

# The Precautionary Principle and the Ethical Foundation of the Radiological Protection System

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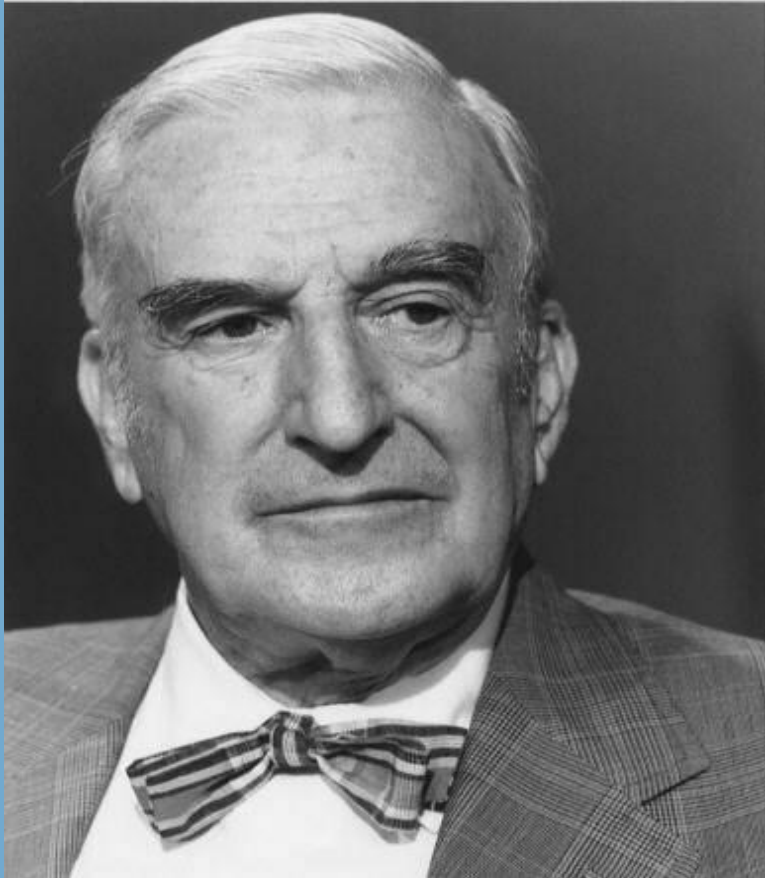
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# Lauriston S. Taylor (1902 – 2004)

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*"Radiation protection is not only a matter for science. It is a problem of philosophy, and morality, and the utmost wisdom."*

