

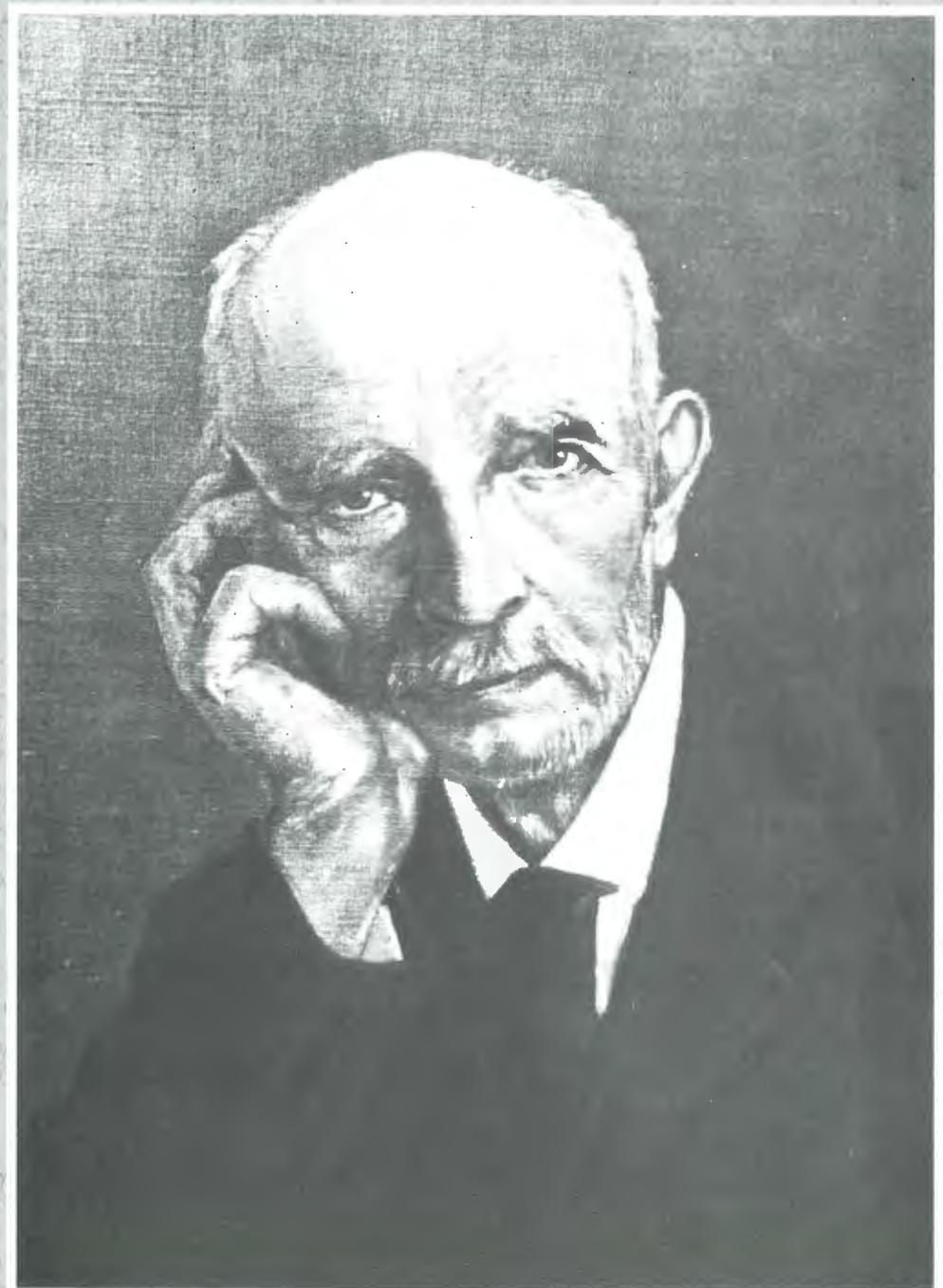


Southern Africa Association for the Advancement of Science  
Suider-Afrika Genootskap vir die Bevordering van die Wetenskap

# **Rudolf Marloth**

## **Brochure - Brosjure**

**Centenary Edition 1902 – 2002 Eeufees-uitgawe**



Dr H.W. Rudolf Marloth (1855 - 1931)

## Dr. H.W. Rudolf Marloth (1855 - 1931)

Rudolf Marloth was born in Germany and immigrated to the Cape of Good Hope in 1883, where he spent the rest of his life. He was an analytical chemist by profession. Though he performed pioneering research on the biochemistry of plants, he was above all a botanist – one of the greatest ever to have worked in South Africa. He is the author of *The Flora of South Africa* (4 volumes, 1913-1932) and many other publications, and is commemorated in the

names of several botanical genera and species.

Rudolf was a founding member of S<sub>2</sub>A<sub>3</sub> and served as its president in 1913-1914. His son, Dr. Raimund H. Marloth, was president in 1964-1965. They are the only father and son pair in our list of presidents.

The *Rudolf Marloth Brochure* was first published in 1989. It is an annual publication devoted mainly to the annual award ceremonies of S<sub>2</sub>A<sub>3</sub>.

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# S<sub>2</sub>A<sub>3</sub> x 100

Ian Raper

President 1996-2002

In 1902, the year the Association was founded and the Anglo-Boer War ended, the southern region of Africa was plentifully endowed with game. Its rivers were undammed and its lakes unpolluted. There were no large power stations or factories dispensing acrid smoke, downloading acid rain and emitting toxic effluent.

The population was small, and only in the centres where gold and diamonds had recently been discovered were there real signs of urban commerce and industry. Transport was animal drawn and steam driven. Franchise was limited to “white males”. It was a bitterly divided area. The north was severely marked by the British scorched earth policy.

It has at all times clearly been the wish of its members that S<sub>2</sub>A<sub>3</sub> should be relevant to real needs within prevailing circumstances. This will no doubt continue to be the case. The Association has endured through various wars and uprisings, and has seen and been party to numerous scientific developments. The twentieth century has been a golden age of discovery and progress, one of the prices of which has been severe damage to the planet.

We find ourselves in a fledgling democracy, with a long history of deep divisions, currently plagued by disease and with serious ecological problems. After so much pain and darkness, we are arguably not yet nearly as united as we could be. We have critically urgent tasks, including both nation building and environmental rehabilitation. As some 1100 scientists reported to the United Nations in anticipation of the World Summit, it will be only about 30 years before human consumption exceeds natural resources. The southern African region is experiencing ongoing turmoil and starvation.

In 1980, S<sub>2</sub>A<sub>3</sub> was one of the initiators of EXPO; we care a great deal that young people in this country should pursue scientific careers. Our tributes to those who, on the strength of their rigorous research, doggedness, insight and vision have been adjudged the best scientists, specifically by way of the award of gold and silver medals to the best of

them, additionally provide positive role models for the youth.

The growth of S<sub>2</sub>A<sub>3</sub>, albeit in fits and starts, is illustrated in the historical articles in this *Brochure* by Cornelis Plug and Esmé den Dulk, and the fascinating retrospectives by H.B.S. Cooke, Philip Tobias, and Will Alexander.

We need now to review and augment our resources and strategies for the coming years. The *South African Journal of Science* continues to be a mainstay in the dissemination of scientific knowledge and enquiry, joined by other research and overview publications, and of course by the might of the Internet. We can predict that the S<sub>2</sub>A<sub>3</sub> website will increasingly become a vital forum for scientific debate and challenge, reporting on ecological and other problems and achievements.

The Council currently makes grateful use of the National Research Foundation in the evaluation of candidates for the gold and silver medals. We must ensure if possible that this happy synergy endures,



Sir David Gill, President 1902-1903

unequivocally directed by criteria of scientific excellence and significance. We owe our predecessors – and posterity! – nothing less. But in fact we owe the latter much more, for example a concerted initiative towards self-sustaining environmental practices.

Merit Certificates, introduced in 1947, offer a very valuable tribute to people and organisations at the discretion of the Council. One of the nominees for a Merit Certificate this year is the SABC2 television programme *50/50*. No similar media programme can claim to have had a greater impact on environmental awareness, in so accessible a form, for people of all ages and persuasions.

Since 1981, the Bronze Medal has been awarded annually to the best student at masters level in the sciences at each of the South African universities. Technikons were included in the late nineties, thanks largely to liaison by Phil Minnaar of the Pretoria branch. These country-wide awards serve to provide incentives and recognition to successive generations of new career scientists.

Monthly public lectures held by the Pretoria branch at the Transvaal Museum offer a consistent channel for reaching both the public and members of the fellowship of scientific scholars in various fields, with information dealing with matters of critical national importance, others that are germane to our objectives – and any object of enquiry. Raids on the inarticulate. These lectures deserve to be recorded and made available electronically, for example on our website and on CD-ROM, as well as in print.

In 1984 the trust fund received from the estate of Rudolf Marloth was earmarked to sponsor the annual Marloth Commemorative Lecture and the *Marloth Brochure*. This annual publication carries details of awards made during each year and also features the acceptance addresses of the Gold and Silver medallists. Such addresses comprise yet another unique resource which ought to be made more widely and permanently available.

In 2001 the *Biographical Database of South African Scientists* was initiated by Cornelis Plug, a council member of S<sub>2</sub>A<sub>3</sub>, to coincide with the centennial celebrations in 2002. More incentives will clearly be created in this way for the study of and pursuit of science. Details of the *Database* appear later in the *Brochure*.

Another centenary initiative of this Council is a project enlisting firms, in the new category of



**Dr Ian Raper, President 1996-2002**

corporate membership, to drive environmental rehabilitation through their own practices and by means of regional heritage associations. Several businesses, specifically in the hospitality and tourism industry, have been given certificates in recognition of their responsibility towards the environment. They will for example host heritage associations on their websites, which will be linked to ours. Members of such associations will undertake sustainable nature-friendly projects. In return S<sub>2</sub>A<sub>3</sub> will provide copious publicity to such corporate members on its own website, in the annual *Brochure* and in monthly newsletters. Their enterprises will undoubtedly and deservedly prosper as their reputations are linked to “nation building through national responsibility”.

Past presidents and medallists of our Association have been leading figures in the development of science across a broad spectrum. The names of Raymond Dart, Robert Broom, Philip Tobias, Bob Brain, Arnold Theiler, Rudolph Marloth, Arthur Bleksley, Austin Roberts, David Woods, Kanti Bhoola and many others are monumental testimony to the importance attached to the advancement of science in the past century.

S<sub>2</sub>A<sub>3</sub> enters its next century with the awareness that, despite the destruction and the crises, a great deal has in fact been achieved. South Africa can be

proud of its achievements in fields across the board. Its research institutes are in some cases among the best in the world, cooperating with other leading international institutions. Leaders among our scientists are dedicated to stemming the Sixth Extinction. We have also happily already shed many narrow ideological and other superstitions, although some remain.

The twentieth century has produced medicines to combat malaria, the tsetse fly and numerous other plagues of Africa, making vast areas habitable which were previously pestilential. Recently, South African researchers have achieved a major breakthrough in the fight against pneumonia among the very young.

The challenge of AIDS looms predominant among medical problems; a pandemic of such horrific proportions that its devastation has already dwarfed many wars. Recent statistics indicate that 4.7 million South Africans are infected with HIV. Vaccines as well as brand new mindsets are critically called for.

In the 20th Century, international progress in the fields of communication and transport has produced space craft, satellite television, cellular telephones, moon landings and Mars buggies, all increasingly dependent on the computer. Probes to other planets have produced astounding results. Hubble and other telescopes, electron microscopy, refined spectrometry and nanoscience reveal glimpses of both the magnitude of our universe and the often perplexing behaviour of the minute particles and energies of which it is composed. Genetic research has mapped the range of human DNA; we can expect current (often contentious) activities like cloning and the genetic engineering of foodstuffs to continue, necessarily along rigorously monitored medical and ethical paths.

A vast environmental problem from the past century is global warming, while the planet and our continent still carry the blights of war and poverty. Nuclear devices of war have not yet been eliminated. Technology is required to reduce the greenhouse effect, hand in hand with methods of energy production and retention which no longer use fossil fuel and its byproducts that poison land and sea. A by-product of the Mars vehicle was an insulation material which is light and diaphanous, composed very largely of air, with an insulating capacity such

that an entire house can be heated using a single candle. There are many other exciting prospects of improving the quality of life on earth, without necessarily depleting natural resources. S<sub>2</sub>A<sub>3</sub> will increasingly joint-venture with like-minded bodies and individuals in a world which welcomes South Africans and their endeavours.

