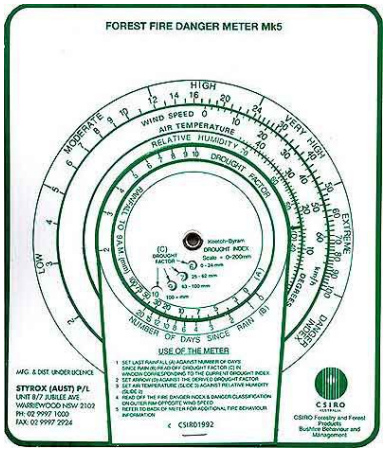
Tuross Head Rural Fire Brigade

Niels Bohr's famous quote that “an expert is a man who has made all the mistakes which can be made, in a narrow field” is probably fairly close to the mark - however making mistakes is probably not such a good way to survive a catastrophic bushfire. Wikipedia defines “an expert·(as) someone widely recognized as a reliable source of technique or skill whose faculty for judging or deciding rightly, justly, or wisely is accorded authority and status by their peers or the public in a specific well-distinguished domain. An expert, more generally, is a person with extensive knowledge or ability based on research, experience, or occupation and in a particular area of study”. So perhaps it's better if we pay attention to the experts who've “been there, done that”, and that phrase certainly applies to one McARTHUR, ALAN GRANT (1923-1978).

Early this month, in NSW, the much vaunted Fire Danger Index (FDI) was changed in response to the findings of the Victorian bush fire commission. But what exactly is this index which we have relied upon for so long? The term FDI was first proposed by McArthur in a leaflet prepared for the Country Fire Authority and Victorian Rural Fire Brigades Association in 1965, entitled “Weather and grassland fire behaviour” and was also in a paper “Fire Behaviour in Eucalypt Forests”, submitted by the author to the Ninth Commonwealth Forestry Conference, India, 1968.

Who is this father of FDI? According to The Australian Dictionary of Biography he was a “forester, ... born on 21 July 1923 at Manly, Sydney, son of Cuthbert Grant McArthur, a Scottish-born storeman, and his native-born wife Vera Kathleen, née Gordon. His father had come to Australia at the age of 14 and served in the Australian Imperial Force. Growing up on a wheat-farm at Merriwagga, Alan completed his primary schooling by correspondence, then attended Yanco Agricultural High School where he established an enduring interest in Australian exploration. In 1941 he joined the Forestry Commission of New South Wales. After studying at the University of Sydney (B.Sc.For., 1945) and the Australian Forestry School, Canberra (Dip.For., 1945), he worked on plantation management in the Tumut and Orange districts.

On 18 February 1947 at St Jude's Anglican Church, Tumbarumba, McArthur married Gladys Charlotte Gardner, a 19-year-old dental nurse. Having been promoted senior forester, he was appointed the first full-time fire control officer of the Snowy Mountains area in 1951 and began his passionate, lifelong inquiry into the behaviour and control of forest and grassland fires. He devised a regional fire prevention plan which provided a model for similar operations elsewhere. In 1953 he transferred to the Commonwealth Forestry and Timber Bureau, Canberra, as fire researcher. He was promoted director of the bureau's forest research institute in 1970. Five years later he was appointed principal research officer in the Commonwealth Scientific and Industrial Research Organization's new division of forest research.



For more than twenty-five years McArthur studied the behaviour of fires in a wide range of fuel types, devising systems for rating the danger of fires under different meteorological conditions. These systems became an essential tool for rural bushfire brigades; they were adopted by the Bureau of Meteorology in forecasting fire-hazard conditions; and they were recommended by the United Nations Food and Agriculture Organization for use in developing countries. McArthur also prepared guidelines for controlled burning, a practice he regarded as essential in containing the disastrous fires to which Australian native forests are prone. Much of his data was derived from field exercises with forestry students to whom he lectured in 1954-70, first at the A.F.S. and later at the Australian National University.

The Western Australian royal commission into bushfires (1961) was one of several official inquiries to benefit from McArthur's advice. He participated in a number of international conferences, and wrote or co-authored some sixty papers on the behaviour and effects of fire and on watershed management. With R. H. Luke, he published *Bushfires in Australia* (Canberra, 1978) which remains an authoritative text.

An athlete in his youth, McArthur took up golf and enjoyed a game of bridge. He suffered from diabetes mellitus, retired in July 1978 and died of pneumonia on 9 November that year in Canberra Hospital. Survived by his wife, son and daughter, he was cremated with Presbyterian forms. He had been elected a fellow (1978) of the Institute of Foresters of Australia and was posthumously awarded the N. W. Jolly medal for that year."

This month, nearly 31 years after his untimely death, McArthur's legacy has once again received a minor facelift with the benefit of hindsight. McArthur's Fire Danger Meters (FDM), which determine the FDI, have been for many years, distributed widely within Australia to authorities with responsibility for fire suppression. In McArthur's original system, an index value of 100 was intended to represent the 'worst possible' fire weather conditions likely to be expected in Australia, where "fires will burn so fast and hot that control is virtually impossible". However, this value has been exceeded on several occasions since 1966. Thus, while the original FDM was divided into five fire danger ratings (Low, Moderate, High, Very High, and Extreme) representing the degree of difficulty of suppression, the new Fire Danger Meter has six ratings:

- Catastrophic - FDI = 100+
- Extreme - FDI = 75 - 99
- Severe - FDI = 50 - 74
- Very High - FDI = 25 - 49
- High - FDI = 12 - 24
- Low/Moderate - FDI = 0 - 11

You may have noticed that McArthur was also a strong advocate of controlled burning, "a practice he regarded as essential in containing the disastrous fires to which Australian native forests are prone". Amongst other things this concept was recently thoroughly studied by the CSIRO in their Project Vesta - Australia's most comprehensive study of forest fire behaviour, investigated the behaviour and spread of high-intensity bushfires in dry eucalypt forests with different fuel ages and understorey vegetation structures.

In their 218–page report on Project Vesta, published in 2008, Messrs Gould, McCaw, Cheney, Ellis, Knight, and Sullivan, found that "reducing fuel loads by prescribed burning reduces the rate of spread, flame height and intensity of a fire, as well as the number and distance of spot fires, by changing the structure of the fuel bed and reducing the total fuel load". It was also found that "when understorey shrubs regenerate after prescribed burning this does not necessarily mean an increase in the rate of spread of a fire because a significant near-surface fuel layer takes time to build up" and "using prescribed burning to lower bark hazard reduces the density of firebrands".

Thus, of the factors affecting fire behaviour: fuel, with it's variables of type (the finer it is the faster it burns), load and orientation; heat, which is influenced by fuel moisture (the drier fuel, the faster and hotter it burns); and oxygen (high wind can create a "blast furnace effect" making fires burn hotter and spread faster), fuel is the only factor capable of being influenced in advance! Something to contemplate as the bushfire season descends upon us.

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