

Reviews

TO THE POLE: THE DIARY AND NOTEBOOK OF RICHARD E. BYRD, 1925–1927. Raimund E. Goerler (Editor). 1998. Columbus: Ohio State University Press. 168 p, illustrated, hard cover. ISBN 0-8142-0800-2. \$US19.95.

In early 1996, archivist Raimund E. Goerler of Ohio State University was cataloging the papers of Richard E. Byrd, the famed American polar explorer and aviator, housed at the university's Byrd Polar Research Center. Goerler was examining Byrd's diary from his Greenland expedition of 1925, and was surprised to discover that the diary also contained Byrd's entries for his controversial 1926 Arctic expedition and flight. On that flight, Byrd claimed the first overflight of the North Pole, and instantly became a household name. But because Byrd's claimed speeds were suspiciously high, his attainment of the Pole has long been doubted by many knowledgeable observers. The diary discovered by Goerler included crucial navigational records that have shed new light on the controversy.

In *To the Pole: the diary and notebook of Richard E. Byrd, 1925–1927*, Goerler has published transcriptions of the diary's entire contents. Critical pages showing Byrd's 1926 navigational records — some erased but still legible — have been reproduced photographically. Besides the erased entries, the diary shows other devastating differences with Byrd's official report of the flight, and should (or should have) put an end to any serious claim that Byrd actually flew all the way to the Pole.

In May of 1926, Byrd found himself in a supposedly unplanned race to fly across the top of the world (although for evidence that Byrd had been deliberately set up to beat Amundsen to the Pole, see Rawlins 1973: 260). On the Arctic island of Spitsbergen, the Norwegian explorer Roald Amundsen was preparing his dirigible *Norge* for a trip across the Arctic Ocean to Alaska, via the North Pole. But the airship — designed and built by Umberto Nobile — had arrived at the base at King's Bay needing a replacement for one of its three engines.

Byrd, also using Spitsbergen as his base, was hoping to beat Amundsen to the Pole in his trimotor airplane *Josephine Ford*. The usually lonely settlement of King's Bay was, for a few weeks, the center of the world's attention, as both expeditions engaged in an outwardly polite but determined contest.

After several failures at takeoff, pilot Floyd Bennett finally managed to get Byrd's plane into the air under a punishing load of fuel just after midnight on 9 May. With Bennett flying and Byrd navigating, the plane disappeared into the north. Later that day, Byrd returned to King's Bay and announced he had reached the North Pole. A planned side trip to Greenland on the return had been cancelled because of an oil leak discovered in one of the engines en

route. Byrd became an instant hero in the United States; he was given the largest ticker-tape parade in New York's history, and he and Bennett were awarded the Congressional Medal of Honor. With this spectacular launch, Byrd's career as a polar explorer and aviator continued successfully for another 30 years.

But outside the United States, Byrd's flight was viewed with caution and even skepticism. Byrd's plane was a Fokker F-VIIA-3m, with a cruising speed of about 75 knots. Given the distance to the Pole, about 1350 nautical miles by Byrd's route, he should have returned in about 18 hours. Byrd had returned in 15.5 hours. In Norway and Italy, the press jumped on the discrepancy.

Shortly after his return to Washington, while still under a cloud of suspicion in the foreign press, Byrd typed up an official report for the Secretary of the Navy and the National Geographic Society. Until recently, that report and Byrd's flight chart have been the most important primary sources on the controversial flight. Byrd died in 1957, but his family held his personal papers until 1985, when they were donated to Ohio State. The University catalogued the papers, but no diary from 1926 was among them. Therefore Goerler's find was a welcome surprise.

