

Some Observatory History -1991 to the Ground-Breaking Ceremony



Alan Watson

Spokesperson Emeritus University of Leeds, UK a.a.watson@leeds.ac.uk



How it started: ICRC Dublin August 1991

aaw/Review Talk at European Cosmic Ray Conference in July 1990

It is disappointing and salutary to realise that these conclusions are not essentially different from those which were reached ten years ago⁶⁰. The conclusions are firmer now but it is depressing to think that the rate of collection of data is unlikely to allow very much stronger statements to be made within the next five years. The problem is lack of exposure: while it has been clear for many years that 1000km² of instrumental area is needed progress towards getting this has been slow. The Volcano Ranch, Sydney and Haverah

the on-going effort at Yakutsk. There are tantalizing indications to be followed up and many theoretical predictions to be tested. The experimental problems challenging are and subtle but certainly soluble. All that is needed is dedication, money and patience; otherwise a reviewer writing ten years from now will not be able to draw many different conclusions.

Sent to Jim Cronin in early 1991

60. A.A. Watson, Quart. J.R. Astron. Soc. 21 (1980) 1.

Paris Conference: April 1992



Edited by M. BORATAV, J. W. CRONIN and A. A. WATSON

Target aperture: 10⁴ km² sr

About 80 participants from across the world

Lots of ideas with proposals for projects in Australia, US, Italy, Andes

Techniques covered fluorescence, RPCs, solarblind Cherenkov detectors as well as more conventional devices

Already fluorescence vs all surface detectors tensions

Young French scientist:

'Just because Pierre Auger was French does not mean that we have to get involved with this'

Adelaide Workshop: First Project Workshop 4 – 15 January 2003



Organised by Roger Clay and Bruce Dawson: about 25 people some of whom stayed for full 11 days. We really worked – astrophysics, ground-array with lead-burger, communications, GPS for timing, fluorescence-only, costings, hybrid idea: Dawson and Lee

Key Meeting

Proceedings of the

Tokyo Workshop on Techniques for the Study of Extremely High Energy Cosmic Rays

> Tokyo : Japan 27~30 September 1993



Institute for Cosmic Ray Research (ICRR) University of Tokyo

Tokyo Workshop 27 – 30 September 1993

More of a discussion meeting than a workshop 65 people, 75% from Japan

Still strong tensions between all fluorescence vs all surface detectors

At this meeting it seems to have been (judging from papers) the fluorescence people who had upper hand

But

Key paper was Bruce's introduction of hybrid idea

'Is a Hybrid Detector the Answer?'

Also when Giorgio Matthiae became interested - largely because of this

Jim and I began to get the idea!

Raising interest in Europe was not so easy: France (exception of Murat), Italy (exception of Giorgio) and Germany (until arrival of Hans) were relatively to get interested

US much simpler:

Fermilab interest early - following meeting there in 1994 after demise of SSC

Trip to the Far East, 23 August – 14 September 1994, with Jim Cronin

Tokyo, Seoul, Beijing, Hong Kong, Hanoi and Australia (Canberra and Adelaide)

- Vietnam visit included meeting with vice-President of Communist Party (Nguyen Van Hieu) Recruited Vietnamese group
- In Canberra we learned how well astronomers lived (Jeremy Mold): led to Office Building
- Chose name of the Project: A.U.G.E.R → Auger

It was 'Giant Array Project' before that – hence GAP note

Sources of seed-corn money

Leeds: Cash raised by the sale of the aluminium lids from Haverah Park water-tanks and of lead that had been used as shielding in muon detectors: GPS and Comms Studies

Introduction to the Director General of UNESCO was made and Jim and Murat charmed \$100k from him

USA was then not a member of UNESCO!

Jim also raised substantial funds from David Grainger, a long-time benefactor of the University of Chicago, and from Robert Galvin, the son of the founder of Motorola

Later he persuaded Galvin to donate ~ 1000 GPS receivers to the project when the model we were using was about to become obsolete and we had no funds to buy what we needed

Jim was able to get through doors that I could never even have knocked on

World-wide Site Searches by Ken Gibbs and Antoine



Argentina (4) Australia (1) South Africa (1)

Later searches in Northern Hemisphere



The FermiLab Design Study (29 January to 29 July 1995)

Six-month study at FermiLab hosted by John Peoples (Director)

"Let a thousand flowers bloom" - for three months

For surface detectors, ideas considered: Radio RPCs Scintillators Water-Cherenkov detectors

Water-Cherenkov detectors selected

Measure energy flow Depth of detectors allows large declination coverage

Remaining time spent on simulations (depth of tank etc.), preparing Design Report (Mike Albrow)

