoek na die hidrolise van wattlehout wat as 'n bron van gisbare suiker vir nywerheidsdoeleindes sal dien, maar hierdie aspek van die probleem word vertraag deurdat moeilikheid ondervind word met die konstruksie van apparate vir hout-hidrolise.

## PLANT PRODUCTS

### Sugar-cane wax

The yields of wax in mud from the clarification of sugar juices by an acid process have been surveyed during a full milling season in co-operation with Mr. G. C. Dymond of G. M. Hulett and Co., Darnall, and the Sugar Milling Research Institute. The wax content of about 20-30% was consistently higher than that of muds from the process in current use, and possible ways of using acid clarification for economical recovery of sucrose and wax are being examined.

### Seaweeds

Because of the growing commercial interest in the industrial exploitation of seaweeds at the Cape, research on these materials has been started. Arrangements have been made for a research officer to spend a year overseas in a modern carbohydrate research-school, and the Department of Botany of the University of Cape Town has agreed to co-operate in the botanical aspects of the work. The species collected are being analyzed on a seasonal basis in order to build up the background of information required for industrial purposes. As a first step in more fundamental work, structural and other properties of agars from *Gracilaria* species, in relation to alterations in the gel-strength after harvesting, are being studied.

### Citric acid

The production of citric acid by fermentation of sugar-cane molasses and sucrose has been investigated, using strains of *Aspergillus niger* in submerged culture. About twenty strains have been selected from the many strains in the laboratory's culture collection and also from overseas sources. Varying compositions of media and gas phase have been tried out with these strains, to ascertain the best conditions for the formation of citric acid. Concentrations of citric acid obtained in the final fermented liquor have been encouragingly high.

### Wood hydrolysis

Extractives of the wood of the black wattle, *Acacia mollissima*, have been examined in some detail, and the structural units in the wood tannin and wood phlobaphene have been identified. The lignin of wattle-wood is now being studied. Proximate analyses of wattle-wood samples have revealed fairly wide variations in percentage composition.

This work has been undertaken to provide a background to investigations into the hydrolysis of wattle-wood to provide an additional source of fermentable sugar for industrial purposes, but work on this aspect of the problem has been delayed by difficulties in the construction of experimental apparatus for wood hydrolysis.

## Ander plantprodukte

Dit is getoon dat die olie van die sade van *Sterculia foetida* 'n vetsuur met besondere eienskappe inhou. Beskikbare feite dui daarop dat die suur 'n onversadigde drie-ledige ring naby die middel van die ketting het.

Die volledige samestelling van verskillende saad-olies van die *Ximenia*-spesies (suurpruim) is bepaal.

## DIEREPRODUKTE

### Visolies

Die samestelling en benutting van sardientjie-olie wat tans kommersiël vervaardig word, word bestudeer.

Twee nuwe molekule distilleerketels is in die laboratorium vervaardig om die hitte-labiele sure van hierdie olies te skei en hul kan ook gebruik word om die betrokke alkohole op te breek. Indien dit moontlik is om suiwer bestanddele met hierdie toerusting te verkry sal daar voortgegaan word met die bestudering van die samestelling van die komponenture.

Die meganisme waardeur standolies gevorm word en die distribusie van molekulêrgewigte in standolies van hoë en lae viskositeit, word bestudeer. Tung-standolie-polimere wat so min as moontlik verhit is, bevat 'n gekonjugeerde diëne-sisteem — hierdie bevinding is teenstrydig met verslae wat in die betrokke lektuur verskyn het. Hierdie, en ander bevindings, beklemtoon die feit dat die beginstadiums van die formasie van standolies bestudeer moet word ten einde komplikasies te wyte aan struktuurveranderinge by verdere verhitting te vermy. Om mee te begin word die polimerisasie van metiel  $\beta$ -elaeostearate ondersoek.

Die moontlikheid om die aaneenskakeling van die molekules te weeg te bring wat die formasie van standolies karakteriseer, deur die werking van vry-radikales wat afgegee word deur die drogende olies, word bestudeer. Besonder doeltreffende aaneenskakeling, sonder verlies van onversadigheid, het moontlik kommersiële vooruitsigte vir die maak van standolies uit halfdrogende olies soos sonneblomsaad-olie.

Hierdie studies word uitgebrei tot die dergelyke geval van selfgeoksideerde (bv. geblaasde) trigliseriedeolies. Daar is op gewys dat litium aluminium hidried met enkel waterstofperioksiedes, dialkiel perioksiedes en dialkiel perioksiedes reageer om hoë opbrengste van die ooreenstemmende alkohole te lewer sodat hierdie reaksie moontlik gebruik kan word om die strukture van onbekende perioksiedes in selfgeoksideerde olies te bepaal. Die gebruik van papier-kromatografiese tegnieke om mengsels perioksiedes te skei is bestudeer en hierdie metode is op 'n suksesvolle manier toegepas op 'n mengsel van twee enkel perioksiedes waarvan die struktuur bekend was.

### Wolwas

Navorsing op die samestelling van wolwas was hoof-

## Other plant products

It has been shown that the oil from the seeds of *Sterculia foetida* contains a fatty acid of unusual properties. The evidence available indicates that the acid has an unsaturated three-membered ring near the centre of the chain.

The complete composition of several kernel oils of *Ximenia* species (suurpruim) has been determined.

## ANIMAL PRODUCTS

### Marine oils

The constitution and utilization of pilchard oils, which are now produced commercially in large quantities, are being studied.

Two new molecular stills have been made in the laboratory for separating the heat-labile acids of these oils, and they are also suitable for fractionating the corresponding alcohols. If pure components can be obtained with this equipment, the way will be cleared for constitutional and other studies of the component acids.

The mechanism by which stand-oils are formed, and the distribution of molecular weights in stand-oils of low and high viscosity, are being studied. Tung stand-oil polymers, prepared with a minimum of heating, have been found to contain a conjugated diene system, which is contrary to reports in the literature. This and other findings emphasize that the very initial stages of the formation of stand-oils should be studied to avoid complications due to structural alterations on further heating. As a first step, the polymerization of methyl  $\beta$ -elaeostearate is being investigated.

The possibility of effecting the linking together of molecules (which characterises stand oil formation) through the action of free radicals generated within the drying oil, is being investigated. Very efficient linking, without loss of unsaturation, has been achieved by a process of this type, which appears to have commercial possibilities for making stand oils from semi-drying oils such as sunflower seed oil.

These studies are being extended to the analogous case of autoxidized (e.g. blown) triglyceride oil. It has been shown that lithium aluminium hydride reacts with simple hydroperoxides, dialkyl peroxides and diacyl peroxides to give high yields of the corresponding alcohols, so that this reaction has possibilities for determining the structures of unknown peroxides found in autoxidized oils. The use of paper chromatographic techniques for separating mixtures of peroxides has been studied and this method has been applied successfully to a mixture of two simple peroxides of known structure.

### Wool wax

Research on the constitution of wool wax has been

saaklik in verband met die onverseepbare fraksie. Die 1:2 glikol fraksie wat vooraf afgeskei is, is in aparte bestanddele deur hoë fraksionele-distillasie ingedeel, en pogings word aangewend om hul juiste struktuur te bepaal. Vakuumfraksionerende kolomme van hoë doeltreffendheid is gemaak ten einde die monohidriese alkoholfraaksie (wat voorheen vermeld is) tot aparte bestanddele te skei. Hoeveelhede wolwas is uit ru-wol verkry van skape waarvan die teelt en voedingsgeskiedenis bekend is en die onverseepbare stof in hierdie monsters word volgens metodes wat in die laboratorium ontwikkel is, bestudeer.

Gedurende die tegnologiese bestudering van die versepings van wolwas met kalk, is gevind dat die reaksie-spoed toeneem as klein hoeveelhede van die reageermiddel toegedien word. Kwantitatiewe gegewens van hierdie reaksie is onder verskillende toestande verkry. Die versameling van hierdie gegewens duur voort as voorloper van die uitbreiding van hierdie proses tot peilaanlegskaal. Die omvang van hierdie studies is uitgebrei om magnesiumsoute van wolwas-sure vir kommersiële gebruik, te produseer.

## VOEDSEL-SOORTE

### Grondboontjies

Die werk van die navorsingsbeurshouer, wat kragtens 'n skema aangestel is wat deur 'n groot vervaardiger van grondboontjies ondersteun word, staan hoofsaaklik in verband met die voorkoming van die skeiding van olie gedurende opberging van grondboontjiebotter. Die navorsingswerk word uitgebrei tot vraagstukke i.v.m. ander grondboontjieprodukte.

### Kaapse kreef

Benewens bestudering van die produksie van chitien uit die affal afkomstig van die inlê van kreef, word die perswaters uit hierdie affal verkry, ondersoek. Dit is bewys dat die lipiedes in hierdie waters hul oorsprong in die hepato-pankreas het en die olies van hierdie orgaan word volledig ondersoek.

### Vis-proteïnes

'n Navorsingsbeampte het uit die buiteland teruggekeer waar sy opgelei is in die tegniek van proteïne-navorsing. Sy bestudeer tans vis-proteïne in samewerking met die Visnywerheid-Navorsingsinstituut. Die bruinword van die stertvlees van kreef is 'n probleem wat deur in-makers ondervind word. Die Visnywerheid-Navorsingsinstituut het gevind dat dit veroorsaak word deur die wisselwerking van die proteïne van die stertvlees met sekere wateroplosbares in die vlees, wat nog nie geïdentifiseer is nie. Sowel die proteïnes van die stertvlees as die ekstraerbare van die vlees word bestudeer ten einde die meganisme van hierdie reaksie te verklaar.

primarily concerned with the unsaponifiable fraction. The 1:2 glycol fraction, isolated previously, has been separated into individual compounds by high-vacuum fractional distillation, and attempts are being made to determine their exact structure. Vacuum fractionating columns of very high efficiency have been made in an attempt to separate the monohydric alcohol fraction (reported previously) into individual compounds. Quantities of wool wax have been extracted from raw wool obtained from sheep of known breeding and nutritional history, and the unsaponifiable matter of these samples is being studied by methods developed in the laboratory.

During technological studies into the saponification of wool wax with lime, it was found that the speed of reaction was increased by addition of minor quantities of a reagent. Quantitative data on this reaction have been obtained under different conditions, and collection of these data is being continued, as a preliminary to operating the process in a pilot plant. The studies have been extended with the object of direct production of magnesium salts of wool wax acids for commercial use.

## FOODS

### Groundnuts

The work of a research fellow appointed under a scheme sponsored by a large groundnut-processing firm, has been concerned mainly with preventing the separation of oil during the storage of peanut butter. The research is being extended to problems connected with other groundnut products.

### Cape rock lobster

In addition to studies of the production of chitin from the offal resulting from the canning of rock lobster, the press liquors derived from this offal are being investigated. It has been shown that the lipids in these liquors are derived from the hepato-pancreas and oil from this organ has been examined in detail.

### Fish proteins

An officer has returned from overseas, where she was trained in the techniques of protein research, and is studying fish proteins in collaboration with the Fishing Industry Research Institute. Browning of rock lobster tail flesh is a difficulty which has been encountered by canners. This has been shown by the Fishing Industry Research Institute to be caused by interaction of the tailflesh proteins with unidentified water soluble substances in the flesh. Both the tail-flesh proteins and the extractives of the flesh are being studied in order to elucidate the mechanism of the reaction.

## Walvis „lymwaters” en walvislewerekstrakte

Wateroplosbares in die afloopwaters van die smelt en suiwering van walvisvet en vleis met stoom onder druk, is deur sproeidroging op eksperimentyskaal verkry en die essensiële aminosure en vitamienes van die B-groep in dié materiale is bepaal. Daar is nagenoeg 90% wateroplosbare degradasie produkte van proteïne in hierdie materiale en aangesien hul in groot hoeveelhede geproduseer kan word, is hul 'n waardevolle bron vir proteïnes vir gebruik as diervoedsel. Die proteïnes is nie van hoë gehalte nie en toon veral tekorte aan methionien en triptofaan, waarskynlik te wyte aan die behandeling met stoom onder druk. Hoewel die konsentrasie van vitamienes van die B-groep aansienlik was, was dit baie laer as in visoplosbares.

Hierdie materiale sal waarskynlik onder plaaslike omstandighede nuttig gebruik kan word in voedsel vir harkouende diere maar nie vir pluimvee of varke nie.

## VOEDING

### Verkalking by die Suid-Afrikaanse Bantoe

Sommige aspekte van hierdie onderwerp is bestudeer en daar is tot 'n aantal tentatiewe gevolgtrekkings gekom. Dit is gevind dat die borsmelk van Bantoemoeders kalsium, fosfor en ander voedingsstowwe bevat in hoeveelhede wat ooreenstem met dié van Blanke moeders. Die samestelling van die ribbene van gesonde en ondervoede Bantoes is dieselfde as die van Blankes waarvan die bene goed verkalk is. Die kalkdigtheid van die bene van die polsgewrig by Bantoe en Blanke persone van dieselfde ouderdomsgroep kan nie van mekaar onderskei word op dieselfde X-straal plate nie. Die bene van Bantoes is nie meer geneigd tot frakture as die van Blankes nie en dit blyk dat frakture by Bantoes meer redelik genees as wat die geval by Blankes is. Bantoe kinders (6 tot 14 jaar) is net so lank as kinders van Glasgow en net 'n bietjie korter as Londense kinders — dit is dus nodig om die algemeen gehuldigde mening dat 'n hoë inname van kalsium vir normale groei onmisbaar is, te wysig, aangesien daar in die normale Bantoe-diët 'n tekort aan hierdie element is.

### Ysterinname en deposisie by die Suid-Afrikaanse Bantoe

Verdere eksperimentele getuïenis ondersteun die standpunt wat voorheen geopper is dat die buitengewone hoë opname van yster deur hierdie mense 'n belangrike faktor, indien nie 'n direkte oorsaak van sogenaamde „diëetkundige hemochromatose” is nie. Gevind is dat die distribusie van yster in die organe van Bantoes wat aan hierdie siekte ly ooreenkom met die van diere wat vir proefdoeleindes met oordosisse yster behandel is.

### Vitamiene C in groentebredie

Daar bestaan 'n plan vir die vervanging van gewone kookpotte deur druk-kookpotte op die goudmyne.

## Whale “glue-waters” and whale-liver extracts

The essential amino-acids and B-group vitamins contained in materials obtained by concentrating and spray drying the waste waters from the rendering of whale blubber and meat with steam under pressure, have been determined. Water-soluble degradation products of protein constitute about 90% of these materials and, as they could be produced in large quantities, they constitute a valuable source of protein for use in animal feeds. The protein is not of high quality and is particularly deficient in methionine and tryptophane, presumably because of the treatment with steam under pressure. Although the concentration of vitamins of the B-group was appreciable, it is much lower than in “fish-solubles”.

In local circumstances, these materials are likely to be useful in animal feeds for ruminants rather than for poultry or pigs.

## NUTRITION

### Calcification in the South African Bantu

Several tentative conclusions have been drawn from a study of some aspects of this subject. Thus it is found that the breast milk of Bantu mothers contains calcium, phosphorous and other nutrients in amounts which correspond to that of European mothers. The composition of the rib bones of both healthy and malnourished Bantu subjects is the same as that of well-calcified European subjects. The calcific density of the wrist-bones of Bantu and European subjects of the same age group, is indistinguishable on the same X-ray plates. Bantu bones are not more liable to fracture than are those of Europeans and evidence suggests that fractures in the Bantu heal more readily than do corresponding injuries in Europeans. Bantu children (6 to 14 years) are as tall as Glasgow children, and only slightly shorter than London children. These observations suggest that there is a need for revising the generally accepted belief that a high intake of calcium is essential for normal growth, since the normal Bantu diet is deficient in this element.

### Iron intake and deposition in the South African Bantu

Further experimental evidence supports the view, expressed previously, that the unusually high intake of iron of these people is a critical factor, if not the primary cause, of so-called “dietary haemochromatosis”. One observation is that the distribution of iron in the organs of the affected Bantu resembles that of animals suffering from an overload of iron induced experimentally.

### Vitamin C in vegetable stew

There is a trend for open cooking to be replaced by pressure-cooking on the gold mines, and the chief

Die hoof mediese beampte verbonde aan een myngroep het versoek dat 'n direkte vergelyking gemaak moet word wat die behoud van vitamien C in groentebredies wat volgens al twee metodes op groot skaal voorberei is sal aandui. Eksperimente het getoon dat die behoud van vitamien C by albei metodes uitstekend was en dat die hoeveelheid in normale porsies meer was as die hoeveelheid van die vitamien wat daagliks nodig is.

### Alkohol in gegiste kossoorte

Die hoeveelheid alkohol in gegiste graanmengsels, kafferbier en ander ongewone mengsels wat deur die Bantoes vervaardig word, word ondersoek.

### Jodium in tafelsout

Die hoeveelheid jodium in sout van verskillende soutpanne word ten behoeve van die Afdeling vir Voeding en Gesondheidsvoorligting van die Departement van Gesondheid ondersoek. Die doel hiervan is om voldoende inligting te versamel voordat pogings aangewend word om geïodiseerde sout beskikbaar te stel aan gebiede waar skildkliergeswel algemeen voorkom by die bevolking.

### Bilharzia

Ten behoeve van die Suid-Afrikaanse Mediese Navorsingsinstituut word pogings aangewend om die bilharzia-slak — Physopsis — sonder skulp te produseer ten einde dit moontlik te maak om die verandering van die cercariae tot die miracidia in die gasheerslak waar te neem. Dit word gedoen deur die klein slakkies met kalkvry slaai wat volgens hidroponiese metodes gekweek is, te voer. Die verhouding tussen die hoeveelheid eiers en die hoeveelheid bloed wat in die uriene van bilharzia-lyers afgeskei word, word ook bestudeer.

### Wurmparasiete

Die feces van nagenoeg 200 Bantoe persone wat op die grense van Johannesburg woon is vir besmetting met wurms ondersoek. Gevind is dat Ascaris in omtrent 'n derde van die feces wat ondersoek is teenwoordig was, maar daar was uitgebreide besmetting by 'n betreklik klein persentasie van die gevalle; Taenia is gevind in omtrent een tiende van die feces. Die Bantoe-bevolking in die besondere gebied wat ondersoek is word dus op voedingsgebied nie tot 'n groot mate deur wurmparasiete ontrief nie.

### WATER

#### Her-gebruik van riool-afvalwaters en nywerheidsafvalwaters

Nagenoeg 75% van die totale hoeveelheid water wat deur die groter munisipaliteite vir huishoudelike en nywerheidsdoeleindes gebruik word bereik die rioolverwyderingsstelsels. In baie dele van die wêreld word

medical officer of one group of mines asked for a direct comparison of the retention of vitamin C in vegetable stew prepared by both methods on a large scale. Experiments showed that the retention of vitamin C with both methods of cooking was excellent and that the amount in normal helpings was more than the daily requirements of the vitamin.

### Alcohol in fermented foods

The content of alcohol in fermented cereal preparations, kaffir beer, and other irregular preparations of the Bantu is being determined.

### Iodine in table salt

The amount of iodine in salt from various salt pans is being determined on behalf of the Division of Nutrition and Health Education of the Department of Health, to provide an adequate background of information before attempts are made to supply iodized salt to areas where there is a high incidence of goitre among the population.

### Bilharzia

On behalf of the South African Institute for Medical Research, an attempt is being made to produce the bilharzia-snail, Physopsis, without a shell so as to make it possible to observe the change of the cercaria to the miracidia in the snail-host. This is being done by feeding very young snails on lime-free lettuce produced by hydroponic methods. The relationship between the number of eggs and the amount of blood lost in the urine of bilharzia sufferers is also being studied.

### Helminths

About 200 stools of Bantu people living on the outskirts of Johannesburg have been examined for infestation by worms. It was found that Ascaris was present in about a third of the stools examined, but the infestation was extensive in a small proportion only; Taenia was noted in about one tenth of the stools. Thus the Bantu population in the particular area examined is not seriously handicapped nutritionally by helminthic infestation.

### WATER

#### Re-use of sewage effluents and industrial wastes

Approximately 75% of the total water consumption (domestic and industrial) of the larger municipalities reaches the sewage disposal systems. In many parts of the world these effluents are treated and used again as a

hierdie afloopwaters behandel en dan weer gebruik as 'n bron vir ru-water. Noukeurige bakteriologiese en chemiese studies dui daarop dat die koste verbonde aan behandeling binne die perke van standaard waterbehandelingsmetodes val.

Die verantwoordelike beampte van die Afdeling vir Waterbehandeling het ses weke in Groot Brittanje deurgebring waar hy die jongste ontwikkelings op die gebied van d'e suiwing van nywerheids- en rioolafvalwaters vir her-gebruik bestudeer het. Hy het ook 'n spesialiste-kursus op die behandeling van nywerheidsafloopwaters begewoon.

### Behandeling van nywerheidsafvalwaters

Die ontwikkeling van 'n verbeterde metode vir die behandeling van afvalwaters afkomstig van die gisting- en verwerking van melkverwerkingsindustrieë waardeur vertering deur aneroobiese mikro-organismes geskied, is voorheen vermeld. Die behandeling van die residu's van wynstokerye word in samewerking met wynstokers en munisipaliteite in die Kaap ondersoek en 'n peilaaanleg word vir hierdie doel by Stellenbosch gebou.

Die Raad van Toesig oor die Suiwelynwerheid het 'n navorsingsbeurs vir ondersoek na die behandeling van afvalwaters van melkverwerkingsindustrieë ingestel. Navorsing in verband met die verwydering van bytsure van die staalnywerheid en ook afvalwaters van vrugte en groente-inmaakfabrieke word tans bespreek.

### Sterilisering van rioolslyke

'n Doeltreffende metode vir die sterilisering van rioolslyke is in die laboratorium ontwikkel en verwerking van die produk tot 'n geskikte grondstof in bemestingsstowwe word bestudeer. Hierdie werk word uitgebrei tot 'n bestudering van die uitwerking van bemesting met kompos en van grondverwydering op die vernietiging van die siste en ova van parasiete.

### Stroomopnames

In die Kaapse gebied het 'n opname van die Bergrivier lig gewerp op die paartyd, tye wanneer maksimum hoeveelhede voorkom en substratum wat verkies word van die individuele spesies wat die flora en fauna van die stroom uitmaak. Dit was moontlik om die hoër Bergrivier in drie hoof ekologiese streke met hul besondere spesies in te deel, hoewel party spesies in al drie streke voorgekom het. Die chemiese samestelling van die rivier se water is gedurende die biologiese opname noukeurig bestudeer.

In die Witwatersrandse gebied neem alle Randse Munisipaliteite waarby Heidelberg en Vereeniging ingesluit is, en ook die Kamer van Mynwese, die Elektrisiteits Voorsieningskommissie die „Institute for Sewage Purification,” die Raad vir die Ontwikkeling van Natuurhulpbronne, die Randse Waterraad, en die Universiteit van die Witwatersrand deel aan 'n program waardeur alle instromings tot die Vaalrivier via die Klip-, Blesbok-,

source of raw water. Careful bacteriological and chemical studies indicate that the costs of treatment are well within the limits of standard methods of water treatment.

The officer in charge of the Water Treatment Division spent six weeks in Great Britain studying recent developments in the purification of industrial and sewage effluents.

### Treatment of industrial wastes

The development of an improved method of treating the wastes from fermentation industries by digestion by anaerobic micro-organisms, has been reported previously. The treatment of the residues from wine distilleries by this method is being investigated in collaboration with wine distilleries and municipalities in the Cape, and a pilot plant for this purpose is being built at Stellenbosch.

The Dairy Industry Control Board has established a research fellowship for investigating the treatment of wastes from milk-processing factories. Research on problems in the disposal of pickling liquors from the steel industry as well as wastes from fruit and vegetable canneries, are being discussed.

### Sterilization of sewage sludges

An effective method for sterilizing sewage sludges has been evolved in the laboratory, and conversion of the product to a form in which it would be a suitable base for fertilizers is being studied. The work is being extended to a study of the effects of composting and land disposal on the destruction of the cysts and ova of parasites.

### Stream surveys

In the Cape area, a survey of the Berg River has thrown much light on the breeding seasons, periods of maximum abundance and preferences in substratum of individual species comprising the fauna and flora of the stream. It has been possible to divide the upper Berg River into three main ecological regions with species peculiar to each, though many other species were common to all three. The chemical composition of the river water has been followed in detail during the biological survey.

In the Witwatersrand area, all the Reef municipalities, including Heidelberg and Vereeniging, as well as the Chamber of Mines, the Electricity Supply Commission, the Institute of Sewage Purification, the Natural Resources Development Council, the Rand Water Board and the University of the Witwatersrand are co-operating in a programme of mapping all the inflows to the Vaal River via the Klip, Blesbok and Suikerboschrand



en Suikerboschrandriviere gekaart word. Die veroorsaking van die styging in die mineraalgehalte van die water gedurende swaar reëns, word ondersoek.

Voorlopige reëlings vir opnames in Natal en in die Oos-Transvaal is voltooi en programme vir die volledige monsterring en kaartering is voorberei.

### Defluorinasie van watervoorrade

Wanneer drinkwater wat meer as 1.5 dele fluor per miljoen bevat, gedrink word, veroorsaak dit dat tande vlek en het ook 'n nadelige uitwerking op die beenstruktuur as geheel. In Suid-Afrika—veral in droë streke—bevat baie waterbronne te veel fluor, en doeltreffende metodes waardeur die konsentrasie fluor verminder kan word word bestudeer.

### FISIËSE EN ANALITIESE CHEMIE

Daar is etlike van die laboratorium se ondersoek en dienste wat nie direk in verband staan met grondstowwe nie.

### Metaalkorrosie

Benewens die behandeling van navrae en minder belangrike probleme wat deur nywerhede en munisipaliteite voorgelê word, word die rol van sulfaatreducerende bakterieë in die korrosie van yster bestudeer. Hierdie studie staan ook in verband met ondersoek na die vertering van riool- en nywerheidsafloopwaters deur aneroobiese mikro-organismes. Voorlopige werk werp twyfel op die mening dat die bakterieë as katodiese depolariseerders in die yster funksioneer.

### Radiochemie

Radio-aktiewe fosfor in superfosfaat wat deur African Explosives and Chemical Industries Ltd. vervaardig is, word gebruik om die optrede van superfosfaat in Suid-Afrikaanse grondsoorte te bestudeer. Hierdie werk word in samewerking met die Universiteit van Natal en verskillende afdelings van die Departement van Landbou gedoen en 'n aanvang is geneem met 'n fundamentele studie van die fiksasie van superfosfaat.

Die werking van 'n sistemiese insektdodende middel in grondboontjies is met gebruik van radioaktiewe fosfor bestudeer en 'n metode is ontwikkel vir die bepaling van klein hoeveelhede waterstof peroksied wat geproduseer is wanneer water met X-strale deurstraal word.

### Hoogpolimere

Die distribusie van molekulêrgewigte in standolies is in besonderhede bestudeer. Fraksies is onder lug-vrye kondisies deur ekstraksie met oplosmiddels geskei en molekulêrgewigte van hierdie fraksies is bepaal. Aangesien molekulêrgewigte veral in die gebied 1,000–10,000 val, bied die meet van hierdie gewigte 'n moeilike probleem. Die dinamiese isotermiese distilleermethode van

Rivers. The causes of the increase in the mineral composition of the water during heavy rains is being investigated.

Preliminary negotiations for surveys in Natal and the eastern Transvaal have been completed, and detailed programmes of sampling and mapping have been prepared.

### Defluorination of water supplies

The consumption of drinking water containing fluoride in excess of 1.5 parts per million results in the mottling of the enamel of teeth and adversely affects the entire bone structure. In South Africa, particularly in arid regions, many sources of water contain excessive amounts of fluorine, and effective methods of lowering the concentration of fluorine are being investigated.

### PHYSICAL AND ANALYTICAL CHEMISTRY

Several of the laboratory's investigations and services are not specifically concerned with particular raw materials.

### Metallic corrosion

In addition to dealing with inquiries and small problems submitted by industries and municipalities, the behaviour of sulphate-reducing bacteria in relation to the corrosion of iron is being studied. This study also has a bearing on investigations into the digestion of sewage and industrial effluents by anaerobic microorganisms. Preliminary work has thrown doubt on the belief that the bacteria function as cathodic depolarizers in the corrosion of iron.

### Radiochemistry

In co-operation with the University of Natal and various divisions of the Department of Agriculture, the behaviour of superphosphate in South African soils is being studied with the aid of radioactive phosphorus. Facilities for the manufacture of "labelled" superphosphate have been made available by Messrs. African Explosives & Chemical Industries, Ltd. A fundamental study of the fixation of superphosphate has been started.

The behaviour of a systemic insecticide in groundnuts has been studied using radioactive phosphorus; and a method has been worked out for determining small amounts of hydrogen peroxide produced by irradiation of water with X-rays.

### High polymers

The distribution of molecular weights in stand-oils has been studied in detail. Fractions have been separated under air-free conditions by solvent extraction and molecular weights of these have been determined. Since molecular weights lie mainly in the range 1,000–10,000 their measurement presents a difficult problem. The dynamic isothermal distillation method of Gee has been

Gee is die mees bevredigende gevind en 'n noukeurige studie van die toestande wat vereis word vir akkurate metings van molekulêrgewigte is met stowwe waarvan die molekulêrgewig bekend is, gemaak.

### Sorpsie van gasse

Gedurende een fase van die bestudering van die diffusie van geadsorbeerde molekules in mikroporieë, is gevind dat adsorberende oppervlaktes heterogeen is m.b.t. die adsorpsie-hittes en dat dit 'n merkbare invloed het op oppervlakte-diffusie.

Vergelykings van die adsorpsie van gasse op die oppervlaktes van los poeiers en op oppervlaktes van dieselfde poeiers wanneer hul in pille saamgedruk is, het lig gewerp op die rol van kapilêre kondensasie en die ontstaan van adsorpsie-histerese. 'n Metode vir die bepaling van poriegrootte uit hierdie gegewens is ontwikkel.

### Analitiese laboratorium

Hierdie onderafdeling word voortdurend besig gehou met die voorsiening aan die behoeftes van die ander afdelings en dit was onmoontlik om mikro-analitiese dienste vir ander inrigtings te verskaf.

found satisfactory, and a careful study of the conditions required for accurate measurement of molecular weights has been made with substances of known molecular weight.

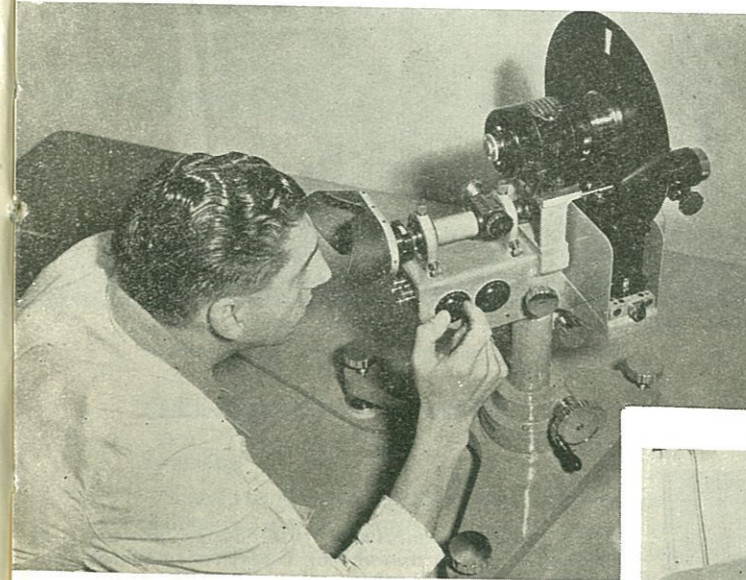
### Sorption of gases

In one phase of studies of the diffusion of adsorbed molecules in micropores, strong evidence has been obtained for heterogeneity of adsorbent surfaces with respect to heats of adsorption, and of the marked influence of this on surface diffusion.

Comparisons of the adsorption of gases on the surfaces of loose powders and on surfaces of the same powders when they are compressed into plugs, have thrown much light on the role of capillary condensation and the origin of adsorption hysteresis. A method for calculating pore size from these data has been originated.

