AUSTRALIAN ALMANAC
Vol. 10 No. 7

North Queensland water development potential

An engineering surveyor's first-hand account

By Jeremy Beck

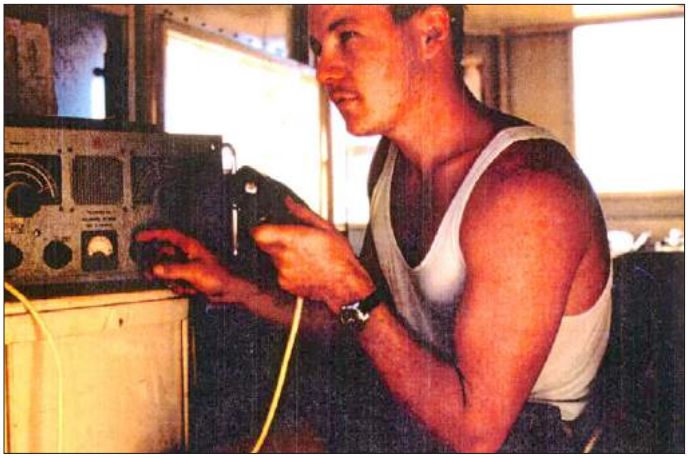
Retired engineering surveyor Barry Moreton has kindly provided the Citizens Electoral Council valuable material documenting the hydroelectric power and development potential for the Herbert and Tully rivers in North Queensland. The Coordinator-General's Department began a detailed Herbert River Investigation in 1959 when access roads were constructed and survey work commenced. A geological survey followed in 1960-61 and the many reports, now gathering dust, detailing the findings show enormous untapped potential still to be realised.

Moreton was a member of the Herbert River Investigation team and additionally he assessed the nearby Tully River for development potential, among other areas. His personal account is riveting and shows that the pioneering spirit that built Australia to become the "lucky country" was alive and well in the early 1960s. His recollection of the flooding Blencoe Creek gives a vivid picture of the enormous volume of water which is available: "From a first-time personal experience, I have an absolute indelible picture burnt into my brain, of the flood spectacle; (later estimated from flood marks to be about 40,000 to 50,000+ cusecs [1,133 to 1,416+ kilolitres per second]) roaring over Blencoe Falls with the most deafening, thundering sound, that I have ever heard in my lifetime, and this includes the famous deafening roar of Africa's Victoria Falls (a worldwide icon). ...

"I was carrying out a reconnaissance mission (by myself) into a possible access track, approach descent, and crossing of the Blencoe Creek for the very first time during the investigation, during a typical wet-season storm. I became stranded (even in my specially 'doctored' 4WD vehicle), between two swollen creeks for three days, and without the usual two-way radio communication with my base or anywhere else, because of the rugged mountainous terrain." Here we're considering mere creeks! On the Herbert River itself, the flood that the proposed Kooragwin Dam was designed for was assumed to have a peak discharge of 410,000 cusecs (11,610 kilolitres per second).

In the *Annual Report of the Commissioner of Irrigation and Water Supply 1961-1962* of the Queensland Government, it is clear the importance of water infrastructure was once understood: "The increasing awareness of landholders to the benefits of irrigated production and assured water supplies for stock and domestic purposes has resulted in a widespread demand for investigation of such works, and a total of 32 projects have been approved for investigation.

"A preliminary investigation of possible water resources development for irrigation on the Herbert River was completed and a report prepared." Investigations on the Herbert River and its tributary the Wild River were made concurrently with investigations by the Coordinator-General's Department into the hydroelectric potential of the Herbert River.



Barry Moreton in the field communicating via two-way radio. Photo: All pictures are courtesy of Barry Moreton.

Coal vs Hydro

A comprehensive report on the Herbert River Investigation was completed and submitted to the State Electricity Commission in May 1962. The *Report of the Co-ordinator-General of Public Works, Queensland* for the year ended 30 June 1962 stated: "It was established that full development of the Herbert River potential, together with that of the two tributary streams, for hydroelectric purposes, could yield more power per annum than had previously been realised." The construction cost for the full scheme, including a 130 megawatt (MW) power station, was estimated at £30 million. At full capacity the electricity would cost "just over 0.8 pence per kilowatt hour unit" and the scheme could save the purchase of some 300,000 tonnes of coal annually, "using resources in water, most of which might otherwise run to waste".

But, the State Electricity Commission decided to build a coal-fired power station at Collinsville, in place of the proposed Herbert River Hydro-Electric Power Scheme. The coal-fired station was commissioned in 1968 with four 30 MW steam turbines. In December 2013 the Collinsville station was decommissioned and in its place sits the new $100 million 42.5 MW Collinsville Solar Farm, a big price tag for a miserable amount of power. And while hydroelectric power can be turned on at any time, we all know what happens with solar power at night and on overcast days.

