COMMENTARY

RE-THINKING FEDERALISM

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The approaching centenary of the Australian Constitution should be sufficient reason for comprehensively re-thinking the federal system underpinning Australian democracy. But there are other compelling reasons too.

It is now widely acknowledged that Australian federalism has been turned on its head. The original proposal was for the States to be the pre-eminent players in the federation. The Commonwealth was conceived of as a kind of factotum coordinating the common interests of the States, always playing second fiddle. As sovereign entities, the States would focus on their local communities; they eschewed a national perspective. Perhaps for this very reason nearly 100 years of federation have seen the Commonwealth inexorably taking charge; its dominance is now all but complete.

GenerallyBen j70 T9.024 Tcwid nd State politics have remained parochial and populist. Some States even managed to conjure up the worst levels of political corruption in Australian history (e.g., the Bjelke-Petersen era in Queensland; WA Inc.). And some have been breathtakingly 4 Tompetent. There a few noble exceptions Be466 Tw(to this: in South Australia, the Playford)TjT*0.003 Tc(Government)Tj4.679 0 TD0.35j70 T9's industrialisation programs and the Dunstan Decade. And with some rare exceptionsd State politicians seem incapable of meshing local needs and the national interest.

The laws of some States and Territories are dangerously undermining Australia's international standing—such as the Northern Territory

The Nixon Report into the Tasmanian economy questions the economic viability of that State. (Maybe Tasmania is not unique in this regard.) Yet despite its small and

Tasmania sends the same number of senators to the federal parliament as each of the more populous States, thereby seriously distorting the Australian democractic system.

Per capita Australian taxpayers probably fund the salaries, allowances, staff ets, and superannuation schemes of more politicians than any other modern democracy. We need to

community.

Adelaidean

Volume 9 Issue Number 7

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Deadline for next issue is 11 May

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Research education

"Say research education," said my colleague.

Why don't we breathe ourselves to death?

AS we breathe, lung movements could be killing the very cells we need for gas exchange.

But researcher Dr Yasmin Edwards and her colleagues have discovered that macrophages, best known for their role in scavenging dead cells, may actually prevent living cells from dying by producing a protective gas of their own.

As people breathe, the cells lining the air sacs of the lungs are repeatedly stretched as the lungs inflate and deflate. This stretching triggers the release of pulmonary surfactant, a detergent-like substance that adjusts surface tension and prevents both over-inflation and collapse of the air sacs.

"This surfactant system is crucial for normal lung function and its failure is responsible for thousands of deaths a year in adult and newborn babies," said Dr Edwards, from Adelaide and Flinders universities.

Dr Edwards and her co-workers have discovered that the stretching not only triggers the release of surfactant from lung cells but also causes them to die.

"This is a major anomaly since it suggests that the very process necessary to life—breathing—kills the cells that are essential for normal lung function," she said.

To understand how this could happen, Dr Edwards has developed an in-vitro (test-tube) lung model to study the interactions between different lung cells. She has found that macrophages, noted for their roles in scavenging and digesting bacteria, viruses and dead cells, in fact protect surfactant-secreting cells from dying after they have been stretched.

"What's more, they appear to do this by producing the gas nitric oxide. At high concentrations, nitric oxide contributes to tes to

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Black hole research boosted by new telescope

Lasers shine new light on gravity waves

WHEN Galileo trained his hand-made telescope on the night sky in 1604, he was the first to see lunar craters, Jupiter's moons and the phases of Venus, all with equipment more primitive than modern binoculars.

But Galileo, and countless astronomers who followed him, laboured under restrictions imposed by more than just primitive equipment. Their telescopes improved with time but, until quite recently, they could only observe visible light.

Visible light forms a tiny slice of the electromagnetic spectrum. Below it are infra red, and radio waves; beyond it, and equally invisible to our eyes, are ultraviolet, X-rays, gamma rays and more.

In the past 50 years, scientists have added immensely to their understanding of the universe by exploring it through these forms of radiation. But limitations still remain. Much of the universe is "dark matter", which emits virtually no electromagnetic radiation.