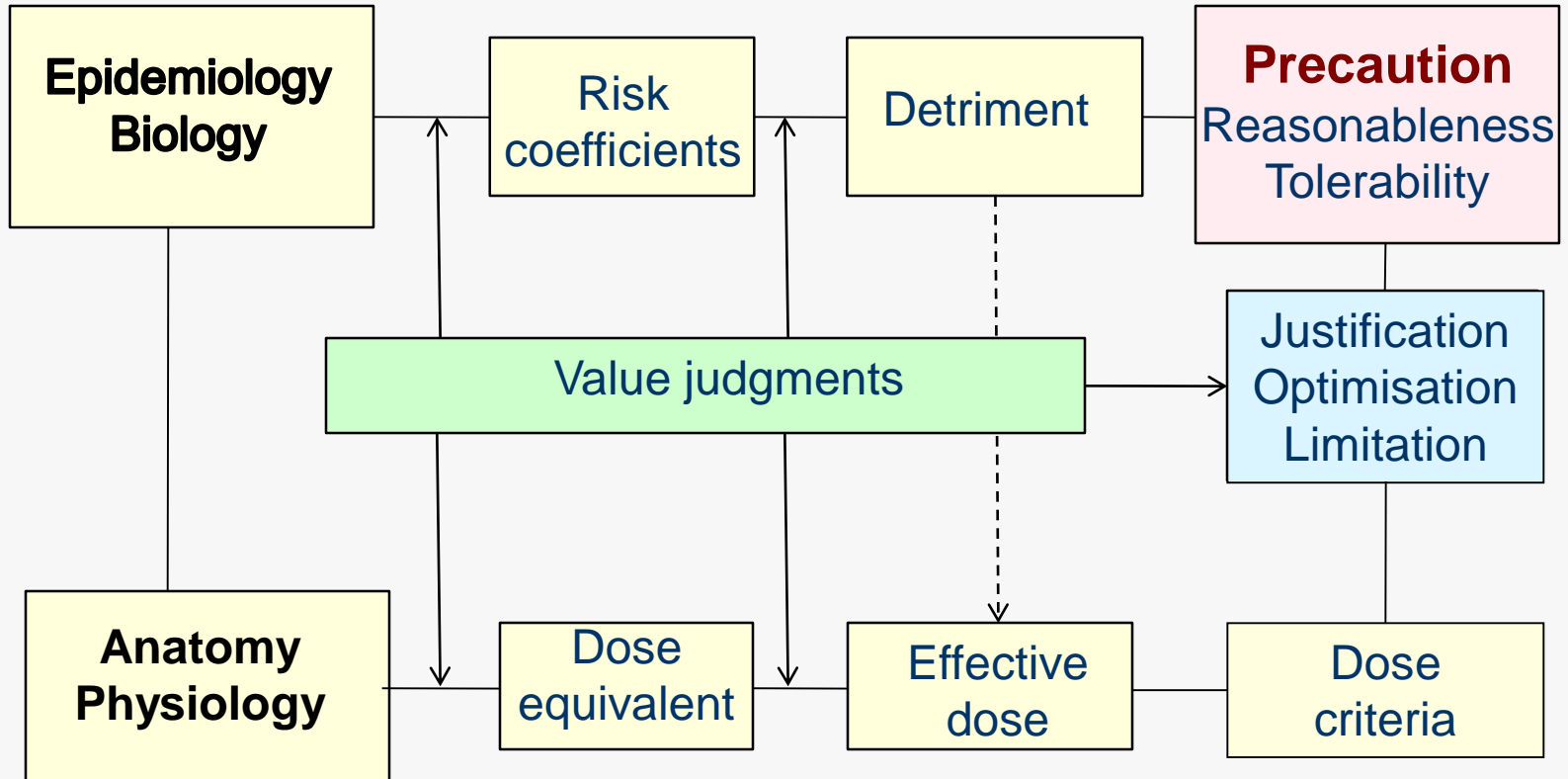
The Philosophy Underlying  
Radiation Protection