Letter to Premier Wayne Goss

The Queensland Government built the Koombooloomba Dam across the Tully River in 1960, but next to nothing has happened in the region since. After decades of government inaction in building water infrastructure, Moreton wrote to Labor Premier Wayne Goss on 21 June 1993, alerting the Premier to the Herbert River Investigation.

On 9 August 1993 John Mickel, Private Secretary to Premier Goss, wrote to Moreton advising that the Queensland Government "is well aware of the Herbert River proposal", adding that a 1982-85

comprehensive investigation identified three potential hydroelectric schemes: the Tully-Millstream, the Burdekin Falls and the Herbert River. Mickel added that further investigations had concluded that the "Tully-Millstream proposal would be the most cost-effective scheme, and have less environmental impact than the Burdekin Falls or the Herbert River site". The Goss Government's Queensland Electricity Commission in a pamphlet at the time stated: "The 600 megawatt Tully-Millstream Hydro-Electric Scheme is essential if electricity supply in Queensland is to keep pace with the growth in electricity demand."

Anti-dam activists mobilised and complained that the dams would inundate 135 hectares of World Heritage rainforest. Never mind that rainforest covers well over half a million hectares within the World Heritage boundaries and in total Queensland is home to over 1 million hectares of rainforest. The Labor Government under Premier Wayne Goss was forced to shelve the Tully-Millstream Scheme.

Letter to Premier Anna Bligh

Moreton wrote to Premier Anna Bligh on 10 June 2009 urging her government to reconsider the Herbert River Investigation. He pointed out the many benefits of the scheme including providing long-term employment, flood alleviation for the towns of Ingham and Halifax, hydroelectric energy, water supply and irrigation. "For me personally," wrote Moreton, "it became a pivotal point in my vocation, as I went on to become a surveyor, but at the time, a handful of us were hand-picked to become survey assistants in the initial survey party dispatched to the Herbert River system. We were to provide the engineering control surveys for the test drilling operations, dam site locations, hydrographic and topographic surveys, and traverses linking the whole scheme for overall design purposes." The Herbert Scheme would encompass three dams: one on the upper reaches of the Herbert River; a dam on Blencoe Creek upstream of Blencoe Falls (which tumble almost 100 m in the *first* single drop); and a dam around 30 km upstream from the Herbert/Blencoe confluence. This was just one proposal: "several pondage sites, combined with power stations were investigated, presenting many possible combinations, and possible future add-on extensions to the scheme."

Moreton continued: "When I also realise that I am one

These prefabricated huts replaced the survey team's original tents.

of only a few people, possibly three people still alive, who have personal knowledge from working on this project, albeit 50 years ago, then, as I have already said, 'when is a good time' to make you aware that this scheme exists. I know that the two surveyors mainly responsible for the survey work are now deceased, leaving no other opportunity for you to have any direct, and unbiased liaison with personnel involved."

Premier Bligh's office referred Moreton's letter to Minister for Natural Resources, Mines and Energy Stephen Robertson, who on 27 August 2009 replied: "A recent report, *Upper Herbert River water supply planning report: economic assessment of infrastructure*, showed that insufficient demand and lack of ability to pay on a full-cost recovery basis were current economic impediments to construction of new water supply infrastructure in the Upper Herbert River, north of the area you mentioned in your letter. … An additional consideration for any proposed infrastructure is the impact on the environment. For the infrastructure options you have outlined this will need to include consideration of the impact on the Wet Tropics World Heritage Area, including Blencoe Falls (Girringun National Park)."

The change in attitude from the Goss to the Bligh governments—both Labor—reflects the descent into irrationalism and inaction that has sadly affected both Labor and Liberal/National governments alike. The neoliberal arguments of "insufficient demand" and the "lack of ability to pay on a full-cost recovery basis" are as irrational as thinking a hydroelectric scheme would upset some perceived delicate "balance of nature", which is scientifically

The "Cashmere" crossing of the Herbert River. In flood, water can reach 25-30 m above the bridge (left). This is displayed with flood markers on a nearby tree (right).

proven to be nonsense. Nature in fact has proven to be very hardy, surviving millions of years of horrendous floods, droughts and bushfires among other violent natural events.

But what impact would there be on the environment? If anything, dams would improve the environment by mitigating flood damage, and they could be placed so as to preserve the scenic beauty of features such as Wallaman Falls, Australia's highest single-drop waterfall. No plant or animal species would be in danger. No matter what plan is proposed, the anti-dam lobby (largely financed through wealthy foundations such as the Rockefeller Brothers Fund) will organise to stop the development.

Life as a field surveyor—Moreton's musings

Moreton recollects life as an engineering field surveyor in what he describes as his "musings". In addition to the extensive Herbert River Investigation, Moreton emphasises the importance of water infrastructure elsewhere, including inter-basin transfer proposals such as the Bradfield Scheme which would also utilise water from the Herbert River. Here below are some excerpts from "Moreton's musings" which he has supplied to the CEC.

"In 1959, I commenced my *informal* engineering and surveying career as a chainman on the construction site of the Koombooloomba Dam. … Some years later, I attended night studies to obtain my *formal* qualifications from QIT/QUT in Brisbane, even though I had been working as an engineering surveyor for six years right across the total eastern half of Australia, broadly from the tip of Cape York and Northern Territory, to the bottom of the Victorian Mornington Peninsula etc.

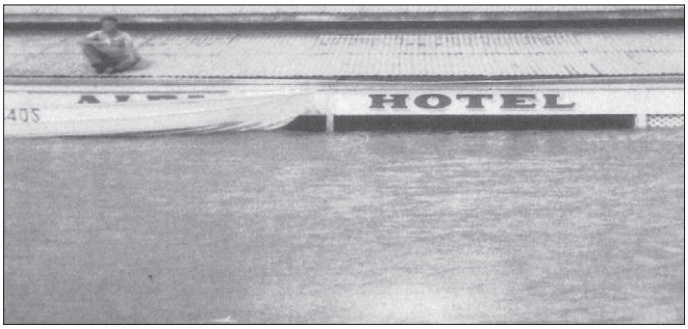
"Before Koombooloomba Dam was finished, I was selected to join the Coordinator-General's initial survey party to commence the Herbert River Investigation. …

"We started with a six-man (later eight-man) survey team and the numbers grew to about 60 allied specialists, including geologists, diamond drillers, engineers, and finally road-construction crews with support teams. Before it was finished, it even had a young resident engineer (complete with wife and later a baby—which I personally took part in delivering, into that wild and rugged 'taipan' infested country). …

"Because of the rough terrain and the long distances traversed by survey, we lived in tents, and bush-bashed our own 4WD tracks at first, until eventually, portable huts were established at two main base camp sites. …

"It was mandatory for all 'key driver' personnel, who went out to work on the Herbert, to be specially licensed by the Ravenshoe Police Station to drive anything and everything from a Land Rover, to a low loader, semi-trailer, or say a 20-tonne dump truck, or even a bulldozer! The testing procedure was carried out, more rigorously than normal circumstances, and every 'designated driver' was responsible for his own vehicle! Even a small dent usually meant instant dismissal, or demotion. This was a strict rule which tested every driver's reaction and judgement to any predicament encountered in the most hostile unknown terrain."

Moreton points out the water development potential right across Queensland, and his assessment of the "Gulf country" where rivers flow through to the Gulf of Carpentaria give a clear picture of how much water is available. For example, consider the Norman River which flows past



Normanton Flood 1974.

the cattle town of Normanton. In 1974 Normanton's highest flood was recorded.

"I have been reliably told that you could literally fish off the veranda of the bottom hotel (Albion Hotel) and as I have lived in that hotel at times, I would certainly imagine it to be true. … During the wet, all the rivers meander in serpentine channels into the Gulf of Carpentaria and *convert low flat plains into oceans of flood water*. Rivers, say 70 km apart, overflow their banks to form a single sheet of water like an inland sea! In fact, from the air above, it can be almost impossible to distinguish landmarks like the coastline, the roads, the properties, and the fence lines that separate them, except an occasional sand hill, and then it is usually teaming with wildlife. …

"Engineer L.B.S. Reid visualised a reservoir in his scheme, the Norman being one of the key river systems, flowing west, viz. the Norman, Einsleigh/Gilbert and Walsh/Mitchell rivers. … I would greatly love to have had the honour of meeting and discussing the sheer brilliance of this scheme with Mr Reid, in person before he passed on in 1952. Unless, or until you have travelled or worked in the vast area mentioned, and especially be conversant with the RLs [reduced levels, or elevation above the sea level datum survey point] and locations of the headwaters of the rivers mentioned in this plan, it is almost incomprehensible to realise not only the potential, cost effective feasibility, but also the *mind-blowing* vision of this scheme. …

"The 'crying shame' in all this, is that a lot of the great volumes of water could be harnessed in so many ways, instead of flowing out to waste. There is simply *no need* for this to be such a *dry* country!"

Moreton at Wenlock River near its mouth at Mapoon, Far North Qld, establishing a perfect datum line, necessary to start a survey.

John Job Crew Bradfield—(1867 – 1943)

We provide this insight into another great engineer, Dr J.J.C. Bradfield, who designed the Bradfield Scheme to channel northern flood water into the inland, excerpted from Australia's Nobler Manhood—"Lo, the Unploughed Future", CEC 25th Anniversary Conference, 18-19 May 2013.

By Noelene Isherwood

Daniel Deniehy, the 1850s republican politician famous for his polemical attack on the idea of a "Bunyip Aristocracy" for Australia, dreamt of nation-building "on a scale equal to the majesty of nature". No Australian figure aspired to and contributed more to achieving this ideal, than Dr J.J.C. Bradfield.

Australia's greatest engineer and nation-builder, John Job Crew Bradfield, Jack to his friends, was born in 1867 in Sandgate, Queensland. He graduated from the University of Sydney in 1889 and went to work as a draftsman for the railways in Brisbane before joining the NSW Department of Public Works. In 1896 he graduated from the Institution of Civil Engineers, London, with first-class honours.

It was early in the 1890s whilst working for the NSW Government Engineer for Water Conservation on a proposal to build a network of locks and weirs along the Barwon and Darling Rivers that Bradfield first conceived of what would become his famous Inland Water Scheme. From there he worked on the construction of Burrinjuck Dam on the Murrumbidgee, which enabled the establishment of the Murrumbidgee Irrigation Area during the 1910s, before leaving the field of water engineering to design the Sydney underground railway, the Sydney Harbour Bridge and the Story Bridge across the Brisbane River.

Let's venture behind the scenes of Bradfield's most iconic project, the Sydney Harbour Bridge, to see how he himself, conceived of this great project—the great "Coathanger" or the "Iron-Lung" as some called it.

Peter Lalor, in his excellent book *The Bridge*, reflected on the art of bridge building. He said, ***"Using a bridge is an instinct; building a bridge is an act of evolutionary progress. … It is as much a leap of the imagination as a triumph over geographical division. … The aesthetics of a well-designed bridge do not only catch the eye, they fire the emotion and the imagination."***

Bradfield had both the *dream* and the *drive* to bring such bridges into being. Lalor added, ***"While some men look at the world and accept it for what it is, others strive to shape it, rearrange it, improve it. He was the only man who oversaw the bridge's conception, birth, growth and completion. He was its father, midwife, wet nurse and mentor. A man of incredible vision, he not only had the astute and extraordinary mind capable of the engineering, political, financial and public relations feats that would be involved in building a bridge across Sydney Harbour, he had the patience to pursue the project for 30 frustrating years as it was proposed and then deposed by government after successive government."***

Bradfield was motivated by and consumed with an extraordinary passion for the Future, and he felt deeply his obligation to transform the natural conditions of the land, to create a more perfect nation. During the construction of the bridge he gave a speech which is truly breathtaking in its implications:

"In the upbuilding of any nation the land slowly moulds the people, the people with patient toil alter the face of the landscape, clearing forests, draining swamps, tilling fields, constructing roads and railways, building factories and rearing cities; they humanise the landscape after their own ideals. Thus in the years to come will result the perfect land and people, body and soul, bound together by innumerable and subtle ties.

Future generations will judge our part in the upbuilding of Australia by our works, and when designing the bridge and its pylons, mayhap the largest structure ever erected in Sydney, I have endeavoured as far as my limitations would allow, to blend utility and strength with beauty and simplicity so that the Bridge may in some degree typify the resourcefulness and idealism of this generation, for notwithstanding the materialism of today, we are not dominated by cold selfishness, Australia has an inner life, we still have our dreams of beauty, truth and justice."

And no matter how frustrated or impeded Bradfield was in achieving his dream of the Future, he never ever despaired or gave up, always drawing strength and inspiration from the "poetic" vision he carried constantly within his own mind. For example, in August 1922 upon returning to Australia after seven months abroad examining bridges, talking to engineers and investigating new engineering technologies, he met with the then Minister for Works Mr R.T. Ball. Afterwards, he made this entry in his diary:

"Do not think govt. are in earnest re Bridge Bill. They have introduced it in such a way as to ensure the defeat, if possible. However the work I have done will not be lost—it is one chapter in the romance of the Sydney Harbour Bridge, which some day I hope to write. Romance never dies; it is as beautiful as the line where the sea and sky meet beyond the boundless expanse of the oceans, as the seven seas themselves in their varying moods, as the melody of the mountains or the setting sun. In the annals of the past each silver lake, each brimming river, both mountain and valley have been shining strong to tell and so also in the lives of men have courage, unselfishness, endurance and patience won through and so it has been so it will be. I will see my Romance of the Bridge become a Reality."

His faith in not only his own capabilities, but in the very principle which animates and drives mankind forward, speaks for itself, every time a person crosses the great "Coathanger" and every time that iconic image of "The Bridge" is displayed for all the world to see.