

Chasing a Giant

BAMS spoke with Jonathan E. Martin about his new book, *Reginald Sutcliffe and the Invention of Modern Weather Systems Science*. Martin is a professor in the Department of Atmospheric and Oceanic Sciences at the University of Wisconsin–Madison and author of *Mid-Latitude Atmospheric Dynamics: A First Course*. A native of northeastern Massachusetts, his lifelong passion for the phenomenology and science of weather systems took root battling the region’s famous winter storms as a morning paperboy.

Why write this book?

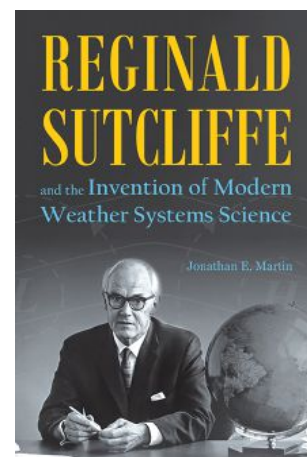
When I was first hired at the University of Wisconsin–Madison in 1994, my first assignment was teaching a senior undergraduate course in synoptic–dynamic meteorology—the study of the theory and observations of midlatitude weather systems. It was a dream come true since the phenomenology of these storms had fascinated me since childhood and my education and research experience to date had only heightened my enthusiasm for them. As I prepared my notes for the course, it became clear that Sutcliffe had singularly elucidated the fundamental dynamics of the development of these cyclones (cyclogenesis) as well as the dynamical explanation for the characteristic coincidence of clouds and precipitation with the cyclone’s cold and warm fronts. This was the whole franchise of modern weather systems science and it had seemingly sprung from the mind of a single scientist in the late 1930s. I was struck by the discrepancy between the importance of these contributions to modern understanding of weather systems (which informed the subsequent great advance in numerical weather prediction) and the relatively low profile of the man who had brought them forth. Twenty years later, a sabbatical afforded me the opportunity to begin examining Sutcliffe’s life in detail and perhaps remedy this unjust set of circumstances.

Who is the book for?

I have written the book with a broad audience in mind. Any reader with an interest in the weather, the impact of weather and weather forecasting on operations in World War II, or the story behind the development of modern weather forecasting will likely find the book interesting. Particular target audiences might be professional and student meteorologists, scientists in general, readers of biographies, as well as weather and technology enthusiasts. Despite the fact that some complex scientific ideas are, by necessity, included, I have endeavored to present them in a manner that renders them digestible to nearly any reader with these interests.

What obstacles did you face writing this book?

One of the most troublesome obstacles in pursuit of this work was that so few primary documents exist concerning Sutcliffe. Part of this stems from his own personal choices. In an interview late in his life he admitted to destroying much of his personal papers. World War II was the culprit in destroying most of his personal correspondence from the 1920s and 1930s (most of it likely consumed in the firebombing of Portsmouth in January 1941) that may have inspired a cynicism about maintaining any subsequent personal papers. Sutcliffe did not keep a diary, either. These difficulties were exacerbated by the Meteorological Office’s peculiar policy of destroying the personnel files of all former employees upon the centennial of their birth. These circumstances were partly remedied by my great fortune in making contact with his two daughters, who did have a good deal of personal family material, including an autobiographical sketch that Sutcliffe composed in 1981–82. In addition, his grammar school in Cleckheaton had, by virtue of some





Jonathan Martin

tremendous serendipity, a host of records from its early days that seemed almost singularly focused on Reginald Sutcliffe. These records were saved from unceremonious destruction years before I began my project by a teacher at the school who discovered them sitting in a dumpster one afternoon as she made her way home! Of course, further remedy was available in the numerous published papers and books written by Sutcliffe as well as the rather remarkable detail of the activities of the Meteorological Office that one can piece together from a careful reading of the invaluable *Meteorological Magazine*.

What did you learn in the process?

