our sportsmen and sportswomen are more than adequately met. The Sports Council has pioneered the new dispensation for SATISCO at South African Universities, and has frequently been called upon to assist other Universities in their negotiations with local SATISCO branches. The changes to the administrative structure have been accompanied by the appointment of a third sports officer, the long-awaited upgrading of facilities and the introduction of Sports Bursaries.

Sports bursaries

Sports Bursaries have had a marked influence on the performances of many of the clubs, and have served to promote a higher profile for sport and an improved image for the University itself. Rhodes has been represented at provincial and national level far more frequently. Our clubs are once again able to compete with the best of the Universities. A recent example of our improving fixtures is the Women's Squash Club, which won the SAU tournament as well as the National Inter-club competition.

The upgrading of the facilities has encompassed the improvement of all floodlighting, including the installation of lighting on the athletics track, the provision of tennis, soccer, squash and athletic clubhouses, a martial arts centre, which accommodates karate, aikido and an indoor air-rifle range.

The Sports Council has acquired the two Physical Education gymnasia which have added new dimensions to the activities of the aerobics, basketball and gymnastic clubs. A heating plant has been installed at the swimming pool, which has contributed to the recent successes of the waterpolo team.

One of the most exciting acquisitions has been the Sportsmen's Clubhouse in the Great Field Complex. Although still in the early stages of reconstruction, this will prove invaluable to SATISCO, and to the rugby, cricket and hockey clubs. Another interesting development has been the provision of Adamson House as a hotel house for visiting sports teams.

The *Rhodes Sport* magazine in its improved form has become a popular publication on campus and amongst feeder schools. Any old Rhodians wishing to receive the magazine should contact the Sports Administration.

Tying up the continents

by Professor Julian Marsh, of the Department of Geology

Lava buttress on the beach at Torres, Brazil. Note the reddish sandstone at the base of the buttress
Picture: Julian Marsh

On a cool, breezy, morning in July, 1988, a group of geologists stood on the beach near Torres, on the south east coast of Brazil, and gazed across the Atlantic towards Africa, some 6000 kilometres away.

Just behind us, a great buttress of rock reared up from the sand - a broad base of coarse, red sandstone, capped by several flows of dull, brown-black basaltic lava, covered by lichen.

Twenty kilometres inland stood the unbroken line of the heavily vegetated Serra Geral escarpment, built of the same volcanic rock, which stretched inland, covering 1 200 000 square kilometres - the earth's largest continuous continental lava sequence -the Paraná flood basalt province.

On the beach in the Skeleton Coast National Park, Etendeka Region, where the same reddish sandstone is found as that on the opposite side of the Atlantic Ocean, 6 000 kilometres away
Picture: Julian Marsh

Cataratas do Iguaçu. These famous falls plunge over thick basalt layers of the Parana volcanic province. Picture: Julian Marsh

Special significance

Afterwards, four of us from South Africa in that party - Professors Tony Erlank and Andy Duncan, and Simon Miller, a graduate student (all of the University of Cape Town), and I - agreed that those moments on the beach were of special significance to us as geologists.

For me, the journey to Torres commenced in 1974, when I joined the Department of Geology at Rhodes University from the University of Cape Town. At Rhodes I quickly found myself drawn into studying the Karoo volcanic rocks as part of an important national research programme.

These rocks are part of an extensive sequence of lavas and intrusive rocks erupted on all southern hemisphere continents during the slow break-up of the supercontinent Pangea, of which Gondwana - the assemblage of which South America, Africa, India, Australia and Antarctica were part.

The strong uplift that southern Africa has experienced since the break-up has resulted in the erosion of much of the volcanic sequence.

This erosion has also cut deep into the sub-volcanic strata to expose the incredible feeder systems to the volcanic rocks. The excellent exposure of both the lava sequences and associated intrusive rocks has made the Karoo sequence a classic example of a continental flood basalt province.

In contrast, in South America, the Paraná basin and its volcanics has experienced a long history of subsidence since separating from Africa some 130 million years ago. Thus, Brazilian geologists can rejoice in the preservation of their areally unsurpassed flood volcanic sequence, but much of it is covered by younger strata, lush forests, and rich agricultural lands, all of which hamper comprehensive scientific investigation.

One of the remnants of Karoo volcanics occurs in the coastal region of north west Namibia.

This is the Etendeka, and I soon became involved with colleagues, Tony Erlank and Andy Duncan, in detailed research on these rocks.

Etendeka lavas

The Etendeka lavas had long been compared to those of the Paraná by the early South African proponents of the continental drift hypothesis, such as Alex du Toit and later, Henno Martin.

When our investigation started, the revolution in the earth sciences that took place in the 1960s was over. The mobility of the continents was widely accepted and the continental drift hypothesis had been incorporated into the plate tectonic paradigm which now forms the basis of our understanding of how the earth works.

Important implications

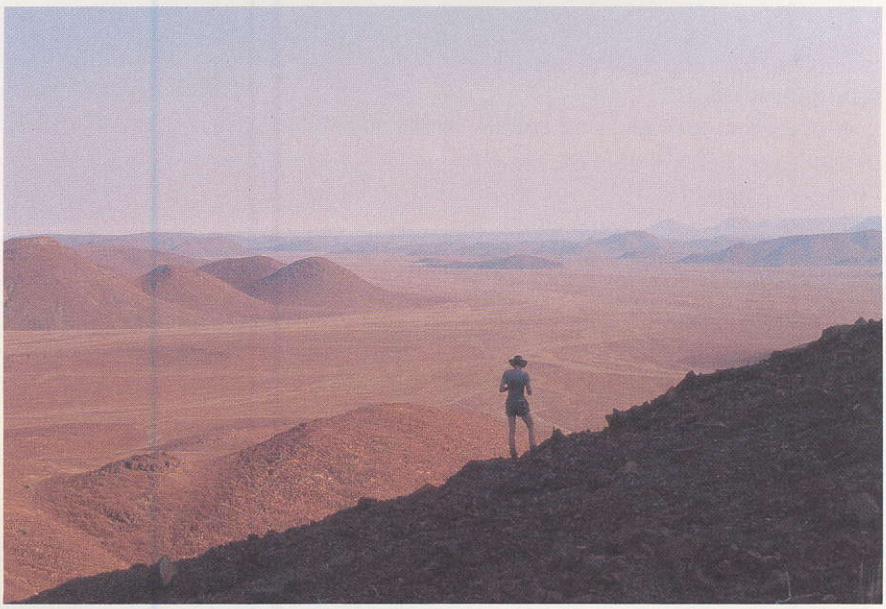
Reassemble South America and Africa into their pre-130 Ma relationship, and it is easy to understand that the Etendeka remnant is a piece of the Paraná succession. Thus, our efforts in detailing the geology of the Etendeka suite had important implications for a huge area of volcanic rocks on a continent some 6 000 km across the Atlantic Ocean.

We quickly showed this to be true by analysing a small number of samples of Paraná rocks collected by Professor Eric Simpson during a geological field-trip in Brazil in the 1960s.

They proved to be identical in every respect, right down to the strontium isotopic composition and rare earth element abundances, to our Etendeka materials.

Potential advantage

Our on-going research was several years old when we became aware that a large Italian group, led by Enzo Piccirillo, of Trieste, was doing a detailed study of the Paraná suite in collaboration with Brazilian earth scientists.



In the Etendeka, overlooking lava outcrops. Picture: Julian Marsh

In the Etendeka, Namibia Picture: Julian Marsh

Some of our English colleagues who had collaborated with us on our Karoo work, namely Keith Cox (Oxford) and Chris Hawkesworth (Open University), were also getting involved.

The Paraná research had the potential advantage of providing a more comprehensive geological picture by virtue of the huge size of the laval field, but this potential was difficult to realize because of poor rock exposure and the cover of younger rocks, vegetation etc.

In the Etendeka, with the aridity of the Namib desert, the vegetation and soil cover problems do not exist, and the erosional dissection of the terrain allows a detailed geological picture to be constructed.

One night, around a campfire in the Etendeka, the idea of a truly international geological field-trip arose, involving South Africans, Namibians, Brazilians, Italians and our English colleagues, jetting between continents to look at and discuss geology.

Special session

At the time, the idea seemed as ephemeral as the flames of that fire. However, an important international conference on the earth's crust was scheduled to take place in Brazil. Keith Cox and Enzo Piccirillo agreed to convene a special session on continental flood basalts and a field-trip through the Paraná was planned.

With the crucial logistic support of Roy Miller, of the Geological Survey in Namibia, we planned a week-long trip through the Etendeka to follow on, after a short break for intercontinental jet travel, the Paraná field-trip. Interested scientists were invited to participate in both.

Sixty-five years previously, Alex du Toit, probably South Africa's most famous geologist, took two weeks to sail from Cape Town to Rio de Janeiro on the first stage of a six-month geological field-trip through Argentina, Uruguay and Brazil.

Geological evidence

The purpose of his trip was to gather geological evidence from South America to support his, then heretical, conviction that South America and Africa were once juxtaposed in the western part of a larger continent known as Gondwana.

Although he paid only cursory attention to the volcanic rocks, Du Toit's work convinced many southern hemisphere geologists that continental drift had occurred, although the international geological community, residing in the northern hemispshere, remained sceptical and were even openly antagonistic, until the revolution of the 1960s.

Three of us on the beach at Torres were old enough to have been taught at University in the pre-revolutionary era by academics who accepted the reality of continental drift and we readily accepted that it had indeed occurred.

The rocks on the buttress at Torres were identical in every respect to the material we had researched in Namibia.

Barely a week later, under the brilliant Namib sun in the Skeleton Coast Park, we scrambled up a short scree slope to view a superb outcrop of rheoignimbrite.

Enzo Piccirillo drew on his cigarette and pronounced: "This is the Palmas of the Paraná!" Perhaps that was his special moment.

Members of the field-trip examining an outcrop of rheoignimbrite in the Etendeka Picture: Julian Marsh