The most surprising facet of the diary's many revelations is that the navigational records in Byrd's typewritten official report were almost entirely fabricated. The second most surprising facet is that Goerler does not realize this — or perhaps he is simply unwilling to believe it. Goerler has provided biographical sketches of Byrd that precede each of the diary's three years (including Byrd's 1927 trans-Atlantic flight). From these sketches, it is clear that Goerler's sympathy lies firmly with Byrd, and no effort at academic impartiality has been made. This partisanship is seen in small ways, including, for example, his choice of the book's title (and the page 1 repetition of his belief that Byrd reached the Pole), as well as in how Byrd's question to Bennett, 'Can you get all the way back on two motors,' transcribed correctly on page 78, is altered in Goerler's own text (page 55) to 'Can *we* get all the way back on two motors?' (emphasis added). It is seen in large ways, too, as in Goerler's astonishing statement, 'Even Byrd's erasures can be read without assistance, further evidence that he made no effort to conceal.' If diary erasures are not evidence that Byrd made an effort to conceal something, one wonders if there is any action by Byrd that Goerler would consider as such.

Since speed and distance are so critical in evaluating the credibility of Byrd's claim, it is disappointing that Goerler has treated these aspects in a rather cavalier manner. For example, while Goerler correctly reports the times of takeoff (00:37) and landing (16:34) from the log of Byrd's ship *Chantier*, readers are not told that *Josephine*

Ford appeared over King's Bay at high altitude, and spent considerable time descending (without forward travel) before landing. The barograph record from the aircraft, reproduced on page 158, indicates that this final descent took about half an hour. Therefore Byrd's actual travel time was about 15.5 hours, as most observers in King's Bay reported. It is also doubly odd that Goerler uses *The New York Times* reporter William Bird's estimate of Byrd's expected travel time ('sixteen to twenty-four hours') as proof of the trip's credibility; first, because this loose estimate indicates that the reporter had only a very vague notion of the airplane's true speed, and, second, because he could have used the much more reliable speed reports of Bernt Balchen (who flew *Josephine Ford* on extended flights the following year), or even of Byrd himself, who expected speeds of 80 to 90 mph in his preflight diary plans (reproduced on page 90). This agrees with Byrd's own dead-reckoning calculations that imply 85 mph for the polar flight itself, reproduced on page 96. At that speed in still air, the trip should have taken 18 hours 17 minutes along Byrd's reported route.

But that is in still air, and wind has a major effect on aircraft, as Byrd was well aware. Byrd reported that he took measurements of wind and drift every three minutes during the trip (he had instruments designed for this purpose). This claim is credible, since without such checks it is doubtful that Byrd and Bennett could have made it back to Spitsbergen. But in his official report and on his flight chart, Byrd records the average dead-reckoning speeds for each hour of the trip. Such averages must be built upon the actual records of his three-minute speed checks, which means he must not only have measured his speed about 300 times during the trip, he must have recorded them all, too. Not one of these 300 records appears in his diary, in spite of many blank pages on which he could have written them. The only dead-reckoning speeds in the diary appear on page 96 of the Goerler edition, where we see Byrd's written question to Bennett: 'What has been our average air speed.' Immediately after, we see Byrd computing 8.5 (hours) times 85 (mph) = 722 (statute miles). This rough computation (not allowing for wind) would still leave Byrd about 40 miles short of the Pole eight and a half hours after takeoff. Just below this, Byrd writes, according to Goerler, '20 miles to go to Pole,' but examination of the page itself shows that the '20' has been written large over the top of an earlier number, very likely a 40. Further, this must be 8.5 hours into the flight, or five minutes after Byrd claimed in his official report that he arrived at the Pole; the discrepancy is missed by Goerler.

The critical page 96 (in Goerler's edition; the page actually comes at the very end of the diary) is a flurry of activity. At the top is Byrd's note 'The Stb [starboard] motor has an oil leak,' followed immediately by 'Can you get all the way back on two motors' and 'What has been our average air speed.' This is followed by computations by Byrd of their distance covered (722 miles) and time in the

air. The page also contains an erased question written by Byrd to Bennett: 'How long were we gone before we turned around,' followed by Bennett's unerased reply, '8 1/2.' The significance of this question, tantamount to an admission of failure in Byrd's own hand, is missed by Goerler.

