

**Memo 10/12**

## **National crisis ahead**

Will Alexander [alexwjr@iafrica.com](mailto:alexwjr@iafrica.com).

Monday 20 August 2012



**Cartoon in the South African Sunday Times in July 2008 during the G8 meeting in Japan.**

### **The laws of chance**

Much has been written about the laws of chance and probability. There were three incidents in my life when my survival defied the laws of probability. There was another occasion when six members of my staff drowned in front of my eyes when the vehicle carrying them overturned while crossing a causeway during a flood. The circumstances were unforeseeable.

Similarly, I have experienced the consequences of extreme events that were well beyond the conventional design criteria. One of them was the flood that destroyed the town of Laingsburg in 1981. It was greater than palaeofloods that occurred thousands of years previously. Consider the situation if a drought of equal severity commenced in the months ahead. My philosophy of life is that there is always the risk, however small, of the occurrence of events that defy the laws of chance and probability and mathematical calculation.

Statistical analyses of hydrological time series are an essential component for the development and management of water resources in countries with dry climates. This becomes critical as the water requirements approach the maximum available resources. To complicate matters, the drier the climate the greater the variability of the climatic processes on all time and space scales.

Multiyear droughts are the greatest concern. The most important question that needs to be addressed is: are these droughts predictable? Joseph's biblical prophecy of seven good years followed by seven years of famine is an example of a successful prediction and subsequent measures that were taken to reduce the consequences. Why is it that 3000 years later, modern scientists are still incapable of developing reliable drought prediction methods? Consider the following.

In 641 AD – more than a thousand years ago - a water level gauging structure was built on Rodda Island in the Nile River at Cairo. The record from the Rodda Nilometer is the longest available hydrological record in the world. In 1950 the civil engineer R.E.Hurst analysed 1080 years of data from the Rodda Nilometer recorded during the period 641 to 1946. He needed this to determine the required storage capacity of the proposed new Aswan High Dam.

He applied the Rippl method to successive segments of equal length, i.e.  $n=10, 20$  etc, and found an unexplained anomaly in the data. The value of the coefficient  $h$  for the Nile River was approximately 0.75 instead of 0.50. He then analysed other long geophysical records, where he found the same anomaly.

It is important to note that the same multiyear anomalies that were present in the flow records of the Nile River were also present in other climatological and geophysical processes. Surely it must be very obvious that all these processes must be related to a single cause. The only conceivable common cause is variations in received solar energy. Why does the Hurst phenomenon not feature in today's hydrological and climatological studies?

<b>Table 1. Values of the Hurst coefficient for various geophysical phenomena.</b>		
<b>Process</b>	<b>n</b>	<b>H</b>
Nile maxima	1040	0.75
Deposits in lakes	2000	0.69
Tree rings	900	0.80
Temperatures	175	0.70
Rainfall	121	0.70
Sunspots	?	0.70
Wheat prices	?	0.69

### **The failure of science**

The availability of mainframe computers in the late 1950s greatly facilitated complex statistical analyses of river flow data. The International Hydrological Decade (IHD) was established by the United Nations in the 1970s. I was appointed as South Africa's representative and attended the 1975 conference in Paris together with David Bredenkamp and another member of my staff. The South African National Committee (SANCIAHS) was

subsequently established. Its 16th symposium will be held from the 1<sup>st</sup> to 3<sup>rd</sup> October this year and is the reason for these fundamentally important comments.

Despite decades of research by many international experts, they have been unable to develop a reliable multiyear prediction method. Unfortunately they neglected their responsibility to investigate the reasons for their lack of success. For example, some 600 experimental catchments were established worldwide during the international decade. The only successful examples were the South African catchments that demonstrated that cultivated timber plantations caused a decrease in runoff. The natural catchment processes are far too complex and variable for practical applications yet we still find scientists claiming that catchment process models should feature in national water resource analyses.

### **My personal concerns**

in January 1950 I married the girl next door. After our honeymoon at the foot of Cathedral Peak in the Drakensberg, I joined the Department of Water Affairs. The next 19 years we moved like nomads from one construction site to another building dams, tunnels, and canals while raising our family.

It was a wonderful experience watching nature at work, especially the dramatic rejuvenation of vegetation and living creatures after the rare rains. It was also very satisfying observing the equally dramatic explosion of biological activities as the dams filled, and water from them started flowing down the dry river beds.

Now it is sad and disturbing to read reports in the scientific literature that storage dams should not be built as they cause environmental damage. This statement is false, alarmist and opportunistic. Clearly the writers have never lived and worked in the conditions they describe. Why do we not read about these periodic rejuvenations in their papers? The natural environment is in dynamic, long-term equilibrium. It is never in a constant state. Do they not understand this? Do they not understand that it is necessary to have a sound knowledge of natural climatic variability at the site being investigated before they can attribute adverse environmental changes to human activities?

