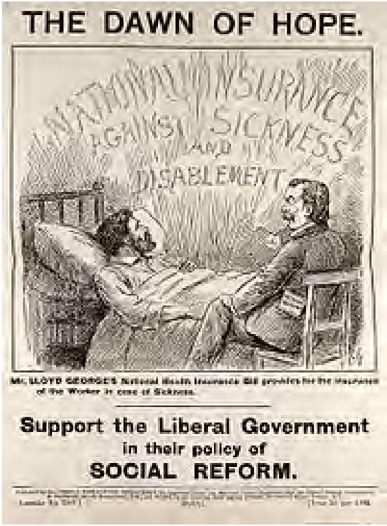
A Century (Almost) of the MRC Biostatistics Unit: Some History

Vern Farewell

Medical Research Council Biostatistics Unit, UK

October 12, 2011

The Beginning



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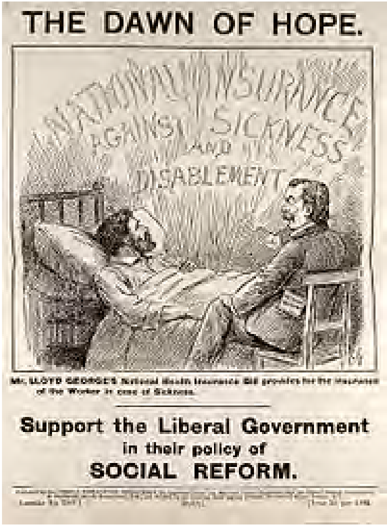

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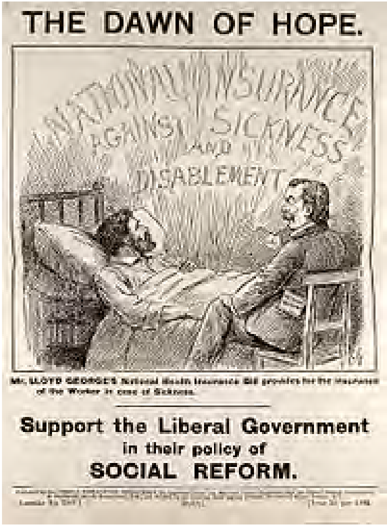

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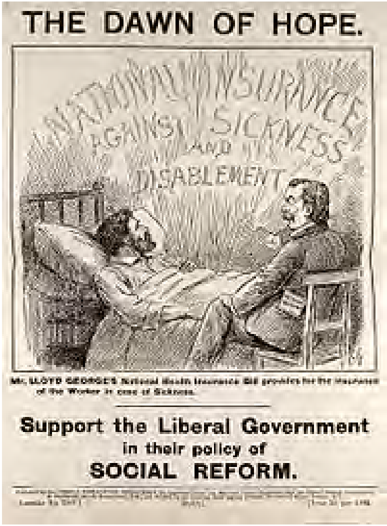

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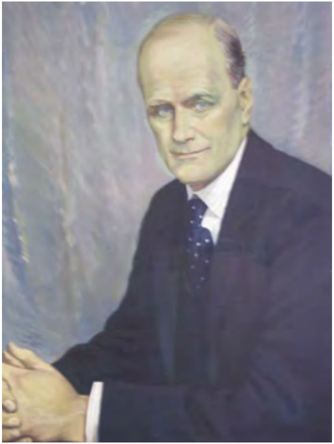
- As part of this, established a Medical Research Fund
- Medical Research Committee set up in 1913 to administer the fund

Sir Walter Fletcher



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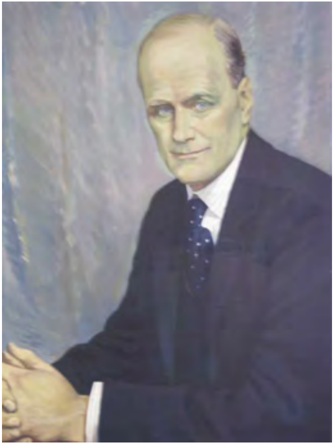

- Elected Fellow of Royal Society for work on biochemistry of muscle contraction.
- Appointed First Secretary (Head) of Medical Research Committee.
- In post for 20 years.
- Oversaw transition to Medical Research Council (MRC) set up by Royal Charter in 1920 and guaranteed independence from any government department.

