

# The formation of the SAIP

Pieter Wagener

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## 1 Introduction

The history of physics in South Africa, as many other aspects, is linked to political and socio-economic changes in the country. These can be associated with the three political eras of our country. It is a testimonial to our science community that they have always transcended political and cultural boundaries, often in turbulent times, to unite in the common purpose of promoting science in our country. This was especially evident in the physics community.

The political changes since the 1990's were particularly dramatic and it is with gratitude that we have seen physicists from widely different cultural backgrounds cooperate with a single aim in mind: Promote physics amongst all the peoples of South Africa. This attitude is not only an inspiration for our future, but also for the whole African continent.

An outstanding example of reaching the nadir of international physics from lowly beginnings is provided by Richard Varder. Born in 1889 in the rural hamlet of King William's Town, he joined Ernest Rutherford 23 years later in Manchester to collaborate in the pioneering work on nuclear physics.

In the new millenium we can learn from the lessons of the past through the lives of the pioneers who established our physics community. These few scientists brought the expertise of Europe to the southern tip of Africa and an obligation rests on the SAIP to extend this inherited knowledge to the rest of the continent. It is therefore fitting to pay tribute to the physicists who made this possible.

## 2 In the beginning

During the twentieth century the history of physics in South Africa followed two cultural streams. In the first half it was dominated by British influence as the country's part of the British Empire. Professors of physics were from England and curricula and research were determined accordingly.

Young scientists mainly went to Cambridge university, particularly to the Cavendish laboratory of Sir Ernest Rutherford, and returned under its influence.

The towering figure during this period was General Jan Christiaan Smuts, who held universal esteem as scientist, philosopher and statesman. He was president of the British Association for the Advancement of Science, rector of Edinburgh University and Chancellor of Cambridge and Cape Town universities.

Smuts played a major role in the progress of our first universally acclaimed physicist, Sir Basil Schonland. Schonland, in turn, was the driving force that developed South African physics in the first half of the century to international status.

The latter half of the century also marked the end of Smuts's political dominance in South Africa. It heralded the emergence of Afrikaner nationalism and with it a concurrent shift in physics away from British influence.

Through Rhodes scholarships Afrikaans scientists still proceeded to either Cambridge or Oxford university, but invariably continued to German and Dutch universities. Two leadership figures emerged just prior to the nineteen fifties, namely Dr Hendrik van der Bijl and Dr Stefan Meiring Naudé, the former persuaded by Smuts to return to South Africa. Meiring Naudé subsequently became the dominant force in the rapid development of experimental physics and its associated institutions in South Africa.

Van der Bijl established Escom (1922), Iscor (1928) and the IDC (1940). These organizations became the industrial counterpart to fundamental physics research and they operated in tandem with one another.

The last decades of the twentieth century saw the emergence of a generation of physicists from other cultural backgrounds. This is reflected in the election of Dr Edmund Zingu as the president of the Institute.

### 3 First attempt

The years after the end of the Second World War in 1945 saw dramatic political, industrial and economic changes in South Africa. Although not as dramatic, changes were also stirring in the scientific community. The CSIR was established in 5 October 1945 under its first president, Dr Basil Schonland. In 1950 he was succeeded by Dr P J du Toit, head of Onderstepoort Veterinary Research Institute and thereafter in 1952 by Dr S M Naudé, who had been head of its National Physical Laboratory (NPL).



The first presidents of the CSIR: B F J Schonland, S M Naudé, P J du Toit

Surrounded by a new generation of scientific pioneers, the thoughts of both Schonland and Naudé must have dwelt on their formative years overseas: Schonland on his association with Rutherford and the Cavendish Laboratory, and Naudé on his work in Berlin in the company of Planck, Nernst, Paschen and Einstein. This must have inspired both of them to establish a similar community of physicists in South Africa. This idea was already mooted by Smuts to Schonland in December 1943.