Gravitational waves seem to offer astrophysicists the best hope of studying objects composed of dark matter, but the problems are considerable. Static objects, even those that are large, will not emit gravitational waves. These, Einstein predicted, are produced when objects are accelerated, or when strong gravitational fields interact dynamically. Likely sources include supernovae and the merging or collision of entities like neutrino stars and black holes. These phenomena should produce extremely intense gravitational waves.

But even these gravitational waves produce only weak forces by common standards. Passing through the Earth, they could move objects, but only by 1/10,000 the width of a proton, and for less than ten milliseconds. How does one search for such forces?

There are two approaches. One involves cooling a metal bar of niobium or aluminium to very low temperatures and listening for the ringing set up in it by the distortion due to gravitational waves. It's an approach being explored in several places, with the University of Western Australia so far having the most sensitive detector of this type. The other approach involves using a laser-based detector.

A laser beam is split into two halves, and bounced back and forth between widely spaced mirrors many times to increase the sensitivity of the detector. The beams can then be brought together and compared. Minute movements caused by the stretching and squeezing of space by gravitational waves should affect them differently, and be detectable as an interference pattern created by the recombined laser beams.

The technique requires pioneering technology: 100 Watts in a laser beam that is almost perfect and very stable. Even here, the methodology divides. Two research teams are working on the problem, one at Stanford University, the other at Adelaide University, funded by large ARC grants.

"The Stanford approach uses a relatively conventional strategy that is lower risk but compromises the quality of the output," said Dr Peter Veitch of Adelaide's Department of Physics & Mathematical Physics.

"The Adelaide approach, on the other hand, will produce a much better quality output but is somewhat more risky. It uses techniques that are commonly used with high-power lasers but have never been tried for this type of neodymium laser for various reasons.

"Nobody else has thought of trying to do what we now consider to be an obvious way to produce such a laser. The competition between the two approaches is evenly poised at the moment but we are confident that our design will be chosen."

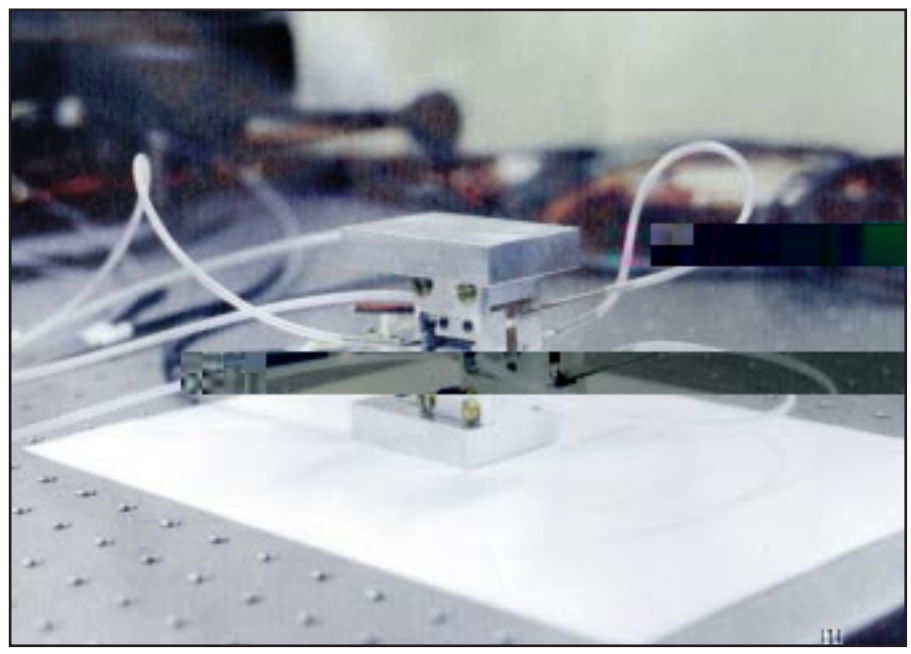
The assumed peculiarities of gravitational waves mean that a single detector can not tell where a signal comes from. A minimum of two detectors is needed, but even then they will struggle to filter background noise from the weak signals they seek.

