

# THE HISTORY OF CARTOGRAPHIC RESEARCH IN AUSTRALIA

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# 60 Years On

Cartography has evolved significantly since the formation of the Australian Institute of Cartographer, now called the Mapping Sciences Institute - Australia, some 60 years ago.

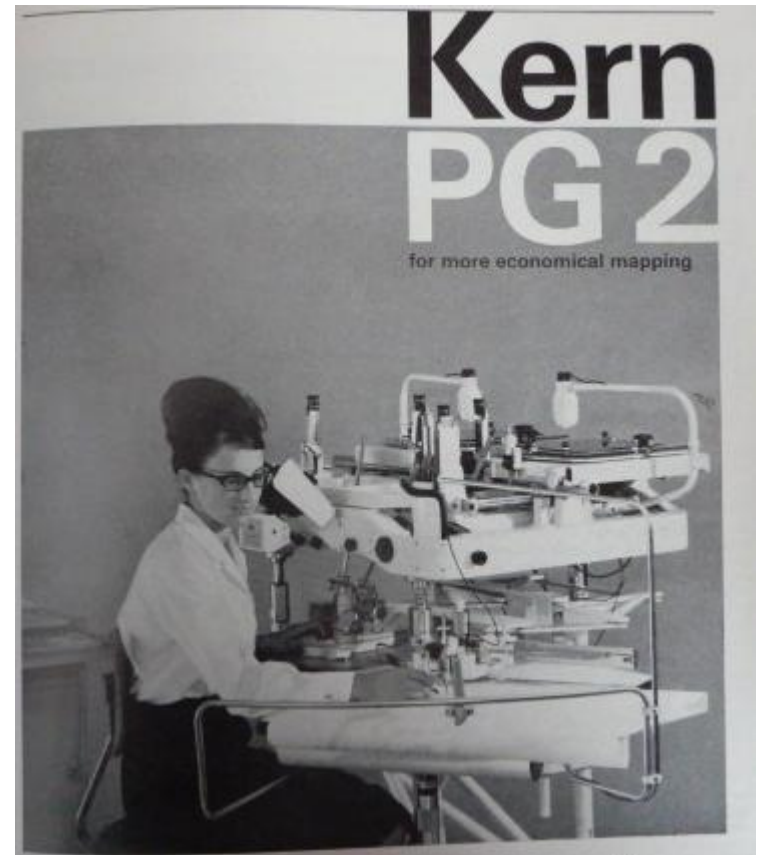
The evolution of cartography in Australia can be mapped by plotting the change in cartographic research over this period.

# 1968

**Cartography in Australia was seeking its own identity.** Just as surveyors in the past had felt they were the neglected child of civil engineering so cartographers wanted to move towards recognition as professionals in their own right.

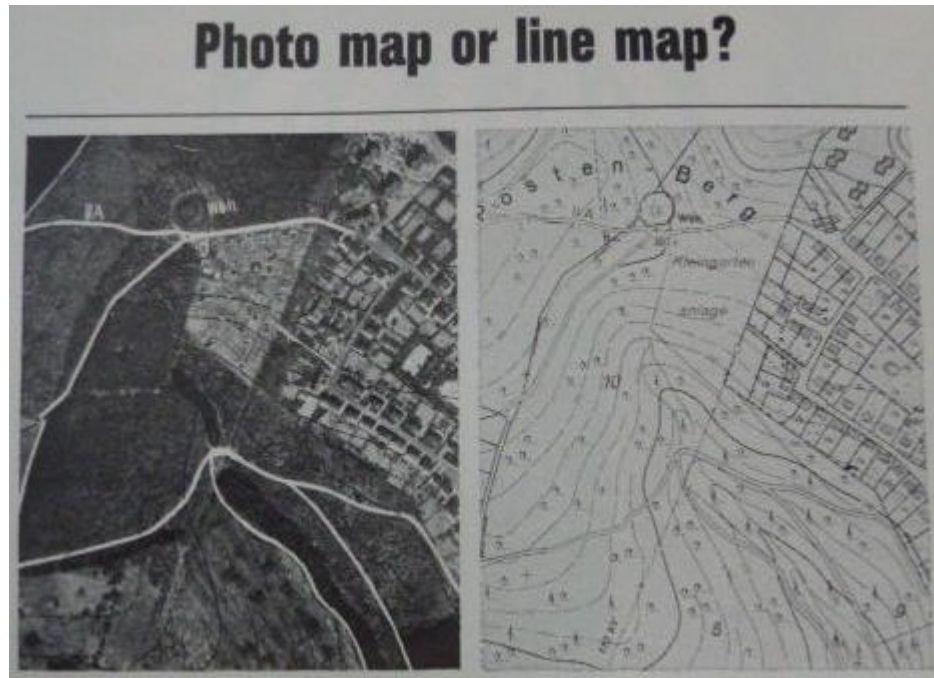
There was a movement for cartography to be referred to as **cartographic engineering**.