At the time there was no national organization to act as platform in sharing research in physics. Pockets of research had been established in the physics departments at universities and dedicated research was conducted at the CSIR.

Modern day communications did not exist and information on research had to be conveyed in person or by mail. The need for a national body of physics researchers that could meet at least once a year to share results and ideas had become a necessity.



**Figure 1:** E C Halliday

Towards the end of 1948 a group of physicists gathered at the laboratories of the CSIR and mooted the formation of an Institute of Physics for South Africa. A circular dated 16 September 1948 was subsequently sent out to physicists and astronomers, as well as to persons in related disciplines, by S M Naudé, E C Halliday and O Brune, all from the National Physical Laboratory of the CSIR.

The circular contained a questionnaire soliciting comments on the feasibility and structure of a SA Institute of Physics. The objects of such an institute were described as:

(i) To promote an interchange of scientific ideas among physicists; (ii) To establish standards of scientific attainment on which could be based minimum scales of remuneration for physicists in South Africa.

Comments were also invited on the feasibility of affiliation with related associations in Britain and the United States.

Members of the department of physics at Stellenbosch University responded on 23 October 1948 giving their support to the first goal, but raised objections about the feasibility of the second one, explaining that at universities the negotiation of conditions of service for physicists could not be divested from the rest of the academic staff.

The question of the statutory registration of physicists would be raised again, about thirty years later.

After discussing the outcome of the circulated questionnaire with his staff, Naudé approached Prof G T R Evans of the Physics Department, Wits, for the use of a lecture room to hold a meeting of physicists interested in the formation

of a South African Institute of Physics. A number of dates were suggested by Evans and after a discussion with Halliday, Naudé suggested 9 March 1949 at 5pm. A detailed questionnaire was circulated on 10 February 1949 to the persons who had replied to the previous one.

The agenda for the "Proposed formation of S.A. Institute of Physics" contained:

- (i) Results of questionnaire; (ii) Ask decision on formation of Physics Institute; (iii) Suggest appointment of committee to work out further details; (iv) Points to be discussed to help committee.

It was noted that Doctors Schonland and Davies suggested that enquiries be made about the corresponding situation in the other Dominions of the British Commonwealth.

A meeting of physicists and astronomers of the Pretoria-Johannesburg region was then held on 9 March 1949 at the University of the Witwatersrand. Present were S M Naudé (chairman), G T R Evans, E C Halliday, J Schreuder, T Alper, O Brune, J W Bommert, W H Aarts, S Kuschlick, H W Norris, P W de Lange, A I Bailey, W T Beezhold, R Jamieson, A E Carte, E I P de Valencé, S C Mossop, E M Lunsden, J P Gaskell, W van den Bos, T Hers, W S Finsen, C L Kidson, J H J Filter, A P Steyn, C W H du Toit, W H Garbers, W M H Rennhackkamp, D D Louw, T J Hugo, M Messelink, C Jackson, A W Thackeray, M Cooper, P L Willmore, A E Thomas, E J Marais, P G Gane, D J Malan, B F J Schonland, T R Vegter and J P Enslin.

The meeting unanimously approved the 'principle of the formation of a S. A. Institute of Physics.' An interim committee was appointed consisting of Prof Evans (alt Dr Cooper), Prof Jackson, Prof Beezhold, Dr Evans, Dr Naudé (alt Doctors Halliday and Brune). The committee would choose four corresponding members, one each from Natal, Cape Town-Stellenbosch, Grahamstown and Bloemfontein.

QUESTIONNAIRE RE FORMATION OF A SOUTH AFRICAN  
INSTITUTE OF PHYSICS.

NAME: Dr. B. F. J. Schonland

ADDRESS: C. I. C.

PRESENT POSITION: Retired

ACADEMIC QUALIFICATIONS: B.A., C.A.S., F.R.S.