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  4. Statistical Department: mainly consist of persons in the permanent employment of the scheme — statistical investigations useful either as a preliminary to research or confirmatory of its results.

John Brownlee

John Brownlee

- Studied mathematics, natural philosophy and medicine in Glasgow, then public health in Cambridge
- Appointed Director of MRC's 'Statistical Department' in 1914
- Administrative principle: 'never (or hardly ever) reply to letters'
- Died suddenly from bronchopneumonia in 1927.
- papers on tuberculosis (phthisis) and periodicity of epidemics (measles)

Major Greenwood

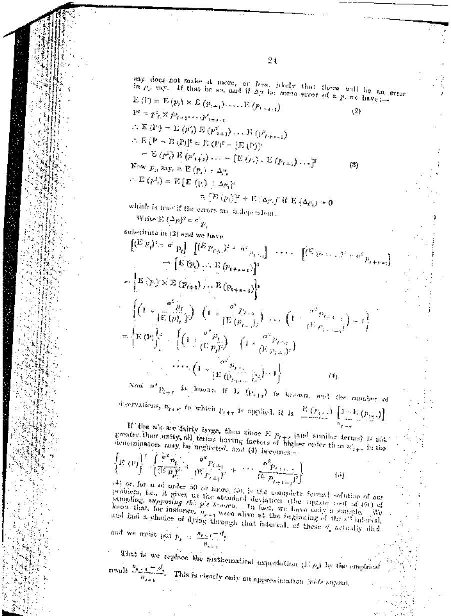
MAJOR GREENWOOD

London School of Hygiene and Tropical Medicine Librar

Major Greenwood

MAJOR GREENWOOD
London School of Hygiene and Tropical Medicine Librar

- Studied medicine, soon turned to research
- Appointed resident statistician in Lister Institute
- After war work, became senior statistical officer at Ministry of Health
- Chaired MRC 'Statistical Committee' from 1921



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say, does not make it more, or less, likely that there will be an error in p_r say. If that be so, and if Δp be some error of a p, we have :—

$$E(P) = E(p_t) \times E(p_{t+1}) \ldots E(p_{t+r-1}) \quad (2)$$

$$P^2 = p_t^2 \times p_{t+1}^2 \ldots p_{t+r-1}^2$$

$$\therefore E(P^2) = E(p_t^2)\, E(p_{t+1}^2) \ldots E(p_{t+r-1}^2)$$

$$\therefore E\{P - E(P)\}^2 = E(P)^2 - \{E(P)\}^2$$

$$= E(p_t^2)\, E(p_{t+1}^2) \ldots - [E(p_t)\,.\,E(p_{t+1}) \ldots]^2 \quad (3)$$

Now p_t say, $= E(p_t) + \Delta p_t$

$$\therefore E(p_t^2) = E[E(p_t) + \Delta p_t]^2$$

$$= [E(p_t)]^2 + E(\Delta p_t)^2 \text{ if } E(\Delta p_t) = 0$$

which is true if the errors are independent.

Write $E(\Delta p)^2 = \sigma^2_{p_t}$

substitute in (3) and we have

(4)

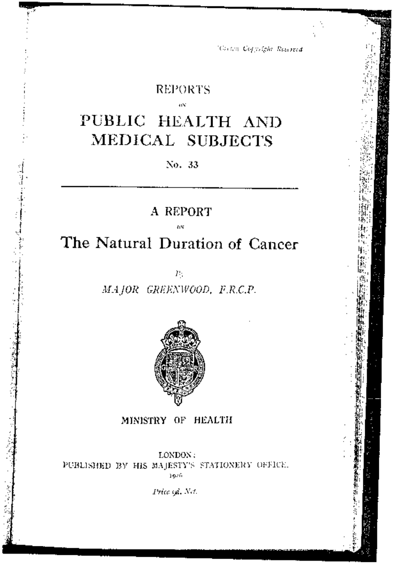
Now $\sigma^2_{p_{t+r}}$ is known if $E(p_{t+r})$ is known, and the number of observations, n_{t+r}, to which p_{t+r} is applied, it is $\frac{E(p_{t+r})\,[1 - E(p_{t+r})]}{n_{t+r}}$