On the same page is Byrd's computation of elapsed time: 9:05 – m:40 = 8:25. Here 9:05 is the current time (Greenwich Civil Time or GCT) and m:40 is midnight and 40 minutes, or 00:40 GCT, his time of takeoff. (Since 40 minutes won't subtract from 5 minutes, Byrd borrows one from the hours column, and overwrites the 9 with an 8; at the same time, he overwrites the 05 as 65 by adding an ascender to the zero. Thus the writing itself resembles 8:65 – m:40 = 8:25). The elapsed time of 8:25 agrees precisely with the elapsed time between takeoff and Pole claimed by Byrd in his official report. But in the report, he moves everything up by three minutes: takeoff is moved up to 00:37 and arrival at the Pole is moved up to 9:02, apparently to allow the takeoff time to match the log of *Chantier*. Again the discrepancy between the diary and the official report is lost on Goerler. Certainly Goerler is to be praised for including a copy of the official report as an appendix, but given the importance of the controversy (which is mentioned prominently on the dust jacket blurb and the back cover), the lack of scrutiny seen here is hard to understand.

Although these discrepancies alone are enough to cast serious doubt on the truthfulness of Byrd's official report, Byrd's diary sextant records utterly demolish any remaining pretense of his claim to have reached the Pole. And here again, Goerler does not recognize the most significant aspects of Byrd's records. Besides glossing over the erased sextant sights, Goerler fails to mention the most important aspects of the sextant records: they disagree almost completely with the sextant readings given by Byrd in his official report. Byrd's diary shows only two sextant sights; both are erased but still legible, as follows:

Time, GCT	Corrected solar altitude
04:39:19	15°56'47"
07:07:10	19°22'54"

But Byrd's official report shows no fewer than eight sextant sights:

Time, GCT	Corrected solar altitude
03:56:24	14°53'41"
04:56:27	16°40'24"
07:07:10	18°15'32"
08:18:26	17°56'31"
08:38:25	17°34'18"
08:58:55	17°18'35"
09:03 ?	17°12'14" ?
09:04 ?	17°12'14" ?

For the final two sights in the report, Byrd does not record the times nor the exact altitudes, only the average altitudes of the two, which he says were taken shortly after arriving at the Pole (9:02 in the report). Note that there is not a single matching altitude between the two documents, and only one matching time (07:07:10). The significance

of the two reported solar altitudes at that time (19°22'54" in Byrd's diary and 18°15'32" Byrd's official report), both claimed to have been measured at the exact same second, cannot be missed — except by Goerler, who does not mention it.

If one assumes that Byrd was flying correctly on his chosen meridian of 11°E, the two sextant altitudes in Byrd's diary show him to be making a constant ground speed of 59 knots (68 mph) over the first six and a half hours of the trip. This is accepting Byrd's diary takeoff time of 00:40 as correct. Observers on the ground put the takeoff at 00:50 or 00:55; these times would give northward speeds of about 61 knots. Since the diary indicates that the average airspeed in the first 8.5 hours was 85 mph, they must have been experiencing a headwind of about 17 mph. This is not unreasonable, and is supported by statements about the winds elsewhere in the diary and the official report.

That being the case, we are in a position to determine the most likely point reached by Byrd at his turnaround. We can start by assuming that Bennett flew at a constant airspeed of 85 mph throughout the trip. Certainly it might be argued that on the return trip, having fallen short of the Pole, Bennett had enough gas to increase speed a little. However, opening the throttles burns fuel so much faster that it is generally not worth the small increase in speed, and this is especially true when flying over terrain that will kill you if you run out of gas. (It is also questionable whether Bennett knew at that time that they had fallen short.) In fact, from an aerodynamic standpoint, range is maximized by slowing down as the flight progresses; this allows the wing to fly at its best lift-to-drag ratio throughout the entire flight as fuel burns off. (Burt Rutan and Jeanna Yeager followed just this strategy on their nonstop round-the-world flight in 1986.)

Also assuming that Byrd and Bennett flew 8.5 hours against a 17 mph headwind on the outbound leg before turning back, they would have made 578 statute miles from King's Bay; flying via Amsterdam Island, this would put their highest latitude at about 87°15'. As a sanity check, we compute the return trip from this point. We will assume that Byrd flew the route he originally reported to Bird: directly to Verlegen Hook (16°10'E, 80°04'N), thence to Amsterdam Island and home. The return distance is therefore 614 statute miles, which they would have covered in 7 hours at an average speed of 88 mph. This would be consistent with a 3 mph tailwind on the way back, which seems too small compared to the wind on the outbound leg.