1. Are you in favour of the formation of a South African Institute of Physics as outlined in the attached memorandum? Yes
2. On the procedure to be adopted do you favour i-
  - (a) Preliminary meeting of groups at various centres who will send delegates to represent their views at a central meeting? Yes
  - (b) A single convention for all prospective members? No
3. On the question of membership, do you favour i-
  - (a) A minimum requirement of say an M.Sc. degree or equivalent (e.g. publication of an original research)? No
  - (b) Different grades of membership? Yes
4. Your suggestions on additional people to be circulated i-
 

Name: \_\_\_\_\_ Address: \_\_\_\_\_

Figure 2: Response of Basil Schonland

RE: FORMATION OF S.A. INSTITUTE OF PHYSICS.

A meeting of all the interested scientists who replied to the questionnaire in the above connection, will be held in the small lecture room, IV, of the Physics Department, Witwatersrand University, at 5 p.m. on the 9th March, 1949. This meeting is primarily intended to bring together the physicists and astronomers of the Witwatersrand, Pretoria, Bloemfontein and Potchefstroom areas to discuss what further steps should be taken (if any). It is hoped that similar meetings will be held later in other centres. It will be appreciated if you can attend and bring your colleagues along.

For your information we may add that a total of 65 replies were received to our questionnaire.

It was concluded that the primary aim of the Institute would be to establish the legal recognition of physicists. As this would still take a long time, Schonland was of the opinion that regular congresses should also be held to promote contact between physicists,

At the first meeting of the Interim Committee on 11 May 1949, the responses of the Australian Institute of Physics and the Indian Institute of Physics were read. Both of these institutes were affiliated with the British Institute of Physics, which offered advantages such as the provision of stationery and discounts on certain journals. The Committee decided that it would be best to form an independent Institute of Physics in South Africa. The question of affiliation could be dealt with at a later stage.

The committee chose the following persons as corresponding members of the Committee: Prof F J G de Vos (Stellenbosch), Prof D B Hodges (Durban), Prof R W James (Cape Town), Prof J R Coutts (Pietermaritzburg), Prof M N S Immelman (Bloemfontein), Prof van Wageningen (Potchefstroom) and Dr S W Watson (Grahamstown).

At the beginning of June 1949 letters were sent to the corresponding members, asking them to gather all ‘scientists’ (‘fisici’ in the Afrikaans version), applied mathematicians and astronomers in their region to obtain their views on the formation of a SA Institute of Physics. Due to illness, Prof James was unable to accept his nomination.

Another meeting of the Interim Committee was held on 6 December 1949 to discuss the further procedure in the formation of the SAIP.

Then everything came to a standstill, until four years later when two young scientists from Bloemfontein took the initiative to resuscitate the formation of the SAIP.

## 4 A fresh start

**O**n 18 May 1953 two professors from the University of the Free State, C B van Wyk of Applied Mathematics and J H N Loubser of Physics, circulated a letter to 27 scientists, soliciting their views on the convening of a physics conference in 1954. About 20 replies were received, amongst them from Professors A C Celliers, D B Hodges, R W James, R W Varder, and Doctors S M Naudé, B F J Schonland, T E W Schumann.

The positive response to the circular prompted them to write to Dr Ernst Marais, then head of the NPL, who informed Dr Halliday of the results. In another letter of 11 August 1953 to Dr Marais, Prof van Wyk suggested holding a meeting of physicists in Pretoria at the end of April or beginning of May 1953. To stimulate interest in the conference he also suggested that, besides voluntary lectures, eminent physicists such as Prof James of Cape Town be invited to give special talks.

After conferring with Dr Naudé, Dr Halliday eventually set down a meeting on 17 August 1953 to discuss the ‘new’ formation of the SAIP.

**NOTULE VAN VERGADERING VAN VOORLOPIGE KOMITEE VIR DIE  
STICHTING VAN 'N INSTITUUT VIR FISIKA IN SUID-AFRIKA  
GEHOU OP 17 AUGUSTUS 1953, IN DIE KANTOOR VAN DIE  
PRESIDENT.**

**TEENWOORDIG:**

Dr. S.M. Naudé (Voorsitter).  
Prof. W.F. Beezhold.  
Dr. A.J.A. Roux.  
Dr. E.J. Marais.  
Dr. O. Brune.  
Dr. E.C. Halliday.