At least four detectors, as widely spaced as possible, are required to get full directional information about the source of gravitational waves. All the northern hemisphere detectors are at similar latitudes, so an Australian instrument will eventually be necessary; but the costs involved mean that there is likely to be only one, and that international collaboration will be required to fund its construction.

The costs may be great, but the benefits could be immense, not only in commercial spinoffs from the technology being developed, but in a better understanding of some of the most elusive mysteries of the universe; how it works and, ultimately, even how it came to be.

—Rob Morrison

Dr Martin Ostermeyer, a Feodor Lynen Fellow from Germany and a member of the research team, installs infra-red diode-lasers to provide the energy source for the stable laser. Photo: Rob Morrison.



A prototype infra-red neodymiuum laser head. A garnet crystal doped with the rare earth neodymium emits infra-red light of the required wavelength. Photo courtesy of Dr Veitch.

From Page 1

"We are proud to be able to honour a South Australian scientist in this way," Mr Perrin said.

"This year the choice was not easy, such is the quality of this State's science effort, but Dr Walker's commitment to the philosophy that science should be communicated simply, but not simplistically, won him the day."

Dr Walker has published extensively, and he was the inaugural winner of Adelaide University's Stephen Cole the Elder Prize for Teaching. He has been an active participant in field days and community projects, including some at Bookmark Biosphere Reserve, and holds many

"No age can be thought more fortunate in the chance of its birth than our own age, for whose instruction men of earlier generations have laboured."

George Maxwell (MD (Edin), FRCP, FRACP) delighted in the foregoing quote from Quintilian, a first century Roman, and was keenly aware both of his own good fortune in receiving a strong education and his responsibility to stamp this into his students.

Appointed at the age of 34 to the McGregor Reid Chair of Child Health at Adelaide University in 1959, he became the founding professor of what was then a new specialist area of medicine, later known as Paediatrics. In this position from 1959 to 1988, he contributed to the education of thousands of Adelaide doctors. Few of them have forgotten his insistence on high standards and self-discipline.

George's introduction to intellectual life began at the age of four when his father bought him Arthur Mee's *Children's Encyclopaedia*. Richly illustrated, it stimulated a life-long interest in history and a fascination with science. At Falkirk High School, in Scotland, he began studying Classics, and was dux in languages, but then switched to Science. He went on to study medicine at the University of Edinburgh, graduating in 1947. In this year too he married his first wife Sheena, and they raised three daughters, Ailsa, Rowena and Moira.

Following service in the Royal Army Medical Corps and a period of general practice, he entered paediatric training at the Royal Hospital for Sick Children in Edinburgh. A Fulbright Fellow in 1951, George worked on the pioneering cardiac catheterization project at the University of Wisconsin, including having his own heart experimented on. He was appointed Associate Professor of Paediatrics there in 1954. His colleague, Professor of Cardiology George Rowe, recently wrote in a letter of condolence:

"...how fine a person George was, and how many lives he made easier and longer. His extraordinary judgment, coupled with his compassion for others and his never failing humor, were towers of strength to me as we sought our way through the beginnings of cardiac catheterization and cardiac surgery. How he was missed when he left!!"

That university's loss was Australia's gain in 1959. Adelaide University and families throughout South Australia benefited from 'Prof's' work at the Children's Hospital. George was particularly proud of the fact that fivejudgmenraowers orute4 04.908 f R

Your details:

Mr/Ms/Dr, etc .....

Family Name .....

Former Family Name (if applicable) .....

Given Names .....

Date of Birth ..... Country of Birth .....

Address .....

State..... Postcode ..... Country .....

Phone Hm ( ) ..... Wk ( ) .....

Fax ( ) .....

Email .....

Adelaide University Degree(s) or Qualification(s):

Qualification	Course	Year of Graduation
.....	.....	.....
.....	.....	.....

Other Degrees or Qualifications from other institutions:

Institution	Qualification	Year of Graduation
.....	.....	.....
.....	.....	.....

Membership of professional bodies or associations:

.....

Please tick if you are:

Former Staff Graduate Other .....

Student Student/Staff No. (if known) .....

Career Details: Please tick if you are:

Still studying Taking time out Self employed

Unemployed Family commitments Retired

Employed

Your position: .....

