

# ANU ELECTRON MICROSCOPY UNIT

Report to Council for 1991

## CONTENTS

1. STAFF OF THE UNIT IN 1991
2. FACILITIES AND ADMINISTRATION
3. MAJOR EVENTS IN 1991
4. MEASURES OF PERFORMANCE
  - 4.1 Teaching
  - 4.2 Publications 1985-1991
  - 4.3 Level of Usage 1985-1991
  - 4.4 Distribution of Users Across ANU
  - 4.5 Non-ANU Users
5. SUMMARY

## 1. STAFF OF THE UNIT IN 1991

Facility Coordinator: Dr. Sally Stowe

Senior Technical Officers: Mr Roger Heady  
Mr David Llewellyn  
Mr David Vowles

Technical Officers: Mr Michael Ciszewski  
Mrs Jennifer Lovatt

Laboratory Technician: Mr Alan Lee

## 2. FACILITIES AND ADMINISTRATION

The Unit acts as a central facility for electron microscopy and various associated techniques, serving the IAS and the Faculties. It is used to a small extent by several other Australian Universities and, on a commercial basis, by a variety of outside organisations.

The Unit is housed within RSBS, and its administrative arrangements are detailed in circular 2498/1988. The Management Committee, appointed or co-opted for two-year renewable terms, currently consists of Prof. B.E.S. Gunning, RSBS (Chairman); Dr P.Cooper, BOZO; Dr P.Evans, Forestry; Dr A.Hardham, RSBS; Dr A.McLaren, RSES; Dr A.Perry, RSPHysSE; Dr S.Stowe, EMU (*ex officio*). Major equipment held by the unit includes six electron microscopes and a variety of ancillary equipment for specimen preparation and imaging. A full description of the services offered is given in a handout, "Notes for New Users" available from the Unit.

## 3. MAJOR EVENTS IN 1991

1991 was the first full year of operation on a single site. Usage continues to rise and become more diversified. This was reflected in approval of funds to purchase a third, "environmental" SEM to replace the aging H500 TEM, so that in 1992 the Unit will be based around three transmission and three scanning EMs.

Light microscopical facilities have been upgraded and now include good-quality binocular (with trans- and epi-illumination, DIC/polarizing filters, rotating stage) and stereo instruments with film and video cameras.

Video output for recording and measurement is now available from scanning, transmission, and light microscopes. Video image capture and analysis can be performed on PC or Mac systems.

A basic facility for Polishing/Grinding is now operational.

## 4. MEASURES OF PERFORMANCE

### 4.1 Teaching

Most teaching of techniques is done on a one-on-one basis to meet the immediate needs of users. However a pilot series of introductory workshops aimed at postgraduates and run with the aid of speakers from the ANU and CSIRO proved successful. The facilities continue to be utilised as part of undergraduate courses by BOZO and Forestry. Some staff members also have an association with courses at the University of Canberra and the TAFE.

### 4.2 Publications 1985-1991

#### Publications in 1991:

1. Ayress MA (1991) On *Vitjasiella ferox* (Hornibrook) In: A Stereo-Atlas of Ostracod Shells, ed. J Athersuch, DJ Horne, DJ Siveter, JE Whittaker, Vol 18. Pt 1. (Brit. Micropalaeontological Soc). pp57-60
2. Bird AF, McClure SG, Nicholas WL (1991) Observations on crystalloid bodies in the pseudocoelom of *Eutobrilus heptapapillatus*. J. Nematology 23:39-47
3. Blest AD, Carter M, Clausen JA, Stowe S, Trowell SC, Tsukitani Y (1991) Induction of retinal degeneration in a crab by light and okadaic acid *in vitro*: comparison with the *Drosophila* light-dependent retinal degeneration mutant *w rdgB<sup>KS222</sup>*. Vis. Neurosci. 7:36-48
4. Blest AD, Stowe S, Clausen JA, Carter M (1991) The distribution of actin immunoreactivity in rhabdomeres of tipulid flies in relation to extra-cellular membrane shedding. Cell Tissue Res. 265:465-472
5. Bruhl JJ (1991) Comparative development of some taxonomically critical floral/inflorescence features in Cyperaceae. Aust. J. Bot. 39:119-27
6. Cox SF, Paterson MS (1991) Experimental dissolution-precipitation creep in quartz aggregates at high temperatures. Geophys. Res. Lett. 18:1401-1404
7. Ducker WA, Senden, TJ, Pashley, RM (1991) Direct measurement of colloidal forces using an atomic force microscope. Nature 353-239-240
8. Evans PD (1991) The strength properties of clearwood. Materials Forum 15: 231-244
9. FitzGerald JD, Pennock GM, Taylor GH (1991) Domain structure in MP(mesophase pitch)-based carbon fibres. Carbon 29:139-164
10. Greenslade P, Nicholas WL (1991) Some Thoracostomatopsidae (Nematoda: Enoplida) from Australia, including description of two new genera and diagnostic key. Invert. Taxonomy 4: 1031-1057