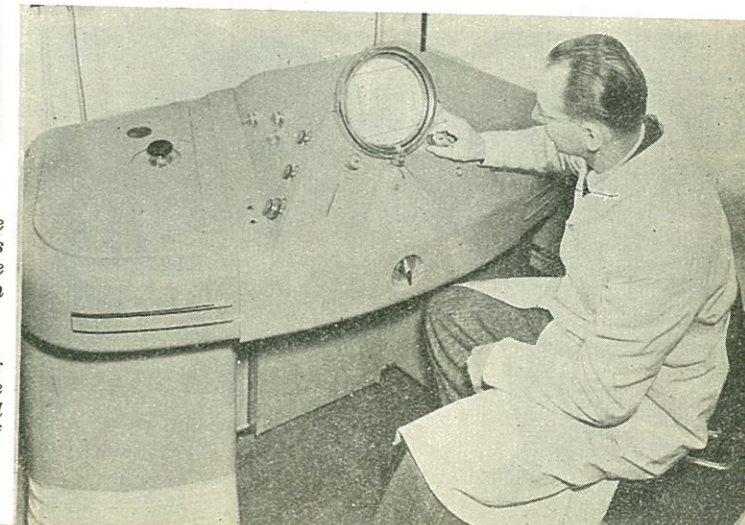
### Analytical laboratory

This section is fully occupied in serving the needs of other sections. Thus far, it has not been possible to extend microanalytical services to other institutions.



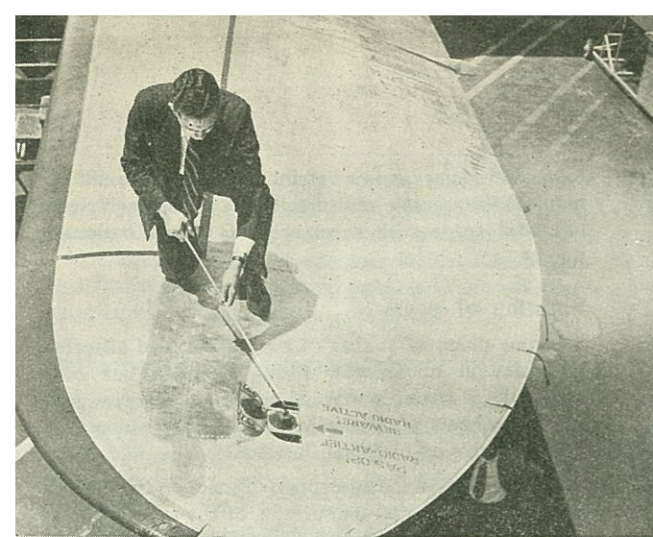
*An optical pyrometer for calibrating instruments used for measuring temperatures above 1063° C.*

*'n Optiese pirometer vir die yk van instrumente wat gebruik word vir die meet van temperature bo 1063° C.*



*Die elektronmikroskoop is gebruik vir talryke bepalings van die grootte en vorm van partikels kleisoorte, silwer jodied, dolomiet en die ontbinde produkte daarvan, virusse, ens., ten behoeve van ander ondersoekers.*

*The electron microscope has been used for numerous determinations of the size and shape of particles of clays, silver iodide, dolomite and its decomposed products, viruses, etc., on behalf of other investigators.*

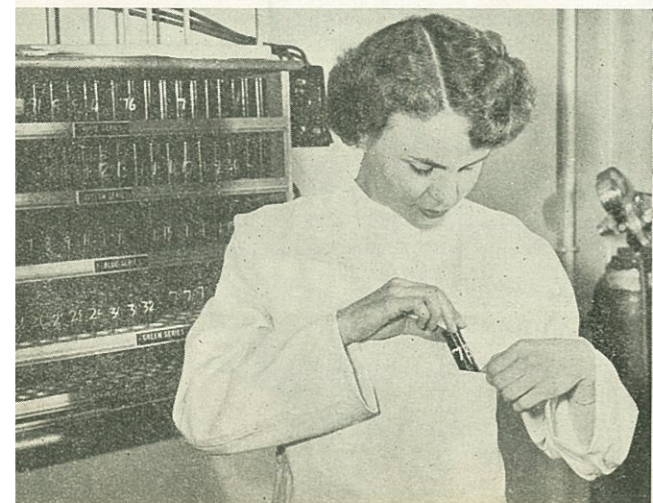
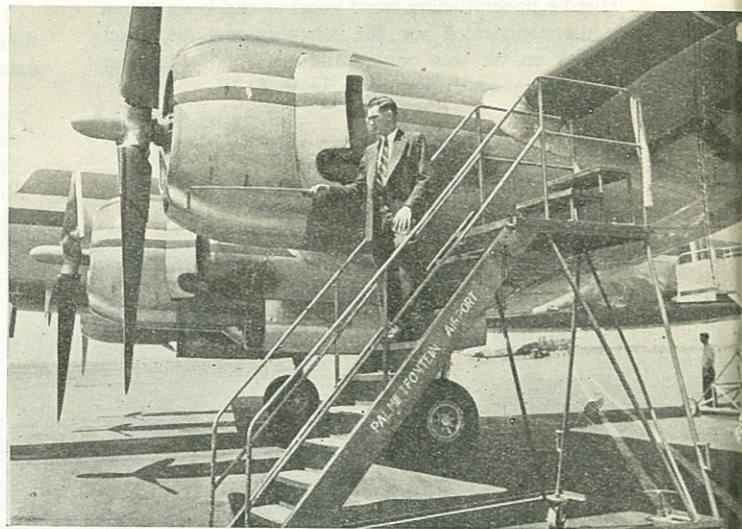


*Radioisotopes are removed from the wing tip of a South African Airways Constellation on arrival at Palmietfontein Airport, Johannesburg.*

*Radioisotope word uit die vlerkpunt van 'n Constellation-vliegtuig van die Suid-Afrikaanse Lugdiens gehaal by die aankoms daarvan op Palmietfontein-lughawe, Johannesburg.*

*Vir gebruik te maak van 'n lang stok, bly die agent op 'n veilige afstand totdat die koker in loodkissie vir die motorrit na Pretoria verpak is.*

*Using a long rod, the agent keeps at a safe distance until the wing-tip container is stowed in a lead box for transport to Pretoria by road.*



*Scaled cylinders containing 'film-badges' provide a measure of the amount of radiation to which staff are exposed when working with radioactive materials and X-rays — this is a national service provided by the C.S.I.R. for the protection of research workers and radiologists.*

*Verseelde silinders wat 'filmwapens' bevat, word gebruik vir die meet van die stralingdosies waaraan personeel blootgestel word wanneer hulle met radioaktiewe stowwe en X-strale werk. Dit is 'n nasionale diens wat deur die W.N.N.R. verskaf word vir die beskerming van navorsingswerkers en radioloë.*

## Nasionale Fisiese Laboratorium

### INLEIDING

#### Direkteur

Dr. S. M. Naudé wat vanaf Januarie 1946 tot September 1950 direkteur van die Nasionale Fisiese Laboratorium was, is in Oktober 1950 aangestel as Vice-President van die W.N.N.R. Sedertdien het dr. O. Brune opgetree as waarnemende direkteur.

#### Advieskomitee

'n Enkele advieskomitee is in die lewe geroep om die Raad van advies te bedien oor alle aspekte van die laboratorium se werk. Alle ander komitees wat voorheen advies gegee het in verband met die verskillende aspekte van die laboratorium se werksaamhede, is ontbind. Die Raad betuig met genoë sy dank aan alle persone wat op hierdie komitees gedien het.

#### Organisasie

Die laboratorium was weereens soos volg georganiseer:

Hoofafdeling vir Elektrotegnologie en Akoestiek, waarby ingesluit is onderafdelings vir elektriese standaarde, elektronika en akoestiek;

Hoofafdeling Fisika van Materie waarby ingesluit is onderafdelings vir fisika van materie, kernfisika, biofisika en hitte;

Stralingshoofafdeling, waarby ingesluit is onderafdelings vir spektrografie, optika, massaspektrometrie, spektrochemie, Röntgenstrale en elektron-diffraksie.

'n Onderafdeling vir Geofisika word by die Bernard Price-Instituut vir Geofisiese Navorsing by die Universiteit van die Witwatersrand in stand gehou en daar is ook 'n onderafdeling vir toegepaste wiskunde wat hulp verleen aan alle onderafdelings van die W.N.N.R.

### ELEKTRIESE STANDAARDE

#### Spanning

'n Stel van 23 verwysingselle is voltooi deur die aankaffing van nog ses normale Westonselle. Hierdie stel het gedurende die afgelope vier jaar uitstekende stabiliteit getoon. Twee klompe standaardselle is in die laboratorium vervaardig en volgens voorlopige toetse vergelyk die tweede klomp gunstig met die beste ingevoerde verwysingselle.

#### Weerstand

Die verwysingstandaard vir weerstand bestaan uit sewe 1-ohm weerstande van die Thomas-tipe, en hul

## National Physical Laboratory

### INTRODUCTION

#### Director

Dr. S. M. Naudé, who was director of the National Physical Laboratory from January 1946 to September 1950, was appointed Vice-President of the C.S.I.R. in October 1950. Since then, Dr. O. Brune has been acting director.

#### Advisory Committee

A single advisory committee has been formed to advise the Council on all aspects of the laboratory's work. All other committees which had formerly given advice on various aspects of the laboratory's activities, have been dissolved. The Council has pleasure in recording its gratitude to those who served on these committees.

#### Organization

The organization of the laboratory has remained as follows:

Division of Electrotechnology and Acoustics, including sections on electrical standards, electronics, and acoustics;

Division of Physics of Matter, including sections on physics of matter, nuclear physics, biophysics and heat;

Division of Radiation, including sections on spectrography, optics and mass spectrometry, spectrochemistry, X-ray and electron diffraction.

A geophysics section is maintained at the Bernard Price Institute for Geophysical Research, University of the Witwatersrand, and there is an applied mathematics section which assists all sections of the C.S.I.R.

### ELECTRICAL STANDARDS

#### Voltage

A set of 23 reference cells has been completed by the acquisition of a further six Weston normal cells. This set has shown excellent stability during the past four years. Two batches of standard cells have been manufactured in the laboratory, and on preliminary tests the second batch compares favourably with the best reference cells which have been imported.

#### Resistance

Seven one-ohm Thomas type resistors comprise the reference standard of resistance, and their stability

stabiliteit is sulks dat hierdie getal voorlopig as voldoende beskou word.

### Toets van instrumente

Wyserinstrumente, potensiometers, stroomtransformators, ens., is vir buite organisasies geëk en sertifikate tot dien effekte is uitgereik.

### Frekwensiestandaard

Die frekwensiestandaard is feitlik voortdurend gebruik vir die yk van ossilators, stopoorlosies en tydhouers.

### Serwomeganismes

Sisteme is ontwikkel waardeur gespesifiseerde kondisies in verskillende laboratorium-toerusting met besondere akkuraatheid gekontroleer kan word.

## ELEKTRONIKA

### Diëlektriese verwarming

Toetse wat gemaak is met 'n diëlektriese verwarmers van 2kW, 24 Megahertz, het getoon dat minerale soos leiklip, rioliet, kalkgesteentes, kleisoorte, skalies ens., volgens hierdie metode verwarm kan word, maar dat hierdie proses blykbaar geen ekonomiese moontlikhede bied nie behalwe vir die afskilfering van vermiculiet en moontlik vir die droog van asbes.

### Sterrekunde

In samewerking met die Radcliffe-sterrewag word 'n registrerende fotometer ontwikkel vir die registreer van reekse sterrekundige gebeurtenisse soos bv. die verduistering van Antares in Junie 1950. Die lig van 'n ster van die 15de grootte toon 'n volle defleksie op die registreerapparaat.

'n Integreerende fotometer vir noukeurige metings van lig afkomstig van baie flou bronne en 'n mikrofotometer waarmee fotografiese plate vinnig skandeer word, word ook ontwerp.

### Ontwerp en herstel van elektroniese instrumente

Verskillende instrumente vir besondere doeleindes is in die W.N.N.R. se laboratoriums ontwerp en gebou. Etlke gebrekkige instrumente is reg gestel, gewysig of herstel.

## AKOESTIEK

### Mobiele akoestiese laboratorium

Die mobiele akoestiese laboratorium is dikwels gebruik vir veldwerk i.v.m. gebou-akoestiek. Raadgewende dienste is aan die Suid-Afrikaanse uitsaai-korporasie verskaf in verband met die ontwerp, behandeling vir akoestiekdoeleindes en isolasie teen geraas van nuwe ateljees in Durban, Kaapstad en Pretoria. Toetse is gemaak van die absorpsie van klank deur meubels

is such that this number is regarded as adequate for the time being.

### Instrument testing

Pointer instruments, potentiometers, current transformers, etc., have been calibrated and certificates issued to outside organizations.

### Frequency standard

The frequency standard has been used almost continuously for calibrating oscillators, stop-watches and timers.

### Servo-mechanisms

Systems have been devised for controlling specified conditions in various pieces of laboratory equipment within fine limits of accuracy.

## ELECTRONICS

### Dielectric heating

Tests made with a 2 kW, 24 Mc/s dielectric heater showed that minerals such as slates, rhyolite, limestones, clays, shales, etc., can be heated by this method, but that the process does not appear to have economic possibilities except for the exfoliation of vermiculite, and possibly for the drying of asbestos.

### Astronomy

In collaboration with the Radcliffe Observatory, a recording photometer is being developed for recording sequences of astronomical events, such as the occultation of Antares in June 1950. The light from a star of the 15th magnitude produces a full deflection on the recording instrument.

An integrating photometer for accurate measurement of light from very faint sources and a microphotometer for rapid scanning of photographic plates is also being designed.

### Design and repair of electronic instruments

Various instruments for special purposes have been designed and built for the C.S.I.R.'s laboratories. Many faulty instruments have been adjusted, modified or repaired.

## ACOUSTICS

### Mobile acoustics laboratory

The mobile acoustics laboratory has been used on many occasions for field work on building acoustics. Consulting services have been provided for the South African Broadcasting Corporation in connexion with the planning, acoustic treatment and insulation against noise of new studios in Durban, Cape Town and Pretoria. Tests have been made of the absorption of sound by

en toebehore, die demp van geluid in ventilasiebuis en die voortplanting van klank in voorgenome geboue. Analises is gemaak van geraas by die voorgenome bouversele en akoestiese eienskappe van bestaande ateljees is getoets.

Die Stadsaal en Clarendon-saal in Bloemfontein, die 'First Church of Christ Scientist' in Durban en die byeenkomsaal van die Pretoria High School for Girls is almal getoets en aanbevelings betreffende verbetering van die akoestiek is gemaak. Advies is ook verleen aan die argitek van die Raad vir Beheer oor die Vee en Vleisnywerheid in verband met die isolasie van die Raad se nuwe gebou teen die voortplanting van klank en die akoestieseontwerp van die Raadskamer; advies is verleen aan African Explosives and Chemical Industries Ltd. in verband met die vermindering van geraas en trillings in twee nuwe fabrieksgeboue.

### Fisiese eienskappe van materiale

Akoestiese toerusting vir die bepaling van die elastisiteits-eienskappe van betonmonsters is vir die Nasionale Bounavorsingsinstituut ontwikkel. Werk is ook aan die gang op toerusting waarmee die snelheid van geluid in beton en ander strukture gemeet kan word.

Soniese metodes vir die gradering van slypwiele en vir die bepaling van die vasklewing van padboumateriale word ondersoek.

## FISIKA VAN MATERIE

### Massastandaarde

Gewigte wat varieer van 500 gram tot 1 milligram kan met Klas-A akkuraatheid vir wetenskaplike en nywerheidsorganisasies getoets word. Vir hierdie doel is daar 'n balans vir 500 gram wat gevoelig is tot een mikrogram en betroubaar tot agt mikrogram onder sekere omstandighede, en 'n mikrobalaans wat betroubaar is tot drie mikrogram; daar is ook twee dose nikroom gewigte met teengewigte van 500 gram wat deur die Nasionale Fisiese Laboratorium by Teddington gesertifiseer is.

### Foto-elastisiteit

Interne spannings in modelle van die mure van huise word gemeet deur gebruik te maak van 'n polarimeter en rekraam. In hierdie studies, wat ten behoeve van die Nasionale Bounavorsingsinstituut onderneem is, word die modelle van die mure, wat by die punte of in die middel heg gehou word, met gewigte belas; numeriese gegewens is van drukspanning en afskuiwing by etlike kritieke plekke in 'n besondere model verkry.

### Lugvaartkunde

Onder toesig van die W.N.N.R. se Komitee vir Lugvaartkundige Navorsing, is daar begin met die meet van windstote op handelslugroetes in Suid-Afrika. 'n

furniture and fittings, the damping of sound in ventilation ducts, and the transmission of sound through proposed structures. Analyses have been made of noise at the proposed sites and acoustic characteristics of existing studios have been tested.

The City Hall and Clarendon Hall, Bloemfontein, the First Church of Christ Scientist, Durban, and the assembly hall of the Pretoria High School for Girls, have all been tested and recommendations for acoustic correction have been made. Advisory services were provided to the architects of the Meat Control Board in connexion with sound-insulation in the Board's new building and on the acoustic design of the board room; advice was given to Messrs. African Explosives and Chemical Industries, Ltd. in connexion with the reduction of noise and vibrations in two new factory buildings.

### Physical properties of materials

Acoustic equipment for determining the elastic properties of samples of concrete has been developed for the National Building Research Institute. Work is also in progress on equipment for measuring the speed of sound in concrete and other structures.

Sonic methods of grading grinding wheels and of determining the adhesion of road materials are being investigated.

## PHYSICS OF MATTER

### Mass standards

Weights varying from 500 gms. to 1 milligram can be tested with class A accuracy for scientific and industrial organizations. For this purpose there is a 500 gm. balance, which is sensitive to one microgramme and reliable to eight microgrammes under certain conditions, and a microbalance which is reliable to three microgrammes; there are also two boxes of nichrome weights with head-weights of 500 gms, certified by the National Physical Laboratory, Teddington.

### Photo-elasticity

Internal stresses in models of house walls are being measured, using a polarimeter and straining frame. In these studies, which have been undertaken on behalf of the National Building Research Institute, loads are applied to models of walls, which are supported at the extremities or at the centre; numerical data have been obtained of compression and shear at several critical points in a particular model.

### Aeronautics

Under the supervision of the C.S.I.R.'s Aeronautical Research Committee, work has started on the measurement of gusts on commercial air routes in South Africa.

Instrument vir die meet van vertikale versnelling en snelheid op 'n voortdurende tydsbasis word gebou en getoets.

### Fisiologie

Die meganiese aksie van die baarmoeder word bestudeer in samewerking met die Professor van Verloskunde by die Mediese Skool van die Universiteit van die Witwatersrand. Getuienis wat verkry is van potensiaalmetings op 'n paar honderd verloskundige pasiënte bevestig nie die postulaat van 'n groep Amerikaanse fisioloë dat die intensiteit van die sametrekking van die baarmoederwand die grootste is by die fundus en dat dit gestadiglik afneem na die onderste gedeelte van die baarmoedernek.

### KERNFISIKA

#### Siklotron

'n Aanvang is geneem met uitgrawings vir die ondergrondse saal wat die siklotron sal huisves. Die vloer sal 30 voet onder die oppervlakte wees en die siklotron sal deur ten minste 9 voet grond en beton aan alle kante beskerm word. Die algemene ontwerp van die siklotron is voltooi en meeste van die bestanddele behoort teen Junie 1952 afgelewer te wees.

#### Standardisasie van radioaktiwiteit

Radio-isotope vir mediese en biologiese doeleindes word gereeld gestandaardiseer in 'n lugwandionisasiekamer. Ses beta-telbuis is vir verskillende isotope gestandaardiseer met ingevoerde standaardoplossings en word gebruik vir vinnige en maklike standardisasie van die isotope waarvoor hul geëk is.

#### Geiger-Mueller-telbuis

Etelike telbuis met besondere ontwerp is gebou en andere is herstel vir universiteite en ander navorsingslaboratoriums.

#### Toepassing op Industriële gebied

Radioaktiewe kobalt is gebruik in verdere toetse i.v.m. die bepaling van die grootte en ligging van holtes in bauxiet-blokke waarmee twee nuwe oonde van 'n groot glasfabriek uitgevoer sal word.

'n Radioaktiewe talliumbron is vervaardig om statiese elektrisiteit in 'n drukkery te verwyder.

### BIOFISIKA

#### Filmwapendiens

Hospitale dwarsdeur die Unie het aangehou om gebruik te maak van die filmwapendiens en 2293 wapens is aan 30 radiologiedepartemente uitgereik; 653 wapens is as standaarde en vir die beskerming van die personeel van die Nasionale Fisiese Laboratorium, gebruik.

An instrument for measuring vertical acceleration and velocity on a continuous time-base is being constructed and tested.

### Physiology

The mechanical action of the uterus is being studied, in collaboration with the Professor of Obstetrics at the Medical School of the University of the Witwatersrand. Evidence obtained from measurements of potential on several hundred obstetrical patients, does not confirm the postulate of a group of American physiologists that the intensity of contraction of the uterine wall is greatest at the fundus and decreases gradually towards the lower cervical segment.

### NUCLEAR PHYSICS

#### Cyclotron

Excavations have started on the underground hall for the cyclotron. The floor will be 30 feet below the surface and the cyclotron will be shielded by at least 9 feet of earth and concrete on all sides. The design of the cyclotron has been completed and most of the components should be delivered by June 1952.

#### Standardization of radioactivity

Radioisotopes for biological and medical use are standardized regularly, using an air-wall ionization chamber. Six beta counting tubes have been standardized for various isotopes, using imported standard solutions, and are used for rapid and easy standardization of the isotopes for which they are calibrated.

#### Geiger-Mueller counting tubes

Many counting tubes of special design have been built, and others have been repaired, for universities and other research laboratories.

#### Industrial applications

Radioactive cobalt has been used in further tests to determine the size and position of cavities in bauxite blocks for lining two new furnaces of a large glass works.

A radioactive thallium source has been made for eliminating static electricity in a printing works.

### BIOPHYSICS

#### Film-badge service

Hospitals throughout the Union have continued to use the film-badge service, and 2,293 badges were distributed to 30 radiological departments; 653 badges were used as standards and for the protection of the staff of the National Physical Laboratory.

### X-straal dosimetrie

'n X-straal eenheid van 100 kV van die 'Maximar'-tipe is gebruik vir die meet van X-straal dosisse volgens 'n metode wat afhang van die hoeveelheid waterstof wat geproduseer word in wateroplossings wat met X-strale deurstraal is.

### Radioisotope

Roetiene-bestellings vir radiojodium en radiofosfor wat in klompe ontvang word, is in dosisse opgemaak en gestandaardiseer.

Radiojodium is aan pasiënte vir diagnostiese en terapeutiese doeleindes toegedien en 'n fisikus van 'n ander inrigting is vir kliniese metings wat in verband staan met mediese benutting van radiojodium, opgelei.

'n Sistemiese insekdodende middel wat met radiofosfor gestempel is, is gebruik om die pad van die insekdodende middel in grondboontjieplante op te spoor. Hierdie werk is gedoen in samewerking met die Afdeling vir Entomologie van die Departement Landbou; die Tabak-Navorsingstasie en die Afdeling vir Skeikundige Dienste is ook gehelp met bemestingstudies waar gebruik gemaak is van fosfaat wat met radiofosfor gestempel is.

'n Aantal besondere bestellings vir radioisotope is namens ander organisasies geplaas. Hierdie organisasies is met hulp en advies bygestaan in verband met die gebruik van radioisotope, bykomende toerusting en die beskerming van personeel. Drie stelle radiokobalt ring-applikators is ontwerp, vervaardig en gestandaardiseer vir geneeskundige gebruik. Die opklaring van radionatrium deur pasiënte aan wie dit toegedien is, is in samewerking met die Baragwanathse Hospitaal bestudeer en hulp is verleen in verband met die toediening van radiogoud. Vir 'n geruime tyd was 'n lid van die W.N.N.R. personeel die Mediese Skool van die Universiteit van die Witwatersrand behulpsaam met die gebruik van radioyster vir ondersoekingswerk na die rol wat yster speel in die veroorsaking van hemochromatose.

### HITTE

#### Toets en yk van instrumente wat gebruik word vir temperatuurmetings

Verdere werk is gedoen in verband met die nagaan van toerusting wat gebruik word vir die standhouding van die akkuraatheid van die internasionale temperatuurskaal. Dit bestaan uit 'n weerstandstermometer (meetgebied -180 tot 600 °C), 'n platien-rhodium termokoppel (meetgebied 600-1063 °C) en 'n optiese pirometer (meetgebied bō 1063 °C). Roetiene toetse en ykingswerk het 260 termometers, 7 termokoppels, 3 optiese piometers en een termokoppel pirometer ingesluit.

#### Termiese konstantes van materiale

Metings van die termiese geleidingsvermoë van monsters termiese isoleerbord en van rotse is vir nywerheidsliggame en ander organisasies uitgevoer.

### X-ray dosimetry

A 'Maximar' 100 kV, X-ray unit was used in investigating the measurement of X-ray dosages by a method which depends on the amount of hydrogen peroxide produced in aqueous solutions irradiated with X-rays.

### Radioisotopes

Routine orders for radioiodine and radiophosphorus which are received in bulk, have been made up into doses and standardized.

Radioiodine has been given to patients for diagnostic and therapeutic purposes, and a physicist from another establishment has been trained in clinical measurements associated with medical uses of radioiodine.

A systemic insecticide labelled with radiophosphorus has been used to study the movement of the insecticide in peanut plants. This work was done with the Division of Entomology of the Department of Agriculture; the Tobacco Research Station and the Division of Chemical Services have been helped with fertilizer studies, using phosphates labelled with radiophosphorus.

Several special orders for radioisotopes were placed for other organizations who were also given help and advice on the use of radioisotopes, ancillary equipment and protection of staff. Three sets of radiocobalt ringapplicators were designed, produced and standardized for medical use. Clearance of radiosodium by patients to whom it had been administered was studied in collaboration with the Baragwanath Hospital, and assistance was given in the medical application of radiogold. For some time, a member of staff provided full-time assistance to the Medical School of the University of the Witwatersrand, using radioiron for investigating the role of iron in causing the condition known as haemochromatosis.

### HEAT

#### Testing and calibration of temperature measuring instruments

Further work has been done on checking the accuracy of equipment used in maintaining the international temperature scale. This consists of a platinum resistance thermometer (range -180 to 600 °C), platinum-rhodium thermocouple (range 600-1063 °C) and optical pyrometer (range above 1063 °C). Routine tests included calibrations of 260 thermometers, 7 thermocouples, 3 optical pyrometers, and one thermocouple pyrometer.

#### Thermal constants of materials

Measurements of the thermal conductivities of samples of thermal insulating board and of rock have been made for industrial firms and other organizations.

## Hittevloei in die aarde

Akkurate temperatuurmetings is in vier boorgate in die Noordelike en Suidelike Transvaal volgens 'n multitermometermetode uitgevoer. Hittegeleiding, soortelike warmte en verspreiding van rotsmonsters uit drie boorgate in die Oranje Vrystaat en Suid-Transvaal is noukeurig ondersoek. Deur gebruik te maak van hierdie gegewens en van temperatuurmetings gemaak deur die Geologiese Opname is die vloei van hitte in die aarde op verskillende plekke in die Transvaal en Oranje Vrystaat bereken.

## Toegepaste fisiologie

Verskillende metodes vir die meet van huid-temperatuur is ondersoek en 'n bevredigende rektaal-termometer waarin termokoppels gebruik word, is ontwerp en gebou. Die konstruksie van 'n menslike warmtemeter, waarmee die snelheid waarteen die menslike liggaam hitte wen of verloor onder verskillende omstandighede gemeet kan word, is ondersoek.

## OPTIKA EN MASSASPEKTROMETRIE

### Massaspektrometrie

'n Consolidated-Nier-massaspektrometer is gebruik vir die bestudering van die uitruiling van koolstof tussen gasse en soliede karbonate deur gebruik te maak van die stabiele isotoop, koolstof 13 as 'n opsporelement. Dit is ook gebruik om klein hoeveelhede waterstof in 'n mengsel gasse waarin koolstuurgas en stikstof teenwoordig was, te bepaal.

'n Massaspektrometer wat gebruik kan word vir verhoudings van m/e tot by 400 is in die laboratorium gebou. Die sterkte van die magneetveld word deur 'n serwo-sisteen beheer wat nie deur afwisselings in die spanning en frekwensie van die elektrisiteitstoevergeaffekteer word nie. 'n Besondere ionbron vir die ontleding van soliede monsters tesame met die beheerstroombane wat daarmee in verband staan, is voltooi. Hierdie instrument kan gebruik word vir die ontleding van loodisotoopverhoudings in die bepaling van die ouderdom van rotse, en die eerste twee monsters van radiogeniese lood is vir hierdie doel voorgelê en was uit Uganda afkomstig.

### Fotometrie

'n Integreerende sfeer en toebehore, lamptoebehore, 'n emissiefotoseleenheid en elektriese beheerpaneel is vir fotometriese werk ontwerp en gebou.

### Spektrofotometrie en kolorimetrie

'n Beckman-spektrofotometer is in werking gestel en die 'Ligfilter-biblioteek' brei vinnig uit. Bepaling van die totale deurlating van OB8-glas deur gebruik te maak van 'n lamp met 'n kleurtemperatuur van 2700°K, wat ten behoeve van 'n fotografiese groothandelaar

## Heat-flow in the earth

Accurate measurements of temperature were made in four boreholes in the northern and southern Transvaal, using a multithermometer method. Thermal conductivity, specific heat and diffusivity of rock samples from three boreholes in the Orange Free State and southern Transvaal, were thoroughly investigated. Using these data and temperature measurements made by the Geological Survey, the flow of heat from the interior of the earth at various places in the Transvaal and Orange Free State has been calculated.

## Applied physiology

Various methods of measuring the temperature of the skin have been investigated and a satisfactory rectal thermometer, using thermocouples, has been designed and built. The construction of a human calorimeter, for measuring the rate at which human bodies gain or lose heat in different conditions, has been investigated.

## OPTICS AND MASS SPECTROMETRY

### Mass spectrometry

A Consolidated-Nier mass spectrometer has been used in studying the exchange of carbon between gases and solid carbonates, using the stable isotope carbon 13 as a tracer. It has also been used to determine small amounts of hydrogen in a mixture of gases in which carbon dioxide and nitrogen were present.

A mass spectrometer which can be used for ratios of m/e of up to 400, has been built in the laboratory. The magnetic field strength is controlled by a servo system which is not affected by variations in the voltage and frequency of the electricity supply. A special ion source for the analysis of solid samples, together with the associated control circuits, has been completed. This instrument can be used for analysing lead isotope ratios in determining the age of rocks, and the first two samples of radiogenic lead which have been submitted for this purpose, come from Uganda.

### Photometry

An integrating sphere and attachments, lamp attachments, an emission photocell unit and electrical control panels have been designed and built for photometric work.

### Spectrophotometry and colorimetry

A Beckman spectrophotometer has been put into operation, and the 'light filter library' is growing rapidly. Determination of the total transmission of OB8 glass, using a lamp with a colour temperature of 2700°K, on

gedoen is, is 'n voorbeeld van die dienste wat verskaf word.

## Straling

'n Universele spektraal-apparaat is vir spektrofotometriese, spektro-radiometriese en spektrale bestudering van fotoelektriese buise en versperringslaag-fotoselle oor 'n uitgebreide spektrale gebied, gebou. Apparaat is opgestel vir die bepaling van die totale deurlating van stralings uit 'n spesifieke straler deur deurskynende materiale. Deurlating van lig afkomstig van 'n projeksielamp met 'n kleurtemperatuur van 2848°K, byvoorbeeld, is vir twee monsters gemeet ten behoeve van 'n nywerheidsfirma.

## Optiese instrumente

Optiese instrumente en bestanddele is ontwerp, getoets en herstel ten behoeve van navorsingslaboratoriums en ander organisasies wat ook met hulp en advies in verband met gespesialiseerde optiese probleme bedien is. Meer as twintig veraluminiseerde spieëls is volgens die vakuumbedekkingsmetode vervaardig en daar was 'n groot aanvraag vir die dienste van die optiese werkplaas.

