

Adrian Horridge, Scientific Advances 1953-2008.

A Curriculum Vita is usually a list of appointments, committees sat through, promotions, societies paid up, and congresses attended.

I was appointed, however, to serve and train students, and research full time, so it seems appropriate to report the action on those fronts. This is really a list of what I thought was worth doing.

1953-1963. Worked on various invertebrates, mainly in marine labs.

1953. 1st recording of a nerve impulse in a coelenterate.

1956. Description of 2 superimposed nerve nets in medusae.

1956. Description of inhibition in several coelenterates.

1956. Use of polarized light to see stresses within glass fibre laminates.

1957. Description of co-ordination of coral polyps, with a model.

1959. 1st electrophysiology of polychaete motor and sensory nervous system.

1961. Neurons sensitive to different pitches in locust ear.

1962. Discovered postural learning in headless insects.

1962. Discovered symmetrical synapses in medusae.

1965. Publication of the 2 volume work "Structure and Function in the Nervous Systems of Invertebrates" jointly with Ted Bullock. This huge work was 10 years in the making. They said I need never work again. It is the comprehensive book on this subject in English, and started many students on their life's topic.

1964-1965 Work on Ctenophores, sadly too late for the above book.

1964. Description of nervous system in Ctenophores.

1964. Discovered giant mitochondria in Ctenophores.

1965. Discovered sliding motion in mechanism of cilia motion.

1965. Discovered neurocilia synapses in Ctenophores.

1965. Discovered many locations of vibration-sensitive cilia.

1962. Decision to concentrate on the compound eye of Crustacea and insects.

1964-onwards. Insect eye studies.

1964 Multimodal neurons in insect optic lobe.

1965. Light causes changes within photoreceptors of locust.

1965. A direct response of the crab to the motion of the sun.

1965. The proper structure and function of the locust retina.

1966. The optic lobe neurons of the locust.

1966. The crab keeps its eyestalks fixed relative to nearby contrasts.

The optomotor memory persists for minutes in the dark.

1966. Optomotor responses of the crab eyestalk.

1968. Further responses of the crab eyestalk.

1968. Crystalline threads in the eye of the firefly.

Move to Australia, decision to concentrate on insect vision.

1969-onwards. Descriptions of numerous insect retinas.

1976. Inference that flying insects measure range by induced motion.

1977. Foveas in insect and *Squilla* compound eyes

1978. Descriptions of facet size and distribution in many insect eyes.

1983. Optical gain measured in superposition eye by counting photons.

1983. The diurnal changes in the cone shape in beetle eyes change the optics.

1984-1994 Insect eyes in motion. Mantids measure range when reaching.

1986. Moving insects measure range.

1987. Beginning of work with trained bees.

1988. Demonstration that trained bees measure range by induced motion.

1990. Bees detect parallax at moving boundaries.

1990. Implementation of the template model of insect vision.

1992. Discovery of fast and slow neurons in insect optic lobes.

1992. Official retirement. No pension. Instead, I invested heavily at the beginning of the long rise of the Australian Stock Market.

1993. Year at Churchill College. Decision to study what bees see.

1994-2004. Work with trained bees.

1994. Discovery of bee's preference for symmetry.

1995. Bees' discrimination and measurement of symmetry.

1996 onwards. Systematic isolation of the cues in bee vision.

1997. Discrimination of disruption irrespective of pattern.

1997. Discrimination of the two sides of the target separately.

1999. Radial/tangential cues are colour blind.

1999. Fixation on a radial pattern assists discrimination of position.

2000. Discrimination of the position of a coloured patch.

2000. Model of the processing channels in a local region of the eye.

2003. Measurements of the size of the feature detectors for modulation.

2003. Bees learn the position, not the orientation of a single bar.

2003. Measurements of the size of the feature detectors for orientation.

2003. Bees detect the cues, not the pattern.

2004. Distribution of the local eye regions round the head detects place.

2005. Complete list of cues.

2006. What insects detect with their eyes.

2008. Generalization is caused by the training method and summation within each eye region.

2009. Mechanisms of shape discrimination.

The secret of making advances in science is to do experiments and test theories.

1975-2008. Sailing boats and canoes of Indonesia and the Pacific.

1975. Spent 2 months on Banda Is in the Moluccas, as Chief Scientist on the US ship Alpha Helix. Walked into a boatyard and discovered Indonesian boats.

1977. Year at Churchill College, Cambridge. Collected literature on Eastern boatbuilding and Pacific canoes, worked on boat and canoe models in Dutch and other museums. Wrote up insect eye work.

1975-1984. Explorations of boatyards and fishing villages in Eastern Indonesia.

1978 Descriptions of methods of construction of Indonesian sailing boats.

1981. Publication of, "The Prahau, Traditional Sailing Boat of Indonesia"
the result of 6 years of collecting data in many islands, and literature
in many languages. The only account of these topics in English.

1981. Interviewed Ua Wa Lusin in Benoa, Bali, on canoe ceremonies.

1982. Discovered that the Austronesian outrigger canoe is a married couple.

1982. Reconstruction of the primitive lashed lug boat of the Eastern Islands.

1978-84. Descriptions of the ceremonies essential during boat building

1984. Inferred that the two-boom triangular sail was primitive, and evolved.

1985. Enlarged 2nd Edn. of "The Prahau". The authoritative book on the topic.

1986. Publication of "Sailing Craft of Indonesia"; a small handbook.

1987. Publication of "Outrigger Canoes of Bali and Madura, Indonesia".

1995. Early Austronesian rigs would naturally sail upwind.

1996-2008 Diverted attention to a series of discoveries on bee vision.

2008. Limiting factors in early Austronesian canoe design. Mat sails.

2008. Publication of "Origins and Relationships of Pacific Canoes and Rigs",
a digest of data and literature from many disciplines.

The secret of finding and publishing something interesting and new is to have a lucky find or idea, then be thoroughly acquainted with the literature, and range widely with open eyes.