**Photogrammetry** was the primary area of research and development in the industry at the time.



# Research

The health of a discipline, such as cartography, can be measured by its level of research activity over the years of its existence.



# 1969

The push for the tertiary education and training of cartographers began.

Bruce Smith (1969) emphasised that the *“importance of cartographic engineering to the community necessitates the planned expansion of all existing courses, both in breadth and depth, in addition to the creation of a comprehensive institute.”*

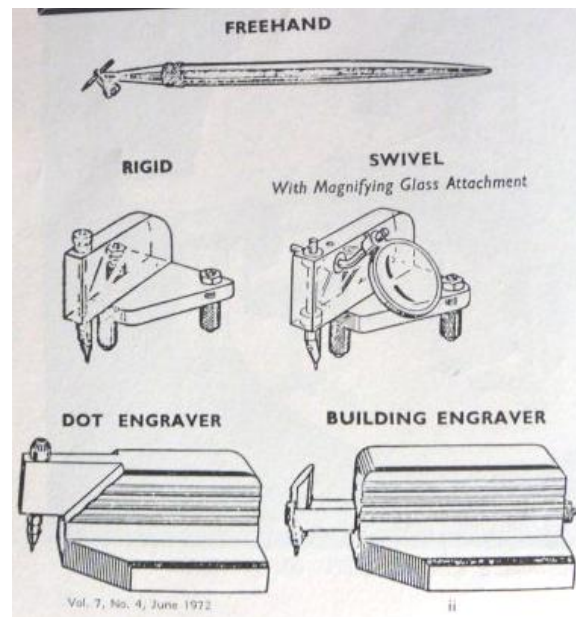
He listed as important the following components:

- Cartographic Technicians
- Cartographic Engineers
- Cartographic Research and Development
- Cartographic Consulting Services



# Change

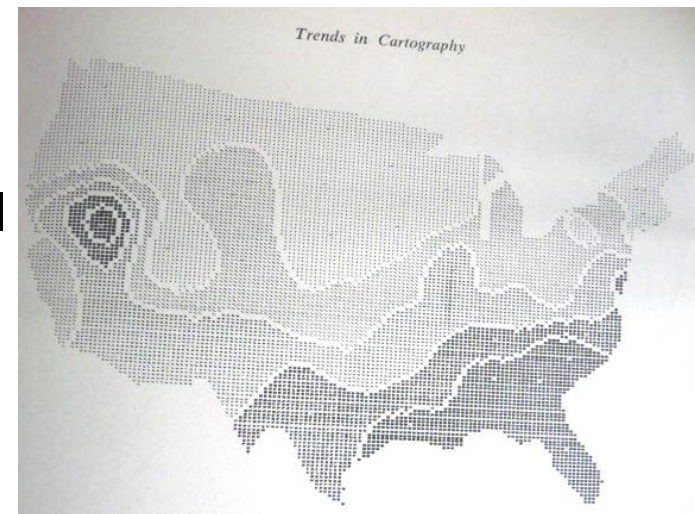
Change is often associated with what can be called a paradigm shift which reflects the evolving matrix of our cartographic sensibility.



