

## **‘When Hywel Met Paul’ – Another Look at the Early Days of Human Factors and Ergonomics**

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### **1. Introduction**

During the late 1940's and 50's regular visits and meetings took place between early pioneers of Human Factors and Ergonomics (HFE) on both sides of the Atlantic (Murrell, 1980). These meetings influenced the subsequent formation of both the Human Factors and Ergonomics Society (HFES) in the USA and CIEHF in the UK. This paper contrasts the careers and scientific work of two of these pioneers (Hywel Murrell and Paul Fitts) and aims to show how many of the characteristics of early HFE have influenced present-day character of debates taking place in more recent years (e.g., research/practice gaps; the status of HFE as a science). The paper summarizes some characteristics of collaborative war-time scientific work, as well as commonalities in the background and scientific interests of Murrell and Fitts. A final section covers aspects of continuity within HFE over the last 60 years.

### **2. War-time precursors of HFE and the birth of HFE in 1949**

The need to solve wartime military problems under great time pressure and with limited resources meant in many cases that scientists from a wide variety of backgrounds worked together on common problems during World War II (Waterson, 2011). At the Telecommunication Research Establishment for example, the so-called ‘Sunday Soviet’ meetings brought together scientists across a range of specialist knowledge, service officers and civil servants in order to collectively ‘brainstorm’ solutions to difficult problems (e.g., the design of radar systems, Hartcup, 1970). Although the first HFE Society was not formed until 1949 (modern-day CIEHF), close relationships between physiologists and psychologists helped to suggest improvements to the design of equipment, as well as establishing new areas of scientific investigation (e.g., physiological phenomena often had psychological consequences – e.g., stress, mental fatigue). Similarly, anatomical studies of equipment use sometimes resulted in the need for workspace design and the involvement of other specialisms (e.g., psychology).

### **3. Comparing the careers of Hywel Murrell (1908-1984) and Paul Fitts (1912–1965)**

Both Murrell and Fitts served in a research capacity during the war within the military. Murrell initially within the Army Operational Research Group and later with the Admiralty (Stammers, 2007). Fitts was employed by the US Air Force and carried out fundamental work on a variety of topics including: pilot error; motor control (‘Fitts’ Law’); stimulus-response compatibility; the design of instrumentation; and, the role of automation in air navigation and traffic control. Both men were influenced by applied experimental psychology, particularly in regard to combining field-based observations with ‘harder’ measure of human performance. Another common feature of their work was a desire to design new methods of work analysis and evaluation (e.g., the Fitts List;

Murrell's work on standards for dial design).

#### **4. Some characteristics of early-day HFE and later continuity/discontinuity**

Much of the work conducted by the two men illustrates core characteristics of HFE which, to some extent, have persisted over time, whilst others have changed as HFE as expanded with the Universities and Industry:

- An emphasis on pragmatism and using knowledge and methods which are 'to hand', regardless of their source and origins, to work through an applied problem.
- A related emphasis on collaboration and the importance of inter-disciplinarity.
- A 'blurring' of the distinction between research and application (practice); only later in the history of HFE did this become an issue (e.g., research-practice gaps, Waterson, 2016)

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