## Spektrografie

Die frekwensieverandering in die Raman-spektra wat veroorsaak word deur veranderinge in die konsentrasie van monsters in oplossing, is vir verskillende organiese molekules bestudeer. 'n Besondere elektrodehouer vir die opwek van vonke en boë in gekontroleerde atmosfeer is ontwerp en gebou en is gebruik vir die bestudering van die bande van molekules wat gevorm word met antimoon, berillium, silikon en bismut. Toerusting is ontwerp vir die bestudering van flou-absorpsiespektra, veral in die spektraalgebied wat vir fotografiese registrering toeganklik is.

## SPEKTROCHEMIE

### Industrieële toepassings

Analises van drukkersmetale en van sinkbasis-legerings word gereeld gedoen en van 80 tot 100 monsters word elke maand in verband met die prospekter vir sink en lood ontleed. Hulp en leiding is verskaf aan 'n nywerheidsonderneming met die opstel van 'n laboratorium waar spektrochemiese analises vir produksiebeheer gebruik sal word.

### Navorsings en ontwikkeling

Fasiliteite is ontwikkel vir die volledige analise—in groot en klein konsentrasies—van alle elemente in plant of diere materiale. Elemente soos kobalt, nikkel, mangaan, molybdeen, ens., kan gelyktydig en akkuraat tot een deel in tien miljoen bepaal word, en 'n direklesende metode vir die analise van kalium, natrium en kalsium word ontwikkel.

behalf of a photographic wholesaler, is an example of the services provided.

## Radiation

A universal spectral apparatus has been built for spectrophotometric, spectro-radiometric and spectral studies of photoelectric tubes and barrier-layer photocells over a wide spectral range. Apparatus has been set up for determining the total transmission of radiation from a specific radiator through transparent materials. For example, transmission of light from a projection lamp having a colour temperature of 2848°K, was measured for two samples on behalf of an industrial firm.

## Optical instruments

Optical instruments and components have been designed, tested or repaired on behalf of research laboratories and other organizations, who have also been provided with advice and assistance on specialized optical problems. More than twenty aluminized mirrors have been made, using the vacuum coating process, and there has been a heavy demand on the services of the optical workshop.

## Spectrography

The shift of frequency in the Raman-spectra caused by variations in the concentration of samples in solution has been studied for various organic molecules. A special electrode holder for obtaining arcs and sparks in controlled atmospheres was designed and built and used in investigations of the bands of molecules formed with antimony, beryllium, silicon and bismuth. Equipment has been designed for studying weak absorption spectra, particularly in the spectral region accessible to photographic recording.

## SPECTROCHEMISTRY

### Industrial applications

Analyses of printers' metals and of zinc base alloys are being undertaken regularly and from 80 to 100 samples are analyzed each month in connexion with prospecting for zinc and lead. Help and guidance was given to an industrial undertaking in setting up a laboratory in which spectrochemical analysis will be used for production control.

### Research and development

Facilities have been developed for the complete analysis in large or small concentrations of all elements in plant or animal materials. Elements such as cobalt, nickel, manganese, molybdenum, etc., can be determined simultaneously and accurately to one part in ten million, and a direct reading method for the analysis of potassium, sodium and calcium is being developed.

'n Lid van die personeel van die Westelike Provinsie Vrughtnavorsingstasie het vir twee weke in die laboratorium gewerk ten einde ondervinding op te doen in verband met spektrochemiese metodes vir die analise van plantmateriale. In samewerking met belangstellende wetenskaplikes en inrigtings, en veral die Departement Landbou, word 'n studie gemaak van spoorelemente wat biologies van belang is in Suid-Afrikaanse grondsoorte. 'n Komitee is in die lewe geroep ten einde werk op hierdie belangrike gebied—wat voorheen verwaarloos is—te ko-ordineer.

## RÖNTGENSTRALE EN ELEKTRONDIF- FRAKSIE

### Kwantitatiewe analises

Bepalings van kristalyn en amorf, 'vrye-kwarts' in stofmonsters het die meerderheid van hierdie werk uitgemaak. Hul is gedoen ten behoeve van verskillende organisasies en hou direkte verband met navorsing op mynering. Baie werk is gedoen op die Geiger-teller spektrometers ten einde hierdie tegnieke te ontwikkel en monsters kan tans binne een uur ontleed word.

### Lang-ketting koolwaterstowwe

'n Metode wat sowel eenvoudig as doeltreffend is en waarvolgens resultate wat volgens geen ander metode verkry kan word nie gelewer word, is ontwikkel om die, aantal koolstofatome in die kettings van hierdie sintetiese kristalkoolwaterstowwe te voorspel. Volgens hierdie metode word die grondvlakrefleksies by skrams invalshoeke beklemtoon sodat hul op die Geiger-teller-spektrometer gemeet kan word. Hierdie werk is gedoen ten behoeve van die Nasionale Chemiese Navorsingslaboratorium.

### Metale

Tekstuur, korrelgrootte en orientasie van kristalle in stempels vir draadtrek is volgens Röntgenstraal metodes ondersoek. Gevind is dat hierdie eienskappe betrekking het op die fisiese eienskappe van die stempels. Die deformatsie van aluminium-monsters word ondersoek en sal met glybande, soos met die elektronmikroskoop waargeneem, gekorrelleer word.

### Partikelgrootte

Die ontbinding van dolomiet word in samewerking met die Nasionale Chemiese Navorsingslaboratorium ondersoek. Dolomiet is vir gespesifiseerde tye by bepaalde temperature en drukke ontbind, en waarnemings van die groei van kristalliete van die ontbinde produkte (magnesium oksied en kalsium oksied en kalsium karbonaat) het juiste inligting verskaf van die meganisme van ontbinding. (*Sien ook* Nasionale Chemiese Navorsingslaboratorium, bld. 13).

One of the staff of the Western Province Fruit Research Station worked in the laboratory for two weeks to gain experience in spectrochemical methods of analyzing plant materials. In collaboration with interested scientists and institutions, and particularly the Department of Agriculture, a study is being made of biologically important trace elements in South African soils. A committee has been set up to co-ordinate work in this important field which previously has been largely neglected.

## X-RAY AND ELECTRON DIFFRACTION

### Quantitative analyses

Determinations of crystalline and amorphous "free quartz" in dust samples have constituted the bulk of this work. They have been done on behalf of various organizations and have a direct connexion with research on silicosis. Much work has been done on the Geiger-counter spectrometers in developing these techniques, and samples can now be analysed in about one hour.

### Long-chain hydrocarbons

A method which has proved both simple and powerful and capable of giving results which cannot be obtained by other methods, has been developed for predicting the number of carbon atoms in the chains of these synthetic crystalline hydrocarbons. By this method the "basal reflections" at small angles of glancing incidence are accentuated so that they can be measured on the Geiger-counter spectrometer. This has been done on behalf of the National Chemical Research Laboratory.

### Metals

Texture, grain-size and orientation of crystals in dies for wire-drawing were examined by X-ray methods. It was found that these properties could be related to the physical properties of the dies. The deformation of aluminium specimens is being investigated and will be correlated with slip-bands as observed on the electron microscope.

### Particle size

The decomposition of dolomite is being investigated in collaboration with the National Chemical Research Laboratory. Dolomite was decomposed for specified times at fixed temperatures and pressures, and observations of the growth of crystallites of the decomposed products (magnesium oxide, calcium carbonate and calcium oxide) provided precise information on the mechanism of decomposition (*see also* National Chemical Research Laboratory, page 13).

## Kristalwerkparameters

Transvaalse chroomertse word in samewerking met die Nasionale Chemiese Navorsingslaboratorium ondersoek. Metodes waarvolgens kristalwerkparameters tot 'n juistheid van een deel in tien duisend gemeet kan word, is ontwikkel vir die evaluasie van die samestelling en graad van soliede oplossing van die verskillende bestanddele in hierdie chroomspinnelle.

Bepalings is ook gemaak vir inrigtings soos die Geologiese Opname en die Universiteit van Pretoria.

### Metings van absolute intensiteit

Metodes vir die meet van die absolute ge-integreerde digtheid van die 'refleksies' van klein, enkel kristalle is ontwikkel aangesien hierdie metings fundamenteel is vir bepaling van kristalstruktuur. Die Geiger-teller-spektrometers wat ontwikkel is om slegs poeiermonsters te hanteer moes vir hierdie doel gewysig word.

### Interne struktuur van kristalle

As gevolg van ondersoek op 'n groep chromium-komplekse wat deur die Leernywerheid-Navorsingsinstituut verskaf is, is dit bewys dat hierdie komplekse nie isomorfies—soos deur vorige werkers gerapporteer—is nie, en die volledige struktuur van twee van hierdie komplekse is verklaar. Gegewens is versamel waaruit die uitwerking van termiese bewegings van atome in die kristalle op hul atomiese verspreidingsfaktor, vasgestel kon word.

### Elektronmikroskopie

Die Phillips elektronmikroskoop is geïnstalleer, ingestel en inlyngestel en die vergroting is geëyk. Nuwe metodes vir die voorbereiding van monsters en van skaduweeprojeksie is ontwikkel en 'n oplossing van 30 Angstroms is met party monsters verkry. Met 'n nuwe kamera wat ontwerp is sal dit moontlik wees om prente teen 'n vergroting van 75,000 maal (sonder vergroting) te kry; bereken word dat met hierdie byvoegsel die oplossingsvermoë tot nagenoeg 20 Angstroms verminder sal word.

Talryke bepalinge van die grootte en vorm van partikels van kleisoorte, silwerjodied, dolomiet en sy ontbinde produkte, virusse, ens., is ten behoeve van ander navorsers gemaak. Die replikategniek vir die ondersoek van metaaloppervlaktes word gebruik in 'n ondersoek van glybande in aluminium en sal later uitgebrei word tot ander metale. Die struktuur van die vormlose oksiedlaag op aluminium is beskryf.

## TOEGEPASTE GEOFISIKA

'n Metode vir die ondersoek van die struktuur van die boonste lae van die aardkors deur metings te maak op die seismiese golwe veroorsaak deur 'n 10 pond hamer, is ontwikkel. Hierdie metode is goedkoop en minder lomp as die gewone metodes vir seismiese ondersoekingswerk waarby klein ontploffings gebruik word. In

## Lattice parameters

Transvaal chrome ores are being examined in collaboration with the National Chemical Research Laboratory. Methods of measuring lattice parameters to an accuracy of one part in ten thousand have been developed for evaluating the constitution and degree of solid solution of the various components in these chrome spinels.

Determinations have also been made for institutions such as the Geological Survey and the University of Pretoria.

### Measurements of absolute intensity

Methods of measuring the absolute integrated intensity of the 'reflections' from small single crystals have been devised, as these measurements are fundamental to determinations of crystal structure. The Geiger-counter spectrometers, which were designed to deal with powder specimens only, had to be modified for this purpose.

### Internal structure of crystals

From investigations into a group of chromium complexes supplied by the Leather Industries Research Institute, it has been shown that these complexes are not isomorphous, as reported by previous workers, and the complete structure of two of these complexes has been elucidated. Data were obtained from which the effect of thermal motions of atoms in the crystals on their atomic scattering factor could be determined.

### Electron microscopy

The Phillips electron microscope has been installed, adjusted and aligned and the magnification has been calibrated. New methods of preparing specimens and of shadow-casting have been developed, and a resolution of 30 Angstroms has been obtained with some specimens. With a new camera which has been designed, it will be possible to take pictures at a magnification of 75,000 times (without enlargement); it is estimated that with this attachment, the resolving power will be brought down to about 20 Angstroms.

Numerous determinations of the size and shape of particles of clays, silver iodide, dolomite and its decomposed products, viruses, etc., have been made on behalf of other investigators. The replica technique of examining metal surfaces is being used in an investigation of slipbands in aluminium, and will be extended to other metals later. The structure of the amorphous oxide layer on aluminium has been described.

## APPLIED GEOPHYSICS

A method of exploring the structure of the surface layers of the earth's crust, by measurements on the seismic waves produced by a 10lb. hammer, has been developed. This method is cheaper and less cumbersome than the usual methods of seismic exploration, in which

voorlopige proewe, is gegewens oor die diepte van die onderliggende rotsstrukture verkry en hul stem ooreen met boorgatgewens tot by 100 voet.

Verdere veldproewe word gemaak deur die Geologiese Opname ten einde vas te stel of die instrument in die praktyk bevredigend is om die fondamente van groot strukture soos damme ens., te ondersoek.

## TOEGEPASTE WISKUNDE

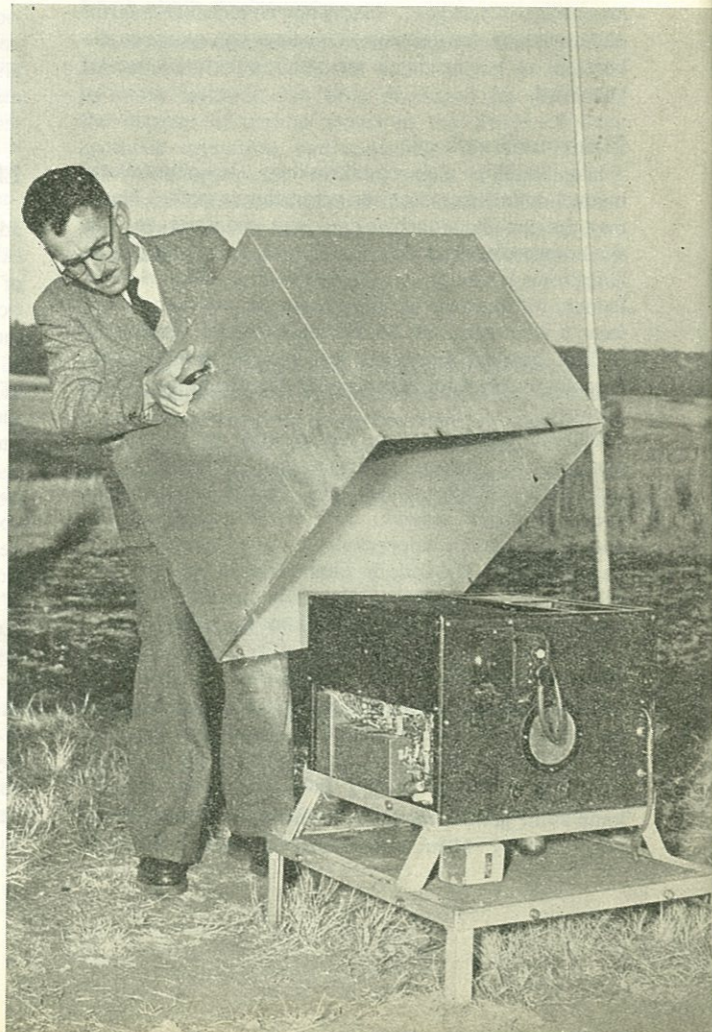
'n Diens is aan die verskillende onderafdelings van die W.N.N.R. se laboratoriums, wat besondere hulp met berekenings in verband met hul navorsingsprojekte vereis het, verskaf.

small explosions are used. In preliminary trials, data on the depth of underlying rock structures were obtained, which were in good agreement with borehole data, down to depths of 100 feet.

Further field trials are being made by the Geological Survey to determine whether the instrument is satisfactory for practical use in investigating the foundations of structures, such as dams, etc.

## APPLIED MATHEMATICS

A service was provided for various sections of the C.S.I.R.'s laboratories who required special assistance in calculations connected with their research projects.



*An automatic radio-noise recorder at the field station provided by the University of the Witwatersrand on its experimental farm at Frankenswald.*

*'n Outomatiese radio-geraas registreerapparaat by die Veldstasie wat deur die Universiteit van die Witwatersrand op sy proefplaas by Frankenswald, beskikbaar gestel is.*

## Telekommunikasie-Navorsingslaboratorium

### Algemeen

Hierdie laboratorium se werksaamhede was weereens veral toegespits op die bestudering van radiovoortplanting, die bestudering van radiogeraaspele en die ontwikkeling van die kristalbeheerde veelgolf-ontvangtoestel.

### Die ionosfeer

Gereelde metings van die hoogte teen frekwensiekarakteristieke van die ionosfeer duur voort in Johannesburg en Kaapstad en die resultate is maandeliks gepubliseer. Voorspellings vir die toestande van hoëfrekwente radiovoortplanting vir Suidelike Afrika is ook gereeld uitgereik.

'n Derde ionosfeerregistreerder wat in Nairobi geïnstalleer sal word, is voltooi en afgestuur. 'n Vierde ionosfeerregistreerder vir gebruik in die Belgiese Kongo is in die laboratorium gebou deur 'n tegnikus wat spesiaal vir dié doel deur die Belgiese Kongo gestuur is.

### Radio-geraaspeil

Die gereelde meet van radio-geraaspele by 100 kilohertz is dwarsdeur die jaar by Palmietfontein voortgesit. 'n Tweede registreerapparaat was tot die einde van 1950 in werking naby Nairobi en 'n derde registreerapparaat was in werking naby Ladysmith (Natal) vir die grootste gedeelte van die jaar. Die Raad is sy dank verskuldig aan die Afdeling vir Burgerlike Lugvaart vir die reelings wat getref is vir die instandhouding en gebruik van hierdie registreerapparate.

Die bestudering van die uitwerking van radiogeraas op laagfrekwente rigtingpeilingsisteme waarmee daar in 1949 gedurende die Decca-Rigtingpeilingsproewe 'n aanvang geneem is, duur voort met ondersteuning van die Afdeling vir Burgerlike Lugvaart. Dergelike toetse is op die Consol-sisteme en op 'n outomatiese radio-kompas (A.D.F.) uitgevoer. Die vermindering (te wyte aan atmosferiese steurings) wat in die afstand van betroubare ontvangs met hierdie sisteme verag kan word, is aangedui in verslae wat gepubliseer is. Benewens atmosferiese geraas, mag neerslagsteurings of krasontladingsteurings hierdie afstand van betroubare ontvangs in die geval van ontvangtoerusting wat deur die lug vervoer word, verminder. Toerusting word dus gebou om die herhalingsfrekwensie en die omvang van hierdie effekte te bestudeer.

'n Eksperimentele outomatiese multifrekwensie geraasregistreerder is voltooi vir die bestudering van atmosferiese geraaspele dwarsdeur die M.F. en H.F. bande. Die is nou voltyds in werking ten einde ondervinding op te bou voordat die ontwerp finaal aangeneem word.

## Telecommunications Research Laboratory

### General

The activities of this laboratory have again been concentrated mainly on the study of radio propagation, the study of radio noise levels and the development of the crystal-controlled all-wave receiver.

### The ionosphere

Regular measurements of the height vs. frequency characteristics of the ionosphere have continued at Johannesburg and Cape Town and results have been published monthly. Predictions of high frequency radio propagation conditions for Southern Africa have also been published regularly.

A third ionosphere recorder for installation in Nairobi has been completed and despatched. A fourth ionosphere recorder for use in the Belgian Congo has been built in the laboratory by a technician sent from the Belgian Congo especially for the purpose.

### Radio noise levels

The regular measurement of radio noise levels at 100 kc/sec at Palmietfontein has continued throughout the year. A second recorder was in operation until the end of 1950 near Nairobi and a third recorder has been in operation near Ladysmith (Natal) for the greater part of the year. The Council is indebted to the Division of Civil Aviation for arranging for the maintenance and operation of these recorders.

The study of the effect of atmospheric noise on low frequency navigation systems, commenced in 1949 during the Decca Navigator Trials, sponsored by the Division of Civil Aviation, has continued. Similar tests have been carried out on the Consol System and on an automatic radio compass (A.D.F.). Reports have been published indicating the anticipated reduction of the reliable range of these systems due to atmospheric noise. In addition to atmospheric noise, precipitation static and corona may cause serious reduction of range in the case of airborne receiving equipment. Equipment is therefore being built to study the frequency of occurrence and the magnitude of these effects.

For the study of atmospheric noise levels throughout the M.F. and H.F. band, an experimental automatic multi-frequency noise recorder has been completed. This is now in fulltime operation to provide experience prior to finalizing the design. The recorder operates on ten frequency bands between 30 kc/s and 30 Mc/s and experience so far has shown that manual operation of such a device is not essential, at any rate under South African conditions.

Met dié toerusting word atmosferiese geraas oor tien frekwensiebande tussen 30 kilohertz en 30 megahertz geregistreer en ondervinding tot dusver het getoon dat handbeheer van so 'n apparaat onder Suid-Afrikaanse toestande in elk geval nie nodig is nie.

Die bestudering van atmosferiese geraas deur gebruik te maak van hoog-diskriminasie registreermetodes by verskillende radiofrekwensies is ook voortgesit. Fasiliteite is verskaf vir die registreer van radiogeraas op 'n magnetiese-band-registreerapparaat en wanneer nodig vir die reproduksie van die oorspronklike golfvorm. Hierdie toerusting het sekere toetse op hulpmiddels vir navigasie aansienlik bespoedig en het dit ook moontlik gemaak om metings ter enige tyd 'n die laboratorium te maak sonder om die gewenste weertoestande af te wag.

### Ionosferiese absorpsie

'n Beperkte reeks metings van skuins inval is gemaak en het redelike ooreenkoms getoon met die waardes wat volgens oorsese metings verwag sou word. Hierdie werk is egter gestaak hangende 'n mere uitvoerige bestudering van die onderwerp waarvoor polsmetodes wenslik is.

### Opname van aardkonstantes

Die veldwerk in verband met die opname van aardkonstantes nader voltooiing. Metings is gemaak oor alle gebiede in die Unie en Suid Wes-Afrika waar geskikte lae- en mediumfrekwensiesenders beskikbaar was.

### Kristalbeheerde kommunikasieontvangtoestel

Die ontwikkeling van hierdie ontvangtoestel is gedurende hierdie jaar voortgesit. 'n Produksie-prototipe is gebou en word deur 'n Suid-Afrikaanse vervaardiger wat ses eksperimentele toestelle vervaardig, gebruik. Applikasie om patente is gemaak in die Verenigde Koninkryk, Australië en Suid-Afrika en komersiële produksie van hierdie ontvangtoestelle behoort binnekort te begin.

'n Kopie van hierdie prototipe is deur 'n ingenieur van die Poskantoor in die laboratorium gebou. Die Suid-Afrikaanse Poskantoor het 'n ontvangtoestel van hierdie aard nodig in verband met frekwensie-monitorwerk.

Die toepassing van die grondbeginsels van die ontvangtoestel tot die buigsame, dog hoogs stabiele frekwensie-beheer van senders, is in besonderhede oorweeg maar praktiese werk was die voltooiing van die prototipe ontvangtoestel te wagte.

### Onderaardse kommunikasie

Die eksperimentele werk in verband met radio-kommunikasie deur rots vir brandblus- en reddingsdoeleindes is voltooi en werk op hierdie gebied is tans beperk tot hulp aan die Kamer van Mynwese met die

Work has also been done on the study of the nature of atmospheric noise using high-discrimination recording-methods at various radio frequencies. Facilities have been provided for the recording of radio noise on magnetic tape and reproducing the original waveform when required. This equipment has considerably expedited certain tests on navigational aids as it has enabled measurements to be made in the laboratory at any time without waiting for the desired weather conditions.

### Ionospheric absorption

A very limited series of oblique incidence measurements have been made which have shown reasonable agreement with values expected from overseas measurements. This work has, however, been stopped pending a more detailed study of the subject, for which pulse methods are desirable.

### Ground constants survey

The field work in connexion with the ground constants survey is now nearing completion. Measurements have been made over all areas in the Union and South West Africa where suitable low and medium frequency radio transmissions have been available.

### Crystal controlled communications receiver

Development of this receiver has continued during the year. A production prototype has been made and is being used by a South African manufacturer who is producing six experimental sets. Patent applications have been made in the United Kingdom, Australia and South Africa and commercial production of these receivers should commence shortly.

A copy of the prototype has been made in the laboratory by a Post Office engineer for the South African Post Office, who require a receiver of this nature in connexion with frequency monitoring.

The application of the basic principles of the receiver to the flexible, yet highly stable, frequency control of transmitters has been considered in some detail but practical work has awaited the completion of the prototype receiver.

### Underground communications

The experimental work in connexion with radio communication through rock, for fire-fighting and rescue operations, has been completed and work in this field

vervaardiging deur plaaslike nywerhede van 'n klein aantal van hierdie toestelle. Die toestelle sal gebruik word vir meer omvattende proewe as wat moontlik was met die laboratorium modelle.

### Opspoor van weerlig met radar

Enige aanvoerwerk is gedoen op die vraagstuk van die opspoor van weerligslae met radar ten einde 'n studie in besonderhede van 'n ge-ioniseerde kolom moontlik te maak.

### Veldstasie

Tot onlangs was meeste van die werk waarvoor 'n veldstasie nodig was maklik binne bereik van die laboratorium maar, vry van kunsmatige steurings is of by die S.A.U.K. se ontvangstasie by Panorama of by Palmietfontein lughawe uitgevoer.

Vroeg hierdie jaar, egter, het die Universiteit van die Witwatersrand 'n klein gebou by die Universiteit se proefplaas by Frankenwald beskikbaar gestel. Die gebou is naby die middel van die plaas geleë waar die peil van kunsmatige steurings redelik laag is.

is now limited to assisting the Chamber of Mines in the production by local industry of a small number of these sets. These will be used for more extensive trials than were possible with the laboratory models.

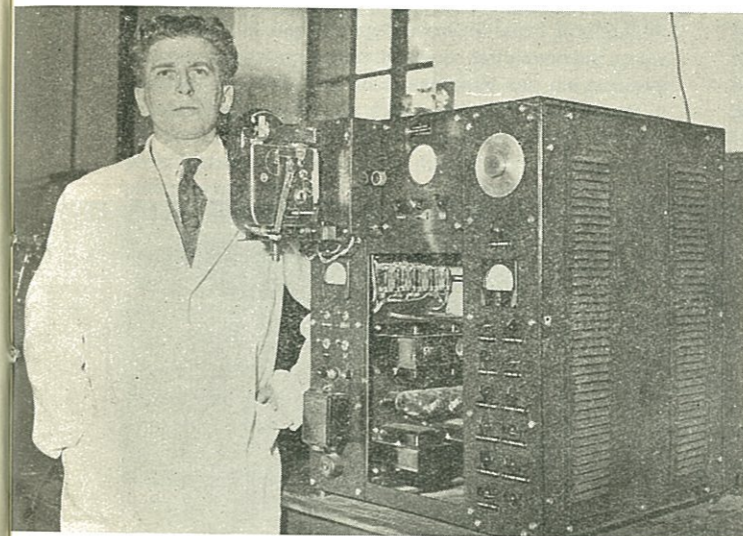
### Radar detection of lightning

Some preliminary work has been done on the problem of detecting lightning strokes by radar, to enable a detailed study of the progress of the ionised column to be made.

### Field station

Until recently most of the work requiring a field station within easy reach of the laboratory but free from man-made radio interference has been carried out either at the S.A.B.C. receiving station at Panorama or at Palmietfontein Airport.

Early this year, however, the University of the Witwatersrand has provided a small building at the University Experimental Farm at Frankenwald. The building is near the middle of the farm, where the levels of man-made radio-noise is reasonably low.



*Mr. N. Grisius, of the Belgian Meteorological Service, with the ionosphere recorder which he built in Johannesburg, under the technical supervision of the Telecommunications Research Laboratory, for operation in the Belgian Congo.*

*Mnr. N. Grisius van die Belgiese Meteorologiese Diens, met die ionosfeer registreerder wat hy in Johannesburg onder die tegniese leiding van die Telekommunikasie Navorsingslaboratorium vir werking in die Belgiese Kongo, gebou het.*

*Mnr. T. L. Wadley met die kristal-beheerde kommunikasie-ontvangtoestel wat hy uitgevind het. Proefstelle word deur 'n Suid-Afrikaanse vervaardiger vervaardig.*

*Mr. T. L. Wadley with the crystal-controlled communications receiver which he invented. Experimental sets are being produced by a South African manufacturer.*

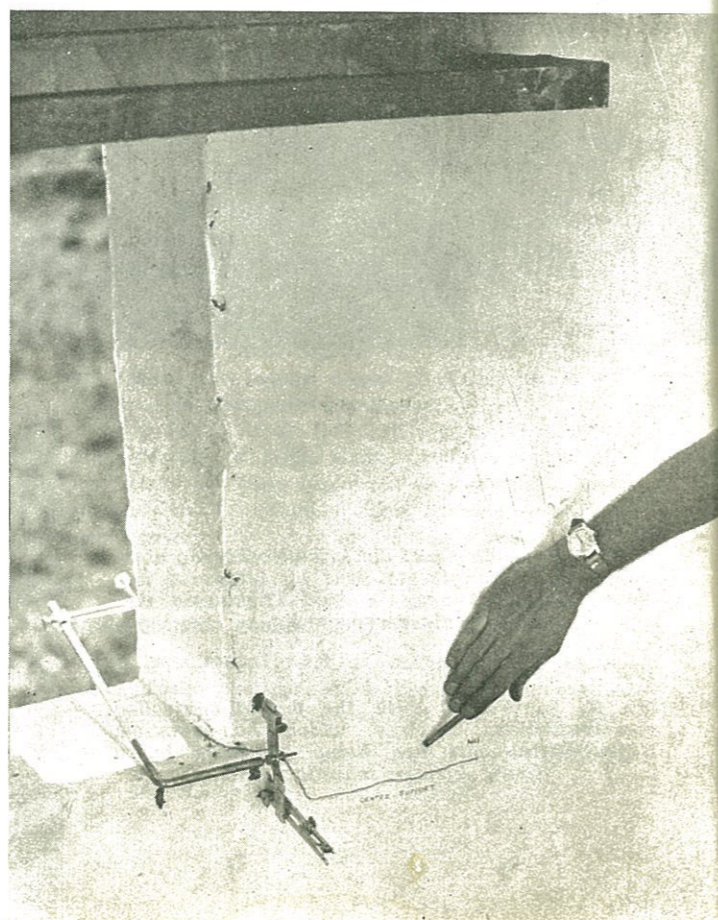






*Experimental walls, reinforced with steel rods, are tested by jacking up the ends or middle while applying a uniform load, to find economical methods of preventing wall-cracks caused by foundation movements.*

*Eksperimentele mure, wat met dun staal stawe versterk is, word getoets deur die uiterstes of die middelste gedeeltes op te lig terwyl 'n egalige lading aangewend word ten einde ekonomiese metodes te vind wat muur-krake, veroorsaak deur fondamentsbewegings, sal voorkom.*



*Metings van vervormingskonsentrasie by die hoeke van vensters deur gebruik te maak van tensometers van die Huggenberger tipe. Hierdeur word gegewens verskaf vir die ontwerp van versterkings ten einde krake by hierdie punte te voorkom.*

*Measurements of stress-concentrations at window-corners, using Huggenberger tensometers, provide data for the design of reinforcement to eliminate cracks at these points.*

## Nasionale Bounavorsings- instituut

### Inleiding

Die Advieskomitee vir Bounavorsing vergader nog steeds elke twee maande. Om dit in sy werk by te staan, het hierdie komitee ander komitees in die lewe geroep wat handel met die volgende navorsingsprojekte: behuising, bloukalk, landgoedbeplanning, oorblywende druk in grondsoorte, verwerking van beton rioolpype en die koste van natuurlike-behuising. Laasgenoemde komitee het onder-komitees wat handel met bekwaamheid van arbeiders, gebou-elemente, boumateriale, bedryfskoste en winste, en met onkonvensionele konstruksiemetodes. Die ondervoorsitter van die komitee, dr. F. E. Kanthack, het om gesondheidsredes afgetree en prof. W. G. Sutton is as ondervoorsitter aangestel. Dr. A. J. Ockleston verteenwoordig die S.A. Instituut vir Siviele Ingenieurs en die Instituut vir Struktuuringenieurs in die plek van dr. Kanthack.

'n Spesiale toekenning van £10,000 deur die Nasionale Behuisings en Beplanningskommissie word hoofsaaklik aan drie navorsingsprojekte bestee: aan navorsing op die metodes waardeur die koste verbonde aan die bou van natuurlikehuise verminder mag word; aan proewe, wat in die eerste plek gedoen is op mure en geboue wat vir proefdoeleindes gebou is om die ophig van fundamente onder geboue te bestudeer en derdens op huise wat spesiaal gebou is om die toepassing in die praktyk van die teorieë van hittevoortplanting te bestudeer; en, aan veldproewe i.v.m. die ventilasie van geboue.