11. Gubler F, Hardham AR (1991) The fate of peripheral vesicles in zoospores of *Phytophthora cinnamoni* during infection of plants. In: *Electron Microscopy of Plant Pathogens*, ed. K. Mendgen, D-E. Leseman, Springer-Verlag pp 197-210
12. Hardham AR (1991) The cellular basis of growth and morphogenesis. In: "Plant Physiology" ed L Taiz, E Zeiger. Benjamin/Cummings Pub.Co., Calif. pp 373-397
13. Hardham AR, Gubler F, Duniec J, Elliot J (1991) A review of methods for the production and use of monoclonal antibodies to study zoosporic plant pathogens. *J Microsc.* 162:305-318
14. Hardham AR, Gubler F, Duniec J (1991) Ultrastructural and immunological studies of zoospores of *Phytophthora*. In: "Phytophthora." eds RC Shattock, DS Shaw, JA Lucas. C.U.P. pp 50-69
15. Hyde GJ, Gubler F, Hardham AR (1991) Ultrastructure of zoosporogenesis of *Phytophthora cinnamoni*. *Mycol. Res.* 95:577-591
16. Hyde GJ, Lancelle S, Hepler PK, Hardham AR (1991) Freeze substitution reveals a new model for sporangial cleavage in *Phytophthora*, a result with implications for cytokinesis in other eucaryotes. *J Cell Sci.* 100:735-746
17. Hyde GJ, Lancelle S, Hepler PK, Hardham AR (1991) Sporangial structure in *Phytophthora* is disrupted after high pressure freezing. *Protoplasma* 165:
18. Kaczmarek WA, Calka A, Ninham BW (1991) Preparation of fine hollow spherical BaFe<sub>12</sub>O<sub>19</sub> powders. *Materials Chemistry and Physics* 12:
19. Maleszka R, Skelly PJ, Clark-Walker GD (1991) Rolling circle replication of DNA in yeast mitochondria. *EMBO J.* 10:3923-3929
20. Robertson IDM, Eggleton RA (1991) Weathering of granitic muscovite to kaolinite and halloysite and of plagioclase-derived kaolinite to halloysite. *Clays and Minerals* 39:113-126
21. Taylor GH (1991) Reflections on reflectance. In: *Proc. 25th Newcastle Symposium on Advances in the Study of the Sydney Basin.* Newcastle, 222-229.
22. Taylor GH (1991) Vitrinite reflectance and fine coal texture. *Energia* 2:1-3
23. Taylor GH, Liu SY, Teichmüller M (1991) Bitumite - a TEM view. *Int. J. Coal Geol.* 18:71-85
24. Trueman J (1991) Egg chorionic structures in Corduliidae and Libellulidae (Anisoptera). *Odontologica* 20:

## Abstracts

Aryal KR, Brandsletter A. Pressure-assisted sintering of Si-Ge Alloy compacts. Aust. and NZ Solar Energy Society, Solar 1991 Conference Dec. 1991 Flinders Univ.

Giroult-Matlowksi G, Perry AJ, Durandet A, Persing H, Boswell RW. Plasma assisted deposition and etching of thick silicon dioxide layers, using the helicon diffusion reactor, for optical planar waveguides on silicon. (Proc. 16th Aust. Conf. on Optical Fibre Technology, Adelaide, December 1991.