Dr. Naudé het verklaar dat Professore van Wyk en Loubser van die Universiteit van die O.V.S. in 'n brief voorgestel het dat in Suid-Afrika 'n konferensie van Fisici gehou moet word. Die gekose tyd is Julie 1954. Hierdie brief is aan 'n groot aantal Fisici in Suid-Afrika gestuur. Dit is nou noodsaaklik dat hierdie komitee 'n besluit neem of stappe in verband met so 'n konferensie geneem moet word of nie.

Dr. Marais het gesê dat Professor van Wyk 'n uitstekende reaksie op sy brief gekry het en dit lyk asof Fisici in Suid-Afrika baie geïnteresseerd is in so 'n vergadering.

Nadat die ander lede van die komitee die saak verder bespreek het, het dr. Naudé voorgestel dat 'n komitee 'n konferensie te Pretoria moet organiseer en dat die konferensie omtrent drie dae moet duur. Die mosie is ondersteun deur die komitee met die opmerking dat steuning vir die komitee gevra moet word van ander Fisici wat in Pretoria en Johannesburg woon.

At this meeting of the 'provisional committee for the formation of an institute for physics,' it was decided that a conference of physicists should be held in Pretoria during July 1954.

On 3 September 1953 Professors van Wyk and Loubser sent out another circular which stated that after discussions [at the meeting of 17 August 1953] it was decided that there was enough interest to hold a conference of physicists. They invited all physicists to the conference, to be held in Pretoria during July 1954, where the establishment of an institute of physics would also be discussed.

Professor F R N Nabarro from Wits replied that he and Dr Halliday would discuss the programme of the conference, and that he felt that the conference should concentrate on one topic with the addition of two survey lectures.

Dr Halliday prepared a draft programme for the conference which he submitted to Dr Marais, who passed it on to Dr Roux with the request to give it

to Dr Naudé for approval. Naudé gave his approval on 9 September 1953.

The provisional programme was circulated by Dr Halliday on 24 November 1953, requesting comments and suggestions from physicists. The general subjects were spectroscopy, physics of the solid state, and nuclear physics together with cosmic rays. The circular stated that ‘the gathering of information of physical research going on in S.A. is of value and that the meeting of a considerable number of Physicists on a social basis is also of value.’ A meeting was set aside for a ‘Discussion on proposed Institute of Physics.’ A formal dinner also appeared on the programme.

Nineteen responses of mixed support from university and government departments, institutes and industrial organizations are on record. An estimated 44 participants were expected. Dr van Wyk and Prof Hales of UCT did not receive the circular, but this was rectified by Dr Halliday with an apology. Dr van Wyk felt that too few circulars were sent out to attract enough participants to the conference.

A meeting of ‘the temporary committee for the formation of an institute of physics in South Africa’ was held on 1 March 1954. The members were Dr S M Naudé (chairman), Prof W F Beezhold, Prof Nabarro, Dr Aarts, Dr Voss, Dr du Toit, Dr Halliday and Dr Brune. Nabarro, Voss, Aarts and du Toit were new members.

## 5 7 July 1955: Formation

At the meeting of 1 March 1954 it was decided that a conference of physicists should be held in Pretoria during July 1954. The conference was held at the University of Pretoria from 5 to 7 July 1954. The opening address was given by Dr S M Naudé and about 50 papers were presented in the following sections:

(i) Optics and spectroscopy (Dr S M Naudé), (ii) Physics of solid state (Prof F R N Nabarro), (iii) Nuclear physics and cosmic rays (Prof S J du Toit) (iv) Electronic and radio physics (Dr J C R Heydenrych) (v) General subjects (Prof W F Beezhold). Amongst those who delivered papers were Dr A M Cormack (later Nobel Laureate in Medicine), Dr S M Naudé, Dr B F J Schonland and Dr A D Thackeray.