### Boumateriale

Navorsing op die vervaardiging van sement uit Suid-Afrikaanse hoogoondslyk met 'n hoë magnesia-inhoud het getoon dat die magnesia in 'n vorm teenwoordig is wat die sement wat vervaardig is nie sal beskuldig nie. Hierdie projek is een van 'n aantal ander projekte wat in verband staan met die gebruik van hoë-magnesiakalkgesteentes wat volop is in Suid-Afrika waar kalkgesteentes met 'n hoë kalsium-inhoud skaars is. Navorsing op die vervaardiging van bloukalk word deur 'n navorsingsbeurs wat deur die vervaardigers verskaf is, ondersteun.

Ingenieurs wy alhoemeer hul aandag aan die oorsake van die verwerking van beton, en die Instituut vir Municipale Ingenieurs het drie beurse vir die bestudering van metodes om die disintegrasie van beton rioolpype te verminder, ingestel. Veronderstel word dat hierdie disintegrasie veroorsaak word deur swaelsuur wat in die teenwoordigheid van rioolgasse deur bakterieë afgegee word en mikrobiologiese aspekte van die probleem word deur een van die navorsingsbeurshouers wat in die Nasionale Chemiese Laboratorium werksaam is, ondersoek. Aspekte van beton-tegnologie en in-

## National Building Research Institute

### Introduction

The Building Research Advisory Committee has continued to meet every two months. To assist it in guiding the work of the institute, it has committees on the following research projects: housing, blue lime, estate planning, residual pressures in soils, corrosion of concrete sewers, and costs of Native housing. The last-named committee has sub-committees on efficiency of labour, elements in buildings, building materials, overheads and profits, unorthodox methods of construction. The committee's deputy-chairman, Dr. F. E. Kanthack, has retired for reasons of health, and Prof. W. G. Sutton has been appointed as deputy chairman. Dr. Kanthack's place as representative of the S.A. Institution of Civil Engineers and the Institution of Structural Engineers has been taken by Dr. A. J. Ockleston.

A special grant of £10,000 from the National Housing and Planning Commission is being spent principally on three projects: firstly, on research into methods of reducing the cost of building Native houses; secondly, on field-studies of the effects of heaving foundations on buildings, using specially constructed experimental walls and buildings, and thirdly, on tests of the practical application of theories of heat-transmission and field tests on ventilation in experimental houses designed and built for this purpose.

### Building materials

In research on the production of cement from South African blast-furnace slag with a high content of magnesia, it has been shown that the magnesia is present in a form which will not be harmful to the resulting cement. This project is one of several others connected with the use of high magnesia limestones, which are plentiful in South Africa, where high-calcium limestones are scarce. Research on the production and use of blue limes is supported through a research fellowship provided by the manufacturers.

Engineers are becoming increasingly interested in the causes of deterioration of concrete, and the Institution of Municipal Engineers has provided three fellowships to study methods of reducing the disintegration of concrete sewers. It is believed that this is caused by sulphuric acid produced by bacteria in the sewer atmosphere, and microbiological aspects of the problem are being investigated by one of the research fellows who is working in the National Chemical Research Laboratory. Aspects of concrete technology and engineering

genieurswese i.v.m. hierdie vraagstuk word deur twee ander beurshouers in die Nasionale Bounavorsings-instituut ondersoek.

### Grondmeganika

Die drie konstruksiemetodes wat verlede jaar voorgestel is om die uitwerking van die oplig van fondamente teen te werk, is algemeen toegepas. Navorsing duur voort ten einde meer inligting i.v.m. hierdie konstruksiemetodes beskikbaar te stel en vog-oordrag in grondsoorte word bestudeer om die oorsake van die opswel van uitgedroogde kleisoorte onder geboue nader toe te lig.

### Strukturele ingenieurswese

Die versterking van baksteenmure met staal stawe om krake wat deur fondamentsbewegings veroorsaak word te verhoed, blyk toepasbaar en goedkoper vir klein geboue te wees, maar daar is egter nog probleme waar daar tot dusver nog geen oplossing voor gevind is nie. Mure en geboue word gebruik om die ontwerp van interne tussenmure en die goedkoopste vertikale en horisontale versterkingsmetodes te bestudeer. Fotoelastisiteitstechnieke word met die medewerking van die Nasionale Fisiese Laboratorium gebruik om die distribusie van spanning en vervormings in modelle van mure wat uit plastiese stowwe vervaardig is, te bestudeer.

### Funksionele doeltreffendheid

Navorsing op hittevoortplanting deur gebou-elemente duur voort in die toetskamer vir hittevoortplanting en proewe hierinverband word ook in die laboratoriums gedoen. Om hierdie resultate te kontroleer word veldproewe op geboue gedoen. 'n Volledige reeks waarnemings van hitte-oordrag, lugtemperatuur, oppervlakte-temperatuur en ventilasie-snelheid word gemaak op 'n groep van agt natuurlike-huise wat volgens konvensionele en onkonvensionele konstruksiemetodes opgerig is. Hierdie huise is by Atteridgeville naby Pretoria met 'n toekenning deur die Nasionale Behuisings en Beplanningsraad, gebou. Ventilatiesnelhede en hittevoortplanting in die huise van Blankes word d.m.v. veldproewe in Vereeniging ondersoek.

Klimaatgegevens word op so 'n manier versamel en ontleed dat gegewens van termiese en ventilasie-eienskappe van huise wat in een landstreek verkry is, in ander dele van die land toegepas kan word.

### Argitektuur

Met die ondersteuning van die Nasionale Behuisings- en Beplanningskommissie en die samewerking van die Departement van Naturellesake, werk al die afdelings van die instituut saam in 'n poging om goedkoop stedelike behuising, en veral natuurlike behuising, te verskaf. Die leefbehoefes van Naturellefamilies en verskille in hierdie behoeftes wat afhang van stamgewoontes, omgewings- en kultuuragtergronde word deur spanne sosioloë

connected with this problem are being investigated by two research fellows in the National Building Research Institute.

### Soil mechanics

The three types of construction which were suggested last year for counteracting the effects of heaving foundations, have been widely adopted. Research has continued to provide more information on these methods of construction, and moisture-transfer in soils is being studied to elucidate the causes of the swelling of desiccated clays under buildings.

### Structural Engineering

The reinforcing of brick walls with steel rods, to prevent cracking caused by foundation movements, seems to be practicable and inexpensive for smaller buildings. There are, however, unanswered problems. Full-scale walls and buildings are being used for studying the design of internal partition walls and the most economical methods of vertical and horizontal reinforcement. Photoelastic techniques are being used, in co-operation with the National Physical Laboratory, to study the distribution of stresses and strains in plastic models of typical walls.

### Functional efficiency

Research on the transmission of heat through the elements of buildings has continued in the heat-transmission test room and in associated laboratory tests. Verification of the results through field-tests on full-scale buildings has started. A complete range of observations of heat-transfer, air temperature, surface temperature and ventilation rate is being made on a group of eight Native houses of orthodox and unorthodox construction, built at Atteridgeville, Pretoria, with a grant from the National Housing and Planning Commission. Ventilation rates and heat transmission in European houses are being investigated in field tests at Vereeniging.

Climatic data are being compiled and analysed in such a way that data on the thermal and ventilation characteristics of houses obtained by tests in one part of the country can be applied in other parts of the country.

### Architecture

With the support of the National Housing and Planning Commission and the co-operation of the Department of Native Affairs, all the divisions of the Institute have combined their efforts in a concerted attack on the problem of providing low-cost urban housing, and particularly Native housing. The living requirements of Native families, and differences in these requirements which depend on tribal, cultural and

ondersoek. Hierdie gegewens word gebruik saam met die minimumbehuisingsstandaarde om huise te ontwerp wat as standaardtypes kan dien vir behuisingskemas.

Maatskappye en privaat persone wat ander metodes vir die bou van goedkoop behuising voorstaan, word uitgenooi om proefhuise op 'n perseel in Pretoria te bou. Die koste verbonde aan boumateriaal en aan die bou van die huise word met dié van normale boumetodes vergelyk en die huise word deur die instituut vir hittevoortplanting, ventilasie, verligting, vogdeurdringbaarheid en struktuur ondersoek.

Navorsing op die ontwerp en uitleg van Naturelle-behuisingskemas het ten doel die vermindering van die koste van dienste, soos paaie, toevoer- en verwyderings-dienste en die daarstelling van beter omgewings. In samewerking met plaaslike outoriteite word 'n aantal eksperimentele woonbuurte gebou, die eerste waarvan by Witbank gebou word en waarvan 150 huise reeds voltooi, en 250 tans onder konstruksie is. Sosiale opnames wat die beplanning van die volgende proefwoonbuurt — die Springs/Rietfontein/Vlakfontein dorp voorafgaan, is feitlik klaar.

Die resultate van vyf jaar se navorsingswerk word by hierdie proewe toegepas, ten einde huise vir soveel moontlik mense, sonder subsidie en waar die instandhouding tot 'n minimum verminder is gedurende die afbetalingstydperk en, met gesonde en bevredigende sosiale omgewings, te verskaf.

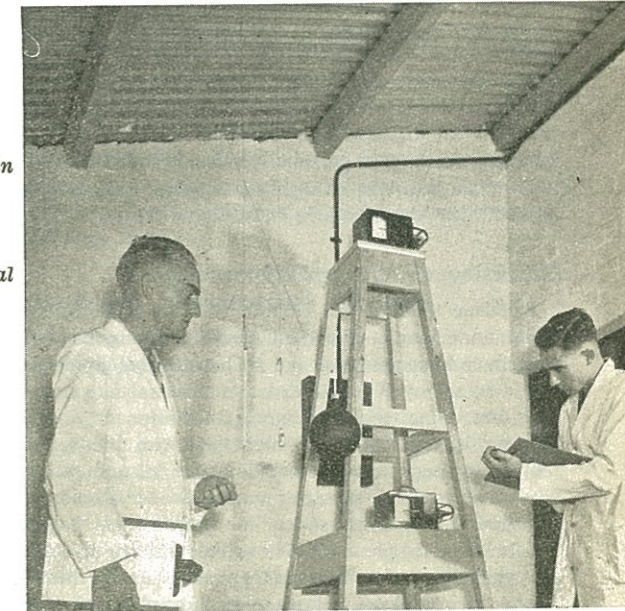
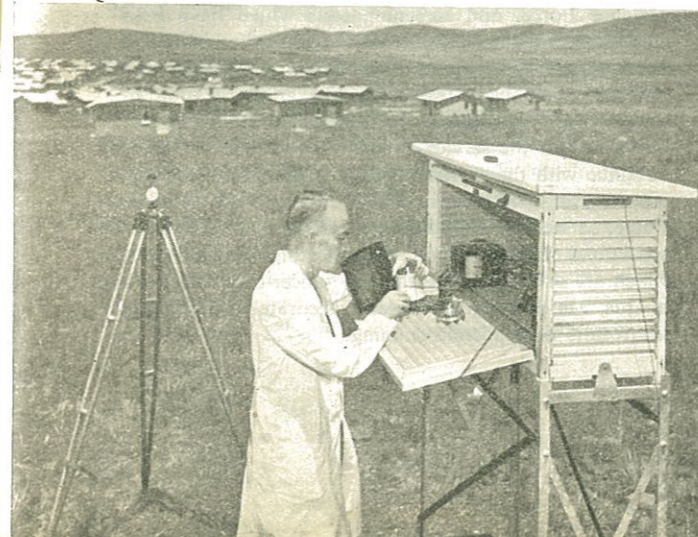
environmental background are being surveyed by teams of sociologists. These data are being used, in conjunction with the minimum standards of accommodation, to draw up house-plans which could be used as standard types for housing schemes. Companies and individuals who propose promising alternative methods of building low cost houses are invited to erect demonstration houses on a site in Pretoria. The costs of building operations and materials are compared with those of normal methods of construction, and the houses are tested by the institute for heat-transmission, ventilation, lighting, moisture penetration and structural characteristics.

Research on the design and lay-out of Native housing schemes aims at reducing the cost of services, such as roads, water and electricity supply and sewage disposal services, and also at achieving better environments. Experimental townships are being designed and built by local authorities with the co-operation of the institute. In the first of these, which is being built at Witbank, 150 houses have been completed and another 250 are under construction. Social surveys to provide the basis for planning the next experimental township, the Springs/Rietfontein/Vlakfontein township, are nearly completed.

In this research on housing the results of five years of research are being applied in an effort to solve the problem of providing houses without subsidy for as many as possible, while at the same time reducing maintenance to a minimum during the amortization period and providing healthy and satisfactory social environments.

*Verwarming en verkoeling word gemeet in goedkoop eksperimentele huise.*

*Heating and cooling is measured in experimental low-cost houses.*



*Measurements of outdoor air-temperatures and wind-velocities are part of the experiments on ventilation and temperature conditions in houses.*

*Metings van buitelug-temperatuur en windsterktes vorm 'n deel van die eksperimente wat gedoen word op die ventilasie en temperatuurkondisies in huise.*

# Nasionale Instituut vir Personeelnavorsing

## Inleiding

'n Nuwe advieskomitee wat handel, nywerhede, mynwyse, verdediging, die Staatsdiens, personeelbeheer, industriële geneeskunde, onderwys en akademiese sielkunde verteenwoordig, is aangestel. Hierdie komitee het sy pligte met goedkeuring onderneem en die Raad is sy dank aan die lede vir hul advies en praktiese hulp verksuldig.

Veldnavorsingswerk is hoofsaaklik bepaal tot daardie projekte waarmee die instituut vir 'n etlike aantal jare reeds besig is. Op industriële gebied behels hierdie projekte keuringsprosedures vir ambagsvakleerlinge, werkers in die klerebedryf en klerikale en administratiewe personeel, sowel as studies van afwesigheid en arbeidsomset, ongelukke, arbeidswaaluasie en prestasievermoë. Navorsing op die klassifikasie en opleiding van naturelle mynwerkers; op metodes waardeur hul bekwaamheid geskat word; en, op toetse waardeur ambagsvakleerlinge vir die ingenieurswerkswinkels van party van die myne uitgekies word, is voortgesit ten behoeve van die goudmynbedryf. Werk is ook gedoen vir die Departement van Verdediging betreffende klassifikasie- en keuringstoetse vir militêre personeel, waarby ingesluit is offisierkadette, vakleerlinge en lugpersoneel.

Die laboratoriumafdelings het, behalwe die diens wat hul vir veldnavorsingspanne lewer, ook etlike fundamentele probleme in verband met die teorie en praktyk van personeelsielkunde ondersoek. Laasgenoemde behels studies van die aard van temperament, van die aanleer van vaardighede by naturelle en van die invloed van omgewingsfaktore op hul toetsoptrede. Statistiek-tegnieke by personeelnavorsing en die bygaande wiskundige beginsels en ook die tegnieke wat betrokke is in die gee van toetse, is bestudeer.

## Navorsing vir die verdedigingsmagte

Roetiene toetsing van rekrute van alle afdelings van die Staande Mag is deur die Unie Verdedigingsmag oorgeneem en keuringstoetse wat vir hierdie doel gestandaardiseer is, sal by Kommandementshoofkwartiere dwarsdeur die Unie toegepas word. Offisiere en onderoffisiere is opgelei in die toepassing van toetse, wat roetiene prosedure in die werwing van rekrute geword het. Die instituut sal egter voortgaan om applikante vir opleiding as lugpersoneel in die Staande Mag en Siviele Burgermag te toets en ook applikante vir opleiding as vakleerlinge en vir ander gespesialiseerde dienste. Toetse vir die keuring van offisierkadette, wat deur keurraad vir offisierkadette op die proef gestel word, blyk besonder akkuraat te wees vir die voorspelling van die resultate van akademiese opleiding.

# National Institute for Personnel Research

## Introduction

A new advisory committee representative of commerce, industries, mining, defence, the Public Service, personnel management, industrial medicine, education and academic psychology has been appointed. This committee has undertaken its duties enthusiastically and the Council is indebted to members for their advice and practical assistance.

Field research has been limited mainly to those projects on which the institute has been engaged for some years. In industry, these concern procedures for selecting artisan apprentices, operatives in the clothing industry, and clerical and administrative personnel, as well as studies of absenteeism, labour turnover, accidents, job evaluation and techniques of merit-rating. Research on the classification and training of Native mine labourers, on methods of assessing their efficiency, and on tests for selecting artisan apprentices for the engineering workshops of some of the mines, has been continued on behalf of the gold mining industry. Further work on classification and selection tests for military personnel, including officer-cadets, artisans and aircrew, has been done for the Department of Defence.

The laboratory sections, besides providing a service for field-research teams, have investigated some fundamental problems in the theory and practice of personnel psychology. These include studies of the nature of temperament, of the acquisition of skill among Natives and of the extent to which their performance in tests is influenced by environmental factors. Statistical techniques for personnel research and the underlying mathematical principles as well as the techniques of testing have also been investigated.

## Defence research

Routine selection of recruits for all branches of the Permanent Force has been taken over by the Union Defence Force, and screening tests which have been standardized for this purpose will be applied at command headquarters throughout the Union. Officers and N.C.O.'s have been trained in the administration of tests which has become a routine procedure in recruitment for the services. The institute will, however, continue with the aptitude testing of applicants for aircrew training in the Permanent Force and Active Citizen Force, as well as for training as artisans and for other specialized duties. Tests for selecting officer-cadets, which are used experimentally by officer-cadet selection boards, are proving particularly accurate in predicting the results of academic training.

## Keuringstoetse vir ambagsvakleerlinge

Die bekwaamheidsvereistes van vakleerlinge word gedurende die tydperk wat vakleerlingskap voorafgaan bestudeer, deur die resultate van toetse wat deur leerlinge aan ambagskole vanaf standerd ses tot matriek gedoen is, te vergelyk met die resultate van interne en nasionale eksamens. Praktiese opleiding word bestudeer in die Suid-Afrikaanse Lugmag, Hoofposkantoor en in die ingenieurswerkswinkels van etlike goudmyne. Ambagstoetse word tans ontwerp ten einde 'n objektiewe basis vir die meet van vooruitgang daar te stel en 'n skaal vir die meet van hul prestasies word ontwikkel.

## Afwesigheid, arbeidsomset en ongelukke

Die praktiese toepassing van tegnieke wat gedurende die afgelope twee jaar ontwikkel is, vir die registrering van afwesigheid en waardeur afwesigheidsgeneigdheid gediagnoseer en voorspel word, word tans deur een van die nywerheidsnavorsingspanne ten behoeve van 'n groot nywerheidsfirma ondersoek. Nuwe metodes vir die bestudering van arbeidsomset is gebaseer op aktuariële sterftesyerstatistieke waarvoor 'n groep van 3,000 „industriële lewens” ondersoek word.

Gehoop word om 'n oorsig te maak van die samestelling en maatskaplik-ekonomiese agtergrond van industriële bevolkings. Hierdie oorsig sal op 'n streeksbasis gedoen word, aangesien afwesigheid en arbeidsomset waarskynlik net soveel deur agtergrondfaktore as deur omstandighede in individuele fabriekke beïnvloed word.

Studies van ongelukke word nog hoofsaaklik bepaal tot navorsing i.v.m. nuwe statistiek-tegnieke waardeur gegewens van ongelukke ontleed word.

## Klassifikasietoetse vir werkers in die klerebedryf

Meer as 500 werkers van alle soorte is in 'n groot klerefabriek in Kaapstad getoets ten einde vas te stel in hoeverre toetse vir die klassifikasie van personeel in die klerebedryf geldig is. Nuwe toerusting is ontwerp en gebou om die toepassing van hierdie toetse in die praktyk te vergemaklik.

## Klerikale en administratiewe personeel

Prosedures vir die kies van administratiewe leerlinge blyk bevredigend te wees. 'n Kort keuringstoets wat ter plaatse toegepas kan word is ontwikkel om te bepaal welke kandidate die volledige keuringsprosedure moet ondergaan. Dit maak dit moontlik om kandidate van alle dele van die land te ondersoek sonder om 'n groot aantal van hul bloot op grond van hul applikasie af te keur. Hierdie tegniek kan algemeen toegepas word wanneer applikasies op 'n landswye basis gevra word, of wanneer die koste verbonde aan byeenroeping van kandidate vir besondere toetse te hoog sal wees.

Metodes wat gebruik is om leerlinge vir administra-

## Tests for selecting artisan apprentices

The abilities required by apprentices are being studied in the pre-apprenticeship stage, by comparing the results of tests done by pupils at trade schools from standard six to matriculation, with the results of internal and national examinations. Practical training is being studied in the South African Air Force, General Post Office and the engineering workshops of several gold mines. Trade tests are being designed to provide an objective basis for measuring progress and a scale of merit-rating is being devised.

## Absenteeism, labour-turnover and accidents

The practical application of techniques of recording absenteeism and of diagnosing and predicting absence-proneness, developed during the past two years, are being investigated by one of the industrial teams which is working under contract to a large industrial concern. New methods of studying labour turnover, based on actuarial statistics of mortality and using an experimental group of 3,000 "industrial lives", are being investigated. Plans are being made to survey the composition and socio-economic background of industrial populations on a regional basis, as absenteeism and labour-turnover is probably influenced as much by these background conditions as by conditions in individual factories.

Accident studies are still confined mainly to research on new statistical techniques for the analysis of data on accidents.

## Classification tests for operatives in the clothing industry

Over 500 coloured operatives of all types have been tested in a large Cape Town factory in a further attempt to determine the validity of tests for classifying personnel in the clothing industry. New equipment has been designed and constructed to facilitate the practical use of these tests.

## Clerical and administrative personnel

Procedures for selecting administrative trainees are operating satisfactorily. A brief screening test, which can be applied locally, can be used to determine which candidates should undergo the full selection procedure. This makes it possible to deal with candidates from all over the country without rejecting many on the basis of their applications only or of going to the expense of collecting large numbers of applicants at a central place for detailed testing. The technique could be applied generally when applications for employment are received on a nation-wide basis, or when detailed testing of many applicants would be too costly.

Methods used for selecting administrative trainees

tiewe poste te kies, word tans gewysig sodat hul toegepas kan word tot gematrikuleerde en klerikale kadette en ook vir meer gespesialiseerde personeel wat verantwoordelik sal wees vir die neem van besluite en vir die beheer van ander persone.

### **Beroepspotensialiteite van Naturelle**

Baanbrekerswerk in die ontwerp van keurings- en klassifikasie toetse vir Naturellearbeiders op die goudmyne wat deur die Transvaalse Kamer van Mynwese ondersteun is, het goeie resultate gelever. Studies wat gemaak is om hierdie resultate te bevestig het getoon dat minder as 4% van die naturelle wat volgens hierdie toetse gekies is in hul opleiding nie geslaag het nie. In teenstelling hiermee, het 17% van die naturelle wat volgens die gewone keuringsmetodes gekies is, en 36% van die wat toevalligerwyse uit groepe gekies is, nie geslaag nie. Ten minste 75% van die wat gekies en opgelei is, was van gemiddelde of bogemiddelde bekwaamheid. Twee myngroepe het sentra waar personeel vir al hul myne op die Witwatersrand gekies kan word, opgerig. Een van hierdie groepe het 'n sentrum vir sy grootste myn opgerig en twee ander groepe is voornemens om roetiene keuringsprosedures, op grond van bevindings van die twee proefsentrums, in te stel. Meer as 40,000 kandidate is deur al hierdie sentrums gedurende die afgelope jaar ondersoek en 500 mans het 'n aantal uitgebreide aanleertoele in verskillende omgewings ondergaan. Hierdie proewe is gedoen ten einde die vermoë van naturelle in die aanleer van handvaardigheid en die toestande wat hierdie leervermoë beïnvloed, te bepaal.

### **Psigo-fisiologiese navorsingswerk**

Aangesien 'n betroubare raming van temperament by alle veldnavorsingsprojekte 'n vereiste is, word teoretiese studies van die aard van temperament in die laboratoriums onderneem. Hierdie studies word gedoen om 'n vollediger kennis van temperamentsoptrede daar te stel en ook om diagnose-metodes noukeuriger te ontwikkel.

### **Wechsler-Bellevue-toets**

Hierdie bekende Amerikaanse toets vir die bepaling van intelligensie by volwassenes, wat beweer word om ouderdomsagteruitgang en ook sekere psigoneurotiese toestande te kan diagnoseer, word vir gebruik in Suid-Afrika gestandaardiseer. 'n Oproep is deur die Pers gedoen ten einde 'n groep vrywilligers te kry wat alle seksies van die samelewing verteenwoordig. Daar is goed hierop gereageer maar dit het egter geblyk dat meeste van die vrywilligers bo die gemiddeld en besonder bekwaam is. Reëlins is getref met hospitale waardeur vrywilligers onder die herstellende pasiënte getoets sal word.

### **Projekte insake statistieke**

Daar is voortgegaan met werk op beheertabelle vir

are being modified for matriculated clerical cadets, as well as for more specialized personnel who will be responsible for handling other people and for executive decisions.

### **Occupational potentialities of Natives**

Important pioneering work in designing selection and classification tests for Native labourers on the gold mines, which was sponsored by the Transvaal Chamber of Mines, has led to useful results. A confirmatory study has shown that less than 4% of boys selected by means of these tests were unsuccessful during training, as compared with a wastage of 17% with the usual methods of selection and 36% with chance selection from new boys. At least 75% of those selected and trained proved to be of average efficiency, or better. Two mining groups have established centres for the selection of personnel for all their mines on the Witwatersrand, one has a centre for its largest mine, and two others are considering the introduction of routine selection procedures on the basis of findings from two experimental centres. More than 40,000 candidates passed through all these centres during the year, and 500 men have passed through several lengthy learning tests in different environments, in experiments to determine the ability of Natives to acquire manual skills, and the conditions which influence their learning.

### **Psycho-physiological researches**

Reliable assessment of temperament enters into many field-research projects, and theoretical studies of the nature of temperament are being undertaken in the laboratory to provide a more complete understanding of temperament behaviour and to refine methods of diagnosis.

### **Wechsler-Bellevue test**

This well-known American adult intelligence-test, which is claimed to be diagnostic of age-deterioration and of certain psychoneurotic conditions as well, is being standardized for use in South Africa. There has been a good response to appeals for volunteers to act as subjects, which were made through the Press to obtain a representative cross-section of the population, but apparently volunteers are mainly of above average and superior ability. Arrangements have been made with hospitals for volunteers among convalescent patients to be tested.

### **Statistical projects**

Further work on control charts for the study of

die bestudering van afwesigheid en vir die beheer van die korrelasie tussen toets en maatstaf; wiskundige studies van die werkingseenskappe van hierdie twee bedensels is voltooi. 'n Nuwe veelvoudige diskriminantfunksie is ontwikkel wat die gebruiklike multireeksmetode vervang. Gevind is dat die enigste doelmatige prosedure wat tot arbeidsomset toegepas kan word, die metode van frekwensiemomente is. 'n Berekeningsteorie is ontwikkel deur Pearsoniese momente met frekwensiemomente vervang en werk op die ramings van maksimum waarskynlikheid duur voort. Praktiese toepassings van die veelvoudige Poisson-distribusie is gevind en die voor- en nadele en ooreenstemmingspunte van die metodes van faktoranalise word teoreties en empiries bestudeer.

### **Gestandaardiseerde intelligensie en geskiktheids-toetse**

Statistiese tabelle en grafieke wat binnekort gepubliseer sal word, sal die praktiese toepassing van geskiktheids toetse tot 'n groot mate vergemaklik. Hierdie tabelle kan gebruik word met gegewens oor die geldigheid van die toetse ten einde 'n bemanningsbeleid wat voorsiening maak vir enige omstandighede, daartestel, en ook om eienskappe soos bv. die getal gekeurde kandidate wat gedurende opleiding nie sal slaag nie; die getal van dié wat nie gekeur is nie en wat moontlik sou geslaag het; die getal kandidate wat gekeur sal word volgens die kwalifikasiestandaard wat vir die spesifieke doel gekies is, ens.

### **Bou en ontwerp van apparate**

Nuwe apparate vir die kies van pilote en operateurs vir myne en die klerebedryf is ontwerp en gebou. Aandag is veral gegee aan duursaamheid, algemene prestasie oor lang tydperke en instandhouding van die apparate. Ontwerpe en konstruksietekeninge is vir publikasie voorberei.

absenteeism and for controlling the correlation between test and criterion has been done, and mathematical studies of the operating characteristics of these two devices have been completed. A new multiple discriminant function has been evolved, replacing the customary multiserial method. It has been found that the only practical procedure which can be applied to labour turnover problems is the method of frequency moments. Estimation theory has been developed by unifying Pearsonian moments with frequency moments and work on estimators of maximum likelihood is continuing. Practical applications have been found for multivariate Poisson distribution, and the advantages, consistencies and drawbacks of methods of factor analysis are being studied theoretically and empirically.

### **Standardized intelligence and aptitude tests**

Statistical tables and graphs which will soon be published should greatly facilitate the practical use of aptitude tests. These tables can be used with data on the validity of the tests to plan a manning policy to meet any set of circumstances, and to predict features such as the proportion of selected candidates who will be unsuccessful in training, the proportion of those rejected who would have been successful in training, the proportion of candidates who will be selected for whatever qualification standard is adopted, etc.

### **Construction and design of apparatus**

New apparatus for selecting pilots, and for operatives on the mines and in the clothing industry, has been designed and constructed. Durability, standard performance over long periods and maintenance have been the chief considerations. Designs and working drawings are being prepared for publication.

## Sentrale Werkplase

Toerusting ter waarde van £11,722 is in die werkplase gebou. Hierdie toerusting is bevredigend gevind en word nou gekapitaliseer.

Die volgende is 'n uitgesoekte lys van die belangriker stukke toerusting wat gedurende die jaar vervaardig is.

### Nasionale Fisiese Laboratorium

Twee boogstaanders van die Scribner-tipe, wat gebruik word om elektrodes s6 te hou dat hul noukeurig in lyn gebring kan word voor die spektrograaf  
Standaard optiese pirometer, vir akkurate temperatuurmetings b6 1000°C

Apparaat vir gebruik in die vrye-veld-wederkerigheidsyking van mikrofone

Elektromagneet vir die massaspektrometer

Twee Etalons vir hoë-dispersie spektroskopie

'n Plaat-kamera vir die elektronmikroskoop om die oplosvermoë van die instrument te verbeter en om die juistheid van elektrondiffraksie-metings uit te brei

'n Integreerende sfeer wat gebruik word in verband met die standardisasie van lampe deur vergelyking van die totale ligopbrengs met dié van standaardlampe

Apparaat vir die meet van akoestiese impedansie

Tweeling Geiger-Müller telapparaat — 'n verbeterde instrument vir die absolute standardisasie van radioisotope

Kunsmatige stem vir die yk van mikrofone

### Nasionale Bounavorsingsinstituut

Vier „triaksiale” aparate vir „triaksiale” -toetse van grondsoorte

Ses eksperimentele gronddruk-selle vir die bepaling van die verspreiding van druk in grondsoorte onder beswaring

Agthoekige windtonnel vir die yking van windspeed-instrumente en vir die bepaling van filmkoëffisiënte onder gedwonge konveksietoestande

Lughelderheidsmeter om die verspreiding van lughelderheid te meet

Agtien deflektometers vir afstandsmeting van defleksies van geboustrukture

Horisontale komparator } vir dimensieveranderings  
en vertikale komparator } metings van beton en kalkmonsters

Walsapparaat vir die bepaling van die sandhou-vermoë van kalksoorte

Ses bol-termometers om die uitwerking van straling te meet

## Central Workshops

Equipment costing £11,722 was built in the workshops. This equipment has proved satisfactory and is being capitalised.

The following is a selected list of major items of equipment produced during the year.