Type of employment (please tick):

Professional Managerial Admin Service

Your position: .....

Current and previous sporting or leisure activities and interests:

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Would you be interested in being a member of a particular chapter? (please tick): YES NO

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State..... Postcode ..... Country .....

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DESKS: Solid wooden desks, ex Department of Surgery, RAH. Various sizes. $70 - $200 ea. Ph Neville 8222 4155 or email: <neville.deyoung@adelaide.edu.au>.

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LANDSCAPE AUSTRALIA JOURNAL: 1979-94 inclusive, 64 issues + 5 slip cases. $125. Ph 8354 4787 orJOURNAL

Bulletin Board

Special Studies Program

Special Studies commencing in the period January-June 2001.

Applications are now invited for Special Studies commencing in the first half of 2001. Applica-tion forms may be obtained from Human Resources (ext 35666 or 35177) or through our Web page on <http://www.adelaide.edu.au/HR/services/f_sspapp.htm> and should be returned to Human Resources through the Head of the Department no later than 12 May 2000.

Following a recent review of the SSP, the University has revised the rates of financial support for staff undertaking SSP activities from 2001 as follows:

1. Calculation of airfare assistance will be simplified and related more closely to the actual cost for the staff member and dependents, to provide reim-bursement of the economy-class, advance-purchase return airfares up to a maximum figure as set out below for the staff member and each dependent charged an adult fare, with an appropriate fraction for dependent minors based on actual fares charged.

* for travel to UK, Europe or North America up to $2,800;
* for travel to Asia, Africa or South America up to $2,000;
* for travel in Australia and the Pacific up to $auw2(o)Tj2.15(p)Tj05ali/TD(o $auw2(o)Tj2.15(p)Tj05ali/TD(o $auwd2msoi)Tj0.312 0 TD/ 0 TD(oa o)Tj1

AUSTRALIAN RESEARCH COUNCIL (ARC)
GRANTS FOR 2001

Research Infrastructure Equipment and Facilities Scheme

The main objective of this program is to fund relatively large scale initiatives (in excess of $100,000) to develop research infrastructure on a collaborative basis among groups of institutions, across the higher education system as a whole, and with organisations outside the system. Approximately $20 mil(st)To7 Tw(Bulletin Boaieij2.295r8d)tSn6 0 TD(ns6 0 TD(v)Tj0.4j0.828 0 Til(r)Tj0.3sat)T

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Research Grants and Fellowships

The following is a list of grant, fellowship and other research funding schemes currently available for application. A more detailed electronic version of this listing (Update: Research), together with guidelines and application forms for some of the major schemes, are available at: <http://www.adelaide.edu.au/RB/>. For hard copy application forms and guidelines for the funding schemes listed below, contact the Research Branch, ext 35137; or email <renae.minerds@adelaide.edu.au>.

Sponsored Programs Information Network (SPIN): SPIN Australia - A database containing current and comprehensive information on over 2,600 government and private funding opportunities. The SPIN web site is accessible via the Research Branch web site.

Earthwatch Australia: Centre for Field Research (CFR) - Research Grants: For details on the level of support available, the application process and lead time necessary, please visit the Centre for Field Research (CFR) homepage at <http://www.earthwatch.org/cfr/cfr.html>.

International Union Against Cancer (UICC) - International Cancer Fellowship: International Cancer Technology Transfer Fellowships (ICRETT): No closing date, selection results within 60 days.

National Heritage Trust, Coasts and Clean Seas - Funding for Environmental Projects 2000-2001: Internal closing date: 11 May 2000. Web site: <http://www.environment.gov.au/net/ccs.html>.

Australian Coal Association Research Program - 2000 Research Priorities: Internal closing date: 12 May 2000. Web site: <http://www.acarp.com.au>.

Emergency Management Australia - 2000-2001 Australian Disaster Research Grants: Internal closing date: 12 May 2000. Web site: <http://www.ema.gov.au/ausgrants.htm>.

National Cancer Institute, USA - Genetic Regulation of Susceptibility to Tobacco-Related Carcinogenesis: Internal closing dates: 15 May & 15 September 2000. Web site: <http://www.nih/gov/grants/guide/pa-files/PA-98-095.html>.

