

# Twenty Years of Radiological Protection Training at Dublin University



**Eric C. Finch** (efinch@tcd.ie)  
School of Physics, University of Dublin,  
Trinity College, Dublin 2, Ireland

**Elaine M. Doorly** (elaine.doorly@tcd.ie)  
Director of Buildings Office, University of Dublin,  
Trinity College, Dublin 2, Ireland

## TRINITY COLLEGE DUBLIN

**Trinity College** (i.e. the University of Dublin) was founded in 1592 and now has 16,000 students.

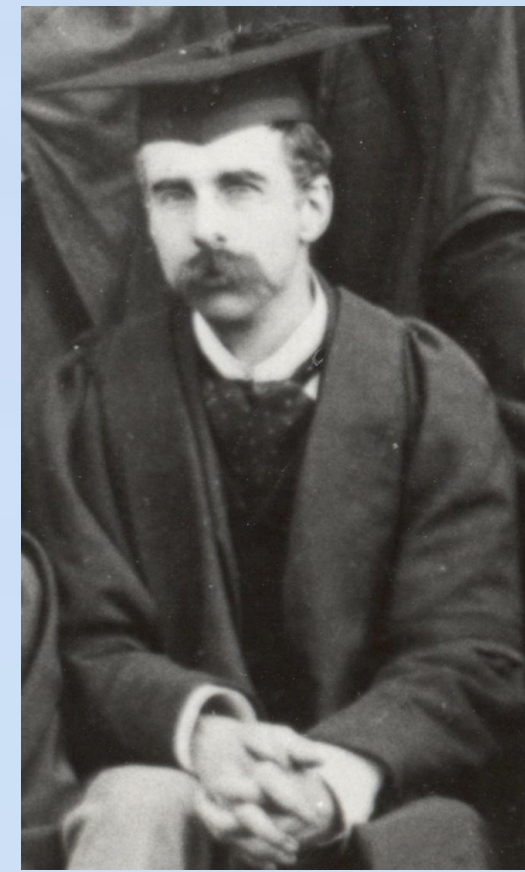
**John Joly** pioneered work with ionising radiation in Trinity from 1907 onwards:

- pleochroic haloes (formed by tracks of alpha particles radiating from inclusions in geological minerals)<sup>(1)</sup>
- cancer therapy (hollow needles of radium/radon inserted into tumours)<sup>(2)</sup>.

**E. T. S. Walton** worked in Trinity on accelerator development after his return from Cambridge. There in 1932 he and Cockcroft split the atomic nucleus<sup>(3)</sup>, for which they shared the 1951 Physics Nobel prize.

**Early <sup>137</sup>Cs gamma irradiator:** Installed in 1962 for plant genetics work.

**Modern work** with radiation includes our own on the gamma radioactivity of building materials in Ireland<sup>(4)</sup>.

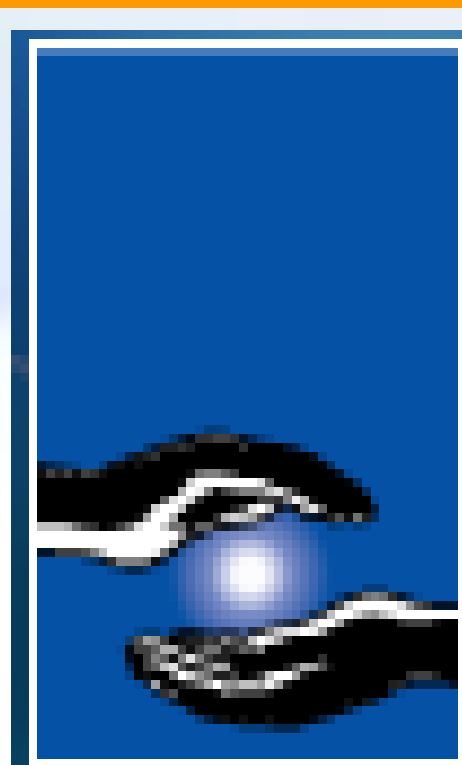


Joly, 1897



Walton, ~1975

## DEVELOPMENT OF IRISH RADIOLOGICAL PROTECTION



RPII logo

**1954:** St Luke's Hospital, Dublin founded for cancer therapy: dosimetry service for Ireland associated with it.

**1971:** Radiological Protection Officer for Trinity College appointed – the first such appointment in Ireland.

**1973:** Nuclear Energy Board for Ireland founded, which developed a national system for radiological protection.

**1977, 1991:** Legislation for radiological protection<sup>(5)</sup>, <sup>(6)</sup>.

**1992:** Radiological Protection Institute of Ireland founded.

## THE FIRST TRAINING WORKSHOP IN TRINITY COLLEGE

**October 1989:** The new R.P.O. (E.C.F.) arranged the College's first formal training workshop in radiological protection.