In a letter to the editor M. (John) Balodis (1969.p4), lecturer in charge of Cartography at The Western Australian Institute of Technology, said *“How much theoretical and/or practical contributions have been rendered in this country towards automated cartography? Or are such methods of absolutely no importance to the development of this country?”*

Abstracts were listed in the journal and included the following topics:

- Aerial Cameras for Colour
- Laser Terrain Profile Recorder
- Derivation of Parallax Equations
- A New Fast-Working Approach to Analytical Photogrammetry
- Monocular Mapping on Micro-Film
- Automatic Contour Digitizer
- Electronic Printing of Colour Materials



# Evolution of a Discipline

A discipline surrounds itself with theory and practices to which it claims some degree of ownership. As a discipline develops anomalies appear and new theories and practices are debated.

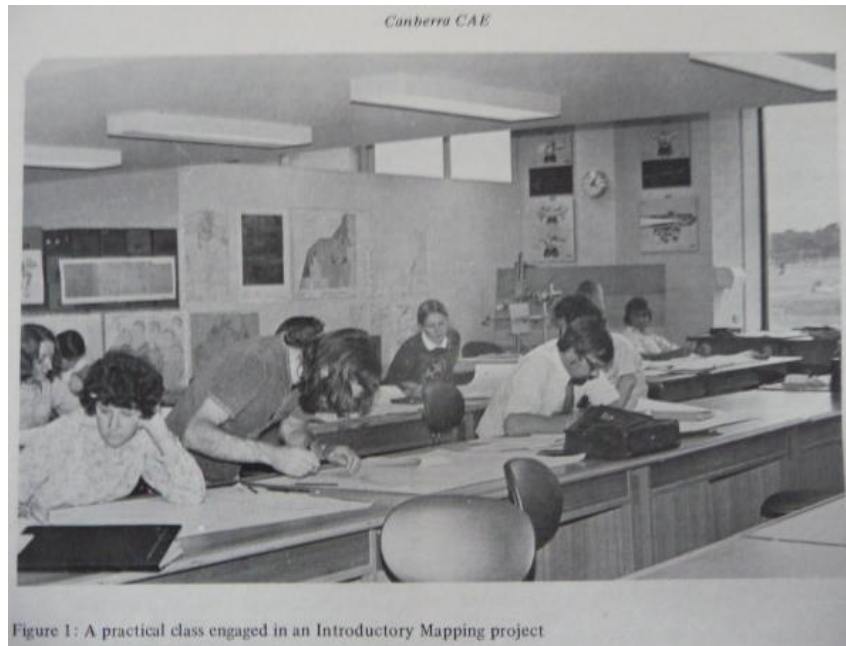
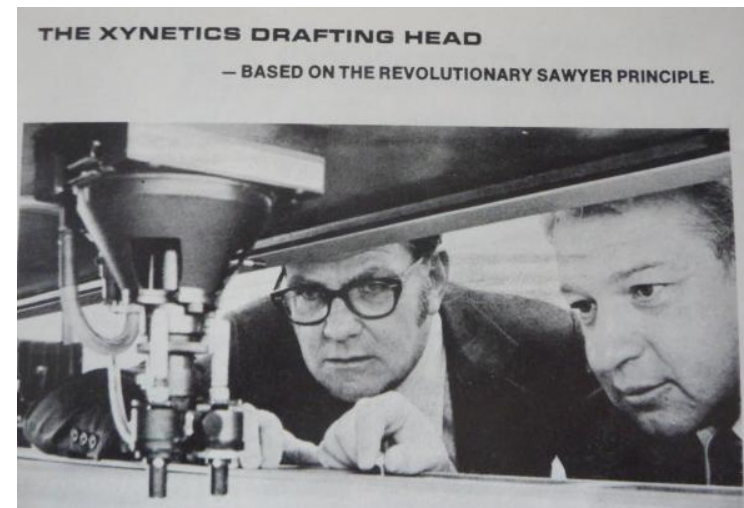