Why is it that now as I approach the end of my days I have to read publications by wet behind the ears scientists that infer that my work in the field building and operating these structures many years ago was in vain? My conscience will not allow me to remain silent when others express these juvenile views that, if accepted, could cause damage to the welfare of our country and its citizens.

### **Development of a climate prediction method**

Together with professional colleagues, staff and students we have developed and verified a multiyear prediction method that unequivocally explains the observed multiyear variations in the natural hydro-climatic processes. Our methodology is well documented in our many

published papers, reports and frequent memoranda. Nobody has had the courage to question our studies or conclusions on scientific grounds.

Why should I continue with my studies in this field under these stressful conditions where professional jealousies and ignorance prevent their general acceptance? I was encouraged by the following two recent events.

### **Snow in the southern hemisphere**



South Africa 14 August 2012



Australia 15 August 2012

Alarmism is a favourite tactic of climate change scientists. How often have we been told that climate change will result in large regions of South Africa becoming warmer and drier? At about 10 o'clock in the morning of 7 August when I looked out of the lounge window I was astonished to see flakes of snow falling to the ground where they promptly melted. This was the first snowfall in Pretoria since 1959. This particular system deposited snow over a larger area of South Africa than had previously been observed. Notice in particular the concurrent snow falls in Australia forwarded by a colleague. This was a hemispherical occurrence.

The synchronous snowfalls in the southern hemisphere were preceded by severe drought conditions in the USA and unusual conditions in Europe. Nobody dared postulate that they were the consequence of climate change caused by human activities. But please read my article in *Civil Engineering* published in 2008 on the likelihood of global droughts from 2009 to 2016. Perhaps the day will come when our prediction methods are formally recognised.

I have repeatedly mentioned that there are increasing reports that the world could be entering a mini ice age. This possibility was confirmed by our own studies of South African hydro-meteorological data. There was more to come.

### **Oscillations**

After sending off my submission to the SANCIAHS symposium, I sat on my armchair in the lounge once more. Across the room was our large grandfather clock. It was presented to my grandfather by the Mayor and Councillors of the Durban municipality upon his retirement in June 1930.

By pure coincidence my attention was drawn to the large brass weight that operated the pendulum. It was hanging on a thin brass chain. There was no direct connection with the pendulum swinging behind the weight. The weight was swinging from side to side with an amplitude of about a centimetre in synchronisation with the pendulum that had an amplitude of 24 cm. Looking closer it was clear that the oscillation of the weight was driven by the oscillation of the pendulum behind it although there was no physical connection between the two. As the weight became lower the oscillations stopped. The very clear oscillatory behaviour of hydrological time series has been my personal puzzle for a number of years. My appeals for help in determining the cause of the oscillations that are clearly apparent in the plotted data were unsuccessful. My colleague David Bredenkamp is also studying this phenomenon.

### **Conclusions**

Despite the remaining uncertainties, there can be no doubt whatsoever that there is a multiyear, predictable oscillating pattern in the hydro-meteorological processes. Those who reject the existence of the predictable periodicity and attempt to suppress this information must inevitably face the ridicule of the scientific community and the public at large.

Here in South Africa, last week there were riots by striking mine workers 34 of whom were killed. Elsewhere in South Africa there are growing tensions arising from unemployment (now 25% of the workforce) and the deteriorating infrastructure, principally electricity and water.

My personal distress rises from the fact that I have undertaken voluntary work in our poor communities. On one occasion I reported that there were people living in conditions that no human beings on this planet should have to endure. Now, neither the water supply authorities, nor the scientific institutions, nor experienced scientists and engineers seem to be aware of the possible national tragedy that lies ahead when our water supplies fail without warning. This is not an alarmist statement as I have personal experience in managing water supplies under these conditions. This time there will be outbreaks of civil disturbances and economic crises. We are currently experiencing a foretaste of these conditions but there are no signs of the development of measures needed to meet these challenges.

I have submitted a hard hitting paper for presentation and publication at the SANCIAHS symposium to be held from the 1<sup>st</sup> to 3<sup>rd</sup> October. It is titled *Water resource management during prolonged drought periods*. I intend distributing it in my next memorandum. I appreciate that I risk excommunication for distributing it at this stage although to different audiences. In the past others were burned at the stake when they questioned current beliefs.

I have recommended that the water supply situation and climate change be vigorously discussed at the symposium. To date climate change scientists have refused to participate in multidisciplinary discussions on this vital, national issue. This attitude is totally unacceptable. They should be exposed as being disloyal and having a blatant disregard of the principles for the advancement of science as detailed in the 1999 Budapest Declaration on Science.

I urge all readers to understand the importance and urgency of the situation.

### **Archives**

As a matter of interest my collection of unique historical publications and other material has been archived by a South African university. It will make interesting reading for future historians.

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