It is certain that technology will advance education at all levels, and that science will both benefit and provide new methods of discovery and measurement. Southern Africa, as we know, has a desperate need for scientists and technologists, and for science educators who can inspire new generations and lift the standards of science learning. 50% of our scientists are over the age of 50, which is a frightening statistic. Researchers must be directed towards solutions to problems such as the inadequacy of fresh water, pollution, toxins in effluent, soil erosion and degradation, deforestation, alien floral invasion, algal bloom, etc.

We cannot begin to contemplate the possible reach of science in the next century and beyond. New sciences will certainly emerge, to deal with new situations and insights. We can certainly determine to be increasingly pro-active in S<sub>2</sub>A<sub>3</sub>; helping to ensure a healthier environment, safer technology and an inspiration to leaders. We can try to imagine what the giants of science in the past could have achieved had they had access to the Internet, GPS and the wealth of calculating and retrieval devices that are at our disposal.

The extreme reality stated by Will Alexander (below, p 21) is that: "Social advancement and environmental conservation are not commensurate objectives as many natural scientists maintain, in that the full achievement of one objective may only be realised at the expense of the other".

This Association, its branches and all its members, both individual and corporate, with all the willing partners it can muster, will need to play a part in conjuring a balance within this reality.

We celebrate the successes of the past, pay tribute to the inspiring people who are still with us and look forward to those who will follow in their footsteps. It is an honour to be associated with S<sub>2</sub>A<sub>3</sub>, especially at this critical time.

# The origin and early history of S<sub>2</sub>A<sub>3</sub>

Cornelis Plug

The Southern Africa Association for the Advancement of Science (S<sub>2</sub>A<sub>3</sub>) was for many years the largest and most influential scientific society in South Africa. Its origin and early achievements form the focus of the present article.

## Organised science before S<sub>2</sub>A<sub>3</sub>

More than 70 scientific societies were founded in South Africa at various times during the nineteenth century, though most were short-lived. They included scientific-professional associations (in medicine, pharmacy, and engineering), literary and scientific societies, specialist scientific societies (in botany, geology, and microscopy), natural history societies, and general scientific societies (in which category S<sub>2</sub>A<sub>3</sub> also falls). The most important general scientific society at the end of the nineteenth century was the South African Philosophical Society (Cape Town, 1877-1908; thereafter the Royal Society of South Africa). Its object was to promote original research related to South Africa and publish the results in its *Transactions*.

The Anglo-Boer War led to the suspension of the activities of most of these scientific societies, as members were called up for military duty, postal services were disrupted, and money was in short supply. Immediately after the war Britain started to rebuild the economies of what were then the Transvaal and Orange River Colonies, and appointed many scientifically trained staff. Furthermore, all over South Africa there was a strong upsurge in cultural and scientific activities. Most of the scientific societies that existed before the war were revived, and many new ones were established. Thus the three years from 1902 to 1904 saw the origin of a dental society, medical society, pharmaceutical society, agricultural union and philosophical society in the Orange River Colony; a dental society and an institute of surveyors in the Cape Colony; a veterinary medical society, institute of land surveyors, pharmaceutical society and dental society in the Transvaal; as well as the Wildlife Society of South Africa and South African Ornithologists' Union. The social climate was one of renewal and expansion.



Theodore Reunert, 1856-1943

## The founding of S<sub>2</sub>A<sub>3</sub>

The first practical step in the formation of S<sub>2</sub>A<sub>3</sub> was taken by Theodore Reunert (1856-1943), a British-born engineer and businessman. He arranged a meeting of engineers in Cape Town on 4 March 1901, during which it was decided to ascertain the opinion of engineers throughout southern Africa as to the advisability of holding an annual congress of South African engineers. At a subsequent meeting on 2 July 1901, chaired by the British civil engineer Sir Charles H T Metcalfe (1853-1928), Reunert's proposal that such a congress be held was adopted. However, those who showed an interest in the proposed congress included both engineers and scientists. During subsequent discussions it became clear that the interests of everyone could best be met by the formation of an Association similar to the British Association for the Advancement of Science (founded in 1831), which would meet once a year in different cities and which would be able to accommodate members representing all scientific

disciplines.

At a general meeting held in Cape Town on 12 September 1901 the following resolution was passed: "That this meeting approves, and hereby confirms, the formation of a South African Association for the Advancement of Science, as far as possible on the lines of the British Association". A committee was appointed to draw up a draft constitution.

The Association's first council was elected in Cape Town on 20 January 1902, and met a week later to elect office bearers. The first President was the director of the Royal Observatory at the Cape of Good Hope, David Gill (1843-1914), a scientist of international repute. Four other prominent persons were elected as Vice-Presidents: Sir Charles Metcalfe, already introduced above; Sidney J. Jennings (1863-1928), mining engineer in Johannesburg; Thomas Muir (1844-1934), mathematician and Superintendent-General of Education of the Cape Colony; and Gardner F. Williams (1842-1922), mining engineer and General Manager of De Beers Consolidated Diamond Mines in Kimberley.

Twenty other prominent scientists and engineers from Bloemfontein, Bulawayo, Cape Town, Durban, East London, Grahamstown, Harare, Johannesburg, Kimberley, Lovedale, Pietermaritzburg, Port Elizabeth, Queenstown, and Simon's Town served on the first Council. Two honorary secretaries were appointed, namely Theodore Reunert and the marine scientist John D F Gilchrist (1866-1926). The civil engineer Wilhelm Westhofen (1842-1925) served as honorary treasurer.

The country now known as "South Africa" did not of course exist at this time. The name encompassed all the territories under British control in the southern part of Africa, bordered on the west and east sides by German South West Africa (Namibia) and Portuguese East Africa (Mozambique) respectively. The later change in the Association's name to Southern Africa Association for the Advancement of Science reflects its continued interest in this same region.

So soon after the Anglo-Boer War, discussions of future cooperation between the colonies had not yet started. The founders of S<sub>2</sub>A<sub>3</sub> regarded cooperation between the various southern African territories as highly desirable and therefore ensured that all regions were represented on its council. The wish for regional cooperation is also reflected in the objects of the association, which were set out in its

constitution as follows:

To give a stronger impulse and a more systematic direction to scientific enquiry; to promote the intercourse of societies and individuals interested in science in different parts of South Africa; to obtain a more general attention to the objects of pure and applied science, and the removal of any disadvantages of a public kind which may impede its progress.

The first of these aims did not differ much from the object of the South African Philosophical Society (SAPS). Furthermore, many of S<sub>2</sub>A<sub>3</sub>'s first office bearers were also members of the SAPS. Why then was it thought necessary to establish S<sub>2</sub>A<sub>3</sub>? One reason is that the meetings of the SAPS were confined to Cape Town, limiting its influence mainly to the Western Cape. A second reason is that the SAPS was somewhat exclusive, with only about 120 members at the turn of the century, most of them professional scientists and academics. The constitution of S<sub>2</sub>A<sub>3</sub> on the other hand stated that "all persons interested in the objects of the association are eligible for membership", and provided a forum where amateur and professional scientists could interact.

The Association was an immediate and resounding success, even though no congress could be arranged in 1902 owing to the still unsettled state of the country. By June 1902 there were 268 members; and by the time the first congress took place in April-May 1903, membership had risen to 765. It rose to a peak of over 1300 in 1906, and remained around the 1000 mark for more than 60 years. However, since the cessation of the annual congresses the number of members has declined sharply. The Association's rather long name was originally abbreviated to SAAAS. In more recent years this was replaced by S<sub>2</sub>A<sub>3</sub>, presumably by a chemist!

### **S<sub>2</sub>A<sub>3</sub>'s annual congresses**

The Association's main activity during its early years was to organise an annual meeting at which addresses and scientific papers were read. At the first such congress the professor of chemistry at the South African College, Prof. Paul D. Hahn, urged the scientific study of our minerals, forestry and agricultural problems and pointed out the need for experimental farms and for improved science education. William Cullen, a chemical engineer who did much for the local manufacture of explosives and fertilisers, pointed out South Africa's mineral wealth

and the research this required. Prof. W.S. Logeman read a paper in defence of the newly developing language then known as “Cape Dutch”. And Sir Charles Metcalfe observed that “motor cars may still be said to be in their infancy ... but there is an enormous field before them”.

This congress was a milestone in South Africa’s scientific and developmental history.

In subsequent years presidential addresses, both general and sectional, often served to evaluate scientific progress, science education, or science policy, either in general or in a more circumscribed field, while papers by professional scientists presented important research results. Each successive meeting took place in a different city, starting with Cape Town in 1903. The list includes most of the cities and major towns in present day South Africa, as well as Bulawayo (1911, 1920, 1953), Maputo (1913, 1922, 1948, 1958, 1968), Harare (1927, 1950) and Windhoek (1937). The *Annual Report of the South African Association for the Advancement of Science* became a prestigious scientific publication, containing several dozen addresses and papers each year. In 1926 it was renamed the *South African Journal of Science*, which is now an independent monthly journal.

## The Transvaal Observatory

In May 1902 an inaugural meeting of Johannesburg members of S<sub>2</sub>A<sub>3</sub> took place and a strong local committee was elected. On 29 October this committee addressed a petition to the Governor of the Transvaal, Lord Milner, requesting that an observatory be established at or near Johannesburg, “for the collection and distribution of meteorological observations throughout the Transvaal Colony”. It was signed by the honorary secretary of the Association, Theodore Reunert.

The Assistant Colonial Secretary, W.H. Moore, replied in December that the proposal had been adopted, and that the budget for the first year suggested by Reunert had been substantially increased to cover the cost of more and better instruments. The Association was invited to suggest a suitable location and accommodation for the observatory, which it did. The observatory was in full working order by May 1904, and was formally opened in January 1905. Although intended as a meteorological observatory, it gradually developed into an astronomical observatory as well, in line with the interests of its director, Robert T A Innes (1861-

1931). In fact, a deputation of S<sub>2</sub>A<sub>3</sub> members convinced the authorities to supply funds for the most powerful telescope in the southern hemisphere at that time, which was eventually installed after World War I. After Union the institution was renamed the Union Observatory, and its work was confined to astronomy.

## Joint meetings with the British Association

A major early achievement was the organisation of a joint meeting of the British and South African Associations for the Advancement of Science, which took place in South Africa in 1905.

This endeavour was of exceptional importance for South African science. In preparation for the meeting a handbook on the development and state of science in the region, entitled *Science in South Africa*, was compiled under the editorship of John D.F. Gilchrist and William Flint. This book is itself a milestone in the history of South African science. A total of 380 British Association (BA) members arrived in Cape Town in August 1902, many of them leading figures in their respective disciplines. Papers were read in Cape Town from 15 to 18 August and in Johannesburg from 28 August to 1 September. These were published in four volumes, and according to the then President of the BA, Prof. George H Darwin (a son of Charles) “[their] total contribution to science, especially as applicable to Africa, has proved to be of considerable magnitude”.

Although the official meeting ended in Johannesburg, many delegates also visited Durban, Pietermaritzburg, Colenso, Ladysmith, Pretoria, Johannesburg, Bloemfontein, Kimberley, Bulawayo, the Victorial Falls, Harare, Mutare, and Beira. In most towns receptions were held, excursions made, specimens collected, and lectures delivered. The overseas delegates finally left for home on 20 September. In a farewell telegram to the press Darwin remarked that “facts observed will furnish material for many scientific memoirs, and it is likely that South Africa will be repaid by stimulated scientific activity” – as indeed proved to be the case.

A second joint meeting with the British Association took place in 1929. This time more than 500 overseas delegates visited South Africa, and conferences were held in Cape Town and Johannesburg. Again a handbook, *South Africa and Science*, was published to provide scientific and industrial background information about South Africa to the overseas delegates, but its reviews of

local science were fewer and less detailed than they had been 24 years earlier. The opening address, "Africa and Science", was delivered by the then President of S<sub>2</sub>A<sub>3</sub>, Prof. Jan Hendrik Hofmeyr (who became Minister of Finance and Education at the outbreak of World War II). Other politicians who attended were Dr. D.F. Malan (then Minister of Internal Affairs, Education and Public Health), and General J.C. Smuts (then leader of the opposition). Smuts was elected President of the British Association for 1931, and had been President of S<sub>2</sub>A<sub>3</sub> in 1925.

### Other early activities

In his presidential address to Section C of the Association in 1910, Prof. H.H.W. Pearson (1870-1916) proposed the creation of a National Botanic Garden. In 1913 Council re-affirmed its resolution that "such an institution would greatly advance the scientific and economic study of the vegetation of South Africa". Parliament sanctioned the scheme in the same year, leading to the establishment of the National Botanic Gardens at Kirstenbosch.