Kaczmarek WA, Ninham BW, Calka A. (1991) "Structure and magnetic properties of aerosol synthesized barium ferrite nanocrystals", and "Magnetic properties of  $Ti_5Si_3$  powder contaminated by Fe." 15th Aust. Institute of Physics Condensed Matter Physics Meeting, Wagga Wagga, and The Joint Magnetism and Magnetic Materials and Int. Magnetism Conf. InterMag '91, Pittsburgh USA. J Appl. Physics 70:5909, 6280

Taylor GH, Pennock GM, FitzGerald JD. Mesophase under the microscope. In: Proc. 20th Biennial Conference on Carbon, Santa Barbara, American Carbon Society, 152-153. 1991

## Postgraduate and Honours Thesis (Completed or submitted in 1991)

Hayduck, Troy C. "Surface coating of membrane filters".  
Chemistry Dept.

Hyde, Geoffrey J. "The structural basis of zoospore formation in *Phytophthora*". RSBS

Joseph, Suzanne. "Studies on *Epicoccum purpurascens* Ehrenb. ex Schlect. Variants from different populations". BOZO

Nyakuengama, John Gwinyai. "The Physical and chemical properties of superior radiata pine (*Pinus radiata* D. Don) wood for thermo-mechanical pumping compared with standard radiata pine". Forestry Dept.

Ramm, Kerrie. "The effects of UV-B radiation on soybean and barley." BOZO

Tong, Carinna. "Studies on emulsion polymerization"

Webb, Mary. "Aspects of embryo sac development, fertilization and proembryogenesis in *Arabidopsis thaliana*, with emphasis on the microtubular cytoskeleton. RSBS

Yang, Li-jun Ou. "Transport properties of symbiotic membranes of soybean & *Siratro* nodules" Biochem & Molec. Biol.

Zhu, ZR. Diagenesis of the late Quaternary raised coal reefs of the Huon Peninsula, Papua New Guinea. Biogeog & Geomorphol. Dept

Accepted for Publication

Baskin TI, Busby CH, Fowke LC, Sammut M, Gubler F (1992) Improvements in immunostaining samples embedded in methacrylate: localization of microtubules and other antigens throughout developing organs in plants of diverse taxa. *Planta*

Davis AR, Gunning BES (1992) The modified stomata of the floral nectary of *Vicia faba* L. 1. Development, anatomy and ultrastructure. *Protoplasma*

Davis AR, Gunning BES (1992) The modified stomata of the floral nectary of *Vicia faba* L. 2. Stomatal number and distribution as selection criteria for breeding for high nectar sugar production. *Acta Horticulturae* 288:329-334

Hardham AR (1992) Cell Biology of pathogenesis. *Ann Rev Plant Mol Biol*

Hardham AR (1992) Subcellular systems. In: "Biology" ed RB Knox, P Ladiges, B Evans. McGraw-Hill. pp

Marotte LR, Rice FL, Waite PME ( ) The morphology and innervation of facial vibrissae in the tammar wallaby, *Macropus eugenii*. *J Anat.*

Qin TK, Gullan PJ (1992) A revision of the Australian pulvariine soft scales (Insecta: Hemiptera: Coccidae). *J Natural History* 26:

Saxby JD, Chatfield P, Taylor GH, FitzGerald JD, Kaplan IR, Lu S-T. Effect of clay minerals on products from coal maturation. *Org. Geochem.*

Skotnicki ML, Mackenzie AM, Torronen M, Brunt AA, Gibbs AJ. Cardamine chlorotic fleck virus, a new carnovirus from the Australian alps. *Aust. Plant Pathology.*

IN THE FOLLOWING TABLES, FIGURES FOR THE COMBINED UNIT ARE DENOTED BY (\*). OTHER FIGURES REFER TO THE OLD "TEM" UNIT ONLY.

