One of the extraordinary stories of the Internet age is that of Wikipedia, a free online encyclopaedia that anyone can edit. This radical and rapidly growing publication, which includes close to 4 million entries, is now a much-used resource. But it is also controversial: if anyone can edit entries, how do users know if Wikipedia is as accurate as established sources such as Encyclopaedia Britannica?

Several recent cases have highlighted the potential problems. One article was revealed as falsely suggesting that a former assistant to US Senator Robert Kennedy may have been involved in his assassination. And podcasting pioneer Adam Curry has been accused of editing the entry on podcasting to remove references to competitors’ work. Curry says he merely thought he was making the entry more accurate.

However, an expert-led investigation carried out by Nature — the first to use peer review to compare Wikipedia and Britannica’s coverage of science — suggests that such high-profile examples are the exception rather than the rule. The exercise revealed numerous errors in both encyclopaedias, but among 42 entries tested, the difference in accuracy was not particularly great: the average science entry in Wikipedia contained around four inaccuracies; Britannica, about three.

Considering how Wikipedia articles are written, that result might seem surprising. A solar physicist could, for example, work on the entry on the Sun, but would have the same status as a contributor without an academic background. Disputes about content are usually resolved by discussion among users.

But Jimmy Wales, co-founder of Wikipedia and president of the encyclopaedia’s parent organization, the Wikimedia Foundation of St Petersburg, Florida, says the finding shows the potential of Wikipedia. “I’m pleased,” he says. “Our goal is to get to Britannica quality, or better.”

Wikipedia is growing fast. The encyclopaedia has added 3.7 million articles in 200 languages since it was founded in 2001. The English version has more than 45,000 registered users, and added about 1,500 new articles every day of October 2005. Wikipedia has become the 37th most visited website, according to Alexa, a web ranking service.

But critics have raised concerns about the site’s increasing influence, questioning whether multiple, unpaid editors can match paid professionals for accuracy. Writing in the online magazine TCS last year, former Britannica editor Robert McHenry declared one Wikipedia entry — on US founding father Alexander Hamilton — as “what might be expected of a high-school student.” Opening up the editing process to all, regardless of expertise, means that reliability can never be ensured, he concluded.

Yet Nature’s investigation suggests that Britannica’s advantage may not be great, at least when it comes to science entries. In the study, entries were chosen from the websites of Wikipedia and Encyclopaedia Britannica on a broad range of scientific disciplines and sent to a relevant expert for peer review. Each reviewer examined the entry on a single subject from the two encyclopaedias; they were not told which article came from which encyclopaedia. A total of 42 usable reviews were returned out of 50 sent out, and were then examined by Nature’s news team.

Only eight serious errors, such as misinterpretations of important concepts, were
detected in the pairs of articles reviewed, four from each encyclopaedia. But reviewers also found many factual errors, omissions or misleading statements: 162 and 123 in Wikipedia and Britannica, respectively.

Editors at Britannica would not discuss the findings, but say their own studies of Wikipedia have uncovered numerous flaws: “We have nothing against Wikipedia,” says Tom Panesas, director of corporate communications at the company’s headquarters in Chicago. “But it is not the case that errors creep in on an occasional basis or that a couple of articles are poorly written. There are lots of articles in that condition. They need a good editor.”

Several Nature reviewers agreed with Panesas’ point on readability, commenting that the Wikipedia article they reviewed was poorly structured and confusing. This criticism is common among information scientists, who also point to other problems with article quality, such as undue prominence given to experts who support Connolley have limited to one revert a day. Users were banned from editing any climate article for six months, but it was a bumpy process. The Wikipedia editors who oversaw the case took three months to reach a decision. They also punished Connolley for repeatedly changing the sceptics’ edits, placing him on a six-month parole during which he is onward.

Connolley, a climate researcher at the British Antarctic Survey in Cambridge, has fought for two years with climate-change sceptics over the entry on global warming. When Connolley was insulted by one of the sceptics and the editing became a ‘revert war’ — where editors repeatedly undo each others’ changes — the matter was referred to the encyclopaedia’s administrators.

Two of Connolley’s opponents were banned from editing any climate article for six months, but it was a bumpy process. The Wikipedia editors who oversaw the case took three months to reach a decision. They also punished Connolley for repeatedly changing the sceptics’ edits, placing him on a six-month parole during which he is limited to one revert a day. Users who support Connolley have contested the decision.

“Scientists’ involvement would lead to a multiplier effect. Experts can help write specifics in a nuanced way.”

Wales also plans to introduce a ‘stable’ version of each entry: Once an article reaches a specific quality threshold it will be tagged as stable. Further edits will be made to a separate ‘live’ version that would replace the stable version when deemed to be a significant improvement. One method for determining that threshold, where users rate article quality, will be trialled early next year.

Jim Giles

Additional research by Declan Butler, Jenny Hogan, Michael Hopkin, Mark Peplow and Tom Simonite. Supplementary information available online at www.nature.com/news/2005/051212/full/438900a.html