Figure 1: A practical class engaged in an Introductory Mapping project

# 1970

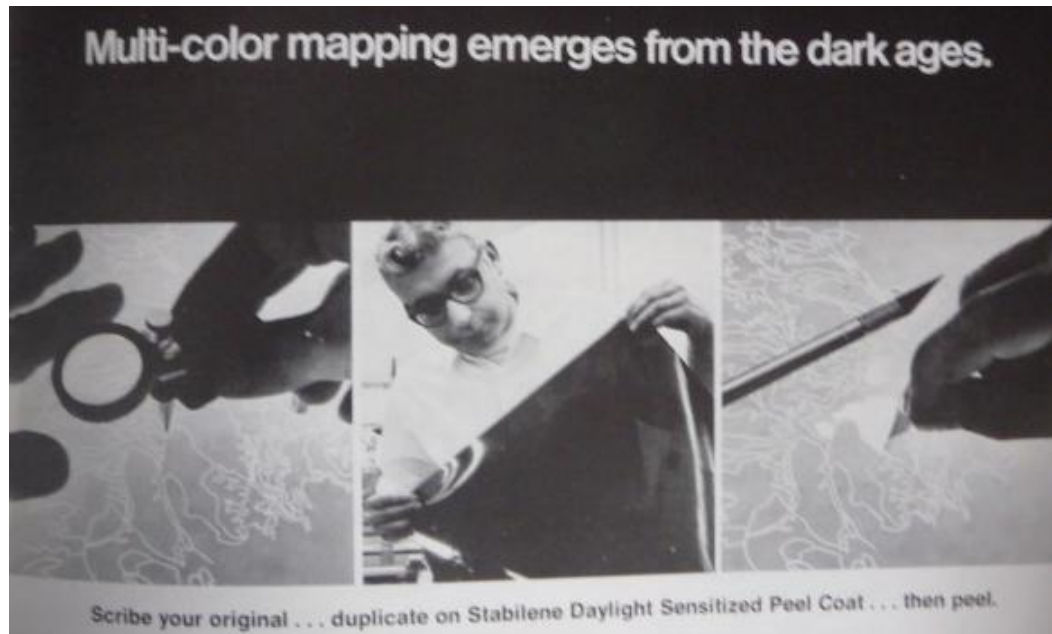
1970 - In this year the Department of Civil Engineering of the Western Australian Institute of Technology drew up a new [Associateship Diploma in Cartography](#)

The Federal President of the AIC in his report (Beikoff,p90) in the journal, commented on the “[staggering intake of students of Cartography into some of the educational establishments in the country](#)”



# Cartographic Knowledge

“Where knowledge is lacking we may extrapolate with due regard for the uncertainties arising from the incompleteness of our knowledge.” (C.J.Herrick -scholar and humanist)



# 1972

Australia started to take its place on the [international stage](#) in terms of the development of cartography. Mr. B.P. Lambert, Director of National Mapping was appointed to the [U.N. Ad Hoc group of cartographic experts](#) in this year.

Journal abstracts - cartographic theory and new views:

- Cartology
- Metacartography
- On the Cartographic Method of Research
- Geographical Reference Systems
- On Map Accuracy Specifications

# 1973

1973 **Systems' thinking** was promoted and the **theory of communication** was introduced.

Recent decades have witnessed the coming of **computers and automation** which is having an immeasurable effect on contemporary cartography and the future outlook. "Trends in Cartography" by Dr. Phillip C. Muehrcke, Associate Professor in Cartography, University of Wisconsin,



# 1973

The Abstracts section included more theoretical papers such as:

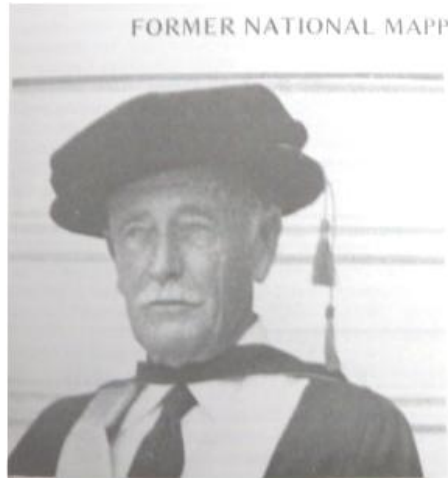
- Semiotics and Cartography – The Application of Cybernetics in Theoretical Cartography
- Error on Choroplethic Maps: Definition, Measurement, Reduction
- Experimental Maps of Road Travel Speed
- A Computer Program for Three-Dimensional Representation of Geographic Data



# 1974

The education sector had grasped tertiary education for cartographers.

