SQUID AND DRILL CHIPS

Geological Society of Australia
Christmas Presentation
Perth, 15 December 1995
by Ron Manners
Executive Chairman, Croesus Mining NL
Director, Foundation for Economic Education (Australia).

I am happy to be addressing this exclusive group of intellectuals tonight. You can still have another drink as my definition of "intellectual" is fairly loose. It includes any person who can think; in the abstract.

Let me start by asking a couple of questions.

Does anyone not particularly like squid?

Do any of you know from which region, Australia and Asia generally sources squid?

The answer is Peru, so let me tell you how this came about.

A Korean fisherman by the name of Byung-Kyu Seo came to Peru in 1985 with the modest dream of chasing the plentiful bluefin tuna that dart through that country's rich Pacific waters. A storm on the open seas in mid-1986 dashed Capt. Seo's plans and by the time it blew over, he had lost fishing equipment worth more than $150,000. However, the clouds that brought disaster came with a silver lining. "I was at sea for a month, looking for my long-line rigs day and night" says Seo, now 47, a native of Pusan, South Korea's biggest fishing port. "When we turned on the floodlights, I noticed that there were thousands of eyes looking up at me from beneath the water".

Those eyes, as Seo and many other Asian fisherman now know, belong to giant squid, found in enormous schools in Peruvian territorial fishing grounds. A little-known resource seven years ago, these squid are now one of Peru's top revenue earners.

Japanese and South Korean companies paid more than $35 million for the rights to capture 170,000 tonnes in 1994, all of which was frozen at sea and shipped to Asia. In the first half of this year, $23 million was raised by selling rights to 100,000 tonnes in the first two auctions.

Fishing has long been big business in Peru. Fish-meal exports alone topped $700 million last year, making it second only to mining as a foreign exchange earner, but despite its long established history, the Asian newcomers are credited with having added a new dimension to the industry.

As the Peruvian Fisheries Minister Sobero states "Their work on this discovery of the squid industry has been one of our most important events in recent years".

Well, that's how so many success stories just seem to happen. It almost looks as though it was by accident.

If Capt. Seo hadn't been fishing for tuna and if he hadn't lost his fishing lines and if he hadn't gone looking for them at night, with spotlights, this tremendous industry may never have been discovered.

So what's all this business about squid got to do with Australia and our exploration industry and the challenges that confront us?

Doesn't this squid story sound familiar? Doesn't it sound like the story of mineral exploration and discovery.

Someone has to develop a belief in something and then take a position.

It's like the old saying "If you want to hit a ball, you've got to swing a bat".

The study of economics is defined as the study of "human action", which is a pretty good definition for any occupation where ideas have consequences.

These ideas that people such as yourselves develop, and then seek support for their execution, can lead down many paths with the most surprising consequences.

One might say that Captain Cook, if he hadn't had that argument with his wife, may not have set out on his journey and Australia may have remained undiscovered for many more years and in all probability we would be speaking Dutch or Portuguese today.

It is interesting to conjecture on such things but let's look at three specific examples of ideas having unintended but very positive consequences.

Let's relate specifically to three major mining discoveries before we examine the challenge that rests with us all.

The first discovery is Kambalda (40km south of Kalgoorlie), where prior to its discovery in 1965 , prospector George Cowcill, had been prospecting for gold for more than 30 years.

Cowcill dug pits which later proved to contain the gossanous outcrops of the nickel orebody of the Lunnon Shoot.

His gold prospecting activities were not self-sustaining so he returned to his farm at Quairading but the prospecting "bug" had taken control. When in 1954 he read of the uranium exploration boom, he visited the Mining Registrar's office in Coolgardie and asked to see samples of uranium-bearing rocks. The green and yellow secondary uranium minerals in the rocks he saw reminded him of those he had taken from his pits dug in 1939, so he headed back to Kambalda.

Still persevering some five years later he took samples into Bill Cleverly, the Geology Lecturer at the Kalgoorlie School of Mines, and asked for them to be tested for radio-active minerals.

There were no radio-active minerals in the samples, but Bill Cleverly assayed them for copper and nickel and reported the significant fact that the samples contained traces of nickel.

Then about 10 years later, Cowcill heard that Western Mining Corporation (WMC) then with gold-mining interests in Kalgoorlie and Norseman, had decided to diversify its search into base metal deposits. This caused Cowcill to mention to his long-time associate John Morgan, that he once collected nickel-bearing samples from Kambalda.

John Morgan took Cowcill's samples for check assays at a WMC associated laboratory where the presence of nickel was confirmed. He then took them to Roy Woodall, WMC's then Assistant Chief Geologist based in Kalgoorlie. The rest of the story is mining history and is the sort of success story that keeps us all pointed in the right direction.

Again, the story of someone looking for gold, having it checked for uranium and being given the bad news that there's no uranium, only nickel.

Let's look at the second of these success stories, being the discovery of what is proving to be one of the world's major nickel provinces, Voisey Bay in Labrador, Canada.

No, this discovery wasn't made by a nickel exploration company, it was discovered by two prospectors working for a diamond exploration company called Diamond Fields Resources.

The prospectors were fascinated by the large rusty gossanous outcrop on the side of a hill. It had been correctly mapped and identified by the Canadian Geological Survey, some years before.

Their initial suggestion to the company, that it warranted a few drill holes, was greeted with a response that they should remember they are in the field looking for diamonds.

The prospectors eventually persuaded the company to drill some holes and a remarkable discovery has eventuated.

That Voisey Bay nickel discovery is currently in the process of meeting the rare criteria of; large, world-scale, low-cost mining and may emerge as the world's lowest cost nickel producer.

The third example we will look at tonight bears some resemblance to these circumstances. The recent high-grade nickel sulphide discovery at Silver Swan, just north of Kalgoorlie was made on ground originally prospected for gold but more recently pegged for diamond exploration by Adex NL (Australian Diamond Exploration). Ashton Gold then earned a 51% interest. Ashton Gold was then vendored into the 1993 public float of Aurora Gold Ltd. Mining Project Investors (MPI) then approached Aurora, expressing interest in the nickel potential. Aurora readily agreed to a sale but wisely retained a royalty.

There we have an old gold prospect that was briefly explored for nickel in the early seventies by Anglo American Corporation, who defined a shallow disseminated nickel sulphide that they named Black Swan.

The ground then became a hot diamond prospect, later finding its way into a gold float, before being off-loaded to the MPI group who have transformed it into what we expect to be Kalgoorlie's next nickel mine.

In addition to that they have unintentionally generated enough excitement to bring on "Nickel Boom Mark II".

All this makes me wonder whether you geologists are ever going to set out and actually find something that you're really looking for.

I know that economics is an imprecise science, but by comparison geologists make economics look like a precision instrument.

It reminds me of the geologist who invited me to his home one night and I asked the casual question of how he first met his wife. He explained that it was at a dance. He noticed this incredibly good looking girl on the other side of the hall, and felt a primitive urge to hold her close . By the time he got over to that side of the room all the girls had gone except one. It wasn't the one he was really aiming for, but fate brought them together. They ended up marrying and have never regretted it. He now wonders what was wrong with all the other men for not aiming for the right target.

Typical geologist! Usually get it right in the end but often get there by going the long way.

Probably closer to home for me, is the successful series of discoveries for Croesus Mining at Binduli, just at the end of Kalgoorlie's main Street.

Binduli's story is just as tortuous as the other examples I have mentioned.

Paddy Hannan camped there the night before arriving in Kalgoorlie. Like so many prospectors to follow, he found it interesting but was deterred by the hard porphyry exposures that represented many back-breaking hours of hard labour, for little return.

Probably about the first serious exploration on the area was carried out by BHP, for nickel, in the late sixties.

Interestingly enough, the ground has continuously been held under mining title and we estimate that since 1966, prior to Croesus' involvement, there had been a total exploration expenditure of $8 million, by many companies and individuals including Charter Consolidated, Mannkal Mining P/L (Ron Manners), Open Pit Mining P/L (Hector Ward), Defiance Mining NL, Aberfoyle Ltd, Newmont, Afmeco, Kalgoorlie Consolidated Gold Mines, Homestake, Pegasus, Battle Mountain Gold, Australian Consolidated Minerals and Pancontinental.

My initial involvement at Binduli was managing a costeaning program for Charter Consolidated NL around 1982. When they abandoned the ground I picked up some of their holding (with their permission) and a lot more ground both to the north and south of the Great Eastern Highway.

The work I did on both groups of tenements was not encouraging, so rather than keep the ground for the Croesus Mining public float I was putting together, I sold the northern group to Intercontinental (which now forms part of the Intermin JV) and the ground south of the road to my cousin, Aidan Keogh, who floated Defiance Mining NL. After considerable expenditure both on their account and with various joint venture partners Defiance subsequently sold it to Croesus in January 1993.

Croesus purchased it simply because we had no ore for our mill and at the Pitman zone, Defiance had identified a resource of 760,000 tonnes at 1.78g/t, that managed to convert to a reserve of 78,000t @ 2.8g/t. That provided us with four months of mill feed for our Hannan South mill. A four month mine-life was quite an achievement for us in 1993.

It was also noted on the last page of our evaluation study document that drilling along the western corridor of the project area had intersected weak supergene mineralisation in wide spaced RAB drilling and that "**this area may generate a small supergene resource**". We had trouble thinking big in those days!.

After the infill drilling at the 78,000t Pitman Pit in May and four months after purchase, mining commenced. The pit was officially opened in July 1993 by David Reed (Chairman of Eyres Reed, Stockbrokers). Contrary to press reports we deny having had multiple openings for the same pit.

Once infill drilling was finished at Pitman, exploration focussed on some of the other targets that we had identified during the evaluation study.

We first drilled an area .about 100m north of Great Eastern Highway with dust from the rig causing some concern to passing motorists. Nothing immediately mineable could be found within a month so we moved on to an area south of the highway where an old RAB hole had intersected some low grade mineralisation in sediments. We put 2 RC holes into this and also got reasonably wide zones of low grade mineralisation in sediments - interesting but not inspiring and more importantly at the time not ready for mining within four months, which is when we were due to run out of ore.

Urgency then forced us to have a look at the area which Michael Ivey our Exploration Manager had reported "**may generate a small supergene resource** ".

After reviewing the existing drilling , and the aeromagnetic and geochemical data a 1000m RAB drilling program (about 20 holes and a budget of $5000) was proposed.

The only difference between this drilling and the work previously carried out was that we planned to drill to the fresh rock interface regardless of depth. The previous work had all stopped at a nominal 40m depth.

It took a few holes for the driller to get used to the ground with samples varying between toothpaste to light coloured water, with some holes taking up to a day to complete. Our drilling contractor also showed a high degree of persistence.

When the results came back we were surprised to have two consecutive holes reporting 31m @1.86 and 21m @2.37g/t Au. Considering the quality of the drilling and the totally uninspiring geology - cream and white clays representing former felsic volcanics , we didn't get as excited as we should have.

An Aircore rig was secured and 20 Aircore holes were drilled with nearly all holes reporting significant mineralisation and defining the now Choctaw /Centurion pit.

Infill and stepout drilling followed rapidly and the oxide components for both areas were quickly identified and mining commenced on a 650,000t reserve base, in November 94, seven months after the discovery hole.

The logical extension was to continue exploring along strike to the south in the same deeply weathered rock types and the Ben Hur oxide zones were identified over an 1800m strike length .

Resource definition drilling was carried out over an 18 month time frame.

While this was going on, some deeper RC and some diamond drilling was undertaken to test the primary potential. Results were mixed with a significant but modest grade (2g/t) primary ore zone being discovered below Centurion.

We need some geology now to make sense of all of this .

A section through the Centurion pit shows the base of oxidation at about 50m below surface and flat lying supergene ore zones within the oxide profile.

Primary geology consists from west to east of well bedded felsic volcanics; a massive feldspar porphyry body and then a zone of black shale and sediments with some smaller porphyry intrusives.

Primary ore zones are related to tensional quartz vein arrays with silica sericite pyrite alteration selvedges. The eastern contact of the porphyry abuts a black shale horizon which can be traced from drilling for over 4 km. It is along this contact where we are currently getting significant high grade mineralisation (see figure 1).

About 8 months ago this contact was considered a good exploration target and 5 diamond holes were drilled, from the surface, along the contact over an 800m strike length.

All of these holes produced disappointing results and the prospectivity of the zone was downgraded.

During this time mining of the Choctaw pit was reaching design depth and in the final goodbye cut at 55m depth a stacked series of flat quartz veins were observed in porphyry with high sulphide content adjacent to the black shale contact.

We had not seen this style of veining before and our interest was raised. Some exploratory RC drilling was completed from the ramp of the pit and we hit similar mineralisation with grades up to 50 grams.

This got our interest and a further small program of RC was completed testing for continuation along strike. One hole in this program reported 15m @20g/t and diamond drilling commenced to help determine the exact geometry of this mineralisation which had not been recognised before. Results of the further drilling is shown in figure 2.

Drilling continues and more results will be released in January.

This mineralisation is associated with highly sulphidic (up to 30%pyrite) silicified and veined porphyry.

Higher grade zones are anomalous in all base metals and silver and visible gold is not uncommon. Initial bottle roll tests suggest that this material is free milling.

"Drilling continues" - an often quoted but perhaps more significant statement than we give credit to.

We still have a lot to learn at Binduli and a lot to drilling to do - but our philosophy hasn't changed. We are getting to like the area which is why we have increased our land holding from 3,900Ha to 7,200Ha.

There are no artificial demarcation lines between our exploration, mining, metallurgical, production and administration people. We all enjoy being part of this wonderfully creative process of converting ideas into substance and we hope to get much better at it.

We drilled 1000m of RAB in tough times where people had drilled before us and now we are drilling diamond holes where we drilled before. Exploration theories must be tested - financial desperation sometimes helps us do this, and gives us opportunities that others may have missed.

In conclusion let me extend this challenge to you.

In Australia today there are far more people consuming wealth, than are creating wealth.

That's why we see our country slipping back each year on the competitive scale of nations.

If we think Australia's level of debt is bad, just think how much worse it would be if people such as you, stopped exploring and creating wealth.

Although you may be small in number, your results are the key to keeping our country afloat.

I wish you well, the country depends on your drilling results, and I leave you with this old saying :

"You only live once, but if you do it right; once is enough".