At its 1916 meeting in Pietermaritzburg the Association adopted resolutions in favour of the introduction of the metric system of weights and measures, decimal coinage, and "daylight saving" time. To give more effect to these resolutions, the Witwatersrand members of S<sub>2</sub>A<sub>3</sub> organised a conference to discuss these matters, which was attended by representatives of 34 societies and public bodies. The resolutions favouring the introduction of the metric system and decimalisation of the coinage were unanimously adopted and forwarded to government. Unfortunately, financial and other considerations intervened, and no decisive action was taken.

On the initiative of Miss Maria Wilman, Director of the McGregor Museum in Kimberley, the Witwatersrand council members recommended to government in 1917 that a law should be passed to limit the export of rare fossils and ethnological materials of national interest. Effective restrictions on the trade in such materials were eventually introduced during the nineteen-thirties.

Many other initiatives have been taken by the Association over the years, including the holding of conferences or symposia on subjects of national importance, for example "Science and post-war reconstruction" in 1949, and on the scientific and technical aspects of the Orange River development



Sir Arnold Theiler, 1867-1936

project in 1963 and 1964. Perhaps its most important contribution should be seen as the South Africanisation of local science, bringing the scientific contributions made by South Africans to the attention of the outside world, and bringing scientific knowledge to bear on local problems in various fields.

In 1907 council made provision for the formation of local branches of the Association which would engage the attention of members by arranging lectures and other activities. Various local branches were formed, but on the whole the efforts have not been successful. At present the Association has only one active local branch, namely that in Pretoria.

### S<sub>2</sub>A<sub>3</sub>'s awards

An important outcome of the 1905 visit of the BA was its grant to fund S<sub>2</sub>A<sub>3</sub>'s first and most prestigious award, the South Africa Medal (gold). The medal is awarded annually for outstanding scientific research in South Africa over a number of years. The first recipient was the eminent veterinary scientist Sir Arnold Theiler (1867-1936), then Government Bacteriologist of the Transvaal, for his work on trypanosomes and horse-sickness.

After the BA's second visit to South Africa in 1929,

it again provided a sum of money, to fund the annual award of the British Association Medal (silver) to the most outstanding young South African researcher of the year. The first recipient, in 1932, was Miss Nellie F. Paterson, junior lecturer in zoology at the University of the Witwatersrand. These two awards now represent the Association's most important contribution to the advancement of South African science.

### Celebrating the half century

To commemorate its first 50 years of endeavours in the advancement of science in southern Africa, the 1952 Science Congress was held in Cape Town under the presidency of Dr. B.F.J. Schonland. Invitations were extended to a number of distinguished scientific bodies in Africa and overseas, with the result that the Congress was attended by representatives of the Royal Society of South Africa and the Akademie vir Wetenskap en Kuns, and by delegates from Britain, the Netherlands, Belgium, France, Portugal, and Australia. The papers read at the Congress were published in a special jubilee number of the *South African Journal of Science*.

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## OBJECTIVES OF S<sub>2</sub>A<sub>3</sub>

- To promote contact between associations, groups and individuals, professional as well as lay persons, who are interested in any aspect of science;
  - to initiate or organise meetings and excursions with a scientific theme,
  - promote scientific and human activities that are environmentally friendly, and
  - promote a scientific approach to education.
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## EARLY REPORTS OF S<sub>2</sub>A<sub>3</sub> AVAILABLE FOR STUDY

In 2001 the Council of S<sub>2</sub>A<sub>3</sub> received with gratitude a set of the *Reports of the South African Association for the Advancement of Science* from Mr. Peter Power. These bound volumes record the proceedings of S<sub>2</sub>A<sub>3</sub>'s Annual General Meeting and Congress from its first year (1903) up to and including 1948. The volumes belonged to Mr. Power's late father, John H. Power, FRSSA, FLS, FZS (1884-1964). The elder Mr. Power was a well-known naturalist who made

important contributions to archaeology and knowledge of South African amphibians. He was Director of the McGregor Museum in Kimberley from 1947 to 1958. In 1947 he received the very first Merit Certificate awarded by S<sub>2</sub>A<sub>3</sub>, for his study of the mammalian fossils of the Vaal River deposits.

The set of *Reports* will soon be housed in the Africana Library of the University of Pretoria, where they will be available for study.

# Recollections of S<sub>2</sub>A<sub>3</sub>

H. B. S. Cooke

I joined the South African Association for the advancement of Science in 1937 at the suggestion of Professor C. van Riet Lowe, whom I had been consulting about stone tools that I was finding during my work as a field geologist for a mining company. The company had several prospectors in various parts of southern Africa and my task was to visit them and report on their work. They were complaining about the "overburden" that they had to remove to get at the "real rocks" underneath. But these surface layers often yielded stone tools which I recognized from field trips in East Anglia when I was a student at Cambridge. Occasionally there were fossil teeth and bones, and Dr Robert Broom soon had me fascinated by the problems relating to human evolution and the potential of the Sterkfontein cave sites for new discoveries. In 1938 I accepted a junior lectureship in Geology at the University of the Witwatersrand and took the opportunity to make a brief study of the geology of the Sterkfontein bone breccia. This was the subject of my very first scientific paper, which was presented on my behalf by Professor van Riet Lowe at the Pietermaritzburg S<sub>2</sub>A<sub>3</sub> Congress in 1938.

One thing led to another. I was planning a trip to the Victoria Falls and Van Riet Lowe gave me a letter of introduction to the newly appointed Secretary of the Rhodes-Livingstone Institute and Curator of the David Livingstone Memorial Museum in Livingstone, Desmond Clark, a graduate in archaeology from Cambridge. Desmond had been excavating hand-axe tools in gravel terraces of the Zambezi and he showed me around the area and we discussed their interpretation. Soon afterwards, he found three fragments of teeth and one complete third molar of an extinct elephant. He sent them to me and I took them to Professor Raymond Dart at the Medical School, as he had described some similar teeth from the gravels of the Vaal River in the *South African Journal of Science* in 1929. Dart protested that he had no time, but on discovering that my background included courses in palaeontology and anatomy, urged me to tackle these myself. This I did to the best of my ability and they were described in a joint paper with Desmond, presented on our behalf to the Royal Society of South Africa by Van Riet Lowe.

Having thus been pitchforked into the field of mammalian palaeontology, I was persuaded to describe a small collection of fossil teeth made by a keen S<sub>2</sub>A<sub>3</sub> member, Mr J.H. Power, from the Vaal River gravels at Pniel and a short paper on this material was given at the East London Congress of the S<sub>2</sub>A<sub>3</sub> in 1939. These events also marked the beginning of a long period of collaboration between van Riet Lowe's assistant, B.D. ("Berry") Malan, Dart's assistant Dr L. H. ("Lawrie") Wells and myself.

One of the great merits of S<sub>2</sub>A<sub>3</sub> in its earlier days was its broad spectrum of scientific coverage, as there were in South Africa at that time relatively few established specialist societies. This, in turn, fostered a broadened outlook among its members, who became interested in what was going on in disciplines other than their own speciality. Quite often I would receive a call from a physicist friend to ask if I had seen an article in *Nature* that he thought might interest me in case I missed it. This was repeated with others and helped breed a feeling of common interest in science as a whole. A zoologist who was carrying out genetic experiments in fruit flies sought my advice on taking photographs of chromosomes as our Department had good oil immersion lenses, and was fortunately able to produce what was needed. Such stories of mutual interest and help are endless and serve to underline the important role played by S<sub>2</sub>A<sub>3</sub>.

A leader in the promotion of inter-disciplinary thinking was S<sub>2</sub>A<sub>3</sub> Council Member Dr Arthur Bleksley, who acquired an excellent reputation as an interpreter of science on the radio. A Science Forum on the South African Broadcasting System was very popular and had a panel comprising a core of "regular" participants with others brought in for particular programmes – usually S<sub>2</sub>A<sub>3</sub> members. Bleksley also set up a panel of "consultants" from particular disciplines that were available to advise members of the Press on items of current interest. This led to the formation of a somewhat informal Science Writers Association, whose members sought expert advice before writing about scientific questions. S<sub>2</sub>A<sub>3</sub> was at the heart of these ventures.

The strength of the S<sub>2</sub>A<sub>3</sub> lay in its multi-disciplinary

character, but the excellent papers presented at the Annual Congress did not see the light of day until the *South African Journal of Science* was published. The Journal was a massive tome and, despite the efforts of its devoted long-time Editor, Mr S. B. Asher, was often delayed so that it did not appear until a year or more after the papers were read. It was rudely described by one of the Council as "being a useful door-stop". In common with many of my colleagues, I felt the need for a new medium that would serve all branches of science on a common meeting ground but provide quick publication of short communications, as *Nature* did in Britain and *Science* did in America. In 1939, I made a proposal for a monthly publication and this was approved in principle by the Council but implementation was delayed by the Second World War. In 1946, I raised the matter again but Council was reluctant to abandon the security of its long line of annual volumes, many of which were indeed valuable sources of data. A compromise was reached by my agreeing to launch a new monthly as the Bulletin of the Association and see how it went. With the valued support in particular of my close friends Lawrie Wells and Berry Malan, and the sage advice and help of Arthur Bleksley and others, *South African Science – Suid-Afrikaanse Wetenskap* was born. I bullied authors into submitting articles and "Letters to the Editors" and culled material from many sources which I re-wrote for use as "fillers". Publishers were persuaded to send us books and these were reviewed by colleagues for no more reward than that of keeping the book. My wife and I read proofs late at night and littered the floor with galleys that we cut up and pasted together for the printer. Slowly – painfully slowly – the new monthly began to attract original papers without our coercion and I had to write less myself; after a year of life we had produced 200 pages and covered fields as varied as music, education, museums and photography, as well as a wide spectrum in the biological and physical sciences. We received more material than our funds allowed us to print, but advertising revenue was still very low indeed. The Association found it difficult to support both the annual volume and the new monthly and they courageously decided to combine the merits of the two by opening the monthly to longer articles and passing to it the traditional title of the *South African Journal of Science*. Thus, after only two years of existence, *South African Science* vanished but, phoenix-like, arose from its ashes with the hallowed title of the Journal.

The rapid growth of specialist societies in South Africa progressively undermined the platform on which the South African Association for the Advancement of Science had been built. The Association weakened, its Annual Meetings became thinner and thinner, and its financial position grew weaker and weaker. Happily the monthly *South African Journal of Science* still had some attraction for the community and it was rescued from extinction by a temporary alliance with its model, *Nature*, and then by financial support through the Council for Scientific Publications. It blossomed under the exceptional editorship of Dr Graham Baker and has become a Journal of world standing; the struggling infant of 1947 has developed, despite its vicissitudes, into a healthy, mature and reputable creature.

Although there were very successful meetings in local centres in various parts of the country, often with talks on topics of interest to laymen, the major activity was the Annual Congress, held in a different place each year. These meetings enabled scientists from different disciplines to get together and exchange ideas to their mutual benefit. The presentations were usually well reported in the Press and a popular evening lecture brought in local residents and helped in conveying current scientific ideas to the lay public. Sometimes the Congress was held outside South Africa in association with a society with similar general interests.

In 1948, at a joint meeting with the Sociedade de Estudos de Mocambique in Lourenco Marques, I was scheduled to give a popular evening lecture on "The search for man's ancestors". In an endeavour to please the local audience, I prepared a short introductory statement which was translated into Portuguese and rehearsed carefully. However, when I arose and started to speak, the locals looked pleased but the South African delegates sat with horrified looks, thinking that I was going to give the entire talk in Portuguese! They were much relieved when I switched to English and all were happy when I also showed a colour film that I had made.

Although essentially a sober gathering, the Annual Congresses were not entirely devoid of lighter moments. At the joint meeting with the Rhodesian Scientific Association in Bulawayo in 1953, Raymond Dart was President and due to give his address entitled "The southern aspect of pulsating humanity". The platform party was resplendent in dinner jackets and Professor Dart was introduced by Van Riet Lowe who said: "I note that the speaker is wearing his dinner jacket but I wonder if, for such a

distinguished anthropologist, tails might not have been more appropriate"! Three years earlier, Van Riet Lowe was President at the joint congress in Salisbury. One of the participants was a visiting zoologist from Sweden, Dr Bengt Lundholm, and just before the Congress he had managed to collect an anteater which he kept in his hotel bedroom, forgetting that it was a nocturnal animal that made much noise in the night. However, the problem was that it would not eat even the ants from chunks of anthraps laid before it. Local advice failed to offer a solution so a telegram was sent to Dr Bigalke at the Pretoria Zoo asking for his recommendation. The meetings were in full swing when a telegram was delivered and handed to the Chairman who said that he had an urgent telegram but was uncertain for whom it was intended. Accordingly, he read it out saying that the entire text read "Copped hard boiled eggs". This created much amusement but fortunately resolved the problem.