Am. J. Roent. Vol. 77, N° 5,  
914-919, 1957

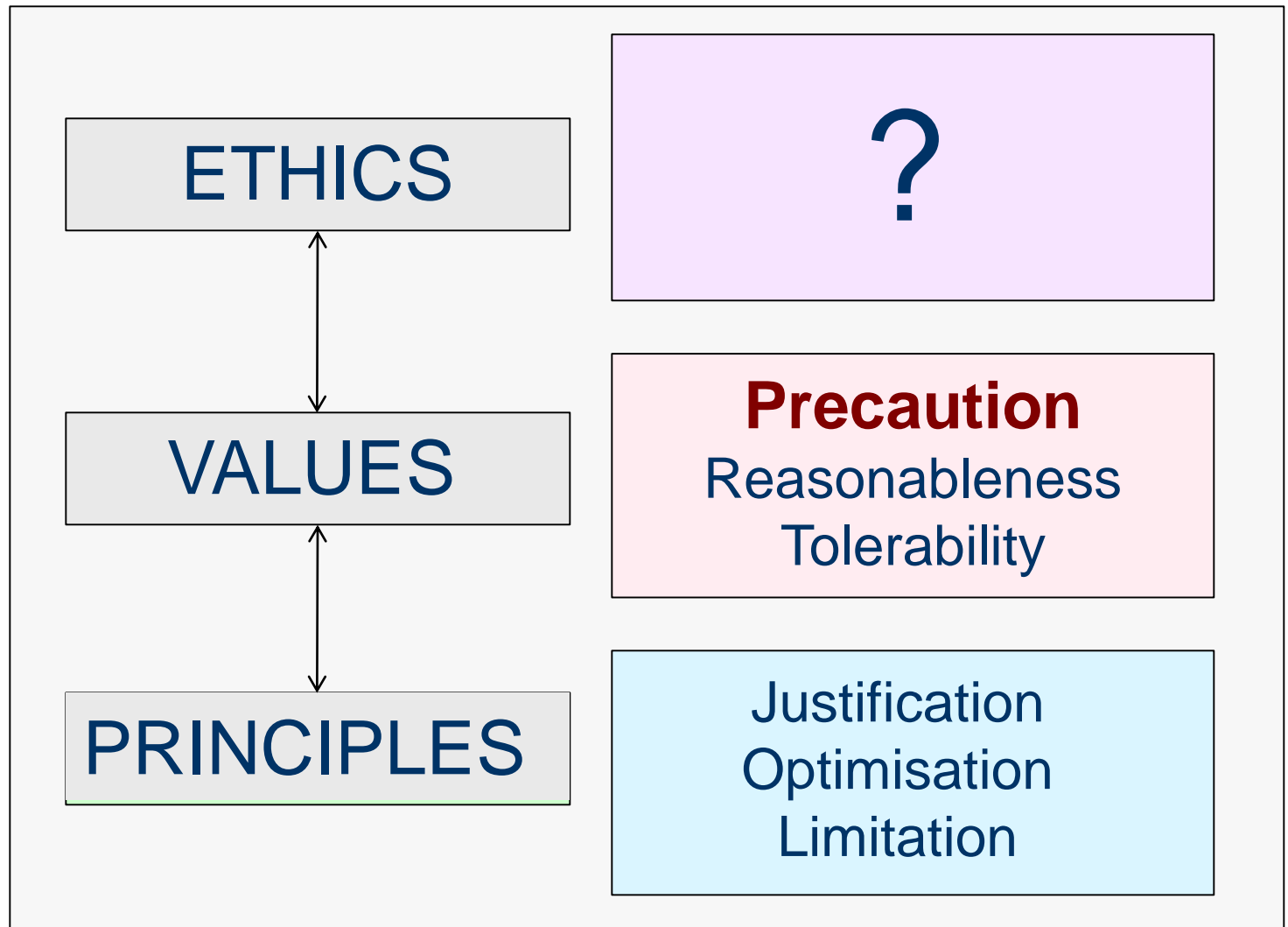
From address on 7 Nov. 1956

- There is no conceptualization / formalization of the ethical principles that underpin the system of radiation protection in ICRP publications, although these principles are quite present
- There is however an interest for such conceptualization / formalization:
  - Debate in the early nineties following the publication of a paper by Persson and Shrader-Frechette on the ethical principles underlying the protection of workers
  - More recently developments in connection with the CRPPH Workshops on “Science and Values in Radiological Protection” (Helsinki, 2008, Vaulx de Cernay, 2009)
  - Increasing questioning from some NGOs and the public
- Creation of a Working Party of ICRP Committee 4 on the ethics of radiological protection in October 2011

# The key elements of the radiation protection system



# What are the ethical foundations of the “values” structuring the radiation protection principles?



# The three domains of ethics

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- **Meta-ethics**

Study of the moral concepts, judgments and reasoning underlying ethics

- **Normative ethics**

Examination of moral standards about how humans ought to behave

- **Applied ethics**

Application of the normative ethical theories to practical problems (abortion, euthanasia...) or to particular domains (medical, business, ...)

Remarks: Ethics (Greek) = Moral (Latin)

- **Consequentialism** (also called teleological ethics) : moral is what is promoting common good. What really matters are the consequences of human actions on the well being of people  
**= focus on the consequences of actions**
  - **Utilitarianism** ethics is the most well known variant of consequentialism. Moral is any action which is leading to the largest increase of social welfare among several alternatives
- **Deontological ethics**: moral is what is accomplished according duties whatever the consequences  
**= focus on duties and rules**
- **Virtue ethics**: is moral what is perfecting human beings as virtuous agents  
**= focus on attitude and behaviour**

- Long **tradition**: prudence (Aristotle), Buddhist tradition, Confucianism, the ancient people of Oceania and America
- Precaution is a **virtue** : how to behave without the full knowledge of the consequences of our actions?  
= **Virtue ethics**
- The object of precaution is the contingent i.e. what can happen or not happen, what is occasional, accidental, uncertain
- Precaution is the virtue of deliberation: the disposition **to choose and act** on what is in our power to do and not to do  
= **relationship to the practice**