Publications 1985-1991

(Not including abstracts, theses or papers in press)

YEAR	RSBS	OTHER	TOTAL
1985	27	7	34
1986	25	4	29
1987	28	6	34
1988	21	5	26
1989*	5	7	12
1990*	13	12	25
1991*	11	13	24

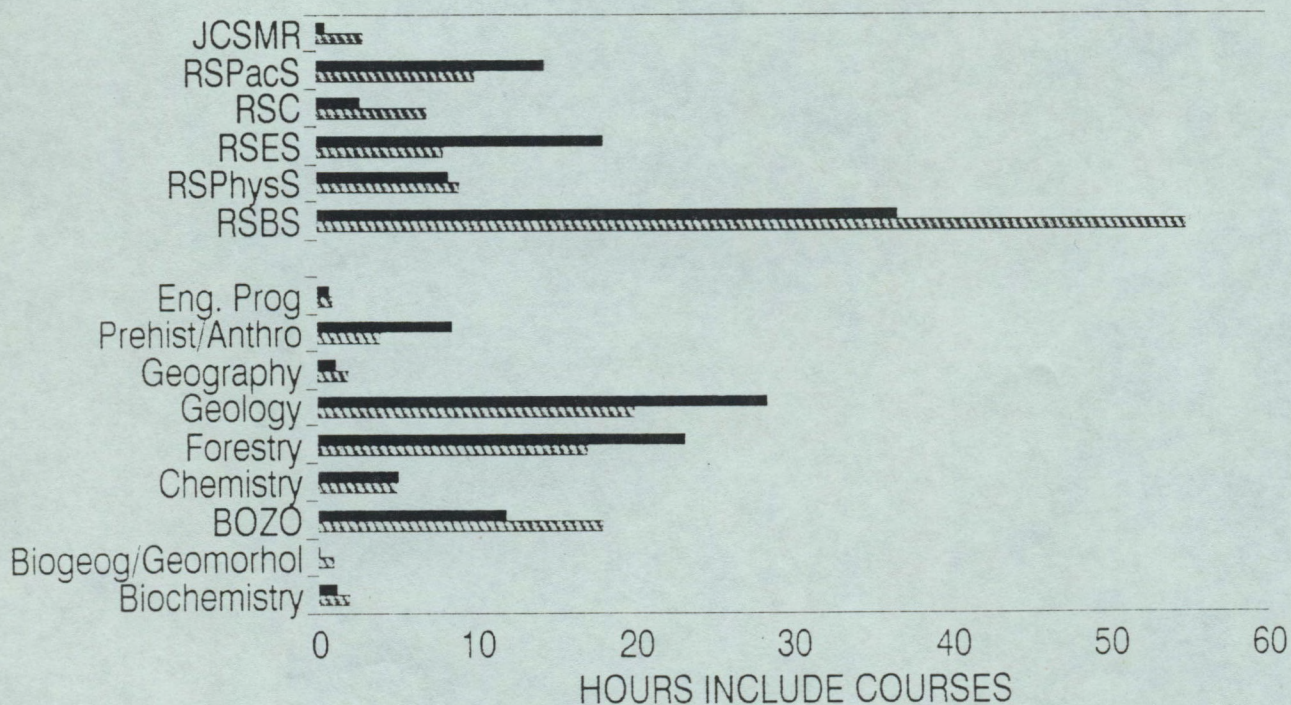
### 4.3 Distribution and Level of Usage 1985-1991



#### Number of Users 1985-1991

YEAR	RSBS	OTHER IAS	FACULTIES	OTHER	TOTAL USERS
1985	57	7	20	2	86
1986	59	13	15	3	90
1987	54	17	14	5	90
1988	45	13	18	2	78
1989*	25	21	42	19	107
1990*	29	29	55	21	134
1991*	55	40	73	22	190

### 4.4 Distribution of Users Across ANU

## DISTRIBUTION OF USERS 1991



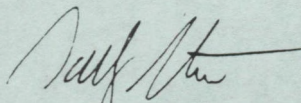
 NUMBER OF USERS
  SCOPE HOURS/30

#### 4.5 Non-ANU Users

In 1991 there were (not counting visiting student groups) 22 non-ANU users, of whom 7 from other Universities used 80 hours (4%) of scope time.

#### 5. SUMMARY

1991 was notable for an appreciable increase both in the number of users (40%) and in the microscope time actually used by those people (57%). The move from two to three SEMs in 1992, and some (limited) amount of unused time on the TEMs, should allow a further increase this year. A good deal of staff time in 1991 was spent in the establishment of upgraded or new ancillary facilities for coating, polishing, image analysis, and light microscopy, and the results should be apparent to users in 1992.