Although such trivial incidents remain in the memory, the  $S_2A_3$  meetings made solid contributions to the progress of science in South Africa and helped to bring South African

achievements to the attention of the world. It has also been responsible for giving recognition to many individual scientists through the award of the prestigious gold South Africa Medal, first awarded in 1908 and, since 1932, the silver British Association Medal. Much prized have been the Certificates of Merit given to individuals in recognition of services to science in South Africa outside the normal course of their professional occupation. More recently bronze medals have been awarded to outstanding Masters science students at the various universities, thus helping to broaden appreciation of science among the coming generation. These awards, like the popular lectures given at the Annual Congresses, have helped to keep the Association alive in the public eye as well as in the fields of science.  $S_2A_3$  has also had an important impact on the young by offering talks in the schools and by promoting science fairs locally and nationally from time to time. Although the membership of the Association may have diminished, it leaves a lasting legacy through the interdisciplinary attitude that is a strength of many South African scientists, as well as in the Association's continuing educational role and its valuable Journal.

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## **$S_2A_3$ BIOGRAPHICAL DATABASE OF SOUTHERN AFRICAN SCIENCE**

The national council of  $S_2A_3$  has launched the compilation of a biographical database of southern African science as part of its centenary celebrations this year.

### **Aims of the project**

- To commemorate persons who participated in scientific endeavours in southern Africa.
- To foster cooperation between southern African scientists by eliciting their participation in a project that encompasses all the natural sciences.
- To make available information about former southern African scientists via the Internet, as a public service.

### **Persons to be included**

Inclusion criteria may differ somewhat between scientific disciplines or between earlier and later historical periods, and will be applied flexibly. The main criterion is that a person should have made

some contribution to scientific knowledge in or about southern Africa, up to (initially) the start of World War II.

### **Information per person**

The length of entries varies between a sentence or two and about 2000 words, plus a list of sources consulted. The biographies focus on a person's role in southern African science and are written specifically for this project. The name of the author appears at the end of each biography to give recognition and facilitate the editorial process. A small black and white photo may be included.

### **Location and construction of the database**

The database is being constructed at <<http://bibinf.unisa.ac.za/s2a3/main.html>>. Please visit this site for further details. It includes an automatic e-mail facility via which you can submit comments and information. The database currently contains a list of about 3200 names of persons whose biographies will be included. The list is fairly complete for persons

active before about 1910, but incomplete for later years. The names are gradually being replaced by biographies.

The project is expected to take about five years to complete. Its progress and possible extension to more recent times will depend on the support it receives from collaborators. If there is enough interest it will be ongoing.

## Invitation to participate

Individuals and scientific societies are invited to participate in the project to ensure that the information in the database is complete and accurate. Please contact the project leader, Prof. Cornelis Plug, at [plugc@mweb.co.za](mailto:plugc@mweb.co.za), or Telephone 012-654-3000.

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## S<sub>2</sub>A<sub>3</sub> AWARDS

- **The South Africa Medal (gold)** is awarded annually to recognise exceptional contributions to the advancement of science on a broad front or in a specific field, by an eminent South African scientist.
- **The British Association Medal (silver)** is awarded annually to a scientist under the age of 40 who is actively engaged in research and has, by way of international participation and publications, shown outstanding capability and achievement.
- **The S<sub>2</sub>A<sub>3</sub> Bronze Medal** serves to commend outstanding science students at the masters level at universities and technikon students.
- **Merit Certificates** are awarded to persons who have contributed, each in their own way, to either the advancement of science or the Association's activities.

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## ONS DANK GAAN AAN ...

**Dr. Berta van Drimmelen**, wat met entoesiasme en veel sorg die Pretoria-tak van S<sub>2</sub>A<sub>3</sub> en die Genootskap as geheel laat herleef het.

**Mev. Ann Bentum**, wat tot 1995 die Raad en die Pretoria-tak met toewyding as sekretaresse bygestaan het.

**Dr. Frans Korb** het die verantwoordelikheid en die voorbereidende werk vir die toekenning van die goue, silwer- en bronsmedaljes op hom geneem.

**Dr. Phil Minnaar**, voorsitter van die Pretoria-tak, samesteller van die Marloth-Brosjyre vir die afgelope jare en motiveerder vir die toekenning van brons medaljes aan teknikons.

**Dr. Gerhard von Gruenewaldt** vir sy bystand met die evaluering van kandidate vir die Suid-Afrika-

medalje (goud) en die British Association-medalje (silwer).

**Mev. Esmé den Dulk**, wat die Marloth-Brosjyre in 1989 in die lewe geroep het en dit tot 1996 saamgestel het.

**Mev. Shirley Korsman**, huidige eresekretaresse van die Nasionale Raad van S<sub>2</sub>A<sub>3</sub>, sonder wie se harde werk die Genootskap nie sou kon funksioneer nie.

**Mnr. Hermann Ortner**, eretesourier van S<sub>2</sub>A<sub>3</sub>, vir sy deeglike bestuur van die Genootskap se finansies.

**In memoriam, Prof. D.G. Roux** vir sy jarelange evaluering van kandidate vir die Suid-Afrika-medalje (goud) en die British Association-medalje (silwer).

# Momentous years

Esmé den Dulk

The annual *Reports of the South African Association for the Advancement of Science*, though mainly a publication medium for the scientific papers read by members, also contain information that directly or indirectly reflects social conditions in South Africa during the early years of the twentieth century. As the following gleanings from the first twelve reports indicate, some things have changed dramatically since then, whereas others have remained the same.

At the inaugural meeting of the S<sub>2</sub>A<sub>3</sub>, 203 members joined, of whom 14 were ladies. In 1910, there were 693 members and 32 Life Members. At this stage 88 members were two years in arrears with the payment of their subscriptions. In some of the volumes an insert appeared reminding members of their outstanding subscriptions. This is a situation that has not changed over the years. A Head Office, based in Cape Town, was established with a permanent secretary and treasurer.

President F.W. Reitz of the Free State, the Hon. D.P. de Villiers Graaf, Dr B.J. Haarhof and Sir H.H. Juta became members of the Association in 1910.

To accommodate the various disciplines under one umbrella, so to speak, and to create a semblance of homogeneity, the related sciences were divided into four categories, each with its own President and office-bearers. For instance, the following sciences resorted under category A: astronomy, chemistry, mathematics, meteorology, and physics. In the early days subjects such as archaeology, education, history, philosophy, mental science, philology, political economy, sociology and statistics resorted under category D. In later years greater emphasis was laid on the purely scientific endeavours of the Association and some of the categories were scrapped.

Lectures were presented regularly by members in the towns where they were based. These lectures attracted people from different backgrounds, but all with an abiding interest in any one of the sciences. On occasions the lectures were presented to sizable audiences in the Town Hall of Kimberley and in Port Elizabeth, and sometimes venues such as school and church halls had to suffice.

Papers were presented at the Annual General Meetings. At the Sectional Meetings papers were

presented dealing with geology, the physical composition of the Cape Colony soil, the age of rock formations, valuable discoveries of prehistoric artefacts, and skeletons of birds, fish and large animals embedded in the rocks. Papers were also presented on the burgeoning fishing industry, as well as numerous papers on education. There were palaeontological collectors scouring the Karoo, fundi on Khoi-San rock paintings, and specialists in other scientific fields. Lectures touching on various aspects of mining – diamond, gold and all manner of other metals – were also popular. Papers on every aspect related to farming, irrigation, meteorology, cattle diseases and entomology were presented.

It appears that botany was one of the earliest sciences studied in southern Africa, together with geology and anthropology. The variety of scientific subjects that were presented to an ever-growing audience and, one might say, taught by the S<sub>2</sub>A<sub>3</sub>, was like an expanding balloon.

The 1904 census, and the subsequent statistics prepared by the Education Departments of the four Colonies, revealed some startling results. In the Cape Colony, with a “European” population of 579 741, some 31 000 children of secondary school-age were not being educated. There were 9 792 “European” children who were employed in lowly jobs, earning very little and with few prospects of ever earning much more, even in adulthood.

There were 20 000 white children in the Transvaal, 10 000 in the Free State and 3 000 and 700 in Natal and Rhodesia respectively, who were not attending school. The incumbent National President, Theodore Reunert, at the Annual General Meeting in 1905 pointed out in his opening address: “the lack of education leads to ignorance, pauperism and eventually to crime!”

The adoption of compulsory education was recommended to the Governments of all four Colonies. Time and time again concerned members of the S<sub>2</sub>A<sub>3</sub> proposed curricula for schools, the training of better qualified and better paid teachers, proper school facilities and more schools for the rural areas.

Serious consideration was also given to the curricula to be introduced at the Tertiary

Institutions. The earliest Tertiary Institute established was the University College of the Cape of Good Hope in 1829. The Victoria College in Stellenbosch followed in 1865. The Huguenot College in Wellington with its 26 students and six lecturers followed in 1874, and Rhodes University College opened its doors in 1904. In time the two main University Colleges became fully fledged Universities, henceforth known as the University of Stellenbosch and the University of Cape Town – Maties and Ikeys to the many thousands of students who passed through those portals.

By 1911 giant strides had been made. Normal Colleges (Teachers' Training Colleges/Colleges of Education in more recent terms), and Agricultural Colleges had been established in several centres, with any number of primary and secondary schools in rural and urban areas. By then some 2 000 Xhosa teachers had been trained, and school facilities had been provided in the Transkei. In spite of the meagre salaries of teachers there was an interesting economic spin-off. Because of the increased buying power local stores ordered more stocks for their shelves. This progressed to the stage when wholesale firms in Cape Town, Port Elizabeth and even some as far afield as Johannesburg started sending their representatives to the Transkei, thus providing a greater choice of merchandise.

Another subject that cropped up regularly was the merits and demerits of the different political structures which could or should be put into place. Before 1910 the four colonies had their own legislatures. Even in those days scientists were not always successful in convincing the politicians that their research was of sufficient scientific significance to warrant generous subsidies. Museums were not seen as serious scientific research institutions and were merely tolerated in spite of several famous directors such as Peringuy and Schonland, who were indefatigable museum directors in their day. On the practical side and in the application of science were scientists such as Lounsbury, the government entomologist; Arnold Theiler, bacteriologist and founder of the Onderstepoort Veterinary Institute; Burt-Davy, a government agrostologist and botanist; and Gilchrist, the ichthyologist, who were laying sound foundations in their particular branches of science.

In today's context of so much easily accessible knowledge it is sometimes difficult to visualise that, in the vast underpopulated country that South Africa was then, there were so many men, and later

women, who were able to collect and disseminate all manner of scientific knowledge. Information and recommendations were made available that were invaluable to the Colonial Governments of the day.

There were several missionaries who became acknowledged anthropologists. The Rev. Wilhelm August Winter spent fifty years living and working amongst the Northern Transvaal tribes, and the Rev. Henri A. Junod wrote and spoke about the Bantu Jews of the Zoutpansberg and of the tribal customs of his time. Fathers Kelly, Northern and Fenton also contributed to the overall knowledge of the tribes of southern Africa.

The study and exploration of the Zimbabwe Ruins elicited exciting controversy. There were anthropologists, such as J K Erskine and R N Hall, who maintained that a process of devolution took place in respect of the Zimbabwe Ruins. Their premise was that Greater Zimbabwe, the forts and dwellings stretching over a distance of 500 kilometers from the coast inland, were the original work of the Hittites and Indian miners.

Thomas Muir, a founder member of the Association, set himself the mammoth task of compiling a "List of writings on determinants" which was published in the *Quarterly Journal of Mathematics* in 1903 and in subsequent publications. The first "List" covered the period from 1693 to 1880. The second covered the period 1784 – 1885, thus supplementing omitted titles as well as adding 176 titles covering the period 1880 – 1885. A much more extensive third "List" followed. In the words of the author, Thomas Muir, the object was to provide working mathematicians with access to what had been done by their predecessors and so to make research less laborious. Bearing in mind the paucity of libraries in South Africa at the time, and the laborious manner in which Thomas Muir had to communicate with libraries overseas, the word "mammoth" is hardly descriptive enough. Another interesting factor to be borne in mind is that at this time "burning the midnight oil" was a fact. Candles, gas and oil lamps were the order of the day.

A library was established at the Association's Head Office for the benefit of S<sub>2</sub>A<sub>3</sub> members. By 1914, some 207 books written by South Africans, a few by Germans, and two by French authors were mentioned as having been acquired by the library. All dealt with matters pertaining to southern Africa. Scientific journals and papers published on all manner of research were received at the library from local associations and government sources and

countries as far afield as Italy, Germany, Sweden, the USA, Great Britain, Spain, and Switzerland. In turn some 65 government offices, embassies, and scientific associations abroad received publications from the S<sub>2</sub>A<sub>3</sub>.