I think the answer to this question is best described in two parts. Intellectually, I learned an enormous amount about the life history of Reginald Sutcliffe and how his influential life was shaped by forces that were of enormous scale and mobilized long before he was born. By this I mean that the child labor and education reforms that characterized nineteenth-century Britain were absolutely essential in providing Sutcliffe with the opportunities he had to make such critical advances in our field. I also deepened my appreciation for the remarkable creativity that characterized his work—especially in the series of papers leading to the development

theorem paper in 1947. Finally, his influence as a teacher and international figure in WMO administration ensured that elements of that creativity, and the gratitude he felt for his education, were promulgated into the future and around the world, enlarging the community of scientists in our field.

I have to say that considerable learning also occurred in an entirely separate, nonintellectual sphere. It was an unexpected thrill to commune with the people who knew him best—his daughters and their families—and to see how happy they were that someone they had never met before had determined it was important to breathe new life into his memory. The experience was a spiritually invigorating, life-changing adventure, and I did not expect that would be the case.

What surprised you?

The life-altering nature of the journey, as I just mentioned, was quite surprising to me but may have been a function of my luck in having connected with the family. Going into the project, the core of my interest in Sutcliffe was his seeming monopoly on fundamental contributions to understanding midlatitude weather



Whitcliffe Mount School football team in spring 1922 with Captain Sutcliffe, third from right in the back row, presiding. [Courtesy of Whitcliffe Mount School Archives.]

systems juxtaposed with his relative obscurity as a scientist. Nothing in the research that went into the book altered that basic view. Nonetheless, it was surprising to discover that he was not interested in weather as a boy and, in fact, turned to the Meteorological Office upon graduating with his Ph.D. in mathematics because there were virtually no other options at the time. The Meteorological Office officially discouraged research, and so a very talented Ph.D. in math was set to really boring tasks in the largely unscientific approach to weather forecasting. How, despite such intellectually suffocating circumstances, young Sutcliffe began to wriggle free and eventually elevate the forecasting enterprise to a hard science is an inspiring story. Another unexpected aspect of Sutcliffe's intellectual life was that he was a persistent skeptic of numerical weather prediction, perhaps the most unheralded scientific advance of the late twentieth century. Throughout the 1950s, when the enterprise was in its infancy, his main complaint was that it was not as good as what could be rendered by deep knowledge and expert judgement. This was indeed the case and remained so for a good part of his professional career. His perspective was sweeping; at the beginning of his career forecasting was a truly unscientific activity. Then his own contributions elevated it to something much more rigorous. It seems as though his skepticism for NWP was rooted in a frustration that too large a share of forecasting research effort in the 1950s focused on the computer, which was still quite limited. He commented more than a couple of times later in his life that he thought the computer came too early—implying that important conceptual and theoretical work might have been displaced by an emphasis on tool development.



Wing Commander Reginald Sutcliffe in southern France, late June 1940. [Courtesy of Mrs. Elin Bowes.]

What are the implications of this work?

I don't think I can comment on that. It's rather like when one publishes a peer-reviewed scientific paper, one often has a hard time predicting what the implications of such work will be. That being said, there is an insidious, and I think dangerous, antiscience thread in our current public discourse. Simultaneously, we live in an age where nearly everyone can cast a quick glance at a mobile phone to acquire accurate weather forecast information, where responsible governments seek scientific answers regarding the likely ramifications of global warming, and where an enormous fraction of the global economy depends on the current and future weather. Given these conflicting circumstances, Sutcliffe's story may be curiously timely in that it argues so strongly for a continued appeal to science in order to better our collective condition. It is my hope that shining a light on his life and work will, in some way, inspire a renewed appreciation for the human dimension in progress and the rich legacy bequeathed to societies wise enough to fully embrace investments in education and basic research.

Where do you go from here?

Back to the lab—there is still an enormous amount to learn about midlatitude storms and their connection to the climate system. If I could read Japanese, I might consider researching the life of Wasaburo Oishi—I think there is a complex and inspiring story there. Another fantastic subject would be Mavis Hinds and her pioneering contributions to NWP in 1950s Britain. There are more stories out there! ●