Sally Stowe  
for the EMU Management Committee



3 11. 272B

2 1 8 29B

19 2 1 17

6

# ANU ELECTRON MICROSCOPY UNIT

Report to Council for 1991

## CONTENTS

1. STAFF OF THE UNIT IN 1991
2. FACILITIES AND ADMINISTRATION
3. MAJOR EVENTS IN 1991
4. MEASURES OF PERFORMANCE
  - 4.1 Teaching
  - 4.2 Publications 1985-1991
  - 4.3 Level of Usage 1985-1991
  - 4.4 Distribution of Users Across ANU
  - 4.5 Non-ANU Users
5. SUMMARY

## 1. STAFF OF THE UNIT IN 1991

Facility Coordinator: Dr Sally Stowe

Senior Technical Officers: Mr Roger Heady  
Mr David Llewellyn  
Mr David Vowles

Technical Officers: Mr Michael Ciszewski  
Mrs Jennifer Lovatt

Laboratory Technician: Mr Alan Lee

## 2. FACILITIES AND ADMINISTRATION

The Unit acts as a central facility for electron microscopy and various associated techniques, serving the IAS and the Faculties. It is used to a small extent by several other Australian Universities and, on a commercial basis, by a variety of outside organisations.

The Unit is housed within RSBS, and its administrative arrangements are detailed in circular 2498/1988. The Management Committee, appointed or co-opted for two-year renewable terms, currently consists of Prof. B.E.S. Gunning, RSBS (Chairman); Dr P.Cooper, BOZO; Dr P.Evans, Forestry; Dr A.Hardham, RSBS; Dr A.McLaren, RSES; Dr A.Perry, RSPHysSE; Dr S.Stowe, EMU (*ex officio*). Major equipment held by the unit includes six electron microscopes and a variety of ancillary equipment for specimen preparation and imaging. A full description of the services offered is given in a handout, "Notes for New Users" available from the Unit.

## 3. MAJOR EVENTS IN 1991

1991 was the first full year of operation on a single site. Usage continues to rise and become more diversified. This was reflected in approval of funds to purchase a third, "environmental" SEM to replace the aging H500 TEM, so that in 1992 the Unit will be based around three transmission and three scanning EMs.

Light microscopical facilities have been upgraded and now include good-quality binocular (with trans- and epi-illumination, DIC/polarizing filters, rotating stage) and stereo instruments with film and video cameras.

Video output for recording and measurement is now available from scanning, transmission, and light microscopes. Video image capture and analysis can be performed on PC or Mac systems.

A basic facility for Polishing/Grinding is now operational.

## 4. MEASURES OF PERFORMANCE

### 4.1 Teaching

Most teaching of techniques is done on a one-on-one basis to meet the immediate needs of users. However a pilot series of introductory workshops aimed at postgraduates and run with the aid of speakers from the ANU and CSIRO proved successful. The facilities continue to be utilised as part of undergraduate courses by BOZO and Forestry. Some staff members also have an association with courses at the University of Canberra and the TAFE.

### 4.2 Publications 1985-1991

#### Publications in 1991:

1. Ayress MA (1991) On *Vitjasiella ferox* (Hornibrook) In: A Stereo-Atlas of Ostracod Shells, ed. J Athersuch, DJ Horne, DJ Siveter, JE Whittaker, Vol 18. Pt 1. (Brit. Micropalaeontological Soc). pp57-60

2. Bird AF, McClure SG, Nicholas WL (1991) Observations on crystalloid bodies in the pseudocoelom of *Eutobrilus heptapapillatus*. J. Nematology 23:39-47

3. Blest AD, Carter M, Clausen JA, Stowe S, Trowell SC, Tsukitani Y (1991) Induction of retinal degeneration in a crab by light and okadaic acid *in vitro*: comparison with the *Drosophila* light-dependent retinal degeneration mutant *rdgB<sup>KS222</sup>*. Vis. Neurosci. 7:36-48

4. Blest AD, Stowe S, Clausen JA, Carter M (1991) The distribution of actin immunoreactivity in rhabdomeres of tipulid flies in relation to extra-cellular membrane shedding. Cell Tissue Res. 265:465-472

5. Bruhl JJ (1991) Comparative development of some taxonomically critical floral/inflorescence features in Cyperaceae. Aust. J. Bot. 39:119-27