Therefore, a better procedure would be to hold the wind constant (at 17 mph from the north) and allow the turnaround time to vary. Under these assumptions, the farthest north would be about 87°41' with a total flight time of 15.5 hours; turnaround time would then be 8 hours 56 minutes after takeoff (or 9:36 GCT using Byrd's diary takeoff time of 00:40). Even allowing 16 hours total flight time, as does Goerler, puts Byrd's farthest at only 87°59', but in either case, Byrd's arrival time at his farthest north would come

at least half an hour after his officially reported arrival time at the Pole.

The logical explanation here is that the oil leak occurred at 9:05, the time that figures prominently in Byrd's elapsed-time computation on page 96. Byrd's quick-and-dirty dead reckoning check at that time put him 40 statute miles short of the Pole (in still air). At their airspeed of 85 mph, that would have required another half hour to make. Byrd pressed on for that half hour, figuring that he had a reasonable case for having made it to the Pole on that basis. But just as the headwind had left him far short of the Pole, the tailwind on the return brought him back far earlier than expected. To make his case credible, Byrd then had to do some fast thinking, some time shuffling, and some sextant faking. The official report is the result of that. If this scenario is correct, Byrd showed real heroism in pressing forward after the oil leak; the decision may have cost him his life, and Bennett's too.

Certainly we cannot fault Goerler for not having the navigational expertise to analyze these records critically. But shortly after the diary was discovered, it was examined by astronomer Dennis Rawlins, who quickly recognized its importance and reported it to Goerler. When the existence of the diary (and Rawlins' analysis) became known, *The New York Times* ran a front-page story debunking the Byrd claim, on the seventieth anniversary of the flight. But Goerler apparently was not happy with Rawlins' negative appraisal, since shortly thereafter he allowed another old Arctic hand, William Molett, to examine both Byrd's diary and Rawlins' report. Molett was an unfortunate choice, but Goerler got the criticism of Rawlins that he apparently wanted.

In an extended footnote on pages 56 and 57, Goerler only hints at Molett's criticisms of Rawlins, but the embarrassing details can be found in Molett's article 'Due north?' which appeared in *Mercator's World*, March–April 1998, shortly after the book's publication. In his article, Molett defends Byrd's diary erasures with an utterly false claim that the erased sextant readings are offset by 'an unerased sextant reading for the same time on the same page.' He then tries to build a case against Rawlins' analysis by repeatedly citing this 'unerased reading' that does not actually exist. In a number of places, Molett also attributes quotes to Byrd's diary that actually appear in his official report. Molett's article is so rife with misstatements of fact that virtually anyone reading it after reading *To the Pole* would find it difficult to believe that Molett had actually examined Byrd's diary at all. It is only against this background that one realizes how astounding it is that Goerler uses Molett's opinion to balance that of Rawlins; both are given equal weight by him in footnote 19.

In fact, Molett, a retired Air Force colonel, has considerable experience in flying aircraft in the Arctic, but it is doubtful that his experience extends to celestial navigation. Shortly after his article appeared in *Mercator's World*, I wrote a letter to the editor of that journal; I

subsequently received a call from Molett. At that time, he repeated his assertion that the sextant reading in the diary had been 'corrected' by Byrd in his official report. Anyone who has ever taken a sextant reading single-handed will realize the impossibility of getting two different readings within one second; just writing down the time and the alidade reading takes longer than that. Molett also was unable to answer the following crucial questions: 1. when exactly did Byrd realize that the original reading was in error, and that a second reading was therefore required?; 2. why did Byrd write down the original reading in his diary if he already knew it was in error at the time?; 3. why did Byrd *not* write the 'corrected' reading in the diary?; and 4. how did Byrd manage to record the 'correct' reading in his official report when there was no diary record of it? Clearly Molett is in way over his head here; but that's what happens when you try to excuse the inexcusable.