**Attendance:** 50, all from Trinity, mostly research students and also 12 academic and technical staff. Student numbers in Trinity at the time totalled 8,000. The workshop duration was 3 hours.

**Presentations:** (a) Introduction from the Dean of the Science Faculty (b) radiation production, detection and dosimetry (c) radiation protection and the biologist (d) the role of the Nuclear Energy Board (e) demonstrations and videos.

**Presenters:** College staff except for (d).



Our own work in Trinity

## EARLY WORKSHOP DEVELOPMENTS

**Workshop scheduling:** Annually each autumn, given soon after the start of each academic year (also in January 1990 by demand).

**1991:** Workshop extended to a full day, with more presentations plus an informal problem-solving session (*not* an examination). Delegates now included some from outside Trinity, although most were still recruited from within.

**1993:** Based on experience gained by then, Trinity participated in a series of workshops involving University College Dublin, the Autonomous University of Barcelona, and an Irish industrial firm using a large gamma irradiator. This was supported by the 'COMETT' European Community technological training programme for universities and industry.

**1996:** Laboratory demonstrations added to College workshop.

## WORKSHOP DEVELOPMENTS SINCE 2000

**Attendance:** At times rising to 70, reflecting the major expansion in research activity in College and in student numbers.

**Duration:** Extended by the new R.P.O. (E.M.D.) to 1½ - 2 days.

**New features:** More laboratory sessions, new presentations, attendance certificates.

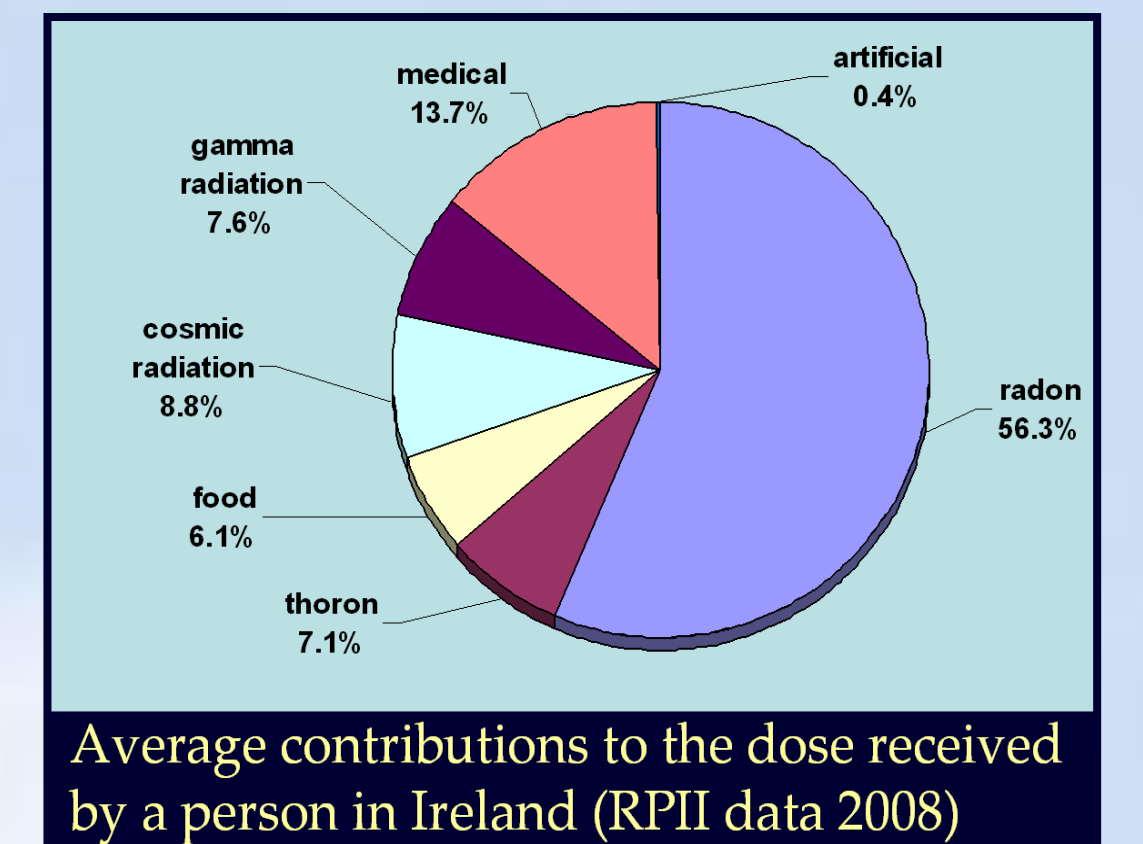


Trinity College: the campanile

## CURRENT WORKSHOP STRUCTURE

### First day:

- Radiation production, detection and dosimetry – 90 minutes
- Protection from external radiation: safe use of X-rays – 45 minutes
- College radiation safety rules and procedures – 45 minutes
- Introduction to problem solving techniques – 75 minutes
- Practical session (i): Practical protection from radiation in a lab situation – 75 minutes



Average contributions to the dose received by a person in Ireland (RPII data 2008)

Slide from presentation (a)

### Second day – morning only:

- Safe use of unsealed radioisotopes – 45 minutes
- Radiation safety legislation and enforcement – 45 minutes
- Practical sessions: (ii) Hazards (iii) Emergency procedures (iv) Contamination monitoring (v) Incident management – total of 105 minutes