6. Cox SF, Paterson MS (1991) Experimental dissolution-precipitation creep in quartz aggregates at high temperatures. Geophys. Res. Lett. 18:1401-1404

7. Ducker WA, Senden, TJ, Pashley, RM (1991) Direct measurement of colloidal forces using an atomic force microscope. Nature 353:239-240

8. Evans PD (1991) The strength properties of clearwood. Materials Forum 15: 231-244

9. FitzGerald JD, Pennock GM, Taylor GH (1991) Domain structure in MP(mesophase pitch)-based carbon fibres. Carbon 29:139-164

10. Greenslade P, Nicholas WL (1991) Some Thoracostomatopsidae (Nematoda: Enoplida) from Australia, including description of two new genera and diagnostic key. Invert. Taxonomy 4: 1031-1057

11. Gubler F, Hardham AR (1991) The fate of peripheral vesicles in zoospores of *Phytophthora cinnamoni* during infection of plants. In: *Electron Microscopy of Plant Pathogens*, ed. K. Mendgen, D-E. Leseman, Springer-Verlag pp 197-210
12. Hardham AR (1991) The cellular basis of growth and morphogenesis. In: "Plant Physiology" ed L Taiz, E Zeiger. Benjamin/Cummings Pub. Co., Calif. pp 373-397
13. Hardham AR, Gubler F, Duniec J, Elliot J (1991) A review of methods for the production and use of monoclonal antibodies to study zoosporic plant pathogens. *J Microsc.* 162:305-318
14. Hardham AR, Gubler F, Duniec J (1991) Ultrastructural and immunological studies of zoospores of *Phytophthora*. In: "Phytophthora." eds RC Shattock, DS Shaw, JA Lucas. C.U.P. pp 50-69
15. Hyde GJ, Gubler F, Hardham AR (1991) Ultrastructure of zoosporogenesis of *Phytophthora cinnamoni*. *Mycol. Res.* 95:577-591
16. Hyde GJ, Lancelle S, Hepler PK, Hardham AR (1991) Freeze substitution reveals a new model for sporangial cleavage in *Phytophthora*, a result with implications for cytokinesis in other eucaryotes. *J Cell Sci.* 100:735-746
17. Hyde GJ, Lancelle S, Hepler PK, Hardham AR (1991) Sporangial structure in *Phytophthora* is disrupted after high pressure freezing. *Protoplasma* 165:
18. Kaczmarek WA, Calka A, Ninham BW (1991) Preparation of fine hollow spherical  $BaFe_{12}O_{19}$  powders. *Materials Chemistry and Physics* 12:
19. Maleszka R, Skelly PJ, Clark-Walker GD (1991) Rolling circle replication of DNA in yeast mitochondria. *EMBO J.* 10:3923-3929
20. Robertson IDM, Eggleton RA (1991) Weathering of granitic muscovite to kaolinite and halloysite and of plagioclase-derived kaolinite to halloysite. *Clays and Minerals* 39:113-126
21. Taylor GH (1991) Reflections on reflectance. In: *Proc. 25th Newcastle Symposium on Advances in the Study of the Sydney Basin.* Newcastle, 222-229.
22. Taylor GH (1991) Vitrinite reflectance and fine coal texture. *Energia* 2:1-3
23. Taylor GH, Liu SY, Teichmüller M (1991) Bitumite - a TEM view. *Int. J. Coal Geol.* 18:71-85
24. Trueman J (1991) Egg chorionic structures in Corduliidae and Libellulidae (Anisoptera). *Odontologica* 20:

## Abstracts

Aryal KR, Brandsletter A. Pressure-assisted sintering of Si-Ge Alloy compacts. Aust. and NZ Solar Energy Society, Solar 1991 Conference Dec. 1991 Flinders Univ.

Giroult-Matlowksi G, Perry AJ, Durandet A, Persing H, Boswell RW. Plasma assisted deposition and etching of thick silicon dioxide layers, using the helicon diffusion reactor, for optical planar waveguides on silicon. (Proc. 16th Aust. Conf. on Optical Fibre Technology, Adelaide, December 1991.