National Centre for Research Resources (NCRR), USA

- **Novel Approaches to Enhance Stem Cell Research**

Internal closing dates: 15 May & 15 September 2000. Web site: <http://www.nih.gov/grants/guide/pa-files/PA-99-086.html>.

- **Comparative Medicine - Various Awards and Programmes (Visit website for further details)**

<http://www.ncrr.nih.gov>.

National Institute of Arthritis and Musculoskleletal and Skin Diseases, USA - Grants for Research on the effects of Microgravity on the Musculoskeletal System: Internal closing dates: 15 May & 15 September 2000

National Institute of Arthritis and Musculoskeletal and Skin Diseases, USA / National Institute for Child Health and Human Development, USA / National Institute of Dental Research, USA / National Institute of Diabetes, Digestive, and Kidney Diseases, USA - Research Grants for Research on Skeletal Growth and Development: Internal closing dates: 15 May & 15 September 2000. Web site: <http://www.grants.nih.gov/grants/guide/pa-files/PA-98-105.html>.

National Institute of Diabetes and Digestive and Kidney Diseases, USA / National Eye Institute, USA / National Institute for Dental and Craniofacial Research, USA / National Institute of Neurological Disorders and Stroke, USA / National Heart, Lung, and Blood Institute, USA - Research Grants - The Role of Growth Factors in the Development of Diabetes Complications: Internal closing dates: 15 May & 15 September 2000. Web site: <http://www.grants.nih.gov/grants/guide/pa-files/PA-99-159.html>.

National Institute of Neurological Disorders & Stroke / National Institute of Arthritis and Musculoskeletal and Skin Diseases, USA - Research Grants - Gene Therapy in Duchenne Muscular Dystrophy: Internal closing date: 15 May & 15 September 2000. Web site: <http://www.grants.nih.gov/grants/guide/1994/94.02.18/pa-gene-therapy-in-d008.html>.

National Institute on Deafness and Other Communication Disorders, USA / National Institute on Aging, USA: Research Grants - Olfactory Neurogenesis: Internal closing dates: 15 May & 15 September 2000. Web site: <http://www.grants.nih.gov/grants/guide/pa-files/PA-95-090.html>.

National Institute on Drug Abuse, USA - Research Grants on the Origins and Pathways to Drug Abuse: Internal closing dates: 15 May & 15 September 2000. Web site: <http://www.grants.nih.gov/grants/guide/pa-files/PAR-99-168.html>.

National Heart, Lung and Blood Institute, USA - Cellular and Molecular Mechanisms of Primary Pulmonary Hypertension: Internal closing dates: 18 May & 15 September 2000. Web site: <http://www.grants.nih.gov/grants/guide/pa-files/PA-00-043.html>.

National Institute of Child Health & Human Development, USA - Vulvodynia - Systematic Epidemiologic or Therapeutic Studies: Internal closing dates: 18 May & 15 September 2000. Web site: <http://www.grants.nih.gov/grants/guide/pa-files/PA-98-112.html>.

National Institute of Dental and Craniofacial Research, USA - International Collaborative Oral Health Research Planning Grant: Internal closing dates: 18 May & 15 September 2000. Web site: <http://www.grants.nih.gov/grants/guide/pa-files/PR-00-012.html>.

National Institute of Diabetes and Digestive and Kidney Diseases, USA - The Role of Endothelial Dysfunction in Diabetic Complications: Internal closing dates: 18 May & 16 September 2000. Web site: <http://www.grants.nih.gov/grants/guide/pa-files/PA-00-026.html>.

National Institute on Aging, USA / National Institute of Arthritis and Musculoskeletal and Skin Diseases, USA / National Institute of Diabetes and Digestive and Kidney Diseases, USA - Skeletal Muscle Perfusion, Aging and Cardiovascular Disease: Internal closing dates: 18 May, 15 September 2000 & 17 January 2001. Web site: <http://www.grants.nih.gov/grants/guide/pa-files/PA-00-056.html>.

National Institute on Drug Abuse, USA - Neurobiological & Behavioural Research on Nicotine and Tobacco Components: Internal closing dates: 18 May & 15 September 2000. Web site: