EDITORIAL

Welcome to our 2014 Journal—**ISSN 0813 - 7404**. Our Journal has usually been published each December in the past. This November issue, however, is likely to be our last one, unless there is a huge outcry against such a move. People's reading habits have changed and this has made the publication of our Journal irrelevant and unnecessary.

2014 represents the 35th anniversary of our first Journal in October 1979 (then the MARIA Journal). This year's Journal becomes our 31st issue overall. Back in 1979, the Journal replaced (temporarily) our monthly newsletter.

We also stopped publishing newsletters this year. We first ceased the printing of hard copies of our monthly newsletter this year.

The February 2014 newsletter was the last issue that we published as a normal hard copy. The newsletter continued until July, but only as an electronic version.

The July 2014 issue was our 413th newsletter. All articles written by our members since then have been posted to our (new) website at www.mlssa.org.au .

We have also made use of emails, Facebook and Twitter to communicate with our members. We have also issued a regular mail-out to our members to keep them up-to-date.

Our old website has now been archived and it is no longer accessible by the public. Items such as past newsletters & journals can no longer be seen (found by browsing). They can, however, be accessed directly via the URL.

A handful of articles from our March to July newsletter issues have been reproduced in this Journal. There are also some new articles which may have been a little out-of-place on our new website.

A (largely) new committee was elected at our April AGM. The committee has been holding monthly meetings, but General Meetings have been put on hold in the meantime. As reported in our June newsletter, meetings will resume on a regular basis once that the new committee is bedded in with new systems and clarity of vision.

Steve Reynolds, Editor 2014-15

CONTENTS

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Willyama Articles

The article titled "The Wreck of the *Willyama*" in our June 2014 newsletter was posted to our website as two separate articles—see http://mlssa.org.au/1980/11/01/the-wreck-of-the-willyama/ and http://mlssa.org.au/2014/05/31/marion-bay-the-wreck-of-the-ss-willyama/ .

Photo Index

As explained in my Photo Index Officer's annual report in April, progress on our Photo Index of South Australian Marine Life has been in limbo for the past couple of years waiting for someone to process (two sizes) of images for posting to our (old) website. We are now planning a complete revamp of the Index. In the meantime, there were a handful of fish photos in our newsletter issues earlier this year.

Firstly, there was this photo of a Slender Blindfish, *Dermatopsis radiatus*, taken by Wendy Butvila at Edithburgh jetty, in our March 2014 newsletter: -

Then there was also this image of a Goblin fish, *Glyptauchen panduratus*, taken by Chris Rapson at Rapid Bay jetty, in the March newsletter: -

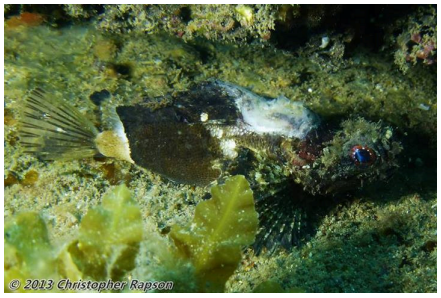
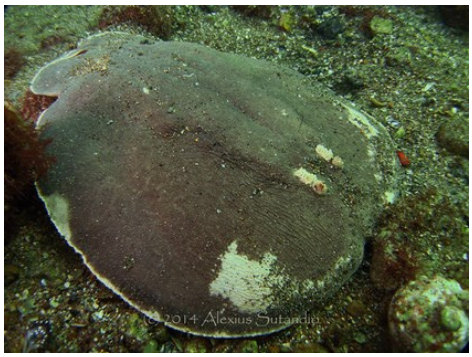


Photo Index cont.

Our July 2014 newsletter featured this photo of a numbfish, *Hypnos monopterygium*, taken by Alexius Sutandio at the OneSteel rockwall during our Underwater Shootout held at Whyalla over the June holiday long weekend: -



Our February 2014 newsletter included this still frame of a Beaked Salmon, *Gonorynchus greyi*, foraging: -

It was taken from some video footage shot by Dan Monceaux whilst snorkelling off Haycock Point on the Fleurieu Peninsula at night in November 2013.