### National Physical Laboratory

Two Scribner arc stands, used for holding electrodes so that they can be accurately aligned in front of the spectrograph

Standard optical pyrometer, for accurate temperature measurements above 1000°C

Apparatus for use in the free field reciprocity calibration of microphones

Electro-magnet for mass spectrometer

Two Etalons for high dispersion spectroscopy

A plate camera for the electron microscope to improve the resolving power of the instrument and increase the accuracy of electron diffraction measurements

Integrating sphere, used in the standardization of lamps by comparisons of total light output with that of standard lamps

Apparatus for the measurement of acoustic impedance

Twin Geiger-Müller counter apparatus — an improved instrument for the absolute standardization of radioisotopes

Scintillation spectrometer for determination of the gamma-ray spectrum of radioisotopes

Artificial voice, for calibrating microphones.

### National Building Research Institute

Four triaxial machines used for “triaxial” tests on soils  
Six experimental soil pressure cells for determination of distribution of pressure in soils under load

Octagonal wind tunnel, for calibration of wind speed instruments and for the determination of film coefficients under forced convection conditions

Sky brightness meter, to measure the distribution of sky brightness

Eighteen deflectometers, for remote measurement of deflections of building structures

Horizontal comparator } for dimensional change  
and vertical comparator } measurements on concrete and lime specimens

Extrusion device, for determination of the sand-carrying capacity of limes

Six globe thermometers, to measure the effect of radiation.

### Nasionale Chemiese Navorsingslaboratorium

Biologiese filter vir die behandeling van afloopwaters

Draaiende toevoerapparaat en skroef transporteur } vir voortdurende toevoer van fyn steenkool na 'n vervoerseenheid

Drommenger, om die vermenging van vastestowwe te ondersoek

Smeltpuntapparaat vir die bepaling van die smeltpunte van organiese stowwe

Kwiksentrifugeerder vir die filtreer van metaalmengsels

Kjeldahl verteerstaander vir die bepaling van stikstof

Kwikkompomp vir die hersirkulasie van kwik

Monsteringsapparate van die Wilding en Neill-tipes vir die neem van monsters onder water in riviere.

### Nasionale Instituut vir Personeelnavorsing

„Hand-voet”-koördinator vir gebruik by die keur van klerewerksters

Leerlingloods-toetsapparaat

Drie twee-hand-koördinatore vir gebruik in 'n reeks toetsbatterye vir die keur van leerjongens en leerlingloodse

Antropometriese skuifpasser vir fisiologiese metings van naturellemynwerkers

Meganiese „aanmekearsit”-toets vir die toets van meganiese insig.

### National Chemical Research Laboratory

Biological filter, for the treatment of effluents

Rotary feeder and screw conveyor } for continuous feeding of powdered coal into a fluidization unit

Drum mixer, for investigating the mixing of solids  
Melting point apparatus, for determination of melting points of organic substances

Mercury centrifuge, for filtering amalgams

Kjeldahl digestion stand, for nitrogen determination

Mercury pump, for re-circulation of mercury

Wilding sampler } for underwater sampling in rivers  
Neill sampler }

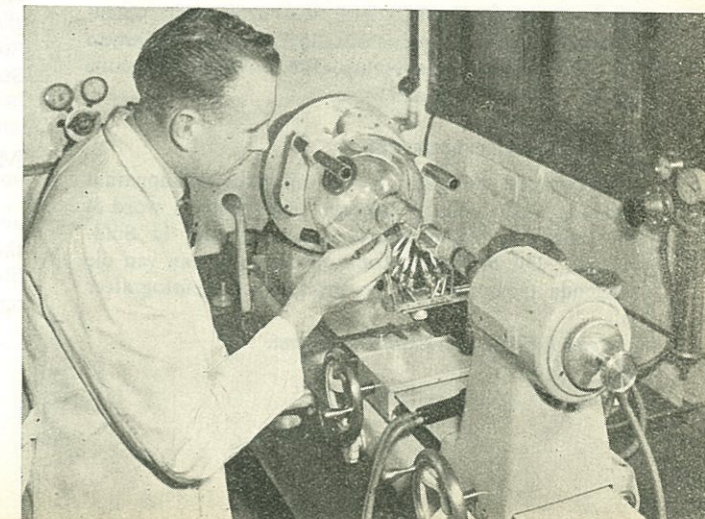
### National Institute for Personnel Research

Foot-hand co-ordinator, for use in the selection of garment workers

Pupil pilot test apparatus

Three two-hand co-ordinators, for use in a battery of tests for selection of apprentices and pupil pilots  
Anthropometric caliper, for taking physiological measurements on mine natives

Mechanical assembly test, for testing mechanical insight



Hier word 'n glasblasery-draaibank gebruik.

Using a glassblowing lathe.

## Afdeling Biblioteek en Inligting

Die personeel van die W.N.N.R. se eie laboratoriums en vraers van buiteorganisasies het gedurende die jaar 23,591 publikasies — vergeleke met 4,709 in die kalenderjaar 1947 — geleen. Hierdie gebruiklike maatstaf vir biblioteeksaktiwiteite dui op die snelle toename van die werksaamhede van hierdie afdeling, wat 'n sentrale wetenskaplike biblioteeks- en inligtingsdiens vir Suid-Afrika verskaf.

### Publikasies wat aangestuur is

Baie van die publikasies wat van oorsee ontvang word — óf deur bemiddeling van die Skakelkantore in Londen en Washington óf van ander organisasies — word aangestuur na die betrokke, gespesialiseerde inrigtings, bv. veeartsenykundige publikasies word na Onderstepoort gestuur, entomologiese monograwe na die Afdeling vir Entomologie, ens. Gedurende die afgelope jaar is 3,766 van hierdie publikasies aangestuur na verskillende organisasies in hierdie land.

### Inligtingsdienste

Navrae vir wetenskaplike en tegniese inligting wat oor die pos ontvang word, word eers ter inligting aan die Skakelafdeling gestuur en word dan, indien nodig, na die betrokke W.N.N.R. laboratorium verwys; gewoonlik word slegs dié navrae wat in verband staan met inligting wat in gepubliseerde of half-gepubliseerde vorm beskikbaar is terugverwys na die biblioteek, maar navrae betreffende die organisasie en toerusting van gespesialiseerde biblioteke—wat in groeiende getalle ontvang word — word regstreeks deur die biblioteek behandel. Dit is dikwels wenslik dat vraers om laasgenoemde inligting self die W.N.N.R. se biblioteek besoek en word hul, waar moontlik, daartoe aangespoor. Gedurende die afgelope jaar was daar etlike van hierdie besoeke.

### Fotografiese afskrifte

Vier honderd sewe-en-veertig mikrofilms en ander tipes fotografiese enkelkopieë van artikels in wetenskaplike tydskrifte is gedurende die jaar verkry. Hiervan is 165 in Suid-Afrika verkry, 197 uit Groot-Brittanje en 85 uit die Verenigde State.

### Mikrokaartleesapparaat

Gedurende die jaar is 'n mikrokaartleesapparaat ontvang en in gebruik geneem. Na verneem word is dit tans die enigste mikrokaartleesapparaat in Suid-Afrika. Die biblioteek koop ou nommers aan van die volgende tydskrifte wat op mikrokaarte gefotografeer is:—

*Zeitschrift für physikalische Chemie*

## Library and Information Division

The staffs of the C.S.I.R.'s own laboratories and outside inquirers borrowed 23,591 publications during the year as compared with 4,709 in the calendar year 1947. This customary yardstick of library activity shows the rapid growth in the work of this division, which provides a central scientific library and information service for South Africa.

### Publications passed on

Many of the publications which are received from overseas, either through the London or Washington Liaison Offices, or from other institutions, are passed on to the appropriate specialised institutions, e.g. veterinary publications are passed on to Onderstepoort, entomological monographs to the Division of Entomology, and so on. During this year 3,766 of these publications were passed on to institutions in this country.

### Information services

Postal inquiries for scientific and technical information are passed first to the Liaison Division for information and for routing, if necessary, to the C.S.I.R. laboratory concerned; as a rule only inquiries concerning information obtainable in published or semi-published form are passed back to be handled by the library, but inquiries concerning the organisation and equipment of special libraries, of which there have been an increasing number, are handled direct. For the latter inquirers, visits to the C.S.I.R. Library itself are often desirable and are encouraged. There have been many such visits during the past year.

### Photographic copies

Microfilm and other types of single photographic copies of articles in scientific journals obtained during the year numbered 447. Of these, 165 were obtained in South Africa, 197 in Great Britain, and 85 in the United States.

### Microcard reader

During the year a microcard reader was received and put into use. It is believed that at the moment this is the only microcard reader in South Africa. The library is purchasing back sets of the following journals reproduced on microcards:—

*Zeitschrift für physikalische Chemie*

*Justus Liebig's Annalen der Chemie*  
*Kolloid Zeitschrift*  
*Zeitschrift für anorganische und allgemeine Chemie*

### Skool vir nywerheidsbibliotekarisering in Port Elizabeth

As voortsetting van die beleid waardeur soveel praktiese hulp as moontlik aan nywerhede verleen word, is die vierde skool vir nywerheidsbibliotekarisering op 19 Julie in Port Elizabeth gehou. Die Hoof van die W.N.N.R. se Afdeling Biblioteek en Inligting, die Bibliotekaris van Rhodes Universiteit en die Bibliotekaris en Onder-Bibliotekaris van Port Elizabeth se Openbare Biblioteek het lesings gegee oor die tegniek van bibliotekarisering, die bronne vir wetenskaplike en tegniese inligting in Suid-Afrika, ensovoorts. Die bywoning van hierdie kursus deur meer as 50 mense was 'n rekord vir hierdie skole.

### „Books are Tools”

'n Kort leidraad tot die organisasie van klein tegniese biblioteke vir Suid-Afrikaanse nywerhede onder die titel „Books are Tools” het in Julie, 1951, verskyn.

### „Fair Copying Declaration”

Tot onlangs is die vanselfsprekende voordele verbonde aan fotografiese kopieë — veral vir die wetenskaplike of tegnoloog wat betreklik afgesonder is in sy werk — oorskadu deur die moontlikheid van moeilikheid i.v.m. kopiereg, indien toestemming van die eienaar van die kopiereg vir elke spesifieke geval nie verkry kon word nie. Twee jaar gelede het die Royal Society leiding gegee aan uitgewers van wetenskaplike tydskrifte deur 'n „Fair Copying Declaration” uit te vaardig. Hierdie Verklaring verleen toestemming tot die maak van afskrifte van die Royal Society se eie wetenskaplike tydskrifte onder sekere voorwaardes, en ander uitgewers is uitgenooi om instemming te betuig tot die verklaring. Oorspronklik was die Verklaring van krag vir 'n tydperk van twee jaar, wat in April 1951 verstryk het. Omdat dit van mening is dat die Verklaring werklik bygedra het tot die verbetering van die verspreiding van wetenskaplike inligting, het die Royal Society vroeg in hierdie jaar uitgewers weereens genooi om toe te stem tot die Verklaring, dié keer nie vir 'n beperkte tydperk nie, maar met dieselfde voorwaardes. Die W.N.N.R. self, en ander vooraanstaande wetenskaplike verenigings in Suid-Afrika het instemming tot die Verklaring betuig. Na verneem word stel die Royal Society tans 'n boekie op waarin 'n lys verskyn van diegene wat reeds instemming tot die verklaring betuig het.

*Justus Liebig's Annalen der Chemie*  
*Kolloid Zeitschrift*  
*Zeitschrift für anorganische und allgemeine Chemie*

### School for industrial librarians at Port Elizabeth

Continuing the policy of offering as much practical help to industry as possible, a fourth school for industrial librarians was held in Port Elizabeth on 19th July, 1951. The head of the C.S.I.R. Library and Information Division, the Librarian of Rhodes University and the Librarian and Sub-Librarian of Port Elizabeth Public Library lectured to the students on the technique of librarianship, the scientific and technical information resources of South Africa and so forth. The attendance of over 50 was a record for these schools.

### Books are Tools

A brief guide to the organization of small technical libraries for South African industry, under the title *Books are Tools*, was published in July, 1951.

### Fair Copying Declaration

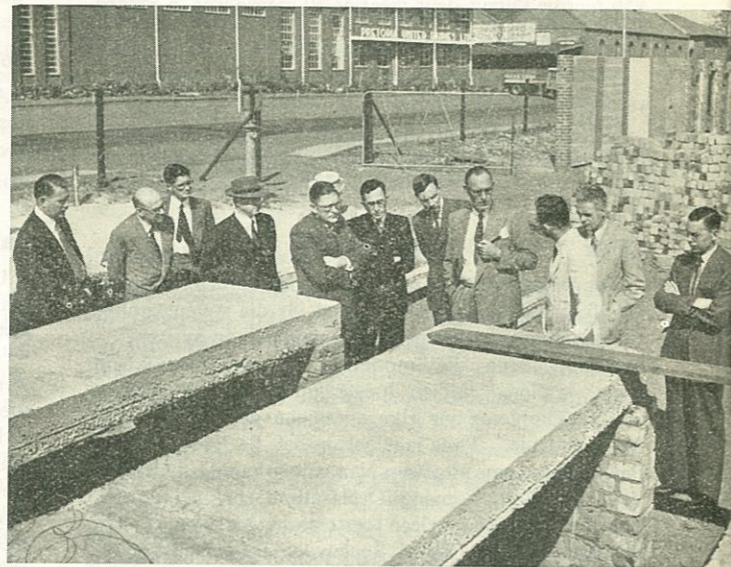
Until recently, the obvious advantages of photographic copying, particularly to the scientist or technologist working in relative isolation, were overshadowed by the possibility of copyright difficulties if permission were not obtained from the copyright owner in each specific case. Two years ago the Royal Society gave a lead to other publishers of scientific journals by issuing a “Fair Copying Declaration” permitting copying from its own scientific periodicals under certain conditions, and inviting other publishers to subscribe to this Declaration. Originally the Declaration was for an experimental period of two years, which expired in April 1951. Early this year the Royal Society, believing that the Declaration had indeed helped in the improvement of the dissemination of scientific information, again invited publishers to agree to the Declaration, this time for no limited period, but with the same conditions as before. The C.S.I.R. itself and the main scientific societies in South Africa have subscribed to the Declaration. It is understood that the Royal Society is preparing a booklet listing the names of all subscribers.



Back runs of some scientific journals are photographed on microcards (5" x 3" in size), 40 or more pages being reproduced on one card. They are read with the aid of this "reader", which projects individual pages onto a screen.

Ou nommers van party wetenskaplike tydskrifte word op mikrokaarte (5" x 3" groot) gefotografeer; 40 of meer bladsye word op een kaart geproduseer. Hulle word gelees d.m.v. hierdie 'leesapparaat' wat individuele bladsye op 'n skerm projekteer.

Die W.N.N.R. laboratoriums is deur die direkteure van die nywerheid-navorsingsverenigings en verteenwoordigers van streeksnavorsingskomitees besoek. Hier word eksperimente wat deur die Afdeling vir Ingenieurswese op die sterkte van hol-blok vloere van die Italiaanse tipe gedoen is, bespreek.



C.S.I.R. laboratories "at home" to directors of industrial research associations and representatives of regional research committees; here experiments by the Engineering Division of the National Building Research Institute on the strength of Italian-type hollow-block floors are being discussed.



A photographic display at the 12th Industrial Exhibition of the Northern Transvaal Chamber of Industries, Pretoria, August, 1951.

'n Fotografiese uitstalling by die 12de Nywerheidskou van die Noord-Transvaalse Kamer van Nywerhede wat gedurende Augustus 1951 in Pretoria gehou is.

## Skakelafdeling, Pretoria

Skakeldienste ontwikkel in die rigting van navorsingsinligting en die mededeling van die resultate van navorsing.

### NAVORSINGSINLIGTING

Twee skakelbeamptes verbonde aan die Nasionale Chemiese Navorsingslaboratorium handel met tegniese navrae en industriële opnames. Hul is die direkteur van daardie laboratorium ook behulpsaam met onderhandelings wat lei tot ooreenkomste vir ondersteunde ondersoek.

### Navrae

Die aantal navrae wat in samewerking met die Nasionale Chemiese Navorsingslaboratorium behandel is, het gestadiglik toegeneem. Die getalle vir twee-maandelike tydperke is soos volg:—

Oktober – November, 1950	.. .. .	56 navrae
Desember 1950 – Januarie 1951	.. .. .	53 navrae
Februarie – Maart, 1951	.. .. .	67 navrae
April – Mei, 1951	.. .. .	105 navrae
Junie – Julie, 1951	.. .. .	101 navrae
Augustus – September, 1951	.. .. .	107 navrae

### Industriële opnames

Inligting van tegniese of ekonomiese aard in verband met navorsingsprojekte word versamel en ontleed ten behoeve van die Nasionale Chemiese Navorsingslaboratorium. Hierdie inligting word gebruik om die voorkeure van navorsingsprojekte te bepaal.

Die volgende is 'n lys van die opnames wat gedurende die jaar onderneem is:

#### Om te dien as agtergrond vir moontlike nuwe navorsingsprojekte

- seegras
- titaan
- nuwe-produkte van olie uit steenkoolprosesse

#### Voortspruitend uit industriële navrae

- vislewerekstrakte
- walvisoplosbares en lewerekstrakte
- probleme verbonde aan die vervaardiging van sout
- nuwe-produkte van afvalstowwe van die suiwelbedryf
- fosfaatstowwe vir dierevoeding

#### Om te dien as agtergrond vir die ontwikkeling van werk wat voortspruit uit laboratoriumstudies

- chromhulpbronne
- kaolien vir verskillende nywerheidsdoel-eindes

## Liaison Division, Pretoria

Liaison services are developing along the lines of research intelligence, and communication of the results of research.

### RESEARCH INTELLIGENCE

Two officers, attached to the National Chemical Research Laboratory, deal with technical inquiries and industrial surveys. They also assist the director of that laboratory in negotiating agreements for sponsored investigations.

### Inquiries

The number of inquiries dealt with in co-operation with the National Chemical Research Laboratory, has increased steadily. The numbers for two-monthly periods are as follows:

October—November, 1950	.. .. .	56 inquiries.
December 1950—January, 1951	.. .. .	53 inquiries
February—March, 1951	.. .. .	67 inquiries
April—May, 1951	.. .. .	105 inquiries
June—July, 1951	.. .. .	101 inquiries
August—September, 1951	.. .. .	107 inquiries.

### Industrial surveys

Technical and economic information related to research projects is collected and analyzed on behalf of the National Chemical Research Laboratory. This information is used in assessing the relative priorities of research projects.

The following is a list of surveys undertaken during the year:

#### To provide a background to possible new research projects

- seaweed resources
- titanium resources
- by-products from oil from coal processes

#### Arising from industrial inquiries

- fish liver extracts
- whale solubles and liver extracts
- salt production problems
- by-products from dairy wastes
- phosphates for animal nutrition

#### To provide a background to development work arising out of laboratory studies

- chrome resources
- kaolin for various industrial purposes

## Nywerheidsnavorsingsverenigings

Die Skakelafdeling is verantwoordelik vir die bevordering van die ontwikkeling van die nuwe navorsingsverenigings, twee waarvan gedurende die jaar in werking getree het. Die direkteur van die Bitumeneuse Bindstof-Navorsingseenheid het in Desember 1950 aangekom en die direkteur van die S.A. Woltekstiel-Navorsingsinstituut in Mei 1951. Voorlopige besprekings in verband met die daarstelling van navorsingsfasiliteite vir die drukkers-, papier-, verpakkings- en dergelike bedrywe is met die Federation of Master Printers gehou.

'n Konferensie van die direkteure van die ses nywerheidsnavorsingsverenigings en van die W.N.N.R. se nasionale laboratoriums en dienste is gedurende September, 1951 in Pretoria gehou. Hierdie konferensie het die geleentheid gebied vir besprekings in verband met die administrasie van navorsing, die werking van die navorsingsvereniging-stelsel en die betrekkings tussen die nywerheidsnavorsingsinstitute en die nasionale laboratoriums.

## MEDEDELING VAN DIE RESULTATE VAN NAVORSING

Hierdie werk word onderneem met die doel om industrie en die algemene publiek in te lig in verband met die manier waarop wetenskaplike navorsing bydra tot die oplossing van Suid-Afrika se probleme. Dit word gedoen d.m.v. persoonlike kontak en deur publikasie in die pers, tydskrifte, nywerheids en handelstydskrifte en publikasies wat deur die W.N.N.R. uitgegee word.

## Streekskomitees

Twee streeksnavorsingskomitees is in die lewe geroep: die Middellandse Streeksnavorsingskomitee in Port Elizabeth onder voorsitterskap van mnr. H. Schauder, en die Natalse Streeksnavorsingskomitee in Durban, onder voorsitterskap van mnr. T. E. Peppercorn. Hierdie komitees het besondere dienste gelewer deur reelings te tref vir die uitruil van inligting tussen nywerars en senior lede van die W.N.N.R. se navorsingspersoneel wat hierdie gebiede besoek het. Hul het ook reelings getref vir hierdie senior personelede om lesings te gee aan wetenskaplike en tegniese verenigings en aan openbare vergaderings, om fabriek te besoek en om besprekings te hou met tegniese personeel i.v.m. die probleme van plaaslike nywerhede.

Lede van hierdie komitees het die W.N.N.R. se laboratoriums gedurende September 1951 besoek en het besprekings gehad met die Raad wat gedurende dié tyd in Pretoria vergader het.

## Jaarverslae en Navorsingsoorsig

Die Skakelafdeling gee ook die Raad se jaarverslae uit en onderneem die distribusie daarvan. Op aanbeveling van die Natalse Streeksnavorsingskomitee het die Skakel-

## Industrial research associations

The Liaison Division is responsible for promoting the development of new research associations, two of which were launched during the year. The director of the: Bituminous Binder Research Unit arrived in December 1950, and the director of the S.A. Wool Textile Research Institute in May, 1951. Preliminary discussions in connexion with the provision of research facilities for the printing, paper, packaging and allied industries, have been held with the Federation of Master Printers.

A conference of the directors of the six industrial research associations and of the C.S.I.R.'s national laboratories and services was held in Pretoria in September 1951. This provided an opportunity for discussing problems connected with the administration of research, the operation of the research association scheme and relations between the industrial research institutes and the national laboratories.

## COMMUNICATION OF THE RESULTS OF RESEARCH

The aim of this work is to inform industry and the general public of the ways in which scientific research is contributing to the solution of South Africa's problems. This is done by personal contacts and through publication in the press, popular journals, industrial and trade journals, and publications issued by the C.S.I.R.

## Regional committees

Two regional committees have been established: the Midland Regional Research Committee in Port Elizabeth, under the chairmanship of Mr. H. Schauder, and the Natal Regional Research Committee in Durban, under the chairmanship of Mr. T. E. Peppercorn. They have been most helpful in arranging for the exchange of information between industrialists and senior members of the C.S.I.R.'s research staff who have visited these areas. They have arranged for them to give lectures to scientific and technical societies and to public meetings, to visit factories, and to have discussions with technical personnel on the problems of local industries.

Members of these committees visited the C.S.I.R. laboratories in September 1951, and had discussions with the Council during the course of its meeting in Pretoria.

## Annual reports and Research Review

The Liaison Division produces and distributes the Council's annual reports. It has also begun, on the recommendation of the Natal Regional Research

afdeling ook begin met die publikasie van 'n driemaandelikse *Navorsingsoorsig*. Dit word versprei aan lede van liggame wat ge-affiliëer is met die Gefedereerde Kamers van Nywerhede en aan die Suid-Afrikaanse Federasie van die Staal en Ingenieursbedrywe, en, aan lede van Suid-Afrikaanse wetenskaplike en tegniese verenigings wat gevra het om dit gereeld te ontvang.

## Adresboek van Navorsingsinrigtings

'n *Directory of Research Organizations in the Union of South Africa* is uitgegee en versprei in antwoord op talle navrae vir inligting betreffende navorsingsaktiwiteite in hierdie land. Die Afrikaanse uitgawe word tans voorberei.

## Internasionale wetenskaplike betrekkings

Die verslag van die verrigtings van die Wetenskaplike Streekskonferensie vir Afrika wat in Oktober 1949 in Johannesburg gehou is, is uitgegee en versprei. Sake betreffende die Raad se lidmaatskap van die internasionale wetenskaplike unies word hanteer met die samewerking van die Vakkundige Assistent van die President.

## Openbare betrekkings

Reëlings vir besoeke aan die W.N.N.R. se laboratoriums is getref deur die Vakkundige Assistent van die President.

## Publisiteit

'n Geïllustreerde brosjure van die W.N.N.R. se nasionale laboratoriums en dienste was wyd versprei onder lede van die Gefedereerde Kamer van Nywerhede en die Federasie van die Staal en Ingenieursbedrywe. Geïllustreerde artikels oor die aktiwiteite van die verskillende laboratoriums is in nywerheids- en handelstydskrifte gepubliseer en pogings is altyd aangewend om koerantverslaggewers, wat om inligting oor navorsingsaktiwiteite vra, te help. Indien dit enigsins moontlik was, is reëlings getref vir hul om 'n onderhoud te hê met die personeel wat betrokke is met die besondere projek.

Committee, the publication of a quarterly *Research Review*. This is being distributed to members of bodies affiliated to the Federated Chambers of Industry and the Steel and Engineering Industries Federation of South Africa, and to members of South African scientific societies who have indicated that they wish to receive it regularly.

## Directory of Research Organizations

A *Directory of Research Organizations in the Union of South Africa* was produced and distributed in response to numerous inquiries for information about research activities in this country. The Afrikaans edition is being prepared.

## International relations in science

The report and proceedings of the African Regional Scientific Conference held in Johannesburg in October 1949, was produced and distributed. Matters connected with the Council's membership of the international scientific unions were dealt with, with the co-operation of the Professional Assistant to the President.

## Public relations

Arrangements for visits to the C.S.I.R.'s laboratories were handled by the Professional Assistant to the President.

## Publicity

An illustrated brochure on the C.S.I.R.'s national laboratories and services was widely distributed among members of the Federated Chamber of Industries and the Steel and Engineering Industries Federation. Illustrated articles on the activities of the different laboratories were published in industrial and trade journals and efforts are always made to assist newspaper reporters who ask for information about research activities. Whenever possible, arrangements are made for them to interview the research staff concerned with particular projects.



## Wetenskaplike Skakelkantoor, Londen

Die uitdeende aktiwiteit van die Raad se laboratoriums het ten gevolge dat daar 'n toenemende aanvraag is vir die hulp van hierdie kantoor. 'n Voorbeeld hiervan is die toename van navrae vir kopieë van besondere dokumente en publikasies wat nie in Suid-Afrika beskikbaar is nie. In die meeste gevalle is hul verkry in die vorm van enkelfotostaat- of mikrofilmkopieë en het 'n totaal van 137 bereik vergeleke met 69 in die vorige jaar. Party van hierdie publikasies kon nie in die Verenigde Koninkryk gevind word nie en moes daar dus elders na gesoek word. Daar is geskakel met etlike dokumentasiesentra op die Vasteland, en hul hulp was besonder waardevol.

Eerstehandse inligting oor 'n groot verskeidenheid onderwerpe is verkry in antwoord op wetenskaplike en tegniese navrae uit Suid-Afrika. Die Raad se laboratoriums en ander organisasies is ook gehelp om toerusting en ander materiale te vind en te bestel, om radioaktiewe stowwe te verkry, om personeel te werf, en om Suid-Afrikaanse wetenskaplike films te versprei; Suid-Afrikaanse wetenskaplikes is ook bekend gestel met die werk van wetenskaplikes in die Verenigde Koninkryk en elders.

Beamptes van die Raad wat in die Verenigde Koninkryk en op die Vasteland diens doen is met die reëlings vir hul besoeke aan navorsingsinrigtings bygestaan en in baie gevalle is beamptes van ander navorsingsliggame op dergelike wyse gehelp. As wetenskaplike adviseur van die Hoëkommissaris vir Suid-Afrika, was die Wetenskaplike Skakelbeampte dikwels gevra om die kantoor van die Hoëkommissaris met hulp en advies in verband met wetenskaplike en tegniese sake by te staan; die wetenskaplike skakelkantoor het op sy beurt groot voordeel getrek uit hierdie samewerking met die Hoëkommissaris. Die Wetenskaplike Skakelbeampte het ook die Raad en ander Suid-Afrikaanse organisasies op verskillende Gemenebeskomitees verteenwoordig.

## Scientific Liaison Office, London

The growing activities of the Council's laboratories have resulted in a greater demand for assistance from this office. An example is the increase in requests for copies of special documents and publications which were not available in South Africa. In most cases these were obtained in the form of single photostat or microfilm copies, and reached a total of 197 as compared with 69 in the previous year. Some of these publications could not be located in the United Kingdom, and the search for them had to be extended farther afield. Liaison was established with a number of documentation centres on the Continent, and their assistance has been of great value.

First-hand information on a wide variety of subjects was obtained in response to scientific and technical inquiries from South Africa. The Council's laboratories and other organizations were also assisted in locating and ordering equipment and materials, in the procurement of radioactive materials, the recruitment of staff, the circulation of South African scientific films and by generally acquainting South African scientists with the work of scientists in the United Kingdom and elsewhere. This office was also used extensively by organizations in the United Kingdom and on the Continent as a source of information on scientific activities in South Africa.

Officers of the Council on duty in the United Kingdom and on the Continent were assisted with arrangements for their visits to research establishments and on numerous occasions officers from other research organizations were similarly assisted. As scientific adviser to the High Commissioner for South Africa, the Scientific Liaison Officer was frequently called upon to assist the High Commissioner's Office with scientific and technical matters; the scientific liaison office, in turn, derived great benefit from this link with the High Commissioner. The Scientific Liaison Officer also represented the Government, the Council and other South African organizations on various Commonwealth Committees

## Wetenskaplike Skakelkantoor, Washington

Die Wetenskaplike Skakelkantoor in Washington het aangehou om die Raad en sy laboratorium te dien en het ook waardevolle hulp aan etlike ander Staatsdepartemente verskaf. As wetenskaplike attaché, het die hoof van die kantoor in noue samewerking gewerk met die Suid-Afrikaanse Ambassade in verband met wetenskaplike sake waarmee laasgenoemde kantoor moes handel. Goeie verhoudings tot die ander wetenskaplike skakelkantore van die Gemenebes wat tesame die Wetenskaplike Kantoor van die Britse Gemenebes uitmaak, is gehandhaaf en die Wetenskaplike Skakelbeampte het Suid-Afrika weer op 'n aantal wetenskaplike konferensies en vergaderings verteenwoordig.

Die onderwerpe waarmee hierdie kantoor moes handel het gestrek van kernfisika tot die verwerking van grondboontjies en die personeel het dikwels gevind dat hul gelyktydig betrokke was in sake soos die besonderhede van nuwe chemiese analiseermetodes, ingewikkelde elektroniese instrumente en die ingewikkeldhede van industriële veiligheidsregulasies.

Die aantal tegniese dokumente (pamflette, herdrukke en ander tegniese inligting) wat ontvang en aangestuur is na Suid-Afrika is tans nagenoeg vier-duisend per jaar. Sowat vyf-en-tagtig enkel herdruk-, mikrofilm- of fotostaatkopieë van besondere publikasies wat nie in die Unie beskikbaar is nie, is op versoek van die W.N.N.R. se biblioteek verkry. Daar is onderhandel met die „Atomic Energy Commission“, die Nasionale Advieskomitee insake Lugvaart en die „Office of Naval Research“ ten einde spesiale uitruilfasiliteite daar te stel waardeur wetenskaplikes in die Raad se laboratoriums vrye toegang geniet tot alle nie-geklassifiseerde publikasies van hierdie liggame. Reëlins is ook getref waardeur die W.N.N.R. se biblioteek op die adreslys van 'n aantal nywerheidsfirmas in die Verenigde State geplaas is.

Suid-Afrikaanse wetenskaplikes wat die Verenigde State en Kanada besoek is met hul reisplanne, vervoer-reëlins, bestellings, hotelbesprekings ens. met hulp en advies bygestaan met behulp van die Suid-Afrikaanse Ambassade. Permissie is ook verkry om dit vir besoekers moontlik te maak om 'n aantal van die Regering van die Verenigde State se navorsingsliggame te besoek. 'n Pamflet — *Notes for Visitors to the U.S.A. and Canada* is saamgestel om besoekers te help met die beplanning van hul reise en om hul tyd so voordelig moontlik deur te bring.

## Scientific Liaison Office Washington

The Scientific Liaison Office in Washington has continued to serve not only the Council and its laboratories but has rendered valuable assistance to several other Government Departments. As Scientific Attache, the Head of the office has worked in close co-operation with the South African Embassy on the scientific matters with which the latter has had to deal. Cordial relations have been maintained with the other Commonwealth scientific liaison offices which severally constitute the British Commonwealth Scientific Office, and the Scientific Liaison Officer has continued to represent South Africa at a number of scientific conferences and meetings.

The subjects with which this office has had to deal have ranged from nuclear physics to the processing of peanuts, and the staff frequently found themselves involved simultaneously in such matters as the details of new methods of chemical analysis, complicated electronic instruments and the intricacies of industrial safety regulations.

The number of technical documents (pamphlets, reprints and other technical information) received and forwarded to South Africa has now settled down to a fairly steady figure of approximately four thousand annually. Some eighty five single reprint, microfilm or photostat copies of special publications not available in the Union were obtained at the request of the C.S.I.R. library. Special exchange arrangements have been negotiated with the Atomic Energy Commission, the National Advisory Committee for Aeronautics and the Office of Naval Research, giving scientists in the Council's laboratories free access to all the non-classified publications of these bodies. Arrangements were also made for the C.S.I.R. Library to be placed on the mailing list of a number of industrial firms in the United States.

South African scientists visiting the United States and Canada have been assisted with the drawing up of itineraries, making appointments, travel arrangements, hotel reservations, etc., and, with the assistance of the South African Embassy, clearances have been obtained to enable visitors to see a number of United States Government research installations. A pamphlet on *Notes for Visitors to the U.S.A. and Canada* was drawn up to assist visitors in planning their trips, and to make the most advantageous use of their time.

## Mediese en Tandheelkundige Navorsing

### Komitees

Die Raad is weereens sy dank verskuldig aan die Mediese en Tandheelkundige Navorsingskomitee en sy verskillende onder-komitees vir hul waardevolle hulp in verband met die ontwikkeling van mediese en tandheelkundige navorsing. Dr. T. B. Davie, Prinsipaal en Onder-kanselier van die Universiteit van Kaapstad was weereens voorsitter van die Mediese en Tandheelkundige Navorsingskomitee en professor J. Barnetson en dr. J. H. Rauch is gedurende die jaar tot die komitee aangestel. Die komitee het twee keer vergader — in Kaapstad en in Pretoria.

Professor S. F. Oosthuizen het voortgegaan om die pligte van Ere-sekretaris vir Mediese Navorsing te vervul. Hy het die mediese navorsingseenhede etlike male gedurende die jaar besoek en het die Verenigde State, die Verenigde Koninkryk en ander Europese lande gedurende Julie, 1951 besoek ten einde die jongste ontwikkelings op die gebied van mediese navorsing te bestudeer.

Die Raad is besondere dank verskuldig aan dr. G. M. Bull en dr. R. M. Kark vir hul dienste as ere-mediese skakelbeamptes in die Verenigde Koninkryk en die Verenigde State van Amerika. Hul waardevolle vertroulike verslae i.v.m. die ontwikkeling van mediese en tandheelkundige navorsing was besonder belangwekkend. Hul het ook in antwoord op navrae wat deur die Raad aan hul gerig is, inligting versamel en aangestuur.

Dr. C. H. Barlow het op uitnodiging van die Raad die Unie besoek ten einde dit van advies te bedien insake probleme verbonde aan Bilharzia en veral om rigting te gee aan navorsing op hierdie gebied. Sy advies is van groot waarde vir die Raad.

### Skenkings

Talryke bydraes wat £289. 1. 6d. beloop, is deur die Eenheid vir Teringnavorsing ontvang. Die W.N.N.R. is besonder dankbaar vir hierdie bydraes, meeste waarvan deur persone wat belangstel in teringnavorsing gemaak is. Al hierdie fondse word gebruik vir die bevordering van die navorsingseenheid se werk, hetsy in die aankoop van toerusting hetsy om die resultate van navorsing te publiseer.

### Mediese navorsingseenhede

Die mediese navorsingseenhede het hul toegelê op konsolidasie eerder as uitbreiding. Die navorsings-aktiwiteite het vlot gevorder en die Raad is tevrede met die vooruitgang wat gemaak is.

Die Transvaalse Kamer van Mynwese het die verantwoordelikheid vir die Eenheid vir Toegepaste Fisiologie

## Medical and Dental Research

### Committees

The Council is again indebted to the Medical and Dental Research Committee and the members of its various sub-committees for their valuable advice on the development of medical and dental research. Dr. T. B. Davie, Principal and Vice-Chancellor of the University of Cape Town, has continued as chairman of the Medical and Dental Research Committee and Professor J. Barnetson and Dr. J. H. Rauch were appointed to this committee during the year. The Committee met twice; in Cape Town and Pretoria.

Professor S. F. Oosthuizen has continued to discharge the duties of Honorary Secretary for Medical Research. He visited the medical research units several times during the year, and in July 1951 visited the United States, the United Kingdom, and other European countries to study the latest developments in medical research.

The Council is grateful to Dr. G. M. Bull and Dr. R. M. Kark for their services as honorary medical liaison officers in the United Kingdom and the United States of America. Their valuable confidential reports on developments in medical and dental research have been most stimulating. They have also collected and transmitted information in response to inquiries directed to them by the Council.

Dr. C. H. Barlow visited the Union at the Council's invitation to advise it on problems of Bilharzia and particularly in regard to the direction of research in this field. His advice has proved most valuable to the Council.

### Donations

Numerous donations, totalling £289.1.6., have been received through the Tuberculosis Research Unit. The C.S.I.R. is very grateful for these donations, most of which are made by individuals interested in research on tuberculosis. All these funds are used directly to assist the work of the research unit, either for the purchase of equipment or to cover the costs of publishing the results of its research.

### Medical research units

The medical units have concentrated on consolidation rather than on expansion. The research activities have progressed smoothly and the Council is satisfied with the advances that have been made.

Responsibility for the Applied Physiology Unit has been taken over by the Transvaal Chamber of Mines.

oorgeneem en dit is tans op 'n permanente grondslag gevestig en die navorsingsgebied is uitgebrei. Die Raad het twee verteenwoordigers op die komitee wat deur die Transvaalse Kamer van Mynwese byeengeroep is om hierdie navorsing te beheer. Hierdeur sal verseker word dat die Raad in voeling sal bly met die vordering van hierdie werk.

### AMEBIASENAVORSINGSEENHEID DURBAN

Erehoof van die Eenheid: dr. R. Elsdon-Dew.

#### Eenheid vir Geneeskundige Proewe

Daar is voortgegaan met die ondersoek van verskillende geneeskundige middels in die behandeling van amebiese disenterie soos dit voorkom by die Naturel. Uit ondersoeke gedoen op 'n groot aantal gevalle blyk dit dat antibakteriese geneesmiddels uiters belangrik is om die siekte onmiddellik te bestry. Dit hou ongetwyfeld verband met die feit dat die ameba om te lewe een of ander faktor wat dit nie self kan produseer nie, nodig het. In die proefbuis en waarskynlik in die ingewande, word hierdie faktor verskaf deur bykomende mikro-organismes en in die lewer en ander weefsels word dit heel moontlik verskaf deur die menslike liggaam. Dit is merkwaardig egter dat sekere antibiotiese geneesmiddels 'n direkte ameba-dodende werking het. Om hierdie werking *in vitro* te bepaal is moeilik omdat die ander organismes wat teenwoordig is ook vatbaar mag wees. Verskillende antibiotiese geneesmiddels het ook verskillende uitwerkings, verder ook veroorsaak sekere antibiotiese geneesmiddels *in vivo* dat die ameba saksweertjies vorm — 'n verskynsel wat nie dikwels voorkom in die behandeling van die gevalle van die eenheid nie. Vervaardigers van antibiotiese geneesmiddels in alle dele van die wêreld is angstig dat die eenheid hul produkte moet toets en hou dit op hoogte van sake van die eksperimente wat deur hul gedoen word.

### Opnames

Opnames word gedoen in samewerking met die Afdeling vir Naturellesake van die Stad Durban, waardeur dit moontlik is om maklik in aanraking te kom met Naturelle wat van verskillende dele van Natal die stad binnekom. Meer as duisend monsters is volgens verskillende prosedures geneem en dit is moontlik om 'n eerste groepering van die Naturelle te maak — tussen die wat vir die eerste maal registreer en tussen die wat hul vir daaropvolgende registrasies aanmeld. Volledige gegewens van elke geval word egter ook op kaarte versamel en dit sal moontlik wees, sodra daar meer gevalle is, om hul verder in groepe in te deel. *Inter alia* kon deur hierdie opname die nut van die sink-sulfaat-teniek op die proef gestel word en 'n verslag sal hieroor mettertyd gelewer word.

### Laboratorium ondersoeke

Hierdie ondersoeke het 'n wye veld gedek aangesien

It is now established on a permanent basis and the scope of the research has been extended. The Council has two representatives on the committee which the Transvaal Chamber of Mines has established to direct and control the research. This will ensure that the Council will be kept in touch with the progress of the work.

### AMOEBIASIS RESEARCH UNIT — DURBAN

Hon. Head of Unit: Dr. R. Elsdon-Dew.

#### Therapeutic trials

Investigations into the use of various drugs in the treatment of amoebic dysentery, as it occurs in the African, have continued. A fundamental feature which emerges is the extreme value of the antibacterial drugs in the immediate control of the disease. This is undoubtedly related to the fact that the amoeba requires for its continued existence some factor which it is unable to elaborate for itself. In the test tube and probably in the bowel this factor is provided by concomitant micro-organisms and in the liver and other tissues it is probably provided by the human. It is of interest to note that certain of the antibiotics seem to have a direct amoebicidal action. It is difficult however, to determine this action *in vitro* as the other organisms present may also be susceptible. Different antibiotics have different effects and, furthermore, certain antibiotics *in vivo* cause the amoeba to encyst—a phenomenon which does not commonly occur in the treatment of the cases dealt with by the unit. Manufacturers of antibiotics all over the world are eager to have their products tested by the unit and keep it informed of their own experimental work.

### Surveys

Surveys are carried out with the co-operation of the Native Affairs Department of the City of Durban, which forms a convenient point of contact with Africans coming from various parts of Natal. More than a thousand specimens have been examined by various methods and a first possible grouping is as between those Africans reporting for their first registration and those reporting for a subsequent registration. Complete data of each case are, however, being kept on a punched card system which will allow other groupings to be done when there are more cases. *Inter alia*, this survey work has formed a useful test of the value of the zinc sulphate flotation technique.

### Laboratory investigations

These investigations have covered a wide range,

enige nuwe gegewens omtrent die parasiet moontlik van waarde mag wees. Dit is uiters moeilik om die plaaslike ameba in 'n kweekbodem te laat ensister en moes die mikrohanterwerk dus op trofosiete gedoen word. Daar is in geslaag om *Entamoeba histolytica* alleen met ander bakterieë wat deur die ondersoekers self gekies is te vestig. As gevolg hiervan kon daar 'n aanvang geneem word met die vervaardiging van antigene vir die komplementbindingstechniek. Deur gebruik te maak van hierdie antigene kon 'n reeks toetse gemaak word op die groot hoeveelheid gevalle van amebiose wat beskikbaar is. Uit hierdie toetse het dit geblyk dat sekere gevalle deurgaans negatiewe reaksies gee wanneer hul teen die verskillende antigene getoets word hoewel daar weer ander gevalle was met besonder hoë titres. Noemenswaardig ook is die feit dat sekere van hierdie gevalle gedurende behandeling teenliggaampies tot die parasiet ontwikkel, selfs in gevalle met betreklik hoë titres. Dit skyn dus asof party Naturelle met akute disenterie wanneer hul onder behandeling kom nog nie teenliggaampies ontwikkel het nie, maar dat hul dit óf as gevolg van behandeling óf met verloop van tyd ontwikkel. Hierdie gebrek aan teenliggaampies veroorsaak waarskynlik die ernstige graad van die siekte maar tot dusver is daar nog nie voldoende gegewens om die ernstigheidsgraad en die ontwikkeling van teenliggaampies te korreleer nie.

Omdat ameba verskillend groei wanneer dit in aanraking is met verskillende organismes is dit belangrik om die meganisme van die simbiose tussen die ameba en die bakterie te bestudeer. In kweekbodems het dit geblyk dat die organismes waarin die ameba die beste bestaan sekere eienaardige redoks-patrone het, en ondersoek word op hierdie patrone gedoen.

Tesame met die geneeskundige proewe, word 'n studie gemaak van die verandering van bakteriese flora wat na toediening van antibiotiese middels en ook by verandering van diëet, plaasvind. Vatbaarheid tot amebiose styg wanneer stysel-koolhidrate deur minder komplekse suikers vervang word en hierdie bevinding is van plaaslike belang aangesien die voorkomssyfer van amebiose onder die stedelike natuur — met sy diëet van brood en koeldrank — aansienlik hoër is as die van die plattelandse natuur.

#### Lektuur en skakeldienste

'n Stelsel waardeur uittreksels van publikasies en lektuur op kaarte versamel word is ingestel. Skakelwerk met ander navorsers op die gebied van amebiose word ook gedoen en dit is besonder waardevol omdat dit oorvleueling tot 'n groot mate uitskakel.

#### BILHARZIA NATURGESKIEDENIS-EENHEID — JOHANNESBURG

Hoof van die Eenheid: dr. B. de Meillon (S.A.M.N.I.)

Die vraagstukke verbonde aan bilharzia is so ingewikkeld en belangrik in Suid-Afrika, dat die W.N.N.R.

for any new data about the parasite might have a possible value. It is exceptionally difficult to persuade the local amoeba to encyst in culture and consequently the micromanipulative work had to be done on trophozoites. *Entamoeba histolytica* was established alone with selected bacteria, and it was possible to start with the manufacture of antigens for the complement fixation technique. Making use of these antigens, a series of tests were done on numerous proved cases of amoebiasis. It appeared that certain cases gave consistently negative results when tested against the various different antigens although there were cases giving extremely high titres. It is remarkable that certain cases developed antibodies to the parasite during treatment, even in relatively high titres. This suggests that some Africans with acute dysentery have not developed immune bodies when they present themselves for treatment, but develop these with the passage of time or under treatment. This lack of immunity may be an explanation of the severity of the condition, but there are not sufficient data yet to correlate severity and development of immunity.

Because there is great variation in the growth of amoebae when associated with different organisms, it is important to study the mechanisms of the symbiosis between the amoeba and the bacteria. In cultures, those organisms which best support the growth of the amoebae seem to show a peculiar redox pattern and this is being investigated.

In conjunction with work on therapeutic trials, the change of bacterial flora following antibiotic therapy has been studied, and also the change in bacterial flora which occurs with a change in diet. Susceptibility to amoebiasis increases when starch carbohydrates are replaced by simpler sugars, and the 'bun-and-lemonade' diet of the labouring African may well be the explanation of the high incidence in these people as compared with their rural confreres.

#### Literature and liaison

A system of abstracting relevant publications on to punched cards has been established. Close liaison with other workers in the field is maintained and has proved extremely useful in eliminating duplication of work.

#### BILHARZIA NATURAL HISTORY UNIT—JOHANNESBURG

Head of Unit: Dr. B. de Meillon (S.A.I.M.R.)

The problems of bilharzia are regarded as so complicated and important in South Africa that the C.S.I.R.

besluit het om die advies in te roep van dr. C. H. Barlow wat baie jare bestee het aan die bestudering van bilharzia in Egipte en in die Verre Ooste, en wat internasionale erkenning verwerf het as malakaloog. Dr. Barlow het ses maande, vanaf Oktober 1950 tot April 1951 deurgebring om 'n studie te maak van bilharzia-slakke in Suid-Afrika. Aan die einde van sy verblyf is gesondheidsbeamptes, mediese praktisyns en navorsers uitgenooi na 'n informele vergadering in Pretoria om vraagstukke verbonde aan bilharzia in Suid-Afrika met dr. Barlow te bespreek. Hierdie besprekings is bygewoon deur besoekers van party ander gebiede in Afrika aan wie uitnodigings deur die Wetenskaplike Raad vir Afrika sud van die Sahara gestuur is.

Geen formele besluite is geneem nie, maar die verrigtings is met 'n elektriese apparaat opgeneem en die transkripsie van hierdie opname is deur die W.N.N.R. as 'n verslag uitgegee.

Werk is by die S.A.M.N.I. gedoen op die sistematiek van volgroeiende schistosome.

Slakke wat in die laboratorium geteel is, is met *B. haematobium*, *B. Mansoni* en *B. bovis* besmet. Hierdeur is gevind dat sekere bekende Egiptiese draers nie met plaaslike *haematobium* en *mansoni* besmet kan word nie en ook dat slakke wat vatbaar is vir *bovis* nie noodwendig draers van *haematobium* is nie. Laasgenoemde is 'n groot stap vorentoe aangesien alle pogings totdusvêr om te onderskei tussen die cercariae van *bovis* en *haematobium* misluk het.

Deur gebruik te maak van antigene vervaardig uit 'n nuwe parasiet — ? *bovis* — is 'n bevredigende toets vir die vroeë diagnose van bilharzia, en, wat ook eenslagtige infeksies aandui, ontwikkel.

Gevind is dat daar sekere bilharzia-wurms bestaan wat verskil in hul besmetbaarheid van slakke en ook in hul reaksie tot geneesmiddels. Hierdeur word die verskil van mening aangaande die doeltreffendheid van sekere geneesmiddels in verskillende dele van die wêreld heel moontlik verklaar.

'n Reeks dammetjies vir slakke is deur die S.A.M.N.I. gebou en gehoop word om slakke en bilharzia onder feitlik natuurlike omstandighede te bestudeer. 'n Deurligtingsapparaat waardeur 76 verskillende akwaria gelyktydig deurlug kan word is tans in werking en hierdie akwaria word gebruik om die besmetbaarheid van slakke in verskillende dele van die Unie te bestudeer.

Die slakkeversameling waarvan in die vorige jaarverslag melding gemaak is, brei steeds uit en beskik tans oor verskeie soorte slakke afkomstig van verskillende plekke in die Unie, Suid Wes-Afrika, Swaziland en Ngamiland.

#### KARDIO-PULMONÊRE NAVORSINGSEENHEID — JOHANNESBURG

Hoof van die Eenheid: Professor G. A. Elliott (Universiteit van die Witwatersrand)

Soos in vorige jare was die aandag veral toegespits op navorsing op kardio-pulmonêre aandoenings.

decided to obtain the expert advice of Dr. C. H. Barlow, who has devoted many years to the study of bilharzia in Egypt and the Far East and won international recognition as an authority on snails. Dr. Barlow spent six months, from October 1950 to April 1951, making a survey and studying bilharzia snails in South Africa. At the end of his stay, health officials, medical practitioners and research workers were invited to an informal meeting in Pretoria to discuss bilharzia problems in Southern Africa with him. These discussions were attended by visitors from some of the other African territories, to whom invitations were issued through the Scientific Council for Africa south of the Sahara.

No formal resolutions were passed, but the proceedings were electrically recorded, and the transcription of this record has been issued as a report by the C.S.I.R.

At the S.A.I.M.R. work was done on the systematics of adult schistosomes. Snails bred in the laboratory were infected with *B. haematobium*, *B. mansoni* and *B. bovis*. It was found that certain well known Egyptian vectors cannot be infected with local strains of *haematobium* and *mansoni*, and also that snails that are susceptible to *bovis* are not necessarily vectors of *haematobium*. This is important, as all attempts to differentiate between the cercariae of *bovis* and *haematobium* have failed.

By using antigens produced from a new parasite—? *bovis*—a satisfactory test was evolved for the early diagnosis of bilharzia and one which will reveal unisexual infections.

It has been found that certain bilharzia worms differ in their ability to infect snails and in their reaction to drugs. This may be the explanation of the fact that there is a difference in opinion with regard to the efficacy of certain drugs in different parts of the world.

A series of snail ponds have been built by the South African Institute for Medical Research, and it is hoped to use these for the study of snails and bilharziasis under approximately natural conditions. An aeration plant has been installed whereby 76 separate units are aerated simultaneously. These aquaria are being used for the study of the infectability of snails from various parts of the Union.

The snail-collection of which mention was made in the previous annual report is still increasing and includes snails from various localities in the Union, South West Africa, Swaziland and Ngamiland.

#### CARDIO-PULMONARY RESEARCH UNIT—JOHANNESBURG

Head of Unit: Professor G. A. Elliott (University of the Witwatersrand)

As in previous years, the emphasis has been on research into cardio-pulmonary disorders.

Aandag word veral gewy aan probleme wat enig is aan Suid-Afrika. Hieronder resorteer dan navorsing wat gedoen word op die verskille wat gevind is in die kranslagaarpatroon van Europese en Bantoerasse en ook hemochromatose en myntering.

Die volgende projekte is afgehandel en word tans vir publikasie voorberei:

'n Vergelyking van die bloed-cholesterolgehalte by Europese en Bantoerasse in Suid-Afrika;

'n Teleroentgenografiese studie van die dwarsdeursnit van die harte van 1,049 normale manlike volwasse mynwerkers;

Elektrokardiografiese leidings van die agterkant van die liggaam in die diagnose van posterior miokardiese infarctie;

Hartkateterasie in aangebore hartaandoenings;

Oksimetrie in 25 normale persone terwyl hul rus en gedurende oefening, toediening van suurstof en hiperventilasie;

Oksimetrie in persone met aangebore hartaandoenings terwyl hul rus en gedurende oefening, toediening van suurstof en hiperventilasie;

Die ballistokardiogram in aorta-stenose, koarktatie en trombose van die aorta;

Werk wat gedurende 1950/51 afgehandel is maar wat nog nie gereed vir publikasie is nie, sluit in:

Die ontstaan van elektrokardiografiese patrone wat gevind word aan die regterkant van die bors by oorvergrooting van die regter hartkamer;

Ballistokardiografiese patrone in Cor-pulmonale, drukverhoging en kroonslagaaraandoenings;

Bestudering van luggang en longvolume in emfiseem;

Respiratoriese funksietoets in kroniese long-aandoenings vóór en na die toediening van Cortisone en ACTH;

Radiologie van die hart in Mitrale-Stenose.

#### EENHEID VIR MAATSKAPLIKE GENEESKUNDE — KAAPSTAD

*Hoof van die Eenheid:* Prof. J. F. Brock (Universiteit van Kaapstad).

Die werk wat gedoen is behels die bestudering van sekere siektes waarvan die morbiditeit, sterftesyfer en verwagte lewensduur baie verskil tussen die twee bevolkings en wat in groot mate deur maatskaplike en omgewingsfaktore veroorsaak word. Om mee te begin word voedingsdeem en die verhouding tot die sindrome van kwashiorkor (ernstig-verlopende ondervoeding) en verder, eklampsie en swangerskap toksemie, bestudeer. Gevind is dat die belangrikste faktor in die bepaling van die feit dat die sindrome veral gedurende die eerste lewensjare voorkom, die gebrek aan koeimelk is en die afhanklikheid van stysel-diët binne die eerste twee jaar nadat 'n kind van moedersmelk gespeen is. Dit was duidelik dat die tekort aan proteïne in die diët die belangrikste etiologiese faktor is.

Particular attention is given to problems that are peculiar to South Africa. With this in view, research is done on the differences that have been found in the coronary artery pattern of Bantu and European races and also the investigation of haemochromatosis and silicosis.

The following projects have been completed and are in the process of preparation for publication:

A comparison of the blood cholesterol levels in European and Bantu races in South Africa;

A teleroentgenographic study of the transverse diameter of the heart of 1049 normal adult male miners;

Electrocardiographic leads from the posterior surfaces of the body in the diagnosis of posterior myocardial infarction;

Cardiac catheterization in congenital heart disease;

Oximetry in 25 normal subjects at rest and during exercise, oxygen administration and hyperventilation;

Oximetry at rest, during exercise, oxygen administration and hyperventilation in congenital heart disease;

The ballistocardiogram in aortic stenosis, coarctation and thrombosis of the aorta.

Work done during 1950/51, but not yet ready for publication includes:

The genesis of electrocardiographic patterns found over the right chest in right ventricular hypertrophy;

Ballistocardiographic patterns in Cor-pulmonale, hypertension and coronary heart disease;

Ventilatory lung volume studies in emphysema;

Respiratory function tests in chronic lung disease before and after the administration of Cortisone and ACTH;

Radiology of the heart in Mitral Stenosis.

#### SOCIAL MEDICINE RESEARCH UNIT—UNIVERSITY OF CAPE TOWN

*Head of Unit:* Prof. J. F. Brock (University of Cape Town.)

Work done includes the study of certain diseases for which morbidity, mortality and life expectation among the two sections of the population is very different and which are largely caused by social and environmental factors.

Nutritional oedema was studied in its relation to the syndrome of kwashiorkor (malignant malnutrition) as well as eclampsia and pregnancy toxemia.

It has been found that the predominance of the syndrome of kwashiorkor in the post-weaning years of life is mainly due to the absence of cows milk and dependence on starchy diets in the first year or two after weaning from the breast. It was clear that deficiency of protein in the diet was the important factor in causing this condition.

Deur bemiddeling van die Wêreld Gesondheidsorganisasie het die hoof van die eenheid die geleentheid gehad om die kliniese eienskappe, etiologie en ekologie van kwashiorkor in die landstreek in Sentraal-Afrika vanaf Zanzibar tot Dakar te bestudeer. In samewerking met 'n deskundige van die W. G. L. in Washington is 'n verslag gelewer oor hierdie opname en dit is met groot welslae ontvang en daar is aan die hand gedoen dat dit in Frans en Spaans vertaal moet word.

'n Verdere projek is die kliniese skatting van die voedingstoestand. Hierdie projek staan ook in verband met die algemene doelstelling waardeur Blankes en Kaapse kleurlinge vergelyk word.

Die ondersoek wat gedoen word i.v.m. swangerskap toksemie is daarop gebaseer dat die voorkomssyfer van hierdie siekte onder die Kaapse kleurling uitermate hoog is. In die bestudering van hierdie siekte word Slamaaiers van Kaapse kleurlinge geskei ten einde vas te stel of die omgewingsverskille en veral voedingsverskille tussen hierdie twee groepe bydra tot die voorkomssyfer van swangerskap toksemie.

Studies van nierhemodinamika is aan die gang en gehoop word om hierdie metodes mettertyd tot swangerskap toksemie toe te pas.

#### EENHEID VIR MAATSKAPLIKE GENEESKUNDE — DURBAN

*Hoof van die Eenheid:* Dr. S. L. Kark (Departement van Gesondheid).

Twee projekte word bestudeer:

Die een het betrekking tot die geboortegewig van suigeling en hulle verdere groei gedurende die eerste lewensjaar, en die ander op die ontwikkeling van meisies met besondere verwysing na geslagsrypheid soos vasgestel deur die ouderdom by die begin van die maandstonde.

#### Studie van geboortegewig en groei van suigeling

Die geboortegewig van Suid-Afrikaanse suigeling is bestudeer op grond van hul ras, geslag en geboorterangnommer. Verdere studies word ook onderneem betreffende die ouderdom van die moeder en die seisoen waarin die geboorte plaasgevind het.

Gegewens in verband met gewigstoename gedurende die eerste lewensjaar word nog steeds versamel en 'n besondere studie word gemaak van die invloed van verskillende voedingsregimes gedurende die eerste week na geboorte. Dit het aanleiding gegee tot 'n vergelykende studie van borsvoeding van Blanke, Kleurling, Naturelle en Indiër suigeling en verder ook van die moontlike verskille van die tyd wanneer melk in die borste van Naturelle en Indiër moeders verskyn na hul geboorte gegee het.

#### Studie van die ontwikkeling van meisies

Die bestudering van die ontwikkeling van meisies het bestaan uit twee aspekte. Die eerste waarvan was

At the invitation of the World Health Organization, the head of the unit had an opportunity to visit the principal centres of the Central African belt between Zanzibar on the east and Dakar on the west, to study the clinical features, aetiology and ecology of kwashiorkor. In co-operation with an expert of the Food and Agricultural Organization, Washington, a report dealing with this survey has been published. It has been recommended that this report be translated into French and Spanish.

Another project is the clinical assessment of nutrition. This project is also linked with the general theme of comparing and contrasting European and Cape Coloured people.

Pregnancy toxemia is being investigated because of the high incidence of this condition in Cape Coloured people. Information on Malay subjects is being separated from that on Coloured people in order to determine whether environmental differences and, particularly, nutritional differences between these two groups contribute to the incidence of pregnancy toxemia.

Work has continued on the study of renal haemodynamics and it is hoped to apply these methods in due course to the study of pregnancy toxemia.

#### SOCIAL MEDICINE RESEARCH UNIT—DURBAN

*Head of Unit:* Dr. S. L. Kark, (Department of Health).

Two projects are under way, the one concerned with birth weight and weight growth in infancy and the other with growth and clinical assessment of girls in relation to puberty, as assessed by menarche age.

#### Study of the birth weight and growth of infants

The birth weights of South African babies has been studied in relation to their race, sex, and birth rank. Further analysis of this data is being undertaken in respect of the influence of season of birth and age of mother.

Material on weight growth during the first year of life is still being collected and a special study of the influence of different feeding regimes on the weight growth during the first week of life has been carried out. This has led to a comparative study of the incidence of breast feeding of European, Coloured, Bantu and Indian babies on discharge from hospital, and of the difference in the time at which "milk first came in" to the breasts of Bantu and Indian mothers after delivery.

#### Studies of the development of girls

The studies in development of girls have consisted of two aspects. The one is concerned with accumulating

die versameling van gegewens i.v.m. die ouderdomme by die begin van die maandstondes waarby ook ingesluit is 'n vergelykende studie van die geslagrypheidsouderdom in verskillende rasse-groepe en sosiale klasse. Meer as 2,000 meisies is tans vir hierdie groep verder uitgebrei word.

Die tweede deel van hierdie projek staan in verband met 'n deeglike kliniese ondersoek en 'n studie in besonderhede van die groei van Naturellemeisies. Tans word 370 meisies ondersoek en hierdie ondersoek sluit die volgende in:

'n *Somatometriese ondersoek* betreffende die gewig, lengte, sittende lengte en borsdiepte. Hierdie bevindings word vergelyk met sekere opgawes soos die Wetzell rooster, die Tuxford indeks en die Stuart persentiles. Metings word elke ses maande gemaak en die geslagrypheidsouderdom word by elke ondersoek aangeteken. Gedurende die jaar is drie somatometriese ondersoeke gedoen.

*Waarneming van die ontwikkeling van sekere sekondere geslagseienskappe* bv. borste, hare in die oksielholte en op die *mons pubis* in verhouding tot die geslagrypheidsouderdom van die meisie. Hierdie ondersoek word ook elke ses maande gedoen. *Ondersoek van die gesondheidstoestand* veral m.b.t. die voedingstoestand.

Die kliniese ondersoek sluit die volgende in:

bestudering van liggaamsbou en postuur, toestand van die vel, hare, onderhuidse weefsel spierstelsel en slymvliese; ondersoek van die hart, bloedvate, bloeddruk, longe, die buik, ledemate en sentrale senuweestelsel. Die uriene, faeces en hemoglobien is ook ondersoek en elke meisie is vir tuberkulose ondersoek.

Hierdie kliniese ondersoeke sal jaarliks herhaal word totdat die maandstondes 'n aanvang neem en ook vir etlike jare daarna in die gevalle waar die juiste ouderdom by die begin van die maandstondes bekend is.

#### TUBERKULOSE-NAVORSINGSEENHEID—DURBAN

*Hoof van die Eenheid:* dr. B. A. Dormer (Departement van Gesondheid).

Werk het gevorder met die sny van dun snitte van hele organe waarvan 108 snitte op papier en 46 op perspex gemonteer is. Die monsters bestaan uit snitte van normale longe, longkarsinome, snitte van longterings ens. Dieremonsters bestaan o.a. uit snitte van die niere van beeste, perde, varke, skape en dele van 'n walvisnier. Anatomiese gietels van die brongiaalboom van 8 huisdiere en plastiese gietels van verskillende dierorgane wat die bloedsomloop en brongiaalsisteme aandui, is gemaak. Bakteriologiese werk het waarnemings van die lewensduur van B.C.G.-entstowwe (ingevoerde) onder afkoelingskondisies en biologiese en kultuurwerk op twee soorte tuberkelbasille ingesluit. Swamkundige navorsingswerk is gedoen op die antibiotiese waarde

data as to the age of menarche in different groups of girls, allowing for a comparative study of puberty age in various race groups and social classes. Some 2,000 girls are at present incorporated in the study and it is expected that an extension of the group under investigation will take place during the forthcoming year.

The second part of this project is concerned with a detailed clinical and growth study of Bantu girls. The number of girls being examined is 370, and includes the following examination:—

- (a) *Somatometric*—the weight, height, sitting height, and chest depth. These findings are compared with certain indices such as the Wetzell grid, the Tuxford index and the Stuart percentiles. Measurements are made at six-monthly intervals and the pubertal age is noted at each examination. Three somatometric examinations were done during the year.
- (b) *Observations on the development of certain secondary characteristics*, namely breasts, axillary and pubic hair in relation to the pubertal age of the girl. This is also done at six-monthly intervals.
- (c) *The assessment of state of health* with particular reference to the nutritional state. This will also take into account the girl's pubertal age.

The clinical examination includes the following items: assessment of physique and posture, condition of the skin, hair, subcutaneous tissue, musculature and mucous membranes, examination of the heart, blood vessels, blood pressure, lungs, the abdomen, extremities and central nervous system. In addition the urine, stools and haemoglobin have been examined and each child has been tuberculin-tested.

It is planned to repeat these clinical examinations annually until menarche is attained and to continue for several years after menarche in those whose exact menarche age is known.

#### TUBERCULOSIS RESEARCH UNIT—DURBAN

*Head of Unit:* Dr. B. A. Dormer (Department of Health)

Work has progressed on the sectioning of whole organs, of which 108 sections were mounted on paper and 46 on perspex. The specimens consist of sections of normal lungs, carcinoma of lungs, sections of tuberculous lungs, etc. Animal specimens consist of sections of the kidneys of cattle, horses, pigs, sheep and portions of the kidney of a whale. Anatomical casts were made of the bronchial tree of eight domestic animals and plastic casts were made from various animal organs showing the circulation and bronchial systems. Bacteriological work included observations of the longevity of B.C.G. vaccine (imported) under refrigeration conditions and biological and cultural work on two strains of tubercle bacilli. Mycological work was done on the antibiotic value of six strains of moulds isolated in pure culture.

van 6 soorte swamme wat in suiwer kultuurbodems gekweek is. Die gebruik van antibiotika ens., by verskeie tipes tuberkulose is nagegaan. Die bakterieë van 1,369 monsters is ondersoek vir sensitiviteit tot 8 verskillende antibiotiese stowwe. Massa Roentgenopnames van bevolkingsgroepe en tuberkulientoetse is gedoen op meer as 30,000 persone.

#### VOEDINGSNAVORSINGSEENHEID — JOHANNESBURG

*Hoof van die Eenheid:* Prof. J. Gillman (Universiteit van die Witwatersrand).

##### Voeding

'n Eenvoudige diëet is ontwikkel waardeur lewersiektes verwek word en is gebruik om die kondisies wat nodig is vir die ontstaan en voorkoming van lewersiektes met meer akkuraatheid te bepaal.

Daar is voortgegaan met studies i.v.m. die byvoeging tot die Bantoe-diëet en hierdie werk mag van groot praktiese waarde wees in hierdie land en ook in ander lande wat met dergelyke vraagstukke te kampe het.

##### Makromolekulêre siekte

Kriteria is daargestel waardeur die retikulo-endoteliöse deur bestudering van die bloed uitgeken kan word. Aansienlike vooruitgang is gemaak m.b.t. die patogenese van hierdie siekte en die aard van die formasie van wit bloedliggaampies in sowel normale as abnormale gevalle is nader toegelig.

##### Reproduktiewe fisiologie van bobbejane

'n Studie is voltooi van die vroeë embriologie van die bobbejaan, en 'n verslag is voltooi waarin gegewens verstrekkend word van die geboorte van 18 bobbejane met volledige analises van die swangerskapsduur, reaksie by die moeder voor, gedurende en na swangerskap. Antropometriese studies van die kleintjies vanaf geboorte en gedurende die eerste drie lewensjare, word gemaak.

Bestudering van die funksie van die skildklier waardeur geslagsaktiwiteit gereguleer word is byna voltooi. 'n Reeks studies is gemaak van die uitwerking van 'n melie-diëet op die menstruele siklus van bobbejane en analises is gemaak van veranderinge in plasma proteïene en ander bestanddele van die bloed. Gewigskommeling by die bobbejaan gedurende die menstruele siklus word ook ondersoek en dit blyk uit hierdie studies dat bobbejane onmisbaar is in die bestudering van watermetabolisme.

#### VIRUS-NAVORSINGSEENHEID — KAAPSTAD

*Hoof van die Eenheid:* Professor M. van den Ende (Universiteit van Kaapstad).

Die algemene program behels die studie van die bou en die vermeerdering van virusse.

In research into the use of antibiotics in various kinds of tuberculosis, the bacteria of 1,369 specimens were examined for sensitivity to eight different antibiotics. Mass X-rays and tuberculin tests were done on 30,000 people of all races.

#### NUTRITION RESEARCH UNIT—JOHANNESBURG

*Head of Unit:* Prof. J. Gillman (University of the Witwatersrand).

##### Nutrition

A simple diet was devised for the production of liver disease and has been used to define more precisely the conditions necessary for the production and prevention of liver disease.

Work has continued on the supplementation of the Bantu diet and these findings may be of considerable practical importance in South Africa and in other countries which are faced with similar problems.

##### Macro-molecular disease

Criteria have been established for the recognition of the reticulo-endotheliosis from studies of the blood. Progress has been made in the knowledge of the pathogenesis of this disease, and the formation of white blood cells in normal and abnormal states has been considerably elucidated.

##### Reproductive physiology of baboons

A study of the early embryology of the baboon has been completed and a paper has been prepared on 18 baboon births, giving full analyses of the duration of gestation, reactions of the mother before, during and after pregnancy. Anthropometric studies on the babies throughout the first 3 years of life are being continued.

A study of the function of the thyroid gland in regulating reproductive activity is nearing completion. A series of studies has also been conducted on the effects of a maize diet on the menstrual cycle of the baboon, with analyses of the changes in plasma proteins and other blood constituents. Fluctuations in the weight of the baboon during the menstrual cycle are being examined and it is evident from these studies that the baboon is an invaluable animal for the investigation of water metabolism.

#### VIRUS RESEARCH UNIT—CAPE TOWN

*Head of Unit:* Professor M. van den Ende (University of Cape Town)

The general programme is the study of the structure and multiplication of viruses.

## Bakteriofage

'n Sistematiese studie is gemaak van 'n groep *Pseudomonas aeruginosa*-fages wat ge-isoleer is van lisogeniese stamme van die organisme. Twee verhandelings oor hierdie studie is vir publikasie voorgelê aan tydskrifte oorsee.

Daar is ook voortgegaan met elektroforese-studies van die *coli*-fages, veral T2 en T4.

## Poliomyelitis

Sekere stamme van die polio-virus is geïsoleer en 'n studie word gemaak van sekere kwantitatiewe aspekte van die groei van hierdie virusse. Pogings word ook aangewend om die virus in eiers te laat groei.

## Knoppiesvelsiekte en griep

Daar is voortgegaan met die kweek van die virusse van knoppiesvelsiekte en griep in eiers. 'n Verslag is gelewer na die onlangse griep-epidemie in Kaapstad.

## Algemeen

As gevolg van die werk wat gedoen is op die *Pseudomonas aeruginosa*-fages is 'n studie gemaak van die antigeniese struktuur van die *Ps. aeruginosa* stamme wat beskikbaar is. Daar is reeds bewyse van 'n koolhidraat-bevattende spesifieke somatiese antigeen wat die organisme in verskillende soorte indeel. Hierdie organismes bevat ook H-antigeen en nie-spesifieke somatiese antigene. Die verspreiding van hierdie verskillende antigene binne die genus word tans bestudeer. Gehoop word dat 'n antigeniese klassifisering van die organismes tesame met inligting in verband met hul vatbaarheid vir fages dit moontlik sal maak om kruis-infeksies deur hierdie organisme in hospitale op te volg.

## Bacteriophages

A systematic study has been made of a group of *Pseudomonas aeruginosa* phages isolated from lysogenic strains of the organisms. The results of these investigations have been incorporated in two papers which have been submitted for publication.

Work has also progressed on electrophoresis studies on the *coli* phages, especially T2 and T4.

## Poliomyelitis

Certain strains of the polio virus have been isolated and a study is being made of certain quantitative aspects of the growth of these viruses. Attempts are being made to adapt the virus to eggs.

## Lumpy skin disease and influenza

Work has progressed on the cultivation of the viruses of lumpy skin disease and influenza in eggs. A report on the recent influenza epidemic in Cape Town has also been published.

## General

Arising out of the work done on *Pseudomonas aeruginosa* phages, a study has been made of the antigenic structure of the *Ps. aeruginosa* strains available. Evidence has been obtained of a carbohydrate-containing specific somatic antigen which differentiates the organism into several types. In addition these organisms contain H antigen and non-specific somatic antigens. The distribution of these various antigens within the genus is now being studied. It is hoped that an antigenic classification of the organisms together with a knowledge of their susceptibility to phages will make it possible to follow up hospital cross-infection by this organism.

## BYLAAG I.

# Publications — Publikasies

APPENDIX I.

### A. C.S.I.R. Publications/W.N.N.R. Publikasies

B. Publications in periodicals by members of the C.S.I.R. staff/Publikasies in tydskrifte deur lede van die W.N.N.R. personeel

C. Publications received during 1951 from holders of C.S.I.R. research awards/Publikasies wat gedurende 1951 van houers van W.N.N.R. navorsingstoekennings ontvang is.

### A. — C.S.I.R. PUBLICATIONS — W.N.N.R. PUBLIKASIES

#### Library and Information Division/Biblioteek en Inligtingsafdeling

C.S.I.R. Information/W.N.N.R. Inligting (monthly library accessions list/maandelikse biblioteek-byvoegingslys)

Mews, Hazel. Books are Tools: the organization of small technical libraries for South African Industry. Pretoria, C.S.I.R./W.N.N.R., 1951. 28p. illus. 2s. 6d. (2s. 8d. post free/posvry).

#### National Institute for Personnel Research/Nasionale Instituut vir Personeelnavorsing

BULLETINS, issued irregularly, circulation restricted/word ongereeld uitgegee, beperkte distribusie. (Contain articles on topics relating to the work of the Institute/Bevat artikels oor onderwerpe in verband met die werk van die Instituut).

Research into absenteeism, labour-turnover and accidents at a large industrial corporation. Summary of report. by/deur A. G. Arbous.

The validation of test-procedures for the selection and classification of administrative personnel. Summary of report. by/deur A. G. Arbous.

A further contribution to the symposium on Kallmann's *The genetics of schizophrenia*. by/deur R. G. Albino.

Some observations in connexion with test-inter-correlations obtained from the 1950 officer-cadet-selection. by/deur F. W. Beeshold.

Bantu games. by/deur A. M. Masilela.

*Bulletin*, vol. III, no. 2. September, 1951.

A note on the concept of test-reliability, by/deur A. G. Arbous.

An experimental study of the relative difficulty of hand-scored versions of the same test. by/deur N. N. Faerber.

A validation of the boss-boy selection procedure. by/deur H. S. Sichel.

The Heymans-Wiersma theory of temperament. by/deur S. Biesheuvel.

A reply to R. C. Albino's criticism of Kallmann's *The genetic theory of schizophrenia*, (1946). by/deur Lewis A. Hurst.

In reply to Dr. Hurst. by/deur K. C. Albino.

Reply by Dr. H. Gulliksen to Mr. J. E. Kerrich's review of *Theory of mental tests* which was published in the last issue of this bulletin.

*Bulletin*, vol II, no. 3. October/Okttober, 1950.

'n Verslag oor onreëlmatighede in die beheerrooster vir die verdedigingsmag se siftingsbattery. by/deur D. J. Gouws.

A method of determining limits for prediction of a variable  $x$  if the joint distribution of  $x$  and  $y$  is not normal. by/deur H. S. Sichel and J. S. Maritz.

The nature and function of the alpha rhythm. by/deur A. C. Mundy-Castle.

A discussion of the Heymans-Wiersma theory. From the factorial point of view. by/deur H. A. Reyburn.

A discussion of the Heymans-Wiersma theory. A pointer from animal behaviour. by/deur J. G. Taylor.

The determination of tachistoscopic exposure-time. The South African psychological association congress, 1950 — commentary. by/deur A. C. Mundy-Castle, B. McKiever and V. Alexander.

*Bulletin*, vol. III, no. 1. February/Februarie, 1951.

Preliminary report on the validation of aptitude tests for the selection of article clerks. by/deur R. V. Sutton and L. Mitchell.

The two-hand co-ordination test: the relationship between speed and number of errors made. by/deur S. Hodson.

Report of the 3rd Annual Meeting of the World Federation for Mental Health, held in Paris, October, 1950.

Book Review: *Industrial democracy at work.* by/deur S. Biesheuvel.

### Telecommunications Research Laboratory/Telekommunikasie-Navorsingslaboratorium

Monthly basic radio-propagation-predictions for Southern Africa/Maandelikse basiese radiovoortplantings-voorspellings vir Suidelike Afrika (Mimeographed/Afgerol).

Monthly bulletin of ionospheric characteristics observed at Johannesburg and Cape Town/Maandelikse bulletin van ionosferiese karakteristieke soos waargeneem in Johannesburg en Kaapstad. (Mimeographed/Afgerol).

HOGG, D. The performance of the consol system of navigation in high atmospheric noise levels. (Mimeographed/Afgerol). Telecommunications Research Laboratory/Telekommunikasie - Navorsingslaboratorium. ETR-12. Pretoria, C.S.I.R./W.N.N.R., March/Maart 1951.

### National Building Research Institute/Nasionale Bounavorsingsinstituut

*Information Sheets*, (DIS) bi-monthly selections of technical enquiries, with replies/*Inligtingspamflette*, (DIS) twee maandelikse seleksie van tegniese navrae met antwoorde.

BULLETINS, (DB) half-yearly/half-jaarliks. (Articles on topics relating to the work of the Institute/Artikels oor onderwerpe wat in verband staan met die werk van die Instituut).

*Bulletin No. 5.* Pretoria, C.S.I.R./W.N.N.R., September, 1950. DR-5.

Foundations on expansive clays. Report on the stratigraphic profile of a test pit at St. Helena gold mine, O.F.S. by/deur A.B.A. Brink.

Limiting factors in high-density, singlestorey estate layouts. by/deur D. M. Calderwood.

The protection and painting of galvanised iron. by/deur L. W. le Roux.

The Italian building industry. by/deur C. A. Rigby. Reinforcements in brick walls as a means of preventing excessive cracking of buildings. by/deur Keeve Steyn.

*Bulletin, No. 6.* Pretoria, C.S.I.R./W.N.N.R., June/June, 1951. DB-6.

Details of some Italian hollow-block floors and roofs. by/deur C. A. Rigby.

Native housing research in South Africa. by/deur F. R. Rodseth, F. van Heerden, and J. E. Jennings.

Some practical aspects of the thermal and ventilation conditions in dwellings. by/deur J. F. van Straaten.

The applicability of the consolidation theory to the calculation of foundation settlements under South African conditions. by/deur B. A. Kantey.

Abstracts from the final report on the experimental use of boss-boy selection tests at Modderfontein B. Gold Mining Co., Ltd.

torium. ETR-12. Pretoria, C.S.I.R./W.N.N.R., March/Maart 1951.

HOGG, D. The performance of the automatic radio-compass in high atmospheric noise levels. (Mimeographed/Afgerol). Telecommunications Research Laboratory/Telekommunikasies-Navorsingslaboratorium, ETR-12. Pretoria, C.S.I.R./W.N.N.R. March/Maart, 1951.

VICE, R. W. Interim report — ground constants survey — report on progress 1949-50. (Mimeographed/Afgerol). Telecommunications Research Laboratory/Telekommunikasies-Navorsingslaboratorium ETI-8. Pretoria, C.S.I.R./W.N.N.R., February/Februarie, 1951.

The significance of some physical properties of non-hydraulic limes. by/deur T. L. Webb. Measurement of ventilation rates in dwellings, using the tracer gas technique, with special reference to the katharometer method. by/deur J. F. van Straaten

#### RESEARCH REPORTS/NAVORSINGSVERSKIE

ROUX, A. J. A., S. J. Richards and W. M. R. Rennhackkamp. The measurement of the thermal properties of building materials—thermal conductivity of thin, 12-ins.-square samples. Pretoria, C.S.I.R./W.N.N.R. DR-6.

ROUX, A. J. A. and S. J. P. Joubert. Periodic heat flow through building components — heat transfer from outside surface of homogeneous wall panels to the inside air under winter conditions. Pretoria, C.S.I.R./W.N.N.R., 1950. DR-7.

ROUX, A. J. A. Periodic heat flow through building components — heat exchange at the outside surface, with special reference to the application of sol-air temperature. (Mimeographed/Afgerol). Pretoria, C.S.I.R./W.N.N.R., 1950 DR-8.

#### MEMORANDA

ROUX, A.J.A. and J. F. van Straaten. Some practical aspects of thermal and ventilation conditions in buildings. Pretoria C.S.I.R./W.N.N.R., 1950. DS-10.

CALDERWOOD, D. M. Notes on town planning, recorded while on a scholarship given by the Massachusetts Institute of Technology, Cambridge, U.S.A. (Mimeographed/Afgerol). Pretoria, C.S.I.R./W.N.N.R., 1951. DS-11.

### Liaison Division/Skakelafdeling

Annual Reports of the C.S.I.R./Jaarverslae van die W.N.N.R.

*Research Review/Navorsingsoorsig.*

Quarterly review of C.S.I.R. activities/Driemaandelikse oorsig van W.N.N.R. aktiwiteite.

NATIONAL laboratories and services/Nasionale laboratoriums en dienste. Illustrated brochure/Geillustreerde brosjure.

### Medical Research/Mediese Navorsing

Verbatim report of informal meeting on bilharzia, held in Pretoria on 29th and 30th March, 1951,

KINGWILL, D. G., ed./red. Directory of research organizations in the Union of South Africa. Pretoria C.S.I.R./W.N.N.R., 1950.

AFRICAN regional scientific conference, Johannesburg, October 17 to October 28, 1949. Pretoria, Government Printer, (1951).  
vol. 1. Proceedings and resolutions  
vol. 2. Statements and communications

(172 pages). Pretoria, C.S.I.R./W.N.N.R., June/June, 1951.

### B. — PUBLICATIONS IN PERIODICALS BY MEMBERS OF THE C.S.I.R. STAFF/PUBLIKASIES IN TYDSKRIFTE DEUR LEDE VAN DIE W.N.N.R. PERSONEEL

#### National Chemical Research Laboratory/Nasionale Chemiese Navorsingslaboratorium

BLACK, M. M. and H. M. Schwartz. South African Fish Products. Part XXX. Seasonal changes in the composition of the Pilchard (*Sardina ocellata* Jenyns). *J. Sci. Food and Agric.*, vol. 1. no. 6. June, 1950. pp. 182-185.

BLACK, M. M. and H. M. Schwartz. South African Fish Products. Part XXXI. The composition of pilchard and maasbanker oils. *J. Sci. Food and Agric.*, vol. 1. no. 8. August, 1950. pp. 248-251.

CARMAN, P. C. Diffusion and flow of gases and vapours through micropores. Part I. Slip flow and molecular streaming. *Proc. Roy. Soc. A.*, vol. 203. no. 1072. 7th September, 1950. pp. 55-74.

CARMAN, P. C. Diffusion and flow of gases and vapours through micropores. Part II. Surface flow. *Proc. Roy. Soc. A.*, vol. 203. no. 1073. 22nd September, 1950. pp. 165-178.

CARMAN, P. C. and F. A. Raal. Role of capillary condensation in physical adsorption. *Nature*, vol. 167. no. 4238. 20th January, 1951. pp. 112-113.

CARMAN, P. C. and P. le R. Malherbe. The routine measurement of the surface of paint pigments and other fine particles. Part II. Particles below 0.1. *J. Applied Chem.*, vol. I. Part 2. 1951. p.105.

CILLIE, G. G. Pectin: its possible manufacture in South Africa. *Food Ind. of S.A.*, vol. 3. no. 9. January, 1951. pp. 27-29.

CILLIE, G.G. and F. J. Joubert. An amylopectin from the juice of the granadilla (*Passiflora edulis*). *J. Sci. Food and Agric.* vol. 1. no. 12. Desember, 1950. pp. 355-357.

GRAY, D. J. S. and L. Novellie. Fish liver extracts constitute new source of B-group vitamins. *Food Ind. of S.A.*, vol. 3. no. 12. April 1951. pp. 41-43.

GRAY, D. J. S. L. Novellie and R. G. Shuttleworth. Recovery of water soluble nutritional factors from fish livers. *J. Sci. Food and Agric.*, vol. 2. no. 2. February, 1951. pp. 91-94.

HAUL, R. A. W., L. H. Stein and J. D. Louw. C<sup>13</sup>O<sub>2</sub> Interchange with solid carbonates and carbon dioxide. *Nature*, vol. 167. no. 4241. 10th February, 1951. pp. 241-242.

HARRIS, D.A. The reaction of diacetyl with ethyl orthoformate. *J. Chem. Soc.* August, 1950. p. 2247.

HEYSTEK, H. An attapulgite occurring in the northern Transvaal. *S. Afr. J. Sci.*, vol. 47. no. 10, May, 1951. p. 287.

HORN, D. H. S. and F. W. Hougen. The isolation of some homologous higher molecular weight glycols from the unsaponifiable fraction of wool wax. *Chem. Ind.*, no. 31. August, 1951. p. 670.

KAHN, I. H. and A. M. Schady. Chromite investigations. Part I. A critical review of methods of utilization with special reference to Transvaal ores. *J. Chem. Metall. Min. Soc. S. Afr.* no. 8. February, 1951. p. 247.

KELLER, P. Sterilization of sewage sludges. Address to the Eighth Annual Congress, Health Official's Association of Southern Africa, 1950.

LIGTHEIM, S. P., E. von Rudloff and D. A. Sutton. Preparation of unsaturated long chain alcohols by means of lithium aluminium hydride: Some typical members of the series. *J. Chem. Soc.*, November, 1950. p. 3187.

MALHERBE, P. le R. Micro structure of South African coals. *Fuel*, vol. 30 no. 5. May, 1951. pp. 97-109.

NOVELLIE, L. An improved method of detecting sugars in paper chromatograms. *Nature*, vol. 166. no. 4226. 28th October, 1950. pp. 745-746.

NOVELLIE, L. Quantitative paper chromatography of amino acids. *Nature*, vol. 166. no. 4232. 9th December, 1950. pp. 1000-1001.

NUNN, J. R. Wool wax studies. Part I. Synthesis of ante-iso-acid components. *J. Chem. Soc.* July, 1951. p.1740.

RAPSON, W. S. The National Chemical Research Laboratory of the South African Council for Scientific and Industrial Research. Part I. *S. Afr. Indus. Chemist*, vol. 5. no. 3. March, 1951. pp. 56-58.

RAPSON, W. S. The National Chemical Research Laboratory of the South African Council for Scientific and Industrial Research. Part II. *S. Afr. Indus. Chemist*, vol. 5. no. 4. April, 1951. pp. 65-70.

SHUTTLEWORTH, R. G. Effluents from milk processing industries. Part I. The utilization of whey and buttermilk. *The S.A. Dairyman*, vol. 13. no. 19. January, 1951. pp. 20-23.

SHUTTLEWORTH, R. G. The industrial potentialities of South African seaweeds. Part I. General introduction. *S.A. Ind. Chemist*, vol. 5. no. 3. March 1951. p.54.

SHUTTLEWORTH, R. G. The industrial potentialities of South African seaweeds. Part II. Carrageenin and related products. *S.A. Ind. Chemist*. vol. 5. no. 4. April, 1951. p. 76.

SHUTTLEWORTH, R. G. The industrial potentialities of South African seaweeds. Part III. Agars. *S. Afr. Industrial Chemist*, vol. 5. no. 5. May, 1951. pp. 88-91.

SHUTTLEWORTH, R. G. The industrial potentialities of South African seaweeds. Part IV. Algin. *S. Afr. Ind. Chemist*, vol. 5. no. 6. June, 1951. 115-117.

SHUTTLEWORTH, R. G. The products and by-products of Fischer-Tropsch and related processes. *S. Afr. Ind. Chemist*, vol. 5. no. 5. May, 1951. pp. 94-98.

STANDER, G. J. Effluents from fermentation industries. Part IV. A new method for increasing and maintaining efficiency in the anaerobic digestion of fermentation effluents. *Public Health*. 1950.

STANDER, G. J. The treatment and disposal of wine distillery effluents. *Die Wynboer*, vol. 19. no. 230. November, 1950. pp. 17-21.

STANDER, G. J. and C. G. Hide. Effluents from fermentation industries. Part II. The significance of the solid phase and of volatile acid development in the anaerobic digestion method of purification. *Public Health*, vol. 15. no. 3. March 1951. pp. 71-73.

STANDER, G. J. Effluents from milk processing industries. Part II. Their treatment before disposal. *The South African Dairyman*, vol. 13. no. 21. March, 1951. pl. 52.

STANDER, G. J. Die besoedeling van riviere en die opruiming van nywerheidsafvalwater. *Volksgezondheid*, vol. 14. no. 12. Desember, 1950. pp. 367-370.

STEIN, L. H. Radio-isotopes and industry. *S.A. Ind. Chemist*, vol. 4. no. 10. October, 1950, p. 193.

STEPHEN, A. M. *Acacia Mollissima* Willd. Part I. The component sugars and aldobionic acid of black wattle gum. *J. Chem. Soc.*, March, 1951. pp. 646-649.

VON RUDLOFF, E. Fatty alcohols from wool wax unsaponifiables by urea-complex formation. *Chem. and Ind.*, no. 17. 28th April, 1951. p. 338.

WALKER, A.R.P. and U.B. Arvidsson. Iron intake and haemochromatosis in the Bantu. *Nature*, vol. 166. no. 4219. 1950. pp. 438-439.

WALKER, A. R. P. Calcification in the South African Bantu. (Letter to the Editor) *J. Amer. Med. Assoc.*, vol. 144. no. 1. 2nd September, 1951. p. 49.

WALKER, A. R. P. and U. B. Arvidsson. The digestibility of cereal fat. *S.A. J. Sci.*, vol. 47. no. 9a. April, 1951. p. 267.

WALKER, A. R. P. Absorption of iron. Letter to the Editor, *Brit. Med. J.*, no. 4710. 14th April, 1951. p. 819.

#### National Institute for Personnel Research/Nasionale Instituut vir Personeelnavorsing

BIESHEUVEL, S. The value of gliding for flying training. *S.A.A.F. Jnl.*, vol. 3. 1951. p. 13.

ARBOUS, A. G. The contribution of two group discussion techniques to a validated test battery. *Occupational Psychology*, vol. 25. no. 2. April,

#### National Physical Laboratory/Nasionale Fisiese Laboratorium

ALPER, T. Radio-isotopes in medicine. *S.A. Med. J.*, vol. 24. no. 52. December, 1950. p.10.

HALES, A. L. and D. I. Gough. Measurements of gravity in Southern Africa. (Foreword by Col. H. A. Baumann, Director, Trigonometrical Survey) *Government Printer*, Pretoria, 1951. Price/Prys 10s.

HUGO, T. J. Infrarooi spektrometrie. *Tegnikon*. vol. 3. no. 4. January, 1951. p. 3.

HUGO, T. J. The spectrochemical determination of magnesium in cast iron. *J. S.A. Chem. Inst.*, vol. 3. no. 1. June, 1950. pp. 17-22.

HUGO, T. J., S. M. Naude and H. Verleger. An electrode holder for operating arcs and sparks in controlled atmospheres. *Rev. Scient. Instruments*, vol. 22. no. 3. March, 1951. p. 210.

MARAIS, E. J. and H. Verleger. The rotational structure of the ultraviolet band system of the P<sub>2</sub> molecule. *Phys. Rev.*, vol. 80. no. 3. 15th November, 1950. p. 429.

MARAIS, E. J. Isotope en massaspektrometrie. *Tegnikon*, vol. 3. no. 5. April, 1951. p. 37.

MOSSOP, S. C. A multi-thermometer method for temperature measurement in boreholes. *J. Chem. Metall. Min. Soc.*, *S. Afr.*, vol. 51. no. 3. September, 1950. pp.120-122.

NAUDE, S. M., H. Verleger and H. L. de Waal. Raman effect of the isomers of benzene hexachloride. *Nature*, vol. 166. no. 4220. 16th September, 1950. p. 475.

NAUDE, S. M. and H. Verleger. The perturbations in the ultraviolet band spectrum of the phosphorus molecule. *Phys. Rev.*, vol. 80. no. 3. 15th November, 1950. p. 438.

NAUDE, S. M. Die Afrikaner en die ontwikkeling op fisies-wetenskaplike en tegniese gebied gedurende die afgelope 50 jaar. *Tydskrif vir Wetenskap en Kuns*, deel 10. no. 2. Oktober, 1950. p. 28-41.

WILSDORF, H. G. F. Röntgenoptik mit kristallreflektoren. *Naturwissenschaften*. vol. 38. no. 11. 1st June, 1951. p. 250.

1951. pp. 73-89.

SICHEL, H. S. The estimation of the parameters of a negative binomial distribution with special reference to psychological data. *Psychometrika*, vol. 16. no. 1. March, 1951. p. 107.

NAUDE, S. M. Max Planck en die ontwikkeling van die kwantefisika. *Tydskrif vir Wetenskap en Kuns*, deel 10. no. 2. Oktober, 1950. p. 205.

POLSON, A., P. J. van Rooy and E. J. Marais. A photometric method for quantitative paper partition chromatography of amino acid. *Onderstepoort, Journ. Vet. Res.*, vol. 25. no. 1. January, 1951. p. 31.

SAVAGE, D. J. The determination of hydrogen peroxide on aqueous solutions. *The Analyst.*, vol. 76. no. 901. April, 1951. p. 224.

STRASHEIM, A. The spectrographic analysis of uranium in uranium ores. *Spectrochimica Acta.*, vol. 4. 1950. pp. 200-211.

STRASHEIM, A. Die kwantitatiewe spektrochemiese analitiese metode. *Tegnikon.*, Jaarg. 4. deel 2. Julie, 1951. pp. 74-95.

STRASHEIM, A. Infrarooi spektroskopie. *Tegnikon.*, Jaarg. 3. deel 4. Januarie 1951. pp. 3-13.

VAN DER MERWE, J. H. and H. Verleger. Low reflectance coatings and the sensitivity curve of the eye. *Proceedings of the Physical Society*, B. vol. 64. no. 373B. January, 1951. p. 76.

VAN DER MERWE, J. H. The influence of convection on measured borehole temperatures. *S.A. J. Sci.*, vol. 47. no. 8. March, 1951. p. 235.

VAN NIEKERK, J. N. and F. R. L. Schoening. The crystal structure of trans-potassium dioxalato-diaquo-chromate Part I.  $K Cr(C_2O_4)_2(H_2O)_2 \cdot 3H_2O$ . *Acta Cryst.* vol. 4. part 1. January, 1951. pp. 35-41.

WAKLEY, J. Carcinoma of the cervix: treatment with radioactive cobalt<sup>60</sup>. The use of ring applicators. *S.A. Med. J.*, vol. 25. no. 30. 28th July, 1951. pp. 523-526.

WILSDORF, H. G. F. and R. A. W. Haul. X-ray study of the thermal decomposition of dolomite. *Nature*, vol. 167. no. 4258. 9th June, 1951. pp. 945-946.



**National Building Research Institute/Nasionale Bounavorsingsinstituut**

HECTOR, A. R. and D. M. Calderwood. A new Native township for Witbank Municipality. *South African Architectural Record*, vol. 36. no. 5. May, 1951. p. 112.