The President (D.W. McInnes,p110) in his report on the 21<sup>st</sup> birthday of the Australian Institute of Cartographers, suggested the establishment and maintenance of a **suitable standard of cartographic education for the whole of Australia was a priority.**



# 1974

Research started to gain momentum with the CSIRO being involved in a number of studies related to [satellite imagery and the application of remote sensing](#) techniques to the exploration and management of Australian resources (Bulletin, p107).

Cartography began to take on its own life separately from photogrammetry. This was a significant paradigm shift.



# 1975

Change became the norm for cartography with two key shifts being reported in the editorial:

1. the development of cartography being driven by tertiary educated cartographers
2. the shift to computer assisted techniques

- The Australian Map Curators' Circle, chaired by Mr Tom Knight, was recent established

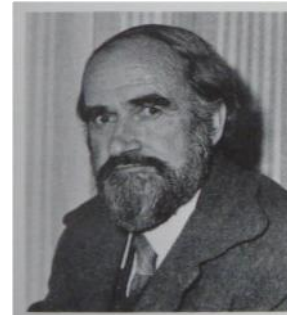
- Automatic Drafting System installed by the Australian Survey Office

- Remote Sensing Association of Australia formed

- The ICA created Commissions on:

- Education
- Technical Terms
- Automation
- Thematic Cartography
- Communications in Cartography
- Cartographic Technology

- Reflecting the growth in tertiary education the AIC adjusted the qualifications for grades of membership



1972-73	D.B. Johnston
1973-74	D.W. McInnes*
1974-75	T.G. Hickson
1975-76	H.R.H. Voss
1976-77	G.H.C. Kennedy
1977-78	H.J.W. Vojacek
1978-79	J.R. Barclay
1979-80	K.M. Ashbolt
1980-81	R.G. Roberts
1981-82	D.R. Hocking

# 1976

The accelerated momentum for change was reported on in the President's report (G.H.C.Kennedy, p205): *"I am conscious of the atmosphere of expectation surrounding cartography at the moment. In Australia we are "between histories" as it were. We still have links with the past when cartography was more an art than a science, and have not yet emerged into the full technological age of applied science in the form of automated techniques."*



# 1977

In his report on the 2<sup>nd</sup> Cartographic Conference in Adelaide, the conference coordinator, John Jenkins (p2) commented that: *“Automation is quite clearly the single item that will have the greatest immediate effect on map production and will sooner or later affect the working lives of nearly all cartographers.”*

John Robertson, RMIT lecturer in cartography, commented at the time that *“Part of a professional person’s activity should be that they write for technical journals of their particular calling.”* (Bulletin, p9)

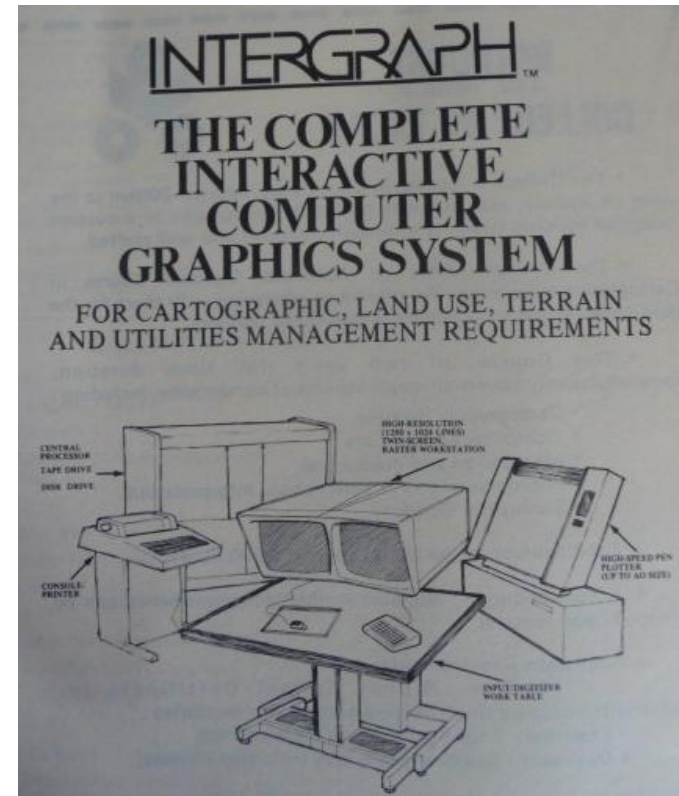
New research and development companies were established at Tertiary Institutions:.