The February newsletter also included this image of a Blue Devil, *Paraplesiops melagris*, (& some bullseyes) taken by Steve Reynolds: -

Marine Megafauna: An Introduction to Marine Science and Conservation

As explained in our April & May 2014 newsletters, I did an online course through Duke University this year. It was an 8-week Coursera course titled "Marine Megafauna: An Introduction to Marine Science and Conservation". See https://www.coursera.org/course/megafauna?sharebuttons_ref=fb for details.

The course was free of charge. We had to read scientific papers each week, watch video presentations, answer questions and complete assignments.

There were deadlines to meet, but with Australia being ahead of America time wise, I didn't feel any pressure regarding them. Of course, the course material was always received a little late here in Australia because of the time difference.

At least two other people that have been associated with our Society also did the same course. The three of us received our certificates for having successfully completed the course, each with distinction. It is probably fair to say that our association with MLSSA helped us to gain the certificate (Statement of Accomplishment). Over 1000 out of 10,500 students earned a distinction for scores of over 85%. Two Facebook groups were started as a result of the course. Check them out at https://www.facebook.com/groups/526554310766157/ and https://www.facebook.com/groups/MegaFauna.Duke/ .

Our April 2014 newsletter also included my course assignment titled "Grey Nurse Sharks, Carcharias taurus". Details were posted to our website at http://mlssa.org.au/2014/04/30/grey-nurse-sharks-carcharias-taurus/ .

The April newsletter also included an article about Leatherback Turtles. It was co-written by three students—Amber Compton, Nolan Powers & myself. As the article can no longer be accessed from our old website, it is being reproduced here now.

Leatherback Turtles, *Dermochelys coriacea*

by Steve Reynolds, Amber Compton & Nolan Powers

Four Leatherback Turtles, *Dermochelys coriacea* were sighted between 17th Dec 2013 & 27th Jan 2014. These sightings were reported to Redmap. One of these was sighted in SA by Shaun Henderson on 17th December 2013. Details can be found at http://www.redmap.org.au/region/sa/sightings/1152/. The other sightings were in Tasmania. According to the web page found at http://www.redmap.org.au/sightings/1237/, a Leatherback Turtle caught up in cray pot floats and released north of King Island at Xmas time was approximately 6 foot long.

Dermochelys coriacea is the largest living species of marine turtle, and also has the widest global distribution of any reptile. This species is listed as critically endangered globally and endangered in Canada. Leatherbacks undertake long distance migrations (up to 18,000 km round-trip) between tropical breeding and foraging grounds and northern temperate foraging grounds.

Amber Compton did the same course as me through Coursera/Duke University (see above). Her written assignment done at the same time as my Grey Nurse Shark article was about Leatherback Turtles: -

- "The leatherback sea turtle is the only sea turtle that has a soft leathery shell of connective tissue rather than a hard bony shell.
- The largest recorded leatherback was almost ten feet long from the tip of its beak to the tip of its tail. It was found washed up on the coast of Wales in 1988, and weighed 2,019 pounds.
- Leatherbacks don't have the hard chewing plates for crushing like other sea turtles, so they are unable to eat hard bodied prey.
- The Pacific population of the Leatherback

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continues to decline rapidly, while the Atlantic Population is rebounding.

The leatherback sea turtle *Dermochelys coriacea* is the only species of the family Dermochelyidae. There are only seven species in this family of sea turtles, most of which are endangered. The leatherback's scientific name is of Greek and Latin origin and broken down refers to the soft skin covering their shell, and having the natural color (sic) of leather. They are also known by an alternate name *Dermochelys coriacea schlegelii* or the Pacific leatherback.

The leatherback is the largest of the sea turtles, some becoming nearly as large as a small vehicle, up to 7ft (2m) long and weighing up to 2,000 pounds (900kg). They are named for their soft leathery carapace that is composed of connective tissue that is oil saturated and situated over loosely interlocking dermal bones. Their coloring (sic) is mostly black with a pinkish white plastron, and spotted markings on their carapace and flippers. The leatherback has the largest range of any turtle in the world and possibly of any vertebrate. They are found mostly in tropical waters, but have been found as far north as Alaska and Iceland and as far south as New Zealand and The Cape of Good Hope. They are pelagic and most often found in the open ocean though they have been known to enter shallower waters of bays and estuaries. The leatherback is federally listed as a critically endangered species. The global population as of 1996 was estimated to me 30-40,000, with the populations in the pacific drastically declining.

Leatherbacks have a long history dating back at least 70 million years. They survived the mass extinction that killed the dinosaurs. Their average lifespan in the wild is estimated to be 45 years. Breeding of these animals takes place in the open ocean. Females return to beaches near where they were hatches to nest. The night time nesting takes place every 2-3 years for an individual female. Throughout the nesting season a female can return every 8-12 days to lay another clutch of eggs laying 5-10 clutches in a single season. On average a nest contains 50-170 eggs, though many are not viable. It takes 8-10 weeks for the eggs to hatch, and many of the young never make it to the open water. The age of maturity for these animals is largely unknown, though a study in the North Atlantic estimated that the turtles there reached maturity at an estimated age of 24.5 to 29 years of age.

Leatherback turtles are very limited in what they eat due to their sharp edged but delicate jaws. Unable to eat hard bodied prey they feed almost exclusively on jellyfish and salps. Leatherbacks are a very deep diving species when foraging. They can dive to depths of 4,200 feet (1,280m) and stay at depth for upwards of 85 minutes. They also have the largest migration for foraging and breeding of any sea turtle.

An interesting fact that I found while researching this species is that the sex of the offspring depends on the temperatures in the nest while incubating. In order for the nest to have both male and female offspring the temperature must remain on average 85.1 degrees Fahrenheit (29.5 degrees Celsius). When temperatures are higher they produce females, and lower temperatures produce males. Once they reach the ocean males will spend the rest of their lives at sea.

Leatherbacks are listed as critically endangered by the IUCN. There are many threats to this species including humans who have a large impact on them in that they are hunted for their meat and their eggs are taken for the yolks in some areas of the world. Often they are caught accidentally in the fishing industry. Pollution is also a major threat. Plastic bags floating in the open water can be mistaken for jellyfish and eaten. Many things are being done to protect this species including protection of nesting beaches, education about the dangers of pollution, and limiting the longline bycatch by restricting the use of longline fishing.

Leatherback expert Dr. James Spotila was awarded the International Sea Turtle Society's Lifetime Achievement Award at the 32nd Annual International Sea Turtle Symposium for his work in research, conservation, and biology. He served as the society's founding president in 2001. He's published more than 150 scientific papers in his career, and published a book, Sea Turtles: A Complete Guide to Their Biology, Behavior, and Conservation. Spotila earned his Ph.D in vertebrate zoology and physiological ecology at the University of Arkansas. Currently he is researching the biology of sea turtles, crocodile, salamanders, and giant pandas.

Further reading:
National Marine Fisheries Service, NOAA Fisheries, Office of Protected Resources, November 19, 2013
http://www.nmfs.noaa.gov/prot_res/species/turtles/leatherback.html
U.S. Fish and Wildlife Service: North Florida Ecological Services Office, Leatherback Sea Turtle Factsheet, February 2012. Multiple authors
http://www.fws.gov/northflorida/seaturtles/turtle%20factsheets/leatherback-sea-turtle.htm
Use of skeletochronological analysis to estimate the age of leatherback sea turtles Dermochelys coriacea in the western North Atlantic by Larisa Avens, J. Christopher Taylor, Lisa R. Goshe, T. Todd Jones, and Mervin Hastings. Printed October 2009 Published online July 13, 2009 http://www.int-res.com/articles/esr2009/8/n008p165.pdf"
Nolan Powers (10 years old) also wrote about the Leatherback Sea Turtle for the Marine Megafauna Writing Assignment #2: -

* "The leatherback is the largest sea turtle and the fourth largest reptile, behind three crocodiles. The largest leatherback ever recorded was 900 kilograms.
* Leatherbacks dive deeper than any other sea turtle – approximately 1230 meters with an air supply lasting 35 minutes.
* The female leatherback enters a trance-like state when laying eggs. Humans can touch them without the females being disturbed.

The leatherback's scientific name is *Dermochelys coriacea*. The taxonomic classification is in the kingdom Animalia, phylum Chordata, class Reptilia, order Testudines and family Dermochelyidae. There are no living species in the same family, but six in the same order including hawksbill, loggerhead, flatback, Kemp's ridley, olive ridley and the green sea turtle. Some of the many common names for *Dermochelys coriacea* are leatherback, leathery turtle, lute turtle, trunkback and coffin back. The leatherback has a black carapace with white dots. It has a teardrop form and a very large head. It can grow from 1.5 to 2.1 meters long, and can weigh from 250-900 kilograms. The leatherback's carapace differs from other sea turtles. It has no scutes, which are bony scales overlaid by horn found on all other sea turtles. Instead, its carapace is made up of millions of osteoderms which are deposits of bone in the thick skin. It has five ridges on its carapace to help it stay streamlined. It has a concave plastron, which is the underside of the carapace. Its flattened forelimbs can grow to 2.7 meters in "wingspan." The leatherbacks' habitat is the open ocean. Leatherbacks can be found in all oceans of the world except the Antarctic. They normally breed in the tropics and feed in sub-polar regions. There are approximately 90,000 individuals left.
The lifespan of the leatherback is normally 30-40 years. Scientists have observed behavior which might be mating, but hasn't been proved. First, the male lunges onto the female's back 3-4 times but the female escapes. The last time, the female does not resist the lunge and the male positions his plastron posterior to the female's carapace. The male dives under water and starts to roll laterally back and forth. The male fertilizes the eggs. The female can lay up to 110 eggs in a clutch. She digs a hole on the beach with her flippers, lays the eggs and covers the hole with sand. Females may lay up to 9 clutches in the nesting season. 1 in 1000 sea turtle hatchlings survive to maturity, but the age of maturity is uncertain.
The leatherback is primarily carnivorous. Its main diet is jellyfish. It may also eat tunicates, which are small marine invertebrates. It can eat squid, which it finds at moderate depths. Its longest and deepest dives for food are at dusk, and the shortest and shallowest are at dawn. This is because they benefit from the vertical migration of deep sea creatures which happens every night. During the day, it swims with its mouth open at the surface and jellyfish float into its mouth.
The leatherback is the only sea turtle capable of thermoregulation. In the sub-polar regions, it is always actively swimming so its body temperature could rise 18 degrees Celsius above the surrounding ocean water. In these areas, the leatherback spends only 0.1% of the 24-hour day resting. In the tropics, it swims slowly because it does not want to overheat. It also

distributes blood to its carapace, flippers and plastron differently depending on the temperature of the surrounding water. Leatherbacks have been studied to understand how dinosaurs could have controlled their body temperature.

The leatherback is listed as endangered by the Endangered Species Act. One of the reasons is that fisheries capture leatherbacks in their overlarge nets as bycatch when targeting fish. Scientists are developing shorter nets because the fish that the fisheries are targeting are not deep-dwelling fish. A fisherman named Sinkey Boone created a Turtle Excluder Device (T.E.D.) for shrimp trawling. A T.E.D. releases turtles without the shrimp escaping. Another threat is human consumption of leatherback eggs and meat. To protect the leatherbacks, people patrol the beaches for poachers during the egg-laying seasons. Light pollution on roads and beach houses often disorient hatchling leatherbacks when crawling to the ocean because they go towards the brighter lights instead of the moon. Leatherbacks often mistake plastic bag litter for jellyfish. This clogs up their digestive system. Some U.S. states and counties have banned plastic bags from grocery stores.

Leatherback Expert: Dr. Scott Eckert

Dr. Scott Eckert is a professor of biology at Principia College. He was awarded the National Marine Fisheries Service Recognition Award in 1984. He served as the chairman of the U.S. Pacific Marine Turtle Recovery Team. He was invited to establish his research program at Duke University's Nicholas School of the Environment Marine Laboratory. Dr. Eckert has published more than 100 general interest articles about sea turtles and whale sharks. He was the first researcher to successfully use satellite telemetry to study the long-term movements of leatherbacks.

Further Reading:

Lehrer, J. 1993. The World of Turtles and Tortoises. Tetra Press, Blacksburg, VA.

Ernst, C. H., Lovich, J. E., Barbour, R. W. 1994. Turtles of the United States and Canada. Smithsonian Institution.