Akte van stigting vergadering gehou in die skoolgebou  
 van die ... 7.7.55  
 Voorwoord: Dr S M Naudé (voorsitter) en 50 stigtingslede  
 Akte: Die akte van die algemene vergadering van  
 -fession gehou in Julie 1954 in die skoolgebou  
 van die Instituut vir Taal en Lettere  
 oorweeg en aangenom.  
 Die voorsitter het die vergadering meegeleed  
 met die akte komitee wat deur die  
 stigting gehou is. Die akte is  
 het en die akte aangenom het.

Grondwet Die grondwet wat deur die stigtingslede  
 opgestel is, is aangenom, en met 'n aantal  
 wysigings, deur die vergadering aangenom.

Bywette Die bywette is ook gelees en aangenom  
 te saam met twee wysigings:  
 In Kopie van die Grond wet en Bywette van  
 aangenom tydens die vergadering word  
 aangenom.

Bekendmaking Aankondiging van stigting by wyse  
 van 'n brief in die volgende  
 tydskrif.

This trial run confirmed the feasibility of forming an Institute of Physics. Subsequently the SA Institute of Physics was formally established at a general meeting on 7 July 1955. About 100 persons were present, with Dr S M Naudé as chairman. The Constitution of the SAIP and its annexures were also adopted with a few amendments.

The following persons signed the attendance register:

**FOUNDATION MEMBERS**

AARTS, Willem Hendrik  
 BARNARD, Adam Johannes  
 BEEZHOLD, Willem Frederick  
 BRUNE, Otto W H O  
 CARLTON, Claire  
 CHERRY, Robin David  
 COOPER, Maurice Algernon

ALBERTS, Laurence  
 BASSON, Johan Kristof  
 BLEKSLEY, Arthur Edward Herbert  
 BUCHOWIECKI, J J  
 CARTE, Alexander Ernest  
 CILLIERS, Andries Charles  
 CORMACK, Allan MacLeod

CUSTERS, Jan Frans Henri	de BEER, Johannes Frederick
de LANGE, Pieter Willem	de VILLIERS, Jacobus Wynand
DEVINE, Martin Gregory	DRUMMOND, Andrew Jamieson
du PREEZ, Margaret Lorene	du TOIT, Stefanus Jacobus
ENSLIN, Johan Frederik	FAIRBROTHER, Jack Alfred
FEAST, Michael William	FEJER, Jules Andrew
FINSEN, William Stephen	FOURIE, Daniel Jacobus
YEARN, Wilhelm Eberhard	GANE, Philip Graham
GELDENHUYS, Jurie Johannes	GOUGH, Denis Ian
GRINDLEY, E N	HALES, Anton Linder
HALLIDAY, Eric Clifford	HERS, Jan
HEWITT, Francis John	HEWITT, Joyce (Miss)
HODGES, David B	JAMES, Reginald William (Prof)
JURITZ, J W F	KNIFE, George Frederick Graham
KOEN, Johannes Gerhardus	KRUGER, Casper Jacobus van Zyl
KRUSE, Karl Max Michael	LAQUA, Kurt
LOCHNER, Johannes Petrus Albertus	LEISEGANG, Ernest Cecil
LOGIE, Hugh John	LOTZ, Frederick Johannes
LOUBSER, Johannes Henoch Neethling	LOUW, Jan Daniel
MACKENZIE, Harold Albert Errol	MALAN, David Johannes
MARAIS, Daniel Jacobus	MARAIS, Ernst J
MEERHOLZ, Paul	MENARY, James Wilson
MORRIS, Alan Richard	MOSSOP, Stanley Campbell
MOUTON, Wynand Louw	NABARRO, Frank Reginald Nunes
NAUDE, Stefan Meiring	NELL, Johannes Petrus
NORRIS, Howard William	KNIFE, George Frederick Graham
PAINE, Henry Howard	PIENNAAR, Willem Johannes
POTGIETER, J E	RENNHACKKAMP, Willem Martin Hugo
RICHARDS, Spencer Joseph	RIGDEN, Philip James
RYKHEER, Johannes	SAVAGE, Derek John
SCHAFFER, Walter	SCHNEIDER, Helmut
SCOTT, Herbert William	SELIGMAN, Charles Peter
SELLSCHOP, Jacques Pierre Friednich	STEIN, Louis Henry
STEYN, Andries Pieter	STOKER, Pieter Helenius
STOY, Richard Hugh	STRASHEIM, Albertus
SZENDREI, Michael Elio	THACKERAY Andrew David
TUCKER, Harry StGeorge	VAN DER MERWE, Johannes Hendrik
VAN DER MERWE, Johannes Hermanus	VAN NIEKERK, Jacobus Nel
VAN SCHALWYK, T G D	VAN WYK, Andrew Murray
VAN WYK, Christoffel Benjamin	VERLEGER, Hermann
VERWEY, Cornelius Johannes	VLOK, Theunis Christoffel Botha
VENTER, Johannes Roelf	WATSON, Sherwood Willoughby
WESSELINK, Adriaan Jan	WILSDORF, Clara Johanne Doris
WILSDORF, Heinz Gerhard Friedrich	ZEEMAN, Pieter Barend

