



Top of the heap: Russell was a domineering personality whose “word was law” in US astronomy.

director of the Princeton Observatory, he delegated undergraduate teaching to two able assistants, Raymond Dugan and John Stewart, who also collaborated with him on a revision of Young’s manual, *Astronomy*, the first revisions to which were published in 1926–27, and final revisions in 1945.

In 1900 Russell was asked to write monthly articles for *Scientific American*, a task he enjoyed for 42 years. These articles were written with the scientifically minded layperson in mind, but otherwise, Russell paid little attention to popularizing astronomy. In fact, he disapproved of the considerable time Harlow Shapley spent on public education during his directorship of the Harvard Observatory, even though such efforts helped in the necessary fund-raising. Russell also criticized Shapley — his former best graduate student at Princeton — for continuing his predecessor Edward Pickering’s “factory” type observational programmes. These programmes were aimed at producing photometric and spectroscopic catalogues, whereas Russell believed observational programmes should be directed at solving specific theoretical problems in astrophysics.

In testing his own theories, Russell was not interested in making telescopic observations himself. Instead, he got permission to examine the collection of spectroscopic plates at the Harvard College Observatory.

US astronomer George Hale had consulted Russell about suitable programmes for the telescopes he built at the Mount Wilson Observatory above the Los Angeles basin. Russell was consequently a welcome visitor at Mount Wilson, and soon persuaded the Princeton administration to give him an annual three months leave of absence to spend there. He also made frequent visits to Harvard. Indeed, Russell seems to have been attempting to direct the research at all three observatories. At Harvard he tried to steer

Shapley into concentrating on the fields of astrophysics with which he himself was most concerned. Although Shapley obviously felt that in any controversy over the composition or evolution of stars, his mentor Russell could not be wrong, he still pursued the topics that most interested himself — the structure of the Milky Way and the distributions in space of external galaxies — subjects to which Russell paid little heed.

The first graduate student to obtain a PhD in astronomy at Harvard or Radcliffe was the British woman Cecilia Payne. In her 1925 thesis she correctly identified hydrogen as the most prevalent atom in the stars. Russell objected that her conclusion could not be correct because he had worked out that the composition of the stars, especially that of the Sun, was the same as the more metallic composition of the Earth’s crust. Payne was forced to water down her thesis by saying that there must be a mistake in her analysis because her conclusion differed from then prevalent beliefs. She said of Russell: “His word was law. If a piece of work received his imprimatur, it could be published; if not, it must be set aside and its author had a hard row to hoe.” In 1929, from an examination of Mount Wilson spectra, Russell himself reached Payne’s conclusion about the prevalence of hydrogen. And in 1934, when Russell was considering whom he should be training as his successor on his retirement in 1943, he lamented that the best-qualified person, “alas, is a woman” — meaning Payne.

After Russell’s son-in-law, Frank Edmondson, obtained his PhD at Harvard, Russell got him an offer of a research position at the University of Virginia. Edmondson declined, preferring a position at his undergraduate University of Indiana, where he would be in line for the directorship of the observatory. Russell strongly disapproved, stating that administration is anathema to

good research. But, like Shapley, Edmondson followed his own inclination, and returned to Indiana.

In his final chapter, “Russell’s Universe”, DeVorkin comments that Russell “helped transform American astrophysics into a wholly physical discipline. Establishing this framework, more than any one discovery or application that bears his name, is Russell’s greatest legacy to astronomy.” Yet DeVorkin continues, “much of his work was not really his own, not new ... he typically seized upon the incomplete work of others and tried to confirm or refute it”.

This comprehensive biography should be of interest not only to historians of science and students of astronomy, but also to psychologists who might enjoy analysing this brilliant, domineering personality. ■

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