Kaczmarek WA, Ninham BW, Calka A. (1991) "Structure and magnetic properties of aerosol synthesized barium ferrite nanocrystals", and "Magnetic properties of  $Ti_5Si_3$  powder contaminated by Fe." 15th Aust. Institute of Physics Condensed Matter Physics Meeting, Wagga Wagga, and The Joint Magnetics and Magnetic Materials and Int. Magnetics Conf. InterMag '91, Pittsburgh USA. J Appl. Physics 70:5909, 6280

Taylor GH, Pennock GM, FitzGerald JD. Mesophase under the microscope. In: Proc. 20th Biennial Conference on Carbon, Santa Barbara, American Carbon Society, 152-153. 1991

## Postgraduate and Honours Thesis

(Completed or submitted in 1991)

Hayduck, Troy C. "Surface coating of membrane filters". Chemistry Dept.

Hyde, Geoffrey J. "The structural basis of zoospore formation in *Phytophthora*". RSBS

Joseph, Suzanne. "Studies on *Epicoccum purpurascens* Ehrenb. ex Schlect. Variants from different populations". BOZO

Nyakuengama, John Gwinyai. "The Physical and chemical properties of superior radiata pine (*Pinus radiata* D. Don) wood for thermo-mechanical pumping compared with standard radiata pine". Forestry Dept.

Ramm, Kerrie. "The effects of UV-B radiation on soybean and barley." BOZO

Tong, Carinna. "Studies on emulsion polymerization"

Webb, Mary. "Aspects of embryo sac development, fertilization and proembryogenesis in *Arabidopsis thaliana*, with emphasis on the microtubular cytoskeleton. RSBS

Yang, Li-jun Ou. "Transport properties of symbiotic membranes of soybean & *Siratro* nodules" Biochem & Molec. Biol.

Zhu, ZR. Diagenesis of the late Quaternary raised coal reefs of the Huon Peninsula, Papua New Guinea. Biogeog & Geomorphol. Dept

Accepted for Publication

Baskin TI, Busby CH, Fowke LC, Sammut M, Gubler F (1992) Improvements in immunostaining samples embedded in methacrylate: localization of microtubules and other antigens throughout developing organs in plants of diverse taxa. *Planta*

Davis AR, Gunning BES (1992) The modified stomata of the floral nectary of *Vicia faba* L. 1. Development, anatomy and ultrastructure. *Protoplasma*

Davis AR, Gunning BES (1992) The modified stomata of the floral nectary of *Vicia faba* L. 2. Stomatal number and distribution as selection criteria for breeding for high nectar sugar production. *Acta Horticulturae* 288:329-334

Hardham AR (1992) Cell Biology of pathogenesis. *Ann Rev Plant Mol Biol*

Hardham AR (1992) Subcellular systems. In: "Biology" ed RB Knox, P Ladiges, B Evans. McGraw-Hill. pp

Marotte LR, Rice FL, Waite PME ( ) The morphology and innervation of facial vibrissae in the tammar wallaby, *Macropus eugenii*. *J Anat.*

Qin TK, Gullan PJ (1992) A revision of the Australian pulvariine soft scales (Insecta: Hemiptera: Coccidae). *J Natural History* 26:

Saxby JD, Chatfield P, Taylor GH, FitzGerald JD, Kaplan IR, Lu S-T. Effect of clay minerals on products from coal maturation. *Org. Geochem.*

Skotnicki ML, Mackenzie AM, Torronen M, Brunt AA, Gibbs AJ. Cardamine chlorotic fleck virus, a new carnovirus from the Australian alps. *Aust. Plant Pathology.*

IN THE FOLLOWING TABLES, FIGURES FOR THE COMBINED UNIT ARE DENOTED BY (\*). OTHER FIGURES REFER TO THE OLD "TEM" UNIT ONLY.