Noteworthy is the name of Alan Cormack, later to be a Nobel Laureate in Medicine. Of the names listed, Laurence (Louw) Alberts, Frank Nabarro, Johan (Jan) van der Merwe, Michael Feast, Pieter H Stoker, C B van Wyk, D J Fourie are still in good health. The post-graduate students, Daan Reitmann and Richard Lemmer, also attended.

## 5.1 The mathematicians

The inclusion of mathematicians in the Institute was a vexing one.

In a letter of 1 July 1955 Dr H S Steyn of the NPL requested Dr Naudé to consider the inclusion of mathematicians and applied mathematicians in the SAIP. The request followed a meeting of mathematicians from the universities of Pretoria, PUCHO, UNISA, UCT and Wits. A sub-committee was proposed to manage the affairs of the mathematicians. The task was given to Prof J van der Merwe of UNISA and Dr Steyn to raise the matter at the inaugural meeting of the SAIP the following week. Dr Steyn mentioned that “deur die nodige samewerking en samesprekings tussen wiskundiges en fisici kan nuwe gesigspunte in en toepassing vir die navorsing gevind word.”

The letter was discussed at a special meeting of the Action Committee on 6 July 1955. From the meeting it emerged that the mathematicians had in mind the inclusion of the name ‘Mathematics’ in the title of the Institute, making it the Institute for Physics and Mathematics.

The meeting was not in favour of the proposal:

“It was finally decided that though the committee was very willing to welcome mathematicians into the membership of the Institute of Physics, so as to give mathematicians a temporary home until such time as there were sufficient numbers of them for a Mathematical Institute to be formed, the committee did not view with favour the proposal to widen the name of the Institute, as it was considered that one of the chief purposes of the Institute was to make the name of Physicist and the nature of the work of the physicist well known and understood by the directorates of industrial organisations who were likely to employ Physicists.

It was therefore decided to invite mathematicians to join the Institute of Physics and to propose the formation of a mathematics branch for the purpose of indicating the status of the mathematician members and also to form an astronomical branch to indicate the status of the astronomer members. Thus a member could write after his name, S.A.Inst P(maths) or (Astronomy)”

This decision was conveyed to Dr Steyn on 18 July 1955. An independent South African Mathematical Society was eventually formed.

It is significant from the above quote that the intention of the committee was to establish the Institute as a professional body assigning professional status to its members. Membership would carry a stamp of approval for employment by the ‘directorates of industrial organisations.’ This issue would be raised again twenty years later.