Eckert, S. A., Eckert, K. L., Ponganis, P., Kooyman, G. L. 1989. Diving and foraging behavior of leatherback sea turtles (*Dermochelys coriacea*). Canadian Journal of Zoology, 67(11). http://www.nrcresearchpress.com/doi/abs/10.1139/z89-399#.UxH0DoV0lpV"

During week 5 of the 8-week course, we had to read "Jellyfish Support High Energy Intake of Leatherback Sea Turtles (*Dermochelys coriacea*): Video Evidence from Animal-Borne Cameras" by Heaslip SG, Iverson SJ, Bowen WD, James MC (2012) - PLoS ONE 7(3): e33259. doi:10.1371/journal.pone.0033259."

Many thanks to both Amber and Nolan for giving us their permission to reproduce their course assignments in our newsletter.

During week 4 of the course, we had read "Behaviour and Physiology: The Thermal Strategy of Leatherback Turtles" by Bostrom BL, Jones TT, Hastings M, Jones DR (2010) - PLoS ONE 5(11): e13925.doi:10.1371/journal.pone.0013925.

We had studied both "Sea Turtle Anatomy, Diversity and Biogeography" and "Sea Turtle Biology and Ecology" during week 2 of the course.

According to the video footage provided for the latter: - The "superlative" Leatherback (is/has):

- Largest turtle (500+ kg)
- Oldest sea turtle (90 mya)
- Most extensive range
- Deepest diving (1200 m+)
- Longest migration

Leatherbacks eat jellyfish, and other soft-bodied invertebrates. The mouth and throat are lined with papillae pointed backward to help them swallow.

I found a piece titled "Satellite tracking identifies risk zones for leatherback turtles" posted on http://conserveturtles.org/turtleblog/blog/2014/03/04/satellite-tracking-identifies-risk-zones-for-leatherback-turtles/ by the Sea Turtle Conservancy (STC). It said that the last large populations of the leatherback turtle are at risk because their migratory routes in the Atlantic Ocean converge with the locations of industrial fisheries, a new study shows. Visit

http://conserveturtles.org/turtleblog/blog/2014/03/04/satellite-tracking-identifies-risk-zones-for-leatherback-turtles/ for more details.
Meanwhile, I read on one of the two Facebook pages for Marine Megafauna that Green sea turtles are not so-named for the colour of their shell, but actually for the fact that the colour of the fat under their shells is green. YouTube video footage of a Green turtle eating a jellyfish can be seen at http://www.youtube.com/watch?v=DmNOsOm0JiE . It was part of our Week 5 studies for the course. But back to the leatherback turtle, I wrote an article titled "Sea Turtle Sighting At Somerton" for our September 2001 newsletter. It can be found at http://web.archive.org/web/20140213185048/http://www.mlssa.asn.au/cgi-bin/Newsletters.cgi?year=2001&nl=MLSSA_NL_281_September_2001.htm .

Ex-MLSSA Members Who Have Moved Interstate

Ben Brayford and James Brook

Several past members of MLSSA have moved interstate to live or work over the years. For example, former MLSSA members Ben Brayford and James Brook are now working for Geo Oceans (http://www.geooceans.com/) in WA. "Geo Oceans is a marine consultancy that uses innovative diverless subsea technology to provide customers with simple solutions for marine surveys. Geo Oceans' diverless solutions are safe, cost-efficient and powerful."
The website at http://www.geooceans.com/ is "packed with interesting visual content including videos, photos and an interactive 3D photogrammetry interface".
Ben is the Executive Consultant for Geo Oceans, and James is a Senior Consultant there. According to Ben's biography on the website, he is "a marine scientist with over 12 years' experience in sampling design, field data collection, marine ecology, diverless technology, data analysis, GIS software and reporting. These combined skills are necessary to complete habitat assessment and mapping projects from the concept and design phase through to final reporting and product delivery. Ben has developed innovative underwater video and photographic equipment for ROVs, and towed video surveys and analysis software to characterise benthic habitats and communities. He has ADAS ROV pilot, ADAS Part 2 commercial diver (SSBA) and unrestricted vessel coxswain qualifications." He's come a long way from his days at Victor Harbor!
James' biography says that he "has 10 years' experience in reef surveys in Australia. He is a marine fauna and algal specialist. James has extensive experience with marine impact assessment and habitat mapping projects including the INPEX Ichthys project, Chevron DomGas and the BHP Billiton Whyalla desalination project EIS, and associated marine ecological studies. James is also a database and software developer with 15 years' experience as a professional software engineer, computer scientist and analyst. James is heavily involved in the continual development of the GO Visions™ software."
Geo Oceans were awarded the Certificate of Merit at the 2014 Golden Gecko Environmental Excellence Awards held in Perth in October 2014.