## THE E.U. CONTEXT

**Workshop content development:** Aimed at reflecting changes over the years in recommendations of the ICRP.

**ICRP 60 (1990)<sup>(7)</sup>:** This was implemented by the European Basic Safety Standards Directive of 1996<sup>(8)</sup> and, in Ireland, by Statutory Instrument 125 (2000)<sup>(9)</sup>. The many changes to the workshop content at this time reflected e.g. introduction of provisions for exposure to natural radiation and new lower radiation dose limits.

**ICRP 103 (2007)<sup>(10)</sup>:** In general, the basic principles and dose limits stay unchanged, but the workshop will be updated if necessary.

**Course applicability:** National legislation in all EU member states now reflects ICRP recommendations and EU directives. The workshop core content is thus appropriate for course participants whether they work in Ireland or in another EU country.

## CONCLUSIONS

We believe that our experience shows the value of running in-house training workshops in radiological protection to the members of a large institution like Trinity College. We intend to continue developing the workshops as the need arises.

### Radiation Production, Detection and Dosimetry

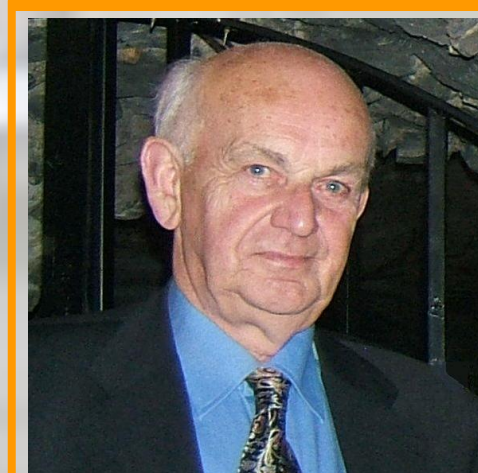
Training Workshop in Radiological Protection  
Monday 8th December 2008



Dr Eric Finch,  
School of Physics,  
Trinity College



## ACKNOWLEDGEMENTS



We wish to thank Professor Ian McAulay, the first College R.P.O. at Trinity College Dublin, for his invaluable support and advice in the development of these workshops, and for his comments on this poster.

## REFERENCES

- J. Joly, Phil. Mag. Ser. 6, **13** (March 1907) 381-383
- J. Joly, Scientific Proceedings of the Royal Dublin Society, **XIV** No. 20 (May 1914) 290-296
- J. D. Cockcroft and E. T. S. Walton, Nature **129** (1932) 242
- E. M. Lee (Doorly), G. Menezes and E. C. Finch, Health Phys. **86** (2004) 378-383
- S. I. (Statutory Instrument) No. 166/1977–Nuclear Energy Order, 1977
- Ireland. Government. Radiological Protection Act, 1991, and subsequent amendments
- ICRP, 1990 recommendations of the International Commission on Radiological Protection, ICRP Publication 60 (Ann. ICRP **21** (1-3))
- European Commission 1996 Council Directive 96/29/EURATOM of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation, Off. J. Eur. Commun. **L159** 0001-0114
- Ireland. Government. Radiological Protection Act, 1991 (Ionising Radiation) Order, 2000, S. I. No. 125 of 2000, Government Publications Office, Dublin, Ireland
- ICRP, 2007 recommendations of the International Commission on Radiological Protection ICRP Publication 103 (Ann. ICRP **37** (2-4))