If the n's are fairly large, then since $E\,p_{t+r}$ (and similar terms) is not greater than unity, all terms having factors of higher order than n_{t+r} in the denominators may be neglected, and (4) becomes—

(5)

(4) or, for n of order 50 or more, (5), is the complete formal solution of our problem, i.e., it gives us the standard deviation (the square root of (5)) of sampling, supposing the p's known. In fact, we have only a sample. We know that, for instance, n_{r-1} were alive at the beginning of the r^{th} interval, and had a chance of dying through that interval, of these d_r actually died, and we must put $p_r = \frac{n_{r-1} - d_r}{n_{r-1}}$.

That is we replace the mathematical expectation $(E\,p_r)$ by the empirical result $\frac{n_{r-1} - d_r}{n_{r-1}}$. This is clearly only an approximation (*vide supra*).



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REPORTS

ON

PUBLIC HEALTH AND MEDICAL SUBJECTS

No. 33

A REPORT

ON

The Natural Duration of Cancer

By

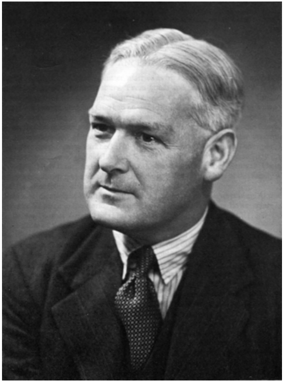
MAJOR GREENWOOD, F.R.C.P.

MINISTRY OF HEALTH

LONDON:
PUBLISHED BY HIS MAJESTY'S STATIONERY OFFICE.
1926

Price 9d. Net.

Austin Bradford Hill



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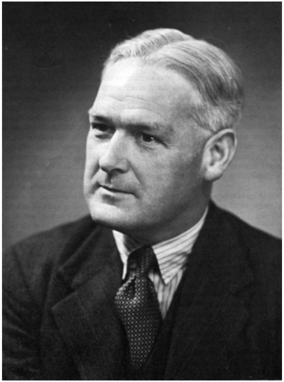

- Wanted to study medicine but prevented by WWI
- invalided out in 1919, took correspondence degree in economics
- Greenwood helped him to get MRC funding to examine high mortality in young adults in rural areas
- Attended Karl Pearson's lectures at UCL
- Succeeded Greenwood in 1945: name change to Statisical Research Unit in 1948

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- Hilda Mary Woods

In the Background

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- Farewell, Johnson and Gear, *Hilda Mary Woods MBE, DSc, LRAM, FSS (1892- 1971): Reflections on a RSS Fellow*, JRSS(A), to appear

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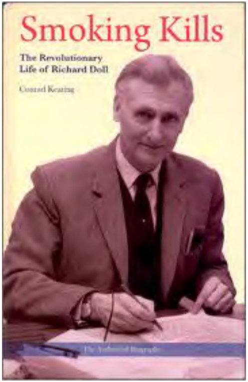
- Farewell and Johnson, *Woods and Russell, Hill and the Emergence of Medical Statistics*, Stat in Med, 2010

Richard Doll



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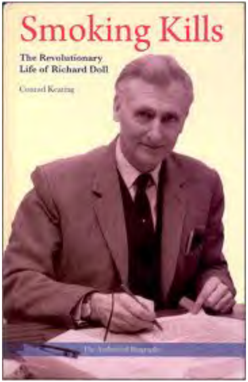

- Medically trained but interested in mathematics. Read Fisher's *Statistical Methods for Research Workers*.
- 1937 article for *St. Thomas's Hospital Gazette*.
    - " Were physicians to abide more strictly to the rules of statistics they would find it very much easier to assess the values of their methods of treatment."
- Most honoured for work with Hill on smoking and cancer.

Subsequent Directors

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- Simon Thompson: 2000-2011

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BSU publications – The Second Quarter Century

BSU publications – The Third Quarter Century