SPENCE, Betty. How our urban Natives live. *South African Architectural Record*. vol. 35. no. 10. October, 1950. pp. 221-236.

**C. — PUBLICATIONS RECEIVED DURING 1951 FROM HOLDERS OF C.S.I.R. RESEARCH AWARDS/PUBLIKASIES WAT GEDURENDE 1951 ONTVANG IS VAN HOUERS VAN W.N.N.R. NAVORSINGSTOEKENINGS**

**General Research/Algemene Navorsing**

ALTMAN, C. The recording and analysis of the wave-forms of atmospheric. D.Ph. thesis — University of the Witwatersrand.

*Wetenskap en Kuns*, Deel X. nr. 2. Oktober 1950. pp. 174-181.

BACKEBERG, O. G. Condensation products of chloral with certain p-substituted phenols and some derivatives of possible chemotherapeutic interest. *The Journal of the South African Chemical Institute*, New Series, June, 1950. vol. III. no. 1. pp. 13-16.

ELOFF, F. C. On the relations of the vomer to the ethmoidal Skeleton in certain rodents. *Annals of the Transvaal Museum*, vol. XXI. part 3. 9th May, 1950.

BISSCHOFF, A. A. Die stollingsgesteente-kompleks op Roodekraal 37, Potchefstroom-distrik. M.Sc. tesis — Potchefstroomse Universiteit.

ELOFF, F. C. The early development of the skull of *Otomys Tropicalis*. *Annals of the Transvaal Museum*, vol. XXI. part I. 6th April, 1948.

BOTHA, P. J. The termination of the seeds of angiospermous root-parasites, Parts I and II. *The Journal of South African Botany*, January, 1950.

ELOFF, F. C. On the nasal region of the chondrocranium of the Cape hare, *Lepus capensis*. *Annals of the Transvaal Museum*, vol. XXI. part 3. 9th May 1950.

BOTHA, P. J. The germination of the seeds of angiospermous root-parasites, Parts III and IV. *The Journal of South African Botany*, April, 1951.

EWER, D. W. and E. Bursell. A note on the classification of elementary behaviour patterns. *Behaviour*, vol. III. no. 1. 1950. pp. 40-47.

BUNT, E. A. A universal range selector for strip chart recorders. *The Review of Scientific Instruments*, vol. 22. no. 1. January, 1951. pp. 57-58.

HAINES, D. W. *Euphorbia* Resins. The triterpenes from *E. Tirucalli*: Euphol Tirucallol and Taraxasterol. D. Ph. thesis — University of Natal.

BUNT, E. A. and A. N. H. Bond. An ionization gauge for the measurement of high vacua. *The Fulcrum* (Journal of the University of the Witwatersrand Student Engineers' Council), vol. 5. no. 5. October, 1950.

HUDSON, G. B. (Mrs.) Studies in the comparative anatomy and systematic importance of the hexapod tentorium — IV. Ephemeroptera. *Journal Ent. Soc. S. Africa*, vol. XIV. no. 1. 31st May, 1951.

CANHAM, P. A. S. and F. L. Warren. The saponins. Part I. The isolation of gitogenin and digitogenin from *Cestrum laevigatum*. *The Journal of the South African Chemical Institute*, New Series, June, 1950. vol. III no. 1. pp. 9-12.

JANSE, A. J. T. The moths of South Africa. vol. V. Part II.

DE WAAL, Prof. H. L. en D. F. Louw. Suid-Afrikaanse senecio-alkaloïede VIII. 'n Aantekening en 'n verbetering insake die identiteit van „retronesiensuur”, „nuwe isatinesiensuur” en „dewaliensuur”. *Tydskrif vir Wetenskap en Kuns*, Deel X. no. 2. Oktober 1950. pp. 172-173.

KLOPPER, S. M. The catalysed dehydration of oxalic acid in acetic acid-acetic anhydride medium. M.Sc. thesis — University of Natal.

DE WAAL, Prof. H. L. en D. F. Louw. Suid-Afrikaanse senecio-alkaloïede IX. Sceleratiensuur en sy verwantskap met sceleranesiensuur. *Tydskrif vir*

KOCH, C. The tenebrionidae of Southern Africa. II. Contribution to the knowledge of the epitragini genus himatismus. *Annales du Musee du Congo Belge Tervuren* (Belgique). *Serie in 8° Sciences Zoologiques* vol. 3.

KOCH, C. Die tenebrioniden des sudl. Afrikas. IV — Uber vier neue afrikanische himatismus-arten. *Entomologischen Arbeiten aus dem Museum G. Frey, München, Band 1*. 1950.

KOCH, C. The tenebrionidae (Col.) of southern Africa. V. — Contribution to the knowledge of the *Cadius*-group of *Opatrini* and the *Crypticini* from south of the Sahara. *Memorias do Museu Dr. Alvaro de Castro*, no. 1. 1950. pp. 35-90.

KOCH, C. The tenebrionidae of Southern Africa. VII. — Preliminary notes on the South African Adesmiini. *The Annals of the Transvaal Museum*, vol. XXI. part 4. 6th July, 1951.

KOEKEMOER, M. J. and F. L. Warren. The *Senecio* alkaloids. Part VIII. The occurrence and preparation of the N-Oxides. An improved method of extraction of the *Senecio* Alkaloids. *Journal of the Chemical Society*, January, 1951. pp. 66-68.

KROPMAN, M. The *Senecio* alkaloids. The structure of the "Necic" Acids. D.Ph. thesis — University of Natal.

KUSCHKE, O. H. Granitic rocks of the Bushveld north-west of Brits. M.Sc. thesis — University of Pretoria.

LAWRENCE, R. F. New fur-mites from South African mammals. *Annals of the Natal Museum*, vol. XII. Part I. August, 1951.

LOUW, D. F. en Prof. H. L. de Waal. Oor die verestering van Feniël-tio-tiol-karbasiensuur. *Tydskrif vir Wetenskap en Kuns*, April, 1950. pp. 94-100.

MACKENZIE, H. A. E. An indicator study of Acetic Acid-Acetic Anhydride mixtures using Thymol Blue and a re-interpretation of the kinetics of the acetylation of sulphuric acid. *The Journal of the South African Chemical Institute*, New Series, June, 1950. vol. III. no. 1. pp. 1-88.

**Medical, Dental and Nutritional Research/Mediese, Tandheelkunde en Voedingsnavorsing**

ALLEN, C. E. L. Electromyography with synchronised photography used in the study of human movement. M.D. thesis — University of the Witwatersrand.

BERMAN, C. Primary carcinoma of the liver.

CLEMENT, A. J. The chemical composition of Salivary mucin (Mucoprotein). A critical survey of the Literature. *Official Journal of the Dental Association of South Africa*, 15th July, 1951.

COHEN, S. Variations in serum protein concentration during the menstrual cycle of the baboon (*Papio Ursinus*). *South African Journal of Medical Science*, vol. 15. pp. 101-114., November, 1950.

MARAIS, J. L. C. and O. G. Backeberg. The nitration of 2-Hydroxy-4, 6-dimethyl-quinoline and the preparation of some related compounds. *Journal of the Chemical Society*, August, 1950 (456) pp. 2207-2211.

MEISSNER, R. Uber das Vorkommen eines die Keimung des Wurzel-parasiten *Alectra Vogeli* Benth. hervorruhenden Stoffes in den Wirtswurzeln. *Phyton*, vol. 3. Fasc. 1 en 2 (6.111.1951).

MILNER, A. M. (Mrs.) The isotopic exchange between oxygen and water. Some preliminary studies. M.Sc. thesis — University of Natal.

RIPLEY, S. H. and D. W. Ewer. Peripheral inhibition in the Locust. *Nature*, vol. 167. p. 1066. 30th June, 1951.

RYDING, W. W. Attempted synthesis a of resorcynyl alcohol. M.Sc. thesis—Rhodes University.

SMITH, J. L. B. The fishes of the family *Veliferidae* from South-East Africa. *Annals and Magazine of Natural History*, Ser. 12, vol. IV, p. 497. May, 1951.

SMITH, J. L. B. On the Genus *Paragobioides*. *Annals and Magazine of Natural History*, Ser. 12, vol. IV. p. 518. May, 1951.

ZEEMAN, P. B. Spectrum of the boron monosulphide (BS) molecule. *The Physical Review*, vol. 80. no. 5. page 902. 1st, December, 1950.

ZEEMAN, P. B. rotational analysis of the band system of the NS molecule. *Canadian Journal of Physics*, vol. 29. pp. 174-185. 1951.

DORMER, B. A. Procedures in the control of tuberculosis. The practical approach: 1. Nursing in tuberculosis. The use of nurse aides. *South African Medical Journal*, vol. 24. 8th July, 1950. pp. 552-555.

DORMER, B. A. Procedures in the control of tuberculosis. The practical approach: 2. Hospitalization. *South African Medical Journal*, vol. 24. 15th July, 1950. pp. 574-576.

DORMER, B. A. Procedures in the control of tuberculosis. The practical approach: 3. The role of the settlement in tuberculosis control. *South African Medical Journal*, vol. 24. 22nd July, 1950. pp. 597-600.

DORMER, B. A. Procedures in the control of tuberculosis. The practical approach: 4. Diagnosis and treatment. *South African Medical Journal*, vol. 24. 29th July, 1950. pp. 618-622.

DORMER, B. A. Procedures in the control of tuberculosis. The Practical approach: 5. The action front. *South African Medical Journal*, vol. 24. 5th August, 1950. pp. 643-644.

DORMER, B. A. and K. Weinbren. The study of normal and pathological organs by means of radio-opaque plastic and stereoscopic X-Ray films. *The British Journal of Radiology*, vol. XXIII. no. 274. October, 1950. pp. 612-613.

ELSDON-DEW, R. Amoebic dysentery in southern Africa. A comparison of Durban and Lourenco Marques. *Anais do Instituto de Medicina Tropical*, vol. VII. July, 1950.

GILLMAN, J., T. Gillman and C. Gilbert. Production experimentale de stimulation diffuse des tissus conjonctifs chez le rat; signification des constatations faites, dans l'interpretation des reticuloses de l'homme. *La Semaine des Hopitaux de Paris*, 27<sup>e</sup> annee, no. 25. avril 1951.

IRVING, J. T. Experimental enamel hypoplasia in rats. *British Journal of Experimental Pathology*. vol. XXXI. no. 4. August, 1950. pp. 458-472.

JANSSEN, E. and J. S. le Roux. The electrocardiographic changes in the syndrome of malignant

malnutrition. *South African Medical Journal*, vol. 24. 9th September, pp. 762-764.

JANSSEN, E. and J. S. le Roux. The syndrome of malignant malnutrition. Observations on the relation of the serum proteins to the occurrence of oedema and the effect of diet. *S.A. Journal of Clinical Science*, vol. 1. no. 2. 1950. pp. 100-113.

MACDONALD, D. K. C. (non-bursar) and C. H. Wyndham. Heat transfer in man. *Journal of Applied Physiology*, vol. 3. no. 6. December, 1950. pp. 342-363.

MENTZ, H. E. A. and W. A. Odendaal, with the technical assistance of P. J. Steyn. The role of the B-Vitamins, lysine and tryptophane with respect to growth, the inactivation of Oestrogens in the liver and sex physiology. *South African Journal for Medical Science* (1950) vol. 15. pp. 83-100.

SALBER, E. J. and E. S. Bradshaw. Birth weights of South African babies. *British Journal of Social Medicine*, vol. 5. no. 2. April, 1951. pp. 113-119.

SCHULENBURG, C. A. R. Adamantinoma, *Annals of the Royal College of Surgeons of England*, vol. 8. May, 1951. pp. 329-353.

VAN WEZEL, R. L. Bilharziasis in South Africa with special reference to the disease as studied in in Transvaal. M.D. thesis — University of Pretoria.

RESEARCH BURSARIES and ASSISTANTSHIPS awarded by the C.S.I.R. during 1951  
NAVORSINGSBEURSE en ASSISTENTSKAPPE wat deur die W.N.N.R. gedurende 1951  
toegeken is

A. GENERAL RESEARCH—ALGEMENE NAVORSING

1. BURSARIES — BEURSE

(i) SENIOR BURSARIES — SENIOR BEURSE (£200-£1,000)

Name and qualifications Naam en Kwalifikasies	Previous awards Vorige toekennings	Where tenable Waar geldig	Subject of research Onderwerp van navorsing
EWER, Dr. R. F. B.Sc. (Hons.) Ph.D. Lecturer in Zoology £400	1948,1950	University of Natal	Studies on water balance in the Anura with special reference to endocrine control.
GANE, Dr. P. G. Ph.D. Deputy Director, Bernard Price Institute	—	United States of America. Seismo- logy Laboratory, Pasadena, Calif.	A study of the seismology of near earthquakes and associated work.
HENKEL, Dr. J. S., Diploma of Forestry, Hon. D.Sc. Pensioner, Union and Southern Rhodesian Forest Services £100	1947,1948, 1949,1950	University of Natal	Preparation of a key to all the indigenous grasses of Southern Africa.
KOCH, Dr. C. D.Sc., Hon. Coleopterologist at the Transvaal Museum £600	1949,1950	Transvaal Museum	Monographic account of the Tenebrionidae (Coleoptera) of South Africa.
LAWRENCE, Dr. R. F., Ph.D. Retired Director of the Natal Museum Honorary Keeper of Arachnida, Natal Museum £400	1948,1949, 1950	—	Mite parasites of South African vertebrates with special reference to lizards.
SMITH, Professor J. L. B. Ph.D., F.R.S.S.A. Professor of Ichthyology £1,000	1946,1947 1948,1949 1950	Rhodes University	Fishes of South Africa
TSCHE, Dr. O. A. Ph.D. Lecturer in Physics £600	—	University of Cape Town	X-ray diffraction by crystals of fatty acids and their structural analysis
WALL-MESHAM, Dr. W. M.Sc., M.D., D.Ph., D.T.M., M.R.C.S., L.R.C.P. Medical practitioner retired £200	—	University of Natal	Fungi as related to diseases of the skin and other diseases with special reference to host-parasite relationship.

## (ii) STUDENT BURSARIES — STUDENTE BEURSE (£100-£200)

Name and qualifications Naam en kwalifikasies	Previous awards Vorige toekennings	Where tenable Waar geldig	Subject of research Onderwerp van navorsing
CHEMISTRY/SKEIKUNDE BARBOUR, J. B. B.Sc., B.Sc. (Hons).	1950	University of Natal	Triterpenes from the Euphorbia species.
CARR, A. D. B.Sc.	—	University of Cape	Multi-stage liquid-liquid extraction using two immiscible solvents.
COOKE, B. A. B.Sc.	—	University of Natal	Thermal diffusion of BF <sub>3</sub>
DAVIES, W. G. B.Sc. (Pure Science)	—	University of Cape Town	The properties of gallium di-chloride with a view to establishing its molecular structure.
DRY, L. J. B.Sc., M.Sc.	—	University of Natal	Synthetic studies in the field of the "Necic" acids.
DU TOIT, A.A. B.Sc., B.Sc. (Hons.)	—	Rhodes University	Base exchange in soils. A statistical study of methods and values for some South African soils.
EVE, A. J. B.Sc., B.Sc. (Hons)	—	Rhodes University	Determination of trace elements in copper by polarographic methods.
FAURE, P. K. B.Sc.	—	Rhodes University	A conductimetric study of adsorption from, and certain reactions in, extremely dilute solutions.
FEWSTER, Miss M.E. B.Sc.	—	University of Leeds	The rate of bacterial metabolism of aromatic amino acids.
FOURIE, R. M. B.Sc., B.Sc., (Hons).	—	University of Natal	The reduced pressure distillation of water through gauze ring packing and the preparation of water heavy in oxygen but normal in hydrogen.
JOHNSTON, A. M. B.Sc., B.Sc. (Hons).	—	University of the Witwatersrand	Further studies in the quinazolone series.
LARGIER, J. F. B.Sc.	—	University of Cape Town	The synthesis of long chain sulphonic acids and investigation of their surface-active properties, especially with regard to rate of evaporation through mono-molecular films on the surface of liquids.
MARKS, G. S. B.Sc.	—	University of Cape Town	The variation of the branched chains of tricosanoic and related fatty acids with a view to determining their biological effects and subsequent correlation with the properties of phthioic acid.
MILNER, Mrs. A. M. B.Sc., B.Sc. (Hons.)	1950	University of Natal	Isotopic exchange between certain aquo-ions and water.
RYDING, W.W. B.S., B.Sc. (Hons)	1950	Rhodes University	The elucidation of the structure of resorcinol formaldehyde resins.
SPENCER, Miss I. J. I. B.Sc.	—	University of Natal	An attempt at the isotopic enrichment of carbon in <sup>13</sup> C by rectification of volatile carbon compounds.

## (ii) STUDENT BURSARIES — STUDENTE BEURSE (Continued—Vervolg)

Name and qualifications Naam en Kwalifikasies	Previous awards Vorige toekennings	Where tenable Waar geldig	Subject of research Onderwerp van navorsing
TAYLOR, C. H. B.Sc., B.Sc. (Hons).	—	Rhodes University	Experimental investigation of the Onsager-Fuoss theory of the conductance of mixed electrolytes.
URANOVSKY, B. B.Sc.	—	Massachusetts Institute of Technology	Lime technology.
VAN ROOYEN, D. B.Sc.	—	University of Cambridge	Corrosion (paints)
VAN ZYL, F. W. B.Sc., M.Sc.	—	Universiteit van Stellenbosch	Ensimatiese afbou van stysel en fermentasie van die afbouprodukte. Onderzoek en identifikasie van ensime-sisteme en van produkte van ensimatiese omsettings. Produksie van drinkbare en industriële alkohol deur fermentasie.
WRIGHT, Mrs. W.G. B.Sc., D.I.C.	—	University of Natal	Extraction of South African plants and seeds, with the object of isolating new alkaloids or saponins which may be useful in the synthesis of Cortisone.
GEOLOGY/GEOLOGIE CILLIERS, J. J. le R. B.Sc.	—	Universiteit van Pretoria	(a) Die hidrologie en geologie van die Fonteine naby Pretoria. (b) Optiese eienskappe van enige senecio-alkaloïede.
MACLACHLAN, G. R. B.Sc., M.Sc.	—	University of Cape Town	The Geology of Paresis Mountain, South West Africa.
STOCKEN, C. G. B.Sc., M.Sc.	—	University of Cape Town	Structure and lithology of the Congo Beds, including mapping and determination, if possible, of their age relations.
TOENS, P. D. B.Sc.	—	Universiteit van Pretoria	Die geologie van die Franspoort-lyn.
VERWOERD, W. J. B.Sc.	—	Universiteit van Stellenbosch	Mineralogiese ondersoek van vanadium erte van die Abenabmyn, Suidwes-Afrika.
ZOOLOGY/DIERKUNDE BISSERU, B. B.Sc.	—	South African Native College, Fort Hare	Avian parasitology: viz. parasites of <i>Heterocorax capensis</i> .
BOUWER, Miss S. R. B.Sc.	—	University of Natal	Endocrine control in the lower vertebrates.
DODDS, Miss S. E. B.Sc., B.Sc. (Hons).	1950	University of Natal	The responses of invertebrates to humidity after desiccation.
FRANK, G. H. B.Sc., M.Sc.	—	Universiteit van Stellenbosch	Development of the chondocranium of the ostrich.
PIENAAR, U. de V. B.Sc., B.Sc. (Hons)	—	University of the Witwatersrand	Investigate experimentally the response of the megaloblast-like cells of the reptile to materials like vitamin B12 and liver extracts which are known in man to restore normal haemopoiesis.

## (ii) STUDENT BURSARIES — STUDENTE BEURSE — (Continued/Vervolg)

Name and qualifications Naam en kwalifikasies	Plevious awards Vorige toekennings	Where tenable Waar geldig	Subject of research Onderwerp van navorsing
PIETERSE, P. J. S. B.Sc., B.Sc. (Hons)	—	Potchefstroomse Universiteit	Die invloed van avitaminose A op die histologiese struktuur van die hormonale kliere van die rot, met spesiale beklemtoning van die Thymus.
SMIT, A. L. B.Sc., M.Sc.	1950	Universiteit van Stellenbosch	Die ontwikkeling van die werwelkolom van <i>Xenopus laevis</i> .
TALBOT, F. H. B.Sc.	—	University of Cape Town	Investigation into the feeding and spawning of the three species of Rhabdosargus. ("White stumpnose", <i>R. globiceps</i> ; "Flatty", <i>R. tricuspidens</i> ; and "Yellow-fin bream", <i>R. Sarba</i> ).
ELECTRICAL ENGINEERING/ ELEKTRIESE INGENIEURSWESE ASWELL, P. C. B.Sc. (Elec. Eng.)	1950 1950	University of Natal	A study of atmospheric super-refraction and the anomalous propagation of radio waves at a wavelength of 150 cm.
BROWNE, L. C. B.Sc. (Elec. Eng.)	1950	University of Natal	A study of atmospheric super-refraction and the anomalous propagation of radio waves at wavelengths of 10 and 3 cm.
CHEMICAL ENGINEERING/ CHEMIESE INGENIEURSWESE CAPLAN, S. R. B.Sc. (Chem. Eng.)	1950	University of the Witwatersrand	The design and construction of a light-scattering Photometer and its application to solutions of polymeric electrolytes.
HARRISON, G. S. B.Sc. (Chem. Eng.)	1950	University of the Witwatersrand	An investigation of the seed fat and seed pod fat of <i>Acacia Girrffea</i> .
HAWES, J. B.Sc. (Chem. Eng.)	—	University of Natal	A mass spectrometric study of oxygen exchange between carbon dioxide and Oxygen containing solvents.
MCCULLOCH, R. J. B.Sc. (Chem. Eng.)	—	University of the Witwatersrand	An investigation of catalytic free radical mechanisms as monitored by mass spectrometric methods.
PRESS, R. E. B.Sc. (Chem. Eng.)	—	University of the Witwatersrand	Physico-chemical methods for the determination of total sulphide ion and potassium in solution with particular reference to sewage and industrial effluents.
BOTANY/PLANTKUNDE GROBBELAAR, N. B.Sc.	—	Universiteit van Pretoria	'n Kromatografiese studie van die stikstof metabolisme van leguminosae plante met spesiale nadruk op die vorming en moontlike afskeiding van Aminosure deur die wortelknolletjies.
NIXON, Miss K. M. B.Sc. (Hons.)	—	University of Natal	Anatomical and taxonomic studies of African grasses—the genera <i>Sacciolepis</i> and <i>Enterepogon</i> .
ENTOMOLOGY/ENTOMOLOGIE VAN WYK, Mej. L. E. B.Sc.	—	Universiteit van Pretoria	Die morfologie, histologie en lewensloop van Suid-Afrikaanse kakkerlakke.

## (ii) STUDENT BURSARIES—STUDENTE BEURSE—(Continued/Vervolg)

Name and qualifications Naam en Kwalifikasies	Previous awards Vorige toekennings	Where tenable Waar geldig	Subject of research Onderwerp van navorsing
PHYSICS/FISIKA BROMMERT, J. W. B.Sc., B.Sc. (Hons)	—	University of Birmingham	Physics of Metals. In particular plasticity
STOKER, D. J. B.Sc., B.Sc. (Hons)	—	Potchefstroomse Universiteit	'n Onderzoek na die voortbrenging en absorpsie van deurdringende ioniserende deeltjies deur die neutrale komponent van kosmiese strale.
MECHANICAL ENGINEERING/ MEGANIESE INGENIEURSWESE BOSMAN, D. L. B.Sc. (Mech. Eng.)	— —	University of the Witwatersrand	Photoelastic stress analysis.
HERRMAN, W. B.Sc. (Mech. Eng.)	—	University of the Witwatersrand	A study of supersonic gas flow phenomena using an interferometer.
WHILLIER, A. B.Sc.	—	Massachusetts Institute of Technology	Storing thermal energy under conditions of periodic heating and cooling in systems which may or may not undergo a change of phase.
ZEEDERBERG, L. B. B.Sc. (Mech. Eng.)	—	University of the Witwatersrand	Determination of ignition delay period of volatile fuel in special compression machine.
ANTHROPOLOGY/MENSKUNDE STRYDOM, F. W. B.A., M.A. Assistant at the Springs High School	—	University of Cape Town	Physical Anthropology: "A comparative study of the physical characteristics of the Zulu, the Southern Basotho, the Xhosa-Fengo and the Baxalaxadi.
MICROBIOLOGY/MIKROBIOLOGIE KISTNER, A. B.Sc.	—	Universiteit van Delft	Mikrobiologie.

## 2. ASSISTANTSHIPS — ASSISTENTSKAPPE (£450-£650)

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

Name and qualifications Naam en kwalifikasies	Previous awards Vorige toekennings	Where tenable Waar geldig	Subject of research Onderwerp van navorsing
BOTHA, Dr. P. J. M.Sc., Ph.D. Senior Lektor in Plantkunde	1947, 1948, 1949, 1950.	Potchefstroomse Universiteit	Fisiologies-ekologiese studies in verband met inheemse parasitiese blomplante
CONNELL, Professor P.H. B.Arch. Professor of Architecture	—	University of Natal	An investigation into the availability of building materials in South Africa and their application in the South African building industry.
DAY, Professor J. H. Ph.D. Professor of Zoology	1946, 1947, 1948, 1950.	University of Cape Town	The ecology of South African estuaries.
DAY, Professor J. H. Ph.D. Professor of Zoology	—	University of Cape Town	Stream surveys
GANE, Dr. P. G. Ph.D. Deputy Director, Bernard Price Institute	1949, 1950.	University of the Witwatersrand	Seismic travel-times in the Transvaal.

(b) GRANTS FOR THE EMPLOYMENT OF UNSKILLED RESEARCH ASSISTANTS — TOEKENNINGS VIR DIE INDIENSNEMING VAN ONGESKOOLDE NAVORSINGSASSISTENTE — (£350-£450)

Name and qualifications Naam en Kwalifikasies	Previous awards Vorige toekennings	Where tenable Waar geldig	Subject of research Onderwerp van navorsing
ELOFF, Dr. G. M.A., D.Sc. Senior Lektor	1950	Universiteit van die Oranje-Vrystaat	Lewenswyse van knaagdiermolle en insektevoormolle met spesiale aandag aan ons inheemse soorte.
HENKEL, Dr. J. S. Diploma in Forestry, Hon. D.Sc. Pensioner—Union and Southern Rhodesian Forest Services	1947, 1948, 1949, 1950.	University of Natal	Preparation of a key to all the indigenous grasses of Southern Africa.
ROWHER, Dr. E. F. C. H. Ph.D. Senior Lektor in Chemie	1946, 1947, 1949, 1950.	Universiteit van Stellenbosch	Ondersoek na die disperse verspreiding van soute in die nie-isomorfe kristalle deur middel van 'n X-straal-vakuum-spektrograaf.
SCHEFFLER, Dr. T. B. D.Sc. Senior Lektor in Fisika			
WARREN, Professor F. L. A.R.C.S., F.R.I.C., Ph.D. Professor of Chemistry	1949	University of Natal	Investigations on medicinal and toxic principles in South African plants.

B. MEDICAL DENTAL AND NUTRITIONAL RESEARCH—MEDIËSE, TANDHEELKUNDIGE EN VOEDINGSNAVORSING

1. BURSARIES — BEURSE

(i) SENIOR BURSARIES — SENIOR BEURSE (£200-£1,000)

Name and qualifications Naam en kwalifikasies	Previous awards Vorige toekennings	Where tenable Waar geldig	Subject of research Onderwerp van navorsing
IRVING, Professor J. T. Ph.D., M.D., M.R.C.S., L.R.C.P. Professor of Physiology £800	—	University of Pennsylvania	Influence of dietary factors upon bone and tooth formation especially that of Vitamin C.
MUSPRATT, J. B.A. Entomologist £500	—	South African Institute for Medical Research	On Aedes and allied mosquitoes of South Africa in relation to yellow fever prevention.

2. ASSISTANTSHIPS — ASSISTENTSKAPPE (£450-£650)

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

Name and qualifications Naam en Kwalifikasies	Previous awards Vorige toekennings	Where tenable Waar geldig	Subject of research Onderwerp van navorsing
BOTHWELL, Dr. A. J. M.B., Ch.B.	—	University of the Witwatersrand	The adsorption and utilisation of radio-iron in idiopathic Haemochromatosis, including iron absorption studies in the varieties of Haemochromatosis seen in malnutrition and after multiple blood transfusions.
GOETZ, Professor R. H. M.D. Research Professor, Surgical Research Department, University of Cape Town	1947, 1949, 1950	University of Cape Town	The Haemodynamics of congenital heart diseases and certain vascular diseases.
GORDON, Dr. I. M.B., Ch.B. Senior Government Pathologist, Union Health Department, Durban Specialist in Pathology	—	Durban	1) Study on the pathogenesis of capillary haemorrhages and other pathological changes as produced in various types of death viz. coma, syncope or asphyxia. 2) The estimation of the post-mortem interval. 3) Study of the effects of poisons in the presence of metabolic disorders. 4) Studies on the correlation which may exist between skeletal development, the development of organs (as measured by autopsy) and chronological age. 5) Develop techniques to establish the presence of human blood on clothing and lethal weapons and to exclude the possibility of bloodstains being of monkey or baboon origin.
HEYNS, Professor O.S. M.A., D.Sc., F.R.C.O.G., M.R.C.S., L.R.C.P. Professor of Obstetrics and Gynaecology	1947, 1950	University of the Witwatersrand	Electrical response during uterine action. Ontogenetic development of human pelvis.
IRVING, Professor J. T. Ph.D., M.D., M.R.C.S., L.R.C.P. Professor of Physiology	1946, 1947, 1948, 1950.	University of Cape Town	Influence of endocrine and dietary factors on enamel and dentin formation.
(a) ODENDAAL, Dr. W. A. D.Sc.	1947, 1948, 1949, 1950.	Universiteit van Pretoria	Die verband tussen nutrisie, endokrinologie en siekte toestande.
(b) TE GROEN, Professor L.J. Arts, Amsterdam Dekaan, Fakulteit Geneeskunde, Pretoria Universiteit			
(c) SNYMAN, Dr. H. W., M.D. Hoof, Departement van Interne Geneeskunde.			
(d) STEYN, Professor D. G. D.V.Sc., Dr. Med. Vet. Professor in Farmakologie.			
(a) ODENDAAL, Dr. W.A. D.Sc. Senior Lektor in Fisiologie Nasionale Voedingsraad	—	Universiteit van Pretoria	Voedingsopname-eenheid

Name and qualifications Naam en kwalifikasies	Previous awards Vorige toekennings	Where tenable Waar geldig	Subject of research Onderwerp van navorsing
PIJPER, A. M.D. Professor in Siektkunde	1947, 1948, 1949, 1950.	Universiteit van Pretoria	Sigbaarmaking van sogenaamde flagella van bakterieë met „phase contrast” mikroskope.
STEYN, Dr. D. G. Dr. Med. Vet., D.V.Sc. Professor in Farmakologie	1949, 1950.	Universiteit van Pretoria	Die moontlike kankerveroorsakende en giftige eienskappe van kleurstowwe (Nigrosine, Orange G, en Benzo Purpurine) wat in ons voedsel en drank gebruik word.
THON, Dr. P. M.B., Ch.B., Ch.M., F.R.C.S. Assistant Surgeon (Tutorial)	—	University of the Witwatersrand	1) Portal Hypertension. 2) A study of the effects of liver anaemia on peripheral circulatory tone.

(b) GRANTS FOR THE EMPLOYMENT OF UNSKILLED RESEARCH ASSISTANTS — TOEKENNINGS VIR DIE INDIENSNEMING VAN ONGESKOOLDE NAVORSINGSASSISTENTE — £(350-£450)

Name and qualifications Naam en kwalifikasies	Previous awards Vorige toekennings	Where tenable Waar geldig	Subject of research Onderwerp van navorsing
SNYMAN, H.W. M.D. Hoof, Afdeling Sistematiese Geneeskunde.	1950	Universiteit van Pretoria	1) Elektroforetiese studie op serum by ondervoeding in Bantoe pasiënte. 2) Elektroforetiese studies op serum by endokrinologiese pasiënte.