Publications 1985-1991

(Not including abstracts, theses or papers in press)

YEAR	RSBS	OTHER	TOTAL
1985	27	7	34
1986	25	4	29
1987	28	6	34
1988	21	5	26
1989*	5	7	12
1990*	13	12	25
1991*	11	13	24

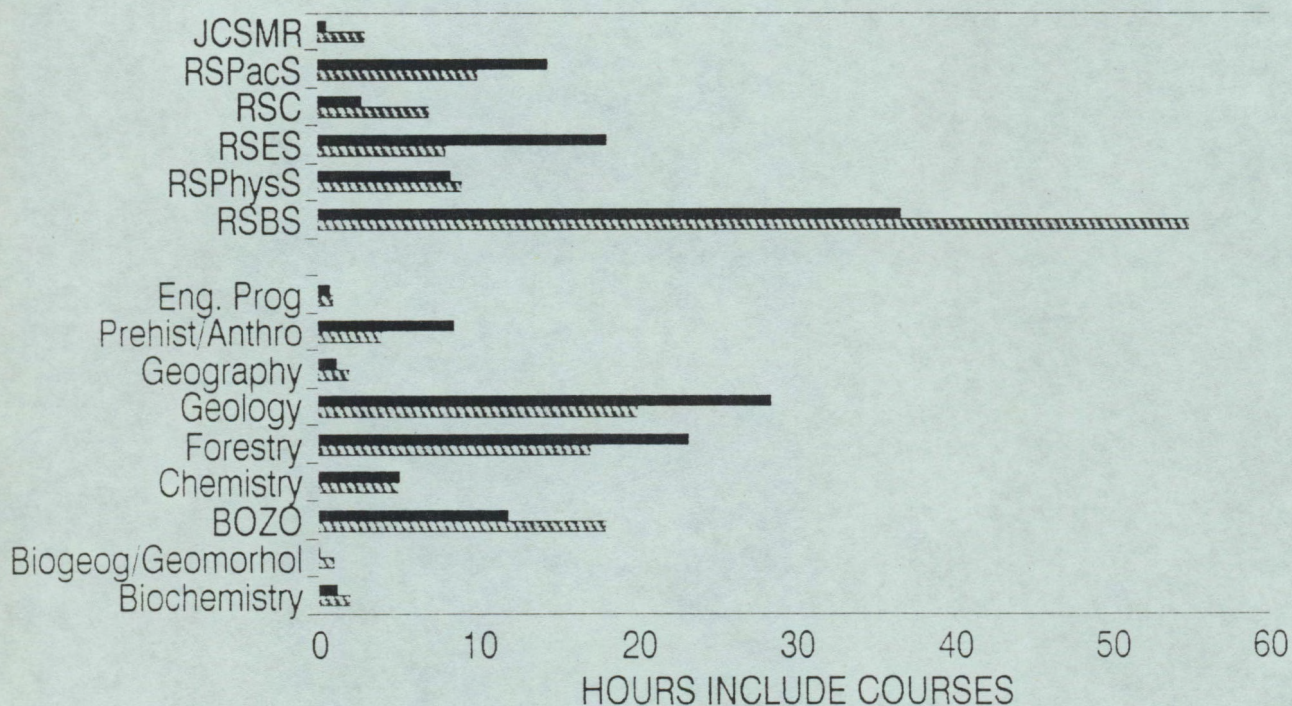
### 4.3 Distribution and Level of Usage 1985-1991



#### Number of Users 1985-1991

YEAR	RSBS	OTHER IAS	FACULTIES	OTHER	TOTAL USERS
1985	57	7	20	2	86
1986	59	13	15	3	90
1987	54	17	14	5	90
1988	45	13	18	2	78
1989*	25	21	42	19	107
1990*	29	29	55	21	134
1991*	55	40	73	22	190

### 4.4 Distribution of Users Across ANU

## DISTRIBUTION OF USERS 1991



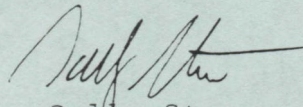
 NUMBER OF USERS
  SCOPE HOURS/30

#### 4.5 Non-ANU Users

In 1991 there were (not counting visiting student groups) 22 non-ANU users, of whom 7 from other Universities used 80 hours (4%) of scope time.

#### 5. SUMMARY

1991 was notable for an appreciable increase both in the number of users (40%) and in the microscope time actually used by those people (57%). The move from two to three SEMs in 1992, and some (limited) amount of unused time on the TEMs, should allow a further increase this year. A good deal of staff time in 1991 was spent in the establishment of upgraded or new ancillary facilities for coating, polishing, image analysis, and light microscopy, and the results should be apparent to users in 1992.



Sally Stowe  
for the EMU Management Committee