To coincide with the opening of the first Union Parliament, it was decided that the 8th Annual General Meeting of the S<sub>2</sub>A<sub>3</sub> would be held in Cape Town in 1910. On this auspicious occasion Dr Thomas Muir was elected President. The South Africa Medal and the sum of fifty pounds sterling were awarded to Dr J.C. Beattie.

The names of members presenting papers and informative talks which recur time and time again in the proceedings of the meetings are E.H.L. Schwarz, William Cullen, Thomas Muir, Charles F. Juritz, J. Burt-Davy and the two anthropologists, Rev. H.A. Junod and Rev. Wilhelm A. Winter. The absence of Robert Broom as a speaker and Hans Merensky as a member is an enigma.

At the end of July 1911, Mrs Julia F. Solly, a member of S<sub>2</sub>A<sub>3</sub>, attended the "Universal Race Congress" held in London. She and several other South Africans served as honorary members on the committee. Among these South Africans were Sir James Rose-Innes, Rev. J.S. Moffat, Mrs Olive Schreiner, and Dr. Rubusana. With the latter were Chief Dalindyebo a Tembu and Tengo Jabavu, the well-known editor of *Imvo*, who also presented a paper. Miss Molteno, daughter of the first Prime Minister of the Cape, was also present. Mrs Jolly reported that "No resolutions were proposed and that the Congress was pledged to no political party or scheme of reform. Neither religious nor political questions were touched."

In 1913 the Annual General Meeting was held in Lourenco Marques from the 7th to the 12th of July. The delegates and observers were treated to a most sophisticated and elaborate programme. Visits to the town and the harbour were arranged. The ladies were entertained while the men attended the various meetings. The papers presented covered a wide range of subjects dealing with aspects of Mozambique in general and Lourenco Marques in particular. The Governor of Mozambique graciously bade farewell to all at a gala dinner and a spectacular



Sir Thomas Muir, 1844-1934

fireworks display. The five members who constituted the entire body of the S<sub>2</sub>A<sub>3</sub> in Mozambique were able to look back on a most successful event.

The development that took place in the country, as portrayed through the annals of the S<sub>2</sub>A<sub>3</sub>, is astounding. The electrification of the larger cities and even of the smaller towns; roads, railways, the extension of the harbours, sewerage works, dams and irrigation schemes burst upon the South African scene during these 12 short years under review. This all required much expertise, the exchange of ideas and knowledge, in which S<sub>2</sub>A<sub>3</sub> played a leading role.

Telling words indeed were spoken by the founder President, Sir David Gill, in 1902, when he said in his inaugural speech: "Science knows no nationality. It forms a meeting ground on which men of every race are brethren, working together for a common end – and that end is truth". This ideal was to be assailed with the commencement of the First World War in 1914.

# Some reminiscences of S<sub>2</sub>A<sub>3</sub>

**Professor Emeritus Phillip V. Tobias FRS, FRCP, Hon. FRSSAf.**

*Honorary Professorial Research Fellow, Director, Sterkfontein Research Unit, Former Vice President of S<sub>2</sub>A<sub>3</sub>*

From its inception, the Association had one major purpose, the organization of an Annual National Conference. These brought together scientists and related scholars from all over the country and met in various centres, not only those with a University. Thus there was a meeting in Paarl and a meeting in Oudtshoorn. These were happy and convivial occasions and numerous papers were presented in the various sections of the Association. During World War II, all of the meetings were held in Pretoria because of problems of expense and difficulties of travel.

I attended my first meeting at Pretoria in July 1946 and on that occasion presented my first ever paper at a conference. This was on a proposed new method for the characterisation of the chromosomes of the Albino Norway rat (*Rattus norvegicus albinus*). As I recall, it was well received and one member of the audience, at discussion time, rose to compliment me, saying, "I do not know who you are, but listening to your delivery, I could be sure that you came from Professor Raymond Dart's department!" (Our department did teach students how to make a presentation.) At that meeting in 1946, three of my fellow members of the BSc Honours class in the department of anatomy at Wits – Anthony C. Alison, Priscilla Kincaid-Smith and M. Maureen Dale – presented papers as well. With hindsight, I think that this might have helped when in that same year the newly established CSIR awarded Honours Bursaries to all four of us, the first BSc Honours bursaries ever given in South Africa and, in that year, the only ones in the country.

Once the war years were behind the Association, it started once more to meet each year at a different centre. It continued the practice of publishing all of the papers from the conference in the annual bulky *South African Journal of Science* – a single volume for the whole year. In those years of the 1950s and 60s, I played an active part in the Association, as follows:

1946-1950 Associate Member (I was still a student).

1950 onwards Full Member

1951-1971 Member of Council

1957-1959 Chief Recorder

1959-1961 President Section E

1965-1966 Vice President of the Association

1969-1970 Vice President of the Association

1973-1976 Vice President of the Association

I also served on the editorial board of the *South African Journal of Science* when it became a monthly publication, as well as on the short-lived *South African Science* (1947-1949), both of these being official publications of the Association. For a short spell, I was editor of the *South African Journal of Science*.

It was in the years following World War II that the Association started to assume other roles with the rise of disciplinary societies. The coming into being of these sectional bodies marked the beginning of the decline of the Annual Conference. Inevitably therefore the journal changed from being the proceedings of the previous year's annual conference to being a monthly journal, which we hoped in time would become a *South African Nature* or *Science*.

Another aspect of the changing face of S<sub>2</sub>A<sub>3</sub> came with its taking an active part in the broader scientific community. One example was the birth of the Science Writers' Association of South Africa. This arose out of some remarks that Professor A.E.H. Bleksley made in his Presidential Address in July 1958 to the Congress of the Association held in Maputo (then Lourenco Marques). Speaking on Science and Society, he referred to the increasing importance of intelligent reporting of factual scientific information by the press. It was as a direct result of this address by Bleksley that the Science Writers' Association of South Africa came into being, its inaugural meeting being held on 20th April 1959. Professor Bleksley was its first President and he was followed in this position by Professor Raymond Dart, whilst I became the third President. Sadly the practice of South African newspapers having dedicated science reporters has dwindled and the Society has died. I think the Association would be justified in claiming the establishment of the Science Writers' Association as one of its indirect achievements.

Another example of the spreading of the

Association's activities came in 1963 when the Orange River Conference was organised by the Association. Its international links had been apparent as far back as 1929 when the British Association for the Advancement of Science met in South Africa, jointly with the South African Association. It was as a result of that joint meeting that the British Association endowed the British Association Medal, which I recall winning in 1952 for the best scientific contribution by a South African scientist under the age of 30.

That joint meeting was historic and a special book was published to mark the visit of distinguished scholars (such as Julian Huxley and Gertrude Caton-Thompson) to our shores. Meetings were held from Cape Town right through the country and the conference proceeded northwards, passing but apparently not appreciating the Makapansgat Limeworks Caves, scene of important ape-man discoveries from 1948 onwards, and even went as far as the Great Zimbabwe Ruins. A famous confrontation took place between R.A. Dart, pressing for foreign influences in the authorship of the ruins, and Miss Caton-Thompson, pressing for the local African origin of this great archaeological relic. The argument has come down through the annals as being singularly heated, and Dart gives an account of his interaction with Gertrude Caton-Thompson in his 1959 autobiographic work, *Adventures with the Missing Link*.

That was not the first such joint meeting: there had been one as far back as 1905. After World War II the South African Association attempted to resume links with international bodies and I recall attending, as the Association's representative, a meeting of the British Association at Bristol in 1955 and on another

occasion at Nottingham.

There is no doubt that the Association made a major contribution to the history of science in South Africa. By providing an annual platform to scientists, young and old, by promoting an interdisciplinary approach and understanding, by serving as the spokesman for organised science in South Africa, the Association played a very considerable role. Its interdisciplinary message is still most important and it is a pity that the almost phrenetic pressures of disciplinary research and publication in dedicated journals has tended to weaken this important function of the Association. Also it has served as a body for the advancement of an understanding by the public of science. Always, at every centre where the Annual Conference took place, there was included in the programme a public lecture and the message went far beyond the inner circle of the scientists and their students. That function too has tended to be diluted over the last quarter of a century.

I believe there are still important functions that the Association can fulfil and it is to be hoped that in its second century it will gradually resume the strength which it once enjoyed. We need a clear redefinition of the respective roles of the Academy of Science of South Africa, the Royal Society of South Africa, the Akademie vir Wetenskap en Kuns – and the South African Association for the Advancement of Science. The role in the public domain and the interdisciplinary role, as well as the historical role in fathering the *South African Journal of Science*, are aspects which should not be allowed to die.

Onwards to the second century of the S<sub>2</sub>A<sub>3</sub>.

# Dr Harry Bolus

## Esmé den Dulk

Aan die begin van die twintigste eeu was daar weinig professionele wetenskaplikes in Suid-Afrika. Vele navorsers het geen formele opleiding gehad in die vertakking van die wetenskap waarin hulle (gewoonlik deelyds) gewerk het nie. Nogtans het verskeie van hierdie amateurs belangrike bydraes tot die wetenskap gemaak en  $S_2A_3$  het hulle as lede verwelkom. Hierdie artikel handel oor die lewe van een van hulle.

Ongelooflik om te dink dat 'n seun van maar vyftien en half jaar van Engeland gestuur was om in 'n vreemde land sy nering te kom vind. Dit is presies wat met Harry Bolus gebeur het. Sy onderwyser in Nottingham, meneer George Herbert, se vriend William Kensit was 'n handelaar in Grahamstad en hy sou Harry as vakleerling oplei in sy besigheid.

Op 12 Desember 1849 gaan jong Harry aan boord en kom eers vier maande later in Port Elizabeth aan. Hy hou sy dagboek getrou by om sy ma van alles wat hy onderweg beleef het te vertel. Die reis van sowat 150 kilometers het ses dae met die ossewa geneem. Hy het skaars tyd gehad om in Grahamstad grond te vat toe die Agste Grensoorlog in 1850 uitbreek. Hy, as 'n fikse jong mannetjie, moes gaan diens doen op die slagveld.

Na 'n skamele twee jaar van opleiding verander Bolus van betrekking en werk tot 1855 in Port Elizabeth by 'n handelshuis. Na 'n kort vakansie in Engeland verhuis hy na Graaff-Reinet. Hier kry hy in 1864 'n betrekking as eerste sekretaris van die "Midland Fire Insurance and Trust Company" – en speel 'n sleutelrol in die vooruitgang van die firma.

In 1862 gee Professor Francis Guthrie van die Graaff-Reinet College 'n reeks openbare lesings oor die plantkunde. Bolus woon die lesings by en ontwikkel 'n belangstelling in die onderwerp. Hier in Graaff-Reinet trou hy met Sophia Kensit (1829-1914), die suster van sy voormalige werkgewer. Die omvang van sy bedrywighede neem toe. Hy skryf gereeld artikels vir die Graaff-Reinet Herald en hy en Professor Guthrie dra by tot die intellektuele en sakelewe van die dorp.

Met die dood van sy oudste seun in 1864 het Harry se liefde en studie van plante vir hom 'n ware steun geword. Dit is juis in hierdie tyd dat sy korrespondensie en verbintenis met Kew Gardens

in Londen 'n aanvang neem. Soos wat sy kennis uitgebrei het, het hy ook ander belangstellende versamelaars bygestaan, en gaandeweg het sy korrespondensie toegeneem. Dit was alom bekend dat hy bereid was om sy kennis met selfs die eenvoudigste versamelaar te deel. Hy het in daardie tyd ook sy eie herbarium begin opbou.

Destyds was daar nog maar min lektuur van 'n werklik wetenskaplike aard oor Suid-Afrikaanse plante beskikbaar. In 1869 lewer Harry sy eerste bydrae tot die plantkunde met 'n artikel oor "Botany in South Africa" in die *Cape Monthly Magazine*. Hy het ook die boek van die Duitse plantkundige, E. Meyers, oor Suid-Afrikaanse plante vertaal.

In 1874 vestig Harry en sy familie hulle in Kaapstad en sluit hy hom by sy broer se makelaarsfirma aan. Voor sy vertrek uit Graaff-Reinet het die inwoners vir hom en Professor Guthrie as dankbetuiging 'n gala-dinee aangebied. Deur hulle toedoen is die Spoorweg Wetsontwerp van 1874 deur die parlement goedgekeur. Graaff-Reinet het ekonomies baie gebaat by die aanleg van 'n spoorlyn na die dorp.