The staff of Geo Oceans with their Certificate of Merit
(James & Ben are 2nd & 3rd from right)

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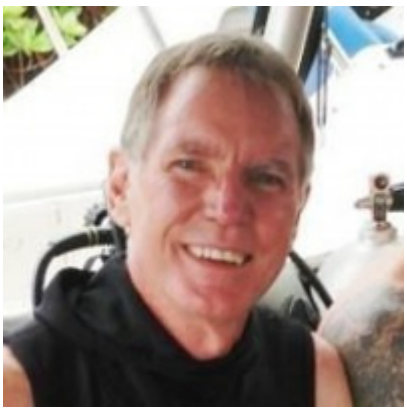
"The award was presented by the Minister for Mines and Petroleum, the Honourable Mr Bill Marmion and recognises Geo Oceans' commitment to environmental excellence in the development and implementation of the diverless technologies throughout the industry. This recent award rounds off an exciting period for Geo Oceans. In June 2014 we were pleased to receive the 2014 Subsea Energy Australia Innovation and Technology Award sponsored by Technip. We are also finalists for the 2014 WA Innovator of the Year Woodside Oil and Gas and Amcom/Cisco ICT Encouragement Awards to be presented in November." (Source: http://www.geooceans.com/news/36-certificate-of-merit-golden-gecko-award-2014)

Many of the above details can also be found in Geo Ocean's electronic newsletter which can be subscribed to by emailing the organisation at info@geooceans.com .

Tony Isaacson

Tony Isaacson was the inaugural President of MARIA (SA), the forerunner to MLSSA. He now runs DiveCareDare in Kawana, SE Queensland with his wife Irene – see http://www.divecaredare.com/). According to the webpage found at http://en.gravatar.com/divecaredare , Tony is a 'Diving Naturalist'. "As a PADI Scuba Diving Instructor, AWARE shark conservation specialist and adventurer, I have dived in some of the most amazing diving locations on the planet. I have been scuba diving since 1970 and have logged over 3000 dives in more than 20 countries around the world. I've documented the marine diversity in exotic locations like Komodo, Fiji, Vanuatu, PNG, Tahiti and the Galapagos Islands. In 2013, I inspired Navy Clearance Diver and bull shark bite survivor, Paul de Gelder and a 60 Minutes film crew to dive with bull sharks at the Ultimate Shark Encounter in Fiji. I was a consultant on the making of documentaries on Leafy Seadragons (for Channel 9), The Great Barrier Reef (with Richard Fitzpatrick for the BBC) and filmed underwater footage in Indonesia and off the Queensland and New South Wales coasts for TRAVELTHERENEXT TV. In July 2014, I headed to South Africa for the Sardine Run and dived with the great white sharks from Durban to Cape Town, South Africa. I'm a great advocate for sharks, sustainability and ecotourism, and I regularly volunteer for Reef Check and Grey Nurse Shark Watch in Australia."



Tony Isaacson

According to the web page found at http://www.divecaredare.com/shark-schools-to-make-people-more-savvy/ , Tony is a "respected shark expert". The web page goes on to say, "*Shark expert Tony Isaacson of Kawana*, said there was likely to be a number of great whites off the (Sunshine) Coast as they followed humpback whales heading south. Mr Isaacson said that with proper education, people need not fear sharks and he could not understand why this was not taught at schools and to tourists visiting the area. "*People need to be shark-savvy*," he said. He said an incident at Byron Bay earlier this month in which a swimmer was killed by a great white happened "a year to the day" he had an encounter with the feared species in the same location.

"I was filming grey nurse sharks and then they started forcing me down to the ocean floor," Mr Isaacson said. "I had never had this experience before and couldn't work out why they were pushing me down. The next thing I saw a 4.5 metre great white above them. This is not unusual, but they are usually quite well fed."

There is a Facebook page for DiveCareDare at https://www.facebook.com/DIVECAREDARE.

Karen Gowlett-Holmes

Karen Gowlett-Holmes was previously a member of MARIA (SA), the forerunner to