# 1978

The Australian Institute of Cartographers had 1200 members by this year (Editorial, p184) and in the President's message (p186), H.J. Vojacek said: *"We have today among our members cartographers with tertiary qualifications, who are introducing a completely new professional level. The outlook of the Institute on cartographers and cartography is changing"*

This was a demand driven push for higher and higher educational qualifications and it would not be long before the **first research degree** saw graduates come on to the market.



# 1981

“The ICA encourages research and development in many fields of cartography and has set up 11 Commissions each with a president who organises research to be done with the help of cartographers. An Australian representative has been appointed to each Commission. “Glyn Roberts (1981,p133) in his President’s message

“The contributions of research and development are producing new technological hardware for collecting and storing information as geographic information systems. “ (Journal editorial)

A research team at the CSIRO Division of Computing Research develops software for the interactive colour mapping of statistical data.

# 1982

The Editorial states, in part, “*Remember back to the early computers, large, slow and hungry for energy. Compare them with today’s compact, fast, powerful and energy efficient models.*”

In this year the Central Mapping Authority of NSW purchased an interactive graphics system consisting of a **PDP-11/44 computer**, **two 67 megabyte disc drives**, Calcomp 600 series digitiser and Tektronics 4016 graphics display tube. Autodraft software was purchased for interactive operations.

# 1982

*“Twenty years ago (1962) the President of the Institute, Norm Williams stated, ‘It is becoming increasingly difficult in this electronic age for even the specialist to keep pace with developments in his own field of science. At the moment this applies particularly to Cartography through all its stages.’*



Byrne Goodrick in his President's message (p191): *“I believe cartography is on the threshold of a new era. .... In this era, maps need to be viewed as data banks of locational information which can be combined with a variety of other data for illustration, interpretation and decision making.”*

# 1984

Tertiary graduates and the **research and development** undertaken in the institutions of learning are having quite an influence on the industry.

The “**thinking**” behind the software and hardware has become a key need in the industry.

“Our educational institutions can be justly proud of their graduates ..... not only do they possess technical competence but they can readily explain what they are doing and why!”.

President’s message by Arthur Cheesman,(p134-135)

# 1984

The CSIRO continues to support cartographic research.

- A research project has been established at the CSIRO Division of Computing Research on the data base aspects of geographic information systems. The project will investigate the manipulation of spatial and aspatial data in an integrated data base, seeking to eliminate the traditional dichotomy between these two types of data. (Bulletin Article)



# 1984

This year, 1984, will possibly go down in history as the year where **cartography in Australia came of age**. From this point on the complexity of the **computer-assisted cartographic systems** and the development of **Geographic Information Systems** meant that cartography was fast becoming **too big for one discipline** to control and hence a multi-disciplinary approach was occurring where individuals and companies from different disciplines such as geography, computer science, mathematics and statistics contributed to the growth of the information age.



# Journal of Spatial Science

Vol. 57 No.1 June 2012

- First results of mixed GPS+GIOVE single-frequency RTK for Australia
- Three viable options for a new Australian vertical datum
- The structural salience of landmarks: results from an on-line study and virtual environment experiment
- Linear features for automatic registration and reliable change detection of multi-source imagery
- Towards a foundation for spatial metadata automation
- Inter-governmental land information asymmetries in Australia
- Hotspots, research productivity and collaboration networks in remote sensing and GIS in Australia from 1991 to 2010

# Concluding Comment

“It is an ironic trick of history that, at the very moment that cartographers seemed to have reached their goals and established their identity, they have to revise their philosophies on what cartography is or should be, to restructure their production and to update their education and training systems. Whether they succeed or not depends on their own inventiveness and flexibility. . . . . The crossbreed of two entirely different species, the cartographer and the computer scientist . . . . has four parents: a geographer, a cartographer, a mathematician and a statistician, and is equipped with horns to defend its acquired knowledge and experience in the field of map design and communication.” (Professor F.J. Ormeling, President, ICA, p19 in his welcome address to the 12<sup>th</sup> ICA Conference. Perth, 1984)