Mej. H.M. Louisa Kensit, dogter van Harry se voormalige werkgewer, is met sy seun Frank getroud en het so 'n aangetroude niggie van hom geword. Sy het 'n lys van sy 43 binnelandse reise gemaak, baie van net 'n paar dae in sy omgewing, ander van selfs meer as 'n maand. Na Wupperthal, Belfast, Barberton, Potchefstroom, Pretoria, Namaqualand, die Vrystaat en selfs so ver as Swaziland en Mosambiek, om maar net 'n paar te noem. Met sy verskeie reise na Engeland en sy verbintenis met Kew Gardens het sy kennismaking met Sir Joseph Hooker en Professor Daniel Oliver tot lewenslange vriendskappe verdiep. Mens kan as 't ware sê dat Mevrouw Darwin en Mevrouw Bolus se lewens 'n gemeenskaplike paadjie geloop het met hul manne wat so uithuisig was.

In 1882 publiseer Harry 'n lys van die Kaapse orgideë. Dit volg hy in 1888 op met beskrywings van die 102 spesies orgideë van die Kaapse Skiereiland, geïllustreer met 36 grafiese plate wat hy self geteken en ingekleur het. In 1893 volg die eerste volume van sy omvattende werk, *Icones orchidearum ...*, waarvan die tweede volume eers kort na sy dood verskyn het.

Bo en behalwe sy boeke skryf hy ook tientalle artikels met bykomende tekeninge wat in vooraanstaande wetenskaplike tydskrifte van sy tyd verskyn het. Sommige van sy artikels is in die *Transactions of the South African Philosophical Society* gepubliseer. Harry was 'n raadslid van hierdie vereniging vanaf 1877 toe dit gestig is en het in 1886-1887 as president daarvan gedien. Hy het ook 'n uitgebreide studie van die Suid-Afrikaanse erikas gemaak, aanvanklik in samewerking met Professor Guthrie. Sy beskrywings van hierdie plante is in 1905 voltooi.

In 1895 tree hy finaal uit die besigheidswêreld, maar bly aktief in sy uitgebreide belangstellingsveld. Hy dien as Trusteelid van die Suid-Afrikaanse Museum. In 1908 word hy genomineer as raadslid van die South African College. Hy dien op die raad van direkteure van die Suid-Afrikaanse Biblioteek en word tot "Fellow of the Linnaean Society" benoem. Al in 1874 is hy as vrederegtter aangestel in die Graaff-Reinet Divisie. In 1902 word hy 'n stigterslid van die Suid-Afrikaanse Vereniging vir die Bevordering van die Wetenskap, later bekend as S<sub>2</sub>A<sub>3</sub>. Sy wetenskaplike ingesteldheid bly egter in ewewig met sy liefde vir die Engelse literatuur en poësie. Sy kunstvaardigheid toon hy deur die jare met honderde uitmuntende tekeninge van plante in die fynste detail waarmee hy sy artikels en boeke geïllustreer het.

In 1902 ontvang Bolus 'n ere-doktorsgraad van die Universiteit van die Kaap die Goeie Hoop, en in 1909 vereer S<sub>2</sub>A<sub>3</sub> hom met die toekenning van die Suid-Afrika Medalje (Goud) en die destyds bykomstige 50 pond sterling. Sy herbarium het die kern van die Universiteit van Kaapstad se Bolus Herbarium



Harry Bolus, 1834 - 1911

gevorm.

Sy medemenslikheid en belangstelling in die onderwys het vorm gevind in 'n Trust vir studiebeurse, asook in sy bydrae tot die stigting van die Departement Plantkunde aan die SA College (later die Universiteit van Kaapstad). Ook het hy sonder vertoon C. Louis Leipoldt – die Afrikaanse digter en koskenner – se mediese studies in Engeland betaal.

Eindelik nog 'n besoek aan Engeland en aan sy geliefde Kew Gardens. Die boot seil uit die Kaapstadse hawe op 24 April 1911. Familie en vriende het nie verwag dat Harry Bolus 'n maand later, op 25 Mei 1911, in Engeland te sterwe sou kom nie.

# Comments on the fulfilment of the objectives of S<sub>2</sub>A<sub>3</sub> during the past century

Will Alexander

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## Introduction

I have been a member of S<sub>2</sub>A<sub>3</sub> for 55 of the 100 years of its existence. While I have never been involved in the administration of the association, I have been very closely involved in the execution and coordination of multidisciplinary studies related to its objectives.

In 1946 the open spaces in the grounds of Wits University were occupied by large Nissan huts used for temporary lecture rooms. Many of the students were still in army uniform awaiting demobilization. I was one of them. A year later there was an invitation pinned to the students' notice board inviting us to attend a lecture on archaeology. I listened, joined the Archaeological Society (the package included membership of S<sub>2</sub>A<sub>3</sub> and subscription to the *South African Journal of Science*) and I have been an armchair member of both societies ever since. I completed my studies in civil engineering in 1949 and entered the civil service as a junior engineer in the Department of Irrigation (presently Water Affairs). Now, more than half a century later, I am still actively involved in the application of knowledge at the interface between theory and practice. This is an ideal perch for looking back on the advances of science during the past century, the successes and failures, and a look into the future.

My principal interest is in water resource development, floods, droughts, natural disasters, environmental and sociological concerns. For the first 70 years of the last century it was the practitioners who conducted most of the research. Their research was driven by the need to solve immediate problems of the day. Reports were written for internal use and occasionally for wider audiences. The results of the studies were seldom published in the scientific literature.

It was only from the 1970s onwards that academic researchers in other disciplines, such as the aquatic sciences, became increasingly involved in water-related research. However, even to this day their

efforts are still hampered by a lack of knowledge of the results of decades of earlier research, combined with their inborn reluctance to quote from the grey literature, and their deep suspicions of statistical analyses.

The following notes are all based on my own experience.

## The development of enquiring minds

Few school teachers and university lecturers appreciate the consequences of their attitudes and advice on the careers, and consequently the future of their students, and their ability to contribute to the advancement of science. I was very fortunate. Eric Axelson was our English teacher at high school. At the slightest prompting he would regale us with details of his investigations that led to his discovery of the Diaz Cross. The chemistry and science teachers instilled us with an enthusiasm for exploring the behaviour of chemicals and electricity. When I approached the school principal Jimmy Black for advice on future studies, he told me that there was no money to be had in chemistry and physics, and that I should study civil engineering instead. This five-minute interview set me on a course in life that I've never regretted.

The lecturers at Wits in 1942 could not sustain the attention of their students in competition with the events elsewhere in the world which was in turmoil. A month before my 18th birthday the principal, Humphrey Raikes, gave me permission to join the army with a stern warning that I would have to start my studies from the beginning when I returned. The first of many misconceptions that I was to encounter in my career was the assumption that troops spend most of their time in combat. This is not so. Armies spend most of their time either licking their wounds and re-grouping after a retreat, or repairing lines of communication and building up stocks of men and equipment after an advance. We had many idle days, when we explored the pyramids and bazaars of Cairo; the Roman ruins at Sabratha and Leptis Magna

in Libya; an erupting Mount Vesuvius in Italy with the dust-covered ruins of Pompeii at its foot; weeks spent in the shadow of the bombed ruins of the Abbey at Montecassino; the wonders of Rome; and victory celebrations in Venice.

Many of us who intended returning to university were sent to a villa outside Florence for a course in cultural rehabilitation, as it was feared that we would have difficulty in settling down to our studies. These fears proved groundless, largely due to the professionalism of our lecturers. Arthur Bleksley effortlessly taught applied mathematics to several hundred students at a time in the examinations hall, while a junior lecturer in mathematics completely lost control of a much smaller class of students who had experienced enough discipline to last them a lifetime. The three lecturers who had the greatest influence on my career were Basil Cooke, Professor Gevers and Edna Plumstead, all in the Department of Geology. Edna was recalled to assist with the training of the large influx of students and was affectionately referred to as 'Ma' Plumstead – but not to her face.

My worst experience was a month before the final exams when one of the professors sprung a test on us in a tantrum, and informed us that the marks would be part of the final exams. I was completely unprepared and walked out of the room without putting a pen to paper. I had visions of failing the exam, not being able to take up employment, having to repay my study loan and having to postpone my pending marriage. This left a mental scar that I carried with me for the rest of my life. I was very conscious of this when it was my turn to train students almost half a century later.

### **Field experience 1950-1970**

While in Rome awaiting repatriation I exchanged my weekly ration of cigarettes (I was a non-smoker) for a 10 cm Nestler slide rule that was my principle calculation tool for the next 20 years. It could be used for multiplication and division with the accuracy of three significant figures. More complex mathematical calculations had to be performed by using graphs and tables. My first research was in 1954, when I developed the rational method for flood-frequency analyses and nomographs for the solution of the equations. This was required for the design of spillways for farm dams, but I considered the study to be part of my routine duties. I wrote a two-page report.

By the 1950s soil erosion had become a major environmental and economic problem over large areas of southern Africa. Legislation was introduced to reduce stock densities, financial assistance was made available for the implementation of anti-soil erosion measures, and large tracts of land were purchased by the state. The Southern African Commission for the Conservation and Utilisation of the Soil was established, and many years later I was appointed as a member.

One of my first responsibilities as a young engineer was to carry out surveys of the sediment deposits in large dams in the eastern Cape in order to determine the rate of loss of storage due to upstream soil erosion. My studies showed that the anti-soil erosion measures appreciably reduced the rate of sediment deposition. The studies also showed that dams were efficient sediment traps and that very little sediment passed through them. Twenty years later I applied this knowledge when I served on a CSIR steering committee for studies of the environmental damage to river estuaries. More of this later.

My first interaction with scientists in other disciplines was during the period when I was in charge of the construction of large dams and water supply projects. At each new project I reported finds of palaeontological or archaeological interest to the nearest museum. Jeanette and Hillary Deacon excavated a cave in the Gamtoos Valley that was threatened by the construction of the water supply system. Later, I was in charge of the construction of the 80 km-long tunnel connecting the Orange and Great Fish river systems. One of the three construction camps was at Oviston on the banks of the Orange River, upstream of Gariep Dam that was then under construction. At the request of Dr Hoffman of the National Museum in Bloemfontein, I arranged for accommodation in the camp for archaeologists Garth and Mary Sampson and built a laboratory to house the archaeological and palaeontological specimens. Their task was to undertake a survey of sites that would be submerged when the dam filled. With typical thoroughness and patience they used masonry trowels and paint brushes to expose artefacts embedded in the alluvium. I suggested that a bulldozer would be a better instrument for this purpose, but my offer to provide one was politely turned down. Later, Dr Hoffman presented me with a colour slide of a fossil *Chasmatosaurus alexandrii* that he had named after me in recognition of my assistance. I felt flattered, although I could not see any personal resemblance.

## Research co-ordination 1970 – 1984

During this period I was directly responsible for the collection, processing, publication and interpretation of routinely measured data including river flow, rainfall, open water surface evaporation, sediment transport, groundwater and water quality. This constitutes the largest database of routinely measured environmental data in South Africa. I was also responsible for all research activities within the Department. The results were published in the form of technical reports targeted at practitioners, and in the proceedings of specialised conferences. There was no incentive to publish in recognised scientific journals.

I was also the Department's representative on a number of research coordinating bodies. These included the CSIR's National Programme for Environmental Sciences (NPES) and its Inland Waters Ecosystems Committee which I chaired. The NPES was chaired by the president of the CSIR and played a major role in the identification of multi-disciplinary research needs in South Africa and the financial support for the research. From this time onwards, academic researchers played an increasing role in environmental studies, and they had the full co-operation and assistance of senior scientists and practitioners in the public service. At one stage we were informed that the continued existence of the *South African Journal of Science* was at risk due to financial difficulties. We protested vigorously, and ways were found for overcoming the difficulty.

Another appointment was on the CSIR's steering committee for the study of the deterioration of river estuaries and consequent environmental damage and reduction of tourist potential. The general view of researchers and the public was that the damage was caused by poor farming practices in the catchments, but this conclusion was unsupported by research, observations or measurements. I pointed out that in general, agricultural practices reduced the volume of sediment reaching the river systems. The degradation of estuaries was principally due to the destruction of riverine vegetation, which in turn changed the equilibrium profile of rivers and their floodplains. I based my views on my earlier studies in the eastern Cape; observed data on sediment transport in rivers; and convincing photographic evidence of the effects of the destruction of riverine vegetation on the redistribution of sediment within the river channels and adjacent floodplains.

Another example, also in the 1970s, arose from

my appointment to the Natal Parks Board's Scientific Advisory Committee for Lake St. Lucia. As a result of the then prevailing severe drought, the lake became hyper-saline and once again this was blamed on agricultural and other development in the catchment. It was feared that the damage was likely to be irreversible.