Paul Mantsch will also give his recollections of the Design Study



Evaluation of project

The Axford Panel: CNRS 19 November 1995

W I Axford: prominent cosmic ray scientist and a Max Planck Director at Katlenburg-Lindau

J Steinberg: Nobel Laureate, 1988

M-T Koshiba: to become Nobel Laureate, 2002

R Cowsik: highly-regarded cosmic-ray theorist

R Ekers: extremely well-known Australian radio astronomer and father of SKA

M Demassiuex: ENST expert for opinion on the planned communications system

'Of course you got a good report: you chose the Panel'

Site vote and formation of Collaboration Board: UNESCO 23 November 1995

- ~80 scientists from 18 countries present
- Meeting chaired by Murat Boratav
- Site selection was between Australia, South Africa and Argentina Very clear decision 3: 4 : 11 (Northern site selection made later in September 1996: Utah chosen in San Rafael)
- Note that each country had one vote: early democracy
- Carlos Escobar became first chair of Collaboration Board with Murat Boratav as secretary
- Jim Cronin as spokesperson and Alan Watson as co-spokesperson (sometime later?)

SAGENAP Panel tribulations: chaired by Patricia Rankin (NSF Program Officer from Colorado)

Two-site proposal submitted by URA on behalf of US (\$30M of \$100M for two-site project)

If Jim Cronin not funded, then clearly project was unlikely to proceed

Three meetings:

5 March 1997: Turned down with reasonable questions raised and some hope of future success - though with guidance to increase the fluorescence coverage to be more than just the area of surface array

Given what we know now, I don't see this as having been a smart suggestion

1 November: The 'El Cheapo' Meeting – nadir of my relationship with Chair of Committee

April 1998: I did not attend – and we got money but only to go South

Itacaruça Meeting: April 1998

Jim devastated by news from SAGENAP: felt that he'd failed us

but the rest of us celebrated - discovering Caipirinhas

With hindsight the SAGENAP decision, probably for the wrong reasons, was a good one

Developing two sites would have been difficult

We would have built two sites that were too small!

After US got funding, other funding appeared quite rapidly – and Axford report certainly helped

Good will visit to Mendoza and Buenos Aires: September 1998

• Meeting with President Menem in Casa Rosa in Buenos Aires

• Hans Bluemer: I remember crystal clear our lengthy discussion on making tanks bullet-proof or not in that seminar room at Tandar



Figure 2: Jim Cronin with Mariette <u>Berl</u> Auger, the daughter of Pierre Auger. She was one of the distinguished guests at the ground breaking ceremony. (Bert is incorrect).

Ground-breaking Ceremony 15 -17 March 1999 Preceded by Finance Board in Mendoza



From Jim Cronin's message to the Collaboration immediately after the Finance Board and Ground-Breaking Ceremony

FB meeting in Mendoza. International Agreement signed by (only) five countries

Ground-breaking ceremony in Malargüe Everybody was charmed by Mariette Auger Berl

Persuaded to speak on several occasions, though always a bit reticent to speak, rose to the occasion with reminiscences of her father's work as seen through a child's eyes - "the sparkles on the roof" as her father described the cosmic rays

The presence of Mariette Auger Berl and the hospitality of all the citizens emphasized the human dimension of our large project.

We are obligated to build the best detector possible. The excellent science that we can extract from our detector is the best way to return the hospitality of our hosts. If along the way we can engage the community with a visitors center and by making internet available in the schools we will have contributed something material as well as spiritual to the citizens of Malargüe.

"A plaque in a beautiful grove will not detect very many cosmic rays. When we return to the concrete problems concerned with the construction of the actual array, there are many difficulties to overcome. Our greatest obstacle is delay caused by the complexities of multi-nation financing. While the money "seems to be there", it is difficult to actually spend it. We need a self-imposed urgency to get the first 40 tanks and the fluorescence in the field (*the Engineering Array*)"

Did I ever disagree with Jim?

End of the Design Study July 1995/aaw

"I think we should consider operating an infilled-section of Auger for perhaps the first five years of the project. This need only be ~ 100 km² and might have 500 m spacing. My estimate is that this would be fully efficient at 5×10^{18} eV so that about 400 events per year would be recorded, a total of 2000 before the detectors were moved to augment the array by ~ 1000 km² (or larger if operations with the sparse array show that a spacing >1.5 km was tolerable for the very largest events). It will enhance the confidence with which we can reconstruct events in the decade above threshold with the 1.5 km-spaced array".

Infilling argument at Morelia over deployment of Engineering Array

Massive CB vote against infilling

Jim: 'Triumph of irrationality'



- My thanks to many people
- It is a fine project and has been extremely successful
- Jim always used to say: "We can only measure what Nature sends us"
- I believe that we've done this spectacularly well
- It has been great to be a part of it
- Will watch future with great interest but increasingly from the side-lines