To the Pole is an immensely valuable book that fills a blank space in one of the most controversial chapters of polar exploration. But it is disappointing that casual readers will not recognize just how valuable it really is. Goerler's unapologetic cheering for Byrd hides, rather than reveals, the true value of Byrd's diary, and the final truth of his remarkable story. (Keith A. Pickering, 10085 County Road 24, Watertown, MN 55388, USA.)

References

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 Rawlins, D. 1973. *Peary at the North Pole: fact or fiction*. Washington, DC: Luce.

HUMAN CHOICE AND CLIMATE CHANGE. Steve Raynor and Elizabeth L. Malone (Editors). 1998. Columbus: Battelle Press. 4 volumes. Vol 1: xlii + 491 p, vol 2: xlii + 451 p, vol 3: xlii + 429 p, vol 4: xii + 193, illustrated, hard cover. Set: ISBN 1-57477-045-4.

This four-volume assessment of social-science research on climate change has been produced to complement the work of the Intergovernmental Panel on Climate Change (IPCC). The many contributors tackle the issues grouped under the broad term 'global climate change' in ways that not only complement research in the natural sciences — and indeed place scientific quantifications into wider social, economic, and political perspective — but demonstrate the vital and distinct perspectives that social scientists have that are of relevance to policy-makers.

As they attempt to understand human activity in relation to climate change, ozone depletion, pollution, and loss of biodiversity, both natural scientists and social scientists appear to be in agreement that human population changes, economic growth, technological change, politico-economic institutions, and globalisation are some of the main human dimensions driving global environmental change. Yet, while the natural sciences may be concerned with assessing the anthropogenic causes and impacts of these human dimensions, the social sciences seek to understand such things as how social institutions, values, and human choices influence and shape relationships among society, culture,

economics, and the environment. At the heart of the social-science perspectives explored at length in these exceptionally well-written volumes are human agency and human choice (especially within social institutions), consideration of which rarely enters into natural-science interpretations and evaluations of the human modification of the environment.

Human choice and climate change argues that we need to gain in-depth understanding of the choices and decisions that people make in relation to how they modify their local environments, in both historical and contemporary perspective. As the editors put it in their introduction, 'humans can choose to repond to the prospect of climate change and can decide, with undetermined and perhaps undeterminable degrees of freedom, what steps to take. However, choice does not merely underlie any possible solution to climate change; it also underlies the problem itself' (vol 1: xiv). With this caveat, especially to the natural sciences, the four volumes proceed to elaborate on the theme of choice lying at the very core of the climate-change issue.

At the same time, global climate change is examined within the broader context of global social change. Indeed, the scientific concern with (and, dare one say, alarm over) global climate change is put into perspective by social scientists, such as sociologists and anthropologists, who argue that the scale, rate, and extent of rapid social change may well outpace the scale, rate, and extent of climate change for the foreseeable future. In which case, who is it that one chooses to believe over scientific climate change scenarios — and, indeed, how do people decide that climate change is worthy of scientific, social, and political attention (if at all)? Because social scientists are often working in societies more directly and immediately affected by changing social, economic, and political conditions and circumstances than by climate change (whether local or regional), global social-science perspectives on society recognise the limits that can be set by focusing merely on climate change. Thus, these four volumes go beyond the IPCC to encompass work in the social sciences that is not necessarily concerned with climate change.

Volume 1, *The societal framework*, assesses the social, cultural, political, and economic systems that provide the contexts for the kinds of human activities that contribute to greenhouse gas emissions and other anthropogenic impacts on the environment. The volume explores population growth, health, human needs and wants, cultural discourses about climate and climate change, and the social and political institutions necessary for political action on climate change. Volume 2, *Resources and technology*, comprises chapters that analyse climate change and the social-scientific perspectives on it in relation to resources and their uses. After outlining and explaining the present state of scientific understanding of climate change, the subsequent chapters examine climate change with reference to human activities that increase greenhouse gas emissions from the use of land and water resources, energy, industry and social systems, and tech-