The word 'fragile' was frequently used to describe the functioning of ecosystems at that time, whereas my own observations and studies indicated that natural ecosystems were inherently robust, and that the postulated effects of human activity were of the same order as those of natural variability. I shared the minority view that the lake would recover after the drought and would not suffer permanent damage.

Nevertheless, public pressure mounted. The Parks Board decided to excavate a canal through the upstream Mkuze Swamp to tap the freshwater lakes within the swamp, and extend the canal through to the Mkuze River upstream of the point where it entered the swamp. I expressed serious reservations, not only because the project would not tap sufficient fresh water to reduce the salinity of St. Lucia, but also that it could cause serious damage to the swamp ecosystem, particularly in the unstable (as different from fragile) river delta area. A member of the Parks Board staff (Mr van Niekerk) designed and built an air boat driven by an aircraft propeller and ex-army tank engine that could force its way through the reeds and swamp vegetation. I had a tracked amphibious vehicle that could negotiate any terrain. I gathered all available professional and technical staff and we carried out a topographical survey of the delta area; surveyed cross-sections and water depths within the swamp; and monitored the complex movement of water flowing through the swamp using tracer dyes. This was the most comprehensive study of a major swamp system undertaken in South Africa, but the results and reports remain buried in the archives of the two organisations. The drought was broken and the ecosystem recovered more rapidly than any of us had anticipated.

## 1985-1994: teaching and technology transfer

My management duties in the Department of Water Affairs became increasingly concerned with staff, budgets and administration matters. In 1984 I exercised my right to retire from the civil service and

within half an hour of giving official notice (my intentions were public knowledge) I received an invitation to serve as Professor in the Department of Civil Engineering at the University of Pretoria. I accepted with gratitude and alacrity. During my first week of teaching applied hydrology to final year students, I failed to get any reaction from the stone-faced students. One day, in desperation, I asked them why they were having difficulty with logarithms that Archimedes developed 2500 years ago, and I mastered without difficulty in my first year at university. Immediately there was a response from the back of the class. "That was much closer to Archimedes' time". The ice was broken and I never looked back.

Training in the natural sciences seldom involves courses in mathematics and statistics, yet statistical analyses are essential for distinguishing between natural variability and changes caused by human activity. A good example is the postulated effects of climate change on the occurrence and severity of floods and droughts. Firstly, detailed studies of historical rainfall and river flow records, some of which are longer than 150 years, provide no evidence to support unexplained changes or trends in the routinely measured data. Secondly, a simple statistical calculation will show that the magnitude of the postulated changes will be such that they will be undetectable against the background of natural variability. Thirdly, water resource development systems are specifically designed to accommodate variability in river flow, and administrative measures have long been in place to provide assistance to those who are vulnerable to effects of droughts. Unfortunately, opposing views on scientific developments are no longer encouraged in scientific journals, so these views remain unchallenged and are later assumed to be uncontested scientific facts.

I used my BBC microcomputer (this was the pre-IBM/Microsoft era), coupled to a video projector, to project animated graphical images onto the screen. I introduced the students to the modelling of water resource systems and the mysteries of statistical analyses for the quantification of uncertainties and risks. I stressed the superiority of graphs and visual interpretation over complex mathematical relationships.

It was during this period that the CSIR was commercialised and many dedicated scientists became redundant. It no longer served as a conduit for cooperation with international scientific bodies such as UNESCO, IUGN, ICSU and others. This

sounded the death knell of co-ordinated multidisciplinary studies at the interface between science and its application in practice. Gone were the days of multidisciplinary collaboration in research in areas identified jointly by scientists and practitioners. Now the CSIR is seen as a competitor for research funding, rather than as an originator, coordinator and active research partner. South African scientists no longer have a multidisciplinary home through which they can exchange views and voice their concerns. Costly mistakes are being made as a result.

### **1995-2002: the introduction of sociological aspects**

In many developing countries in Africa the rural areas are no longer able to support the rising populations that depend on them. The ability of these countries to develop social upliftment programmes is hampered by financial austerity requirements associated with economic reform and the heavy tax burdens required to service the national debt. They also lack the necessary scientific and technological expertise to evaluate the well-intentioned but often inappropriate advice of overseas scientists.

In 1996 I accepted an invitation to serve on the United Nations Scientific and Technical Committee on Natural Disasters. In the meetings, conferences and symposia that followed I found myself articulating the situation in the developing countries on the African continent, which is quite different from the situation in the developed countries of the northern hemisphere. This led to me being commissioned to undertake a study that presented the African perspective on risk and society. I included comment on misguided notions of sustainable development

Where the planning objective is to enhance the quality of life, social advancement studies should take precedence over environmental impact studies. The attainment of a sustainable society will increasingly involve environmental sacrifices. Social advancement and environmental conservation are not commensurate objectives as many natural scientists maintain, in that the full achievement of one objective may only be realised at the expense of the other. Decisions will have to be made on the extent to which one objective will have to be sacrificed to achieve the other. The role of scientists is to present a range of scenarios and their sociological and economic benefits and environmental consequences. Decision makers will have to select the

most appropriate compromise solutions.

## Conclusion

Factors that continue to hinder the application of advances in scientific knowledge in practice include the increasingly narrow knowledge gaps and consequent loss of overall perspective by researchers; unchallenged research conclusions (there was a time when the comments by writers occupied almost as much space in scientific publications as the original papers); reluctance by scientific journals to accept overview papers; the *publish or perish* philosophy that encourages research on trivial subjects that have little prospect of being applied in practice; and most importantly, the natural

reluctance of practitioners to apply new methods in preference to existing tried and tested methods.

In this situation there is already a tendency for frustrated academic scientists to lobby political decision makers directly and bypass the practitioners, the professional advisers to the decision makers, and more importantly, those of us who train them. These obstructions to the development and application of knowledge required for the implementation of the Budapest declaration could be significantly reduced if a forum existed for the exchange of information between practitioners and academic researchers, and not simply between academic scientists in isolation from the rest of society.

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## S<sub>2</sub>A<sub>3</sub> CORPORATE MEMBERSHIP

In 2001 the Council of S<sub>2</sub>A<sub>3</sub> decided to institute a new category of membership, to give recognition to businesses that are dedicated to environmental conservation and enhancement practices.

The first two such corporate members, both involved in the tourism industry, are listed below.

We thank them, and recognise in them pioneering nation-builders.

The Centenary Heritage Project is not limited to members of the hospitality industry. It offers all businesses an opportunity to participate in “nation-building through national responsibility”.

### CORPORATE MEMBERS 2002

#### Sparkling Waters Hotel, Rustenburg

One of the leading hotels in the Rustenburg sector of the Magaliesberg range, Sparkling Waters has long been proud to share with its residential and conference guests the natural and cultural treasures in its surroundings. It has been the first in the world to feature a “Cyber Soapie” (at the website [www.sparklingwaters.co.za](http://www.sparklingwaters.co.za)) which highlights in a fictional framework the factual history of its situation and its characters, past and present.

This soapie, *The Valley of Sparkling Waters*, indicates the unique, sensitive natural richness of the range, first home to man and some 2 300 million years old – 100 times as old as Everest.

The directors of the hotel have embraced the heritage challenge and are reaching many thousands of people, including fellow members of the important Magaliesberg Meander. The hotel has earned a Three Diamonds (highly recommended) rating from Qualitour.

#### Qualitour (Pty)Ltd

Under the guidance of MD Greg McManus, Qualitour has initiated the Heritage Programme – a tourism-based environmental rating programme with very strict criteria which have been designed to reduce the impact that businesses have on their environment. Sparkling Waters is one of the members of this programme together with properties such as Sandton Convention Centre, Bakubung Lodge and the Michelangelo Hotel.

Research has shown that tourists are increasingly attracted to destinations that are environmentally responsible; in fact, 52% of tourists from the UK have cited this as their chief determining factor when choosing their destination.

Heritage’s very comprehensive requirements actually allow a member to reduce expenses through savings in water, energy and waste while also improving community interaction and ensuring sustainable development.

# Professor Govert Cornelis van Drimmelen

*Professor van Drimmelen is the oldest surviving President of S<sub>2</sub>A<sub>3</sub>. He held office in 1963/4 and is still an active and much appreciated member of Council. He provided the following overview of his life and work.*

In the year after the Union of South Africa was established, Govert Cornelis van Drimmelen was born on 27 September 1911 in Zeerust, Western Transvaal, where the Rev. Pieter van Drimmelen, his father, was a minister of the Dutch "Hervormde" Church. He was the oldest son in a family of five children.

In 1915 the family moved to Pietersburg where his father put him in school at the age of six years. In 1919, after his father had died in the Great Influenza Pandemic, he was taken to Europe and went to a State school in Heerde in the Netherlands, shifted one standard back to adapt.

In 1920 he was transferred to a Christian School in Haarlem, again one standard back to adapt for his return to South Africa. In 1921 when his mother moved her family to Brooklyn in Pretoria, he was placed in an English medium class, again one standard back to adapt. All this had a profound effect on him.

In 1927 the family moved to a farm on the Magaliesberg mountain range where the children had to go to school in a model-T Ford car and three trains every morning and evening, with transfers at Hercules and Pretoria stations.

Govert matriculated in 1928 at 17 years old. He discovered accidentally that a bursary was available for veterinary students, so he went with his mother and uncle to be interviewed by Dr. P.J. du Toit at Onderstepoort, on whose advice he registered at the University of Pretoria for the first year B.Sc. course. He was the only student to qualify in veterinary science in 1933 after five years of study.

In 1929 his brother died in an accident, after which the family moved to Pretoria and he to the Onderstepoort Hostel.

On 12 December 1933 Govert became a Government Veterinary Officer and was stationed at Allerton, Pietermaritzburg, Natal. He subsequently served in the Transkei, Ermelo and Bloemfontein.

He achieved success in the battle against East Coast Fever, Sheep Scab and Anthrax, and in the Orange Free State against Tuberculosis, Rabies, Brucellosis and, incidentally, Dourine and Psittaco-

sis. He lectured at Glen Agricultural College near Bloemfontein, and submitted a doctoral thesis on artificial insemination in 1947.

In 1946 he was transferred to a research post in microbiology at the Onderstepoort Veterinary Research Institute and became lecturer in Bacteriology and Mycology. His spare time was devoted to the affairs of the South African Association for the Advancement of Science (S<sub>2</sub>A<sub>3</sub>), the "Veldtrust", and the South African Biological Society.

In 1952 the World Health Organization (WHO) appointed Govert as representative for Brucellosis in Africa south of the Sahara; and after a WHO Meeting in Florence, he spent six months on a study tour to Wey Bridge (London), Rotterdam, Hilversum, the Pasteur Institute in Paris, Copenhagen and Hamburg.

In 1958 he became Professor of Bacteriological and Mycological diseases. In 1962 he was promoted to Senior Research Officer in charge of the Bacteriological Section of the Onderstepoort Veterinary Research Laboratories.

As a local contribution to the advancement of science Govert assembled his colleagues on Thursdays at lunchtime in the Boulevard Hotel, Pretoria, to organize a "Hands-on Museum of Modern Science", coupled with weekly lecture evenings or public talks.

The United States Embassy contributed, on permanent loan, a Space Rocket, eight stories high, which was to be set up parallel to an elevator shaft next to an eight storey building on two erven in Skinner Street donated by the City Council. Everybody in private industry as well as Government Departments and Provincial Councils contributed. At the fourth floor stage the building was opened by the State President, Jim Fouché. Unfortunately, after Govert had gone to the United States as Agricultural Counsellor, a major sponsor of the museum project developed liquidity problems, with the result that the committee was forced to accept the four storey Didacta Building. This building still maintains the hands-on Science Museum, now used by droves of school children with great success.

In 1962 Govert, armed with five research papers, represented sub-Saharan Africa at the WHO meeting in Geneva and visited London, to see the contractor constructing the "Bruvac" apparatus for Onderste-

poort. He also visited the WHO Brucella research station on Malta at the invitation of Lois Jones, of Madison, Wisconsin.

In 1964 he received a Certificate of Merit from S<sub>2</sub>A<sub>3</sub>. Also this year he was invited to visit the "Freie Universitat von West Berlin" where he spent a week and delivered his lecture (in German!).

In 1965 Govert was decorated with the South Africa Medal (Gold) by S<sub>2</sub>A<sub>3</sub>.

In 1966 he was appointed Agricultural Councillor (Scientific) to the South African Embassy in Washington, D.C. He was in charge of communicating to the United States Department of Agriculture all South African advances, and in return to collect in the Land Grant Colleges and Universities, at congresses and in the farming communities, all information that might be to the benefit of South Africa. He also had to take care of the South African agricultural students studying in the USA, for example at Texas M&A, Columbus (Ohio), and in Missouri, Iowa, and Maryland.