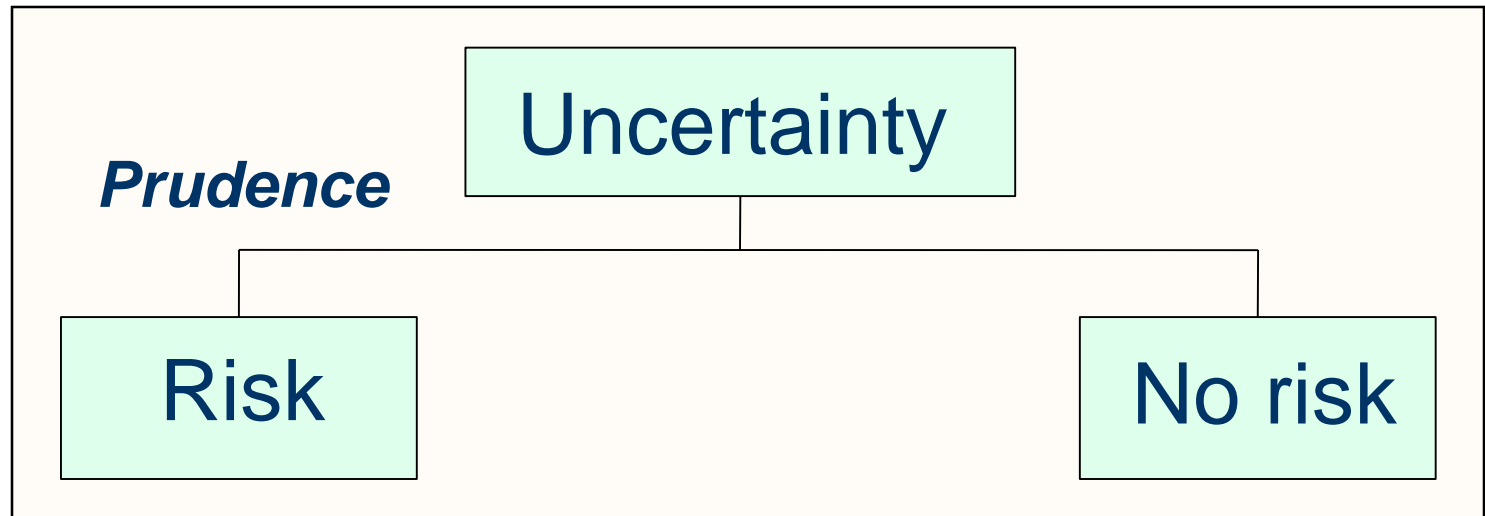
# The introduction of precaution in the system of protection

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“Whilst the values proposed for maximum permissible exposures are such as to involve a risk which is small compared to the other hazards of life, nevertheless in view of the **unsatisfactory nature of much of the evidence on which our judgments must be based**, coupled with the knowledge that certain radiation effects are **irreversible** and cumulative, it is strongly recommended that every effort be made to reduce exposures to all types of ionizing radiations **to the lowest possible level**”.

*1950 International Recommendations on Radiological Protection - Introductory paragraph*

# The Pascal's Wager



- If I bet there is no risk and it turns out that there is one, I can only have regrets
- If I bet there is a risk and it turns out that there is no risk, I have no regrets

**The adoption of a prudent attitude minimizes regrets in case of a wrong choice**

## ICRP Publication 9 , 1966

- ( § 7) The mechanism of the induction by radiation of leukemia and other types of malignancy is not known. Such induction has so far been clearly established after doses of more than 100 rads, but **it is unknown whether a threshold dose exists below which no malignancy is produced.**

Also, because of the lack of knowledge of the nature of the dose-effect relationship in the induction of malignancies in man (...) the Commission sees **no practical alternative, for the purposes of radiological protection, to assuming a linear relationship between dose and effect**, and that doses act cumulatively.

- ( § 52) As any exposure may involve some degree of risk, the Commission recommends that **any unnecessary exposure be avoided**, and that all doses be kept **as low as is readily achievable**, economic and social considerations being taken into account.

# The implications of precaution

- Maintaining exposures below a limit is not a guarantee of no risk

**Limitation of individual becomes an issue of tolerability of risk and equity**

- Risk taking is justified only if there is a benefit in return

**Justification of decisions**

- Once an activity is justified:

- How far to reduce the risk?
- How not to jeopardize activity?
- What criteria to use to base decisions on the right level of protection?

**Optimisation of protection i.e. the quest for reasonableness**

- The radiation protection system is a construct that combines the state of **knowledge** on the effects of radiation, **ethical values** and the feedback **experience**
- Precaution is a **cornerstone** of the edifice: it allows to take into account the inevitable limitations of radiation science **to act virtuously**
- There are also **procedural aspects** of the implementation of the precaution which fall within the ethics: the right to know, the informed consent, the engagement of stakeholders,...
- The precaution also implies **a duty of vigilance** regarding the effects of radiation resulting in a duty of **disease surveillance** of exposed populations and a duty to pursue relentlessly **research in the fields of epidemiology and radiobiology**