During his term overseas he visited Montreal and Calgary in Canada; San Francisco, Los Angeles, Pasadena and Indio Agricultural Research Stations in California; Taconia, Seattle and Pullman University in Washington State; Kansas, Denver, Phoenix, El Paso, Kentucky and Amhurst Universities; and went to Mexico twice for International Congresses.

In 1968 he was decorated with the Medal for Pathological Excellence by the Pathology Section of the US Armed Forces.

In 1969 he was awarded the Senior Captain Scott Medal of the South African Biological Society.

In May 1972 Govert was appointed Director of Diagnostic Services, classified as "Specialist Assistant" to explain the "Deputy" salary which he continued to receive on his return to South Africa.

At Onderstepoort he occupied the erstwhile offices of the late Sir Arnold Theiler and spent his time in the Diagnostic Laboratories at Allerton near Pietermaritzburg, Grootfontein near Middelburg (Cape Province), Stellenbosch, Windhoek and Skukuza.

On 28 Feb 1975 Govert retired at the age of 63 years, after a career at Onderstepoort of 47 years which included his studies and field services.

During the following almost thirty years of his life he enjoyed the company of his elder sister and two brothers. He built a house for his wife on Waterkloof Ridge with a north-east glass wall to watch the Highway of Heaven: 35% of the ecliptic is visible from their bed, every evening, night and morning. He was thrilled with the courses on birds, reptiles and snakes at the Transvaal Museum, attended meetings of S<sub>2</sub>A<sub>3</sub>, the Astronomical, Ornithological and Dendrological Societies, the "Suid-Afrikaanse Akademie vir Wetenskap en Kuns" and the Simon van der Stel Foundation, and went on field trips, especially those of the Pretoria Bird Club.

In palaeontology he remembers a time when Raymond Dart was President of S<sub>2</sub>A<sub>3</sub>, Arthur Bleksley was its Secretary and Phillip Tobias his Sectional Secretary, while he was himself elected Sectional President for Pathology. The S<sub>2</sub>A<sub>3</sub> is still his main contact with science. He received the unique "Laudeum" award in 1993 for his long continued contributions to the advancement of science. It hangs in the centre of his study wall at 233 McKenzie St., Pretoria, his old age residence, across the road from the school he attended 81 years ago. There also he maintains his Internet contact with the S<sub>2</sub>A<sub>3</sub> website, where he recently posted an article, which readers can access at:

<http://s2a3.up.ac.za/resources/article01.html/continued>.

# S<sub>2</sub>A<sub>3</sub> Presidents 1902-2002

- 1902/3 Sir David Gill (1843-1914) astronomer  
 1903/4 Sir Charles H T Metcalf (1853-1928) civil engineer  
 1904/5 Theodore Reunert (1856-1943) engineer, businessman and educationist  
 1905/6 Gardner F Williams (1842-1922) mining engineer and general manager, De Beers  
 1906/7 Dr James Hyslop (1856-1917) physician  
 1907/8 Sir Walter F Hely-Hutchinson (1849-1913) British Colonial Governor  
 1908/9 Sir Hamilton J Goold-Adams (1858-1920) soldier and administrator  
 1909/10 Sir Thomas Muir (1844-1934) mathematician and educationist  
 1910/1 Prof Paul D Hahn (1849-1918) educationist and chemist  
 1911/2 Sir Arnold Theiler (1867-1936) veterinary scientist  
 1912/3 Dr Alexander W Roberts (1857-1938) educationist and amateur astronomer  
 1913/4 Prof H W Rudolf Marloth (1855-1931) botanist and analytical chemist  
 1914/5 Dr Robert T A Innes (1861-1931) astronomer  
 1915/6 Prof Lawrence Crawford (1861-1951) mathematician and university administrator  
 1916/7 Prof John Orr (1870-1954) engineer and educationist  
 1917/8 Dr Charles F Juritz (1867-1945) agricultural chemist  
 1918/9 Reverend William Flint (1854-1943) churchman, librarian and scholar  
 1919/20 Dr Iltyd B Pole Evans (1879-1968) mycologist, botanist and conservationist  
 1920/1 Prof James E Duerden (1865-1937) zoologist  
 1921/2 Dr Arthur W Rogers (1872-1946) geologist  
 1922/3 Prof John D F Gilchrist (1866-1926) zoologist and marine biologist  
 1923/4 Prof James A Wilkinson (1874?-1934) chemist  
 1924/5 General Jan C Smuts (1870-1950) statesman, soldier and philosopher  
 1925/6 Dr Edward T Mellor (1868-1940) geologist  
 1926/7 Prof Harold B Fantham (1876-1937) zoologist  
 1927/8 Sir J Carruthers Beattie (1866-1946) physicist and university principal  
 1928/9 Jan F H Hofmeyr (1894-1948) classicist and politician  
 1929/30 Harry E Wood (1881-1946) astronomer  
 1930/1 Prof John W Bews (1884-1938) botanist and university principal  
 1931/2 Prof Petrus J du Toit (1888-1967) zoologist and veterinary scientist  
 1932/3 Dr Robert Broom (1866-1951) palaeontologist  
 1933/4 Dr Alexander L du Toit (1878-1948) geologist  
 1934/5 Prof Max M Rindl (1883-1947) organic chemist  
 1935/6 Lord George H H V Clarendon (1877-1955) Governor-general of the Union of SA  
 1936/7 Lieutenant-general C Graham Botha (1883-1973) archivist, researcher and author  
 1937/8 Prof L F Maingard ( -1968) San linguist  
 1938/9 Prof George H Stanley (1877-1964) metallurgist  
 1939/40 Prof Cornelius G S de Villiers (1894-1978) academic, author and genealogist  
 1940/1 James Gray (1882-1957) chemist  
 1941/2 Dr Edwin P Phillips (1882-1967) botanist  
 1942/3 Dr Adrianus Pijper (1886-1964) pathologist  
 1943/4 Colonel John G Rose (1876- ) chemist  
 1944/5 Ernest C Chubb (1884-1972) ornithologist, natural historian and museum pioneer  
 1945/6 Dr Frederick E T Krause (1868-1959) judge  
 1946/7 Prof Henry H Paine (1883?-1980) physicist  
 1947/8 Dr Sidney H Skaife (1889-1976) entomologist, natural historian and author  
 1948/9 Dr Gilles v d W de Kock (1889-1973) veterinary scientist  
 1949/50 Prof Clarence van Riet Lowe (1894-1956) archaeologist  
 1950/1 Prof Ernst G Malherbe (1895- ) educational psychologist and university principal  
 1951/2 Dr Basil F J Schonland (1896-1972) physicist  
 1952/3 Prof Raymond A Dart (1893-1988) anatomist and physical anthropologist  
 1953/4 Prof Percival R Kirby (1887-1970) musician, musicologist and historian  
 1954/5 Dr Thomas B Davie (1895-1955) academic and university principal  
 1955/6 Dr S Meiring Naudé (1904-1985) physicist  
 1956/7 Prof Robert H Compton (1886-1979) botanist  
 1957/8 Prof Arthur E H Bleksley (1908-1984)

- applied mathematician  
 1958/9 Dr Ronald Elsdon-Dew (1909-1984)  
 medical researcher  
 1959/60 Dr Bernard Smit ( - )  
 entomologist  
 1960/1 Dr Robert A Dyer (1900-1987)  
 botanist  
 1961/2 Dr Jacobus P Duminy (1897-1980)  
 educationist, humanitarian and sportsman  
 1962/3 Dr Simon Biesheuvel (1908-1991)  
 psychologist  
 1963/4 Prof Govert van Drimmelen (1911- )  
 veterinary scientist  
 1964/5 Dr Raimund H Marloth (1904- )  
 pomologist  
 1965/6 Dr Abraham C Hoffman (1903-1969)  
 zoologist and museum director  
 1966/7 Prof Cornelius A du Toit (1910- ) zoologist  
 1967/8 John L M Lintner (1907- )  
 agronomist  
 1968/9 Prof John F V Phillips (1899-1987)  
 ecologist  
 1969/70 Prof Ian D Macrone (1898-1981)  
 psychologist and university principal  
 1970/1 Prof Adolf J W Bayer (1900-1978) botanist  
 and academic  
 1971/2 Prof Guerino R Bozzoli (1911- 1998)  
 electrical engineer and university principal  
 1972/3 Prof Sidney H Haughton (1888-1982)  
 geologist and palaeontologist  
 1973/4 Dr James M Hyslop (1908-1984)  
 mathematician  
 1975-1976 Prof Otto Wipplinger (1914- ) civil  
 engineer  
 1977-1978 L S Richfield ( - )  
 1979-1980 Prof Daniel M Joubert (1928-1994)  
 agriculturalist and university principal  
 1981-1982 Mr Denys G Kingwill (1917-1997)  
 information scientist  
 1983-1984 Prof R D Griesel (1936- )  
 neuropsychologist  
 1985-1986 Dr Gordon K Nelson (1928-1996)  
 neuropsychologist  
 1987 Brigadier G N Robertson ( - )  
 1988-1990 Prof Eric Holm (1945- ) entomologist  
 1990/1 Prof Paul Smit ( 1932- ) kinesiologist  
 1991-1996 Prof Johan Wolfaardt (1939- )  
 theologian  
 1996-2002 Dr Ian Raper (1945- ) literary theorist,  
 scientific publisher



The S2A3 Congress held in Johannesburg in 1972

# The Pretoria Branch of S<sub>2</sub>A<sub>3</sub>

**Phil Minnaar**

An association is a group of people with a common interest. They usually have a need for new knowledge and insights about a specific topic and an interchange of views. In the case of S<sub>2</sub>A<sub>3</sub> the common interest is science in all its disciplines and facets. The interchange has been taking place in the Pretoria Branch of S<sub>2</sub>A<sub>3</sub>.

A revival of interest in the affairs of S<sub>2</sub>A<sub>3</sub> took place in the late 1970s, largely in Pretoria and Johannesburg. This interest resulted in the formal formation of the Pretoria Branch of S<sub>2</sub>A<sub>3</sub>.

Two of the aims of the association serve as guidelines for the activities of the Pretoria Branch. These two aims are:

- To create a meeting ground for scientists and others with an interest in science;
- To encourage the pursuit of science among young people.

The meeting ground is created through monthly talks in Pretoria by scientists who share their latest research findings or present informative overviews of their particular fields of science. General fields covered are the physical, earth and life sciences, engineering and technology, medicine, computer science and technical aspects of the human sciences.

The following are some examples of the themes of talks that have been presented:

- The Buddhist view of science and technology
- Controlling the reproduction of the African elephant
- Evolution
- Ancient Egyptian science
- Holography
- Linguistic finger printing
- Cloning
- The artist and the fourth dimension
- Honeybee social communication
- Artificial intelligence
- The hominid family tree
- The new millennium
- Breast cancer
- The human genome sequence
- Animal-assisted therapy

- Spiders
- Space geodes
- Indigenous knowledge systems

The Pretoria Branch also arranged a talk by a famous astronomer from Australia, Dr D. Malin, who presented a spectacular slide presentation titled "A universe of colour". He is the inventor of an instrument which makes it possible to take colour photographs of stellar formations. This talk drew an audience of nearly 200 people.

An interesting talk, "Seeing is believing", was presented by the magician Martino. He gave a general overview of the world of magic, without giving away any secrets, then demonstrated some examples of sleight of hand which fascinated the audience. The purpose of his talk was to explore the differences between rational science and pseudo-science.

The talks have always been open to the youth and even some schoolchildren attend the meetings. In the last number of years a special effort has been made to encourage and bring students from historically disadvantaged communities to the meetings.

Notices for the meetings are sent out in a newsletter, which includes interesting items on the latest developments in science or contributions made by South African scientists. These news items constitute another contribution that the Pretoria Branch makes to the promotion of science.

Membership of the Pretoria Branch currently stands at 64. It is an important aim of the Committee to increase membership.

The Pretoria Branch has been fortunate over the years to have had successive committees consisting of dedicated persons who devote their time and energy to S<sub>2</sub>A<sub>3</sub> because of their love for science.

The Pretoria Branch will continue as a dynamic, multi-disciplinary meeting place for people interested in the wonders of nature and the beauty of science. Young people are inspired to follow careers in science and perhaps, one day, become leading scientists themselves.

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## Invitation to Prospective Members

All persons who support the advancement of science are invited to become members of S<sub>2</sub>A<sub>3</sub> at an annual individual membership fee of R60-00 per person (R30-00 for students). Corporate membership is now also available at R500-00 p.a..

Please contact the secretary, Mrs. S.A. Korsman, at:  
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