

# The Online Library Catalog: Paradise Lost and Paradise Regained?

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[摘要] This think piece tells why the online library catalog fell from grace and why new directions pertaining to cataloging simplification and primary sources will not attract people back to the online catalog. It proposes an alternative direction that has greater likelihood of regaining the online catalog's lofty status and longtime users. Such a direction will require paradigm shifts in library cataloging and in the design and development of online library catalogs that heed catalog users' longtime demands for improvements to the searching experience. Our failure to respond accordingly may permanently exile scholarly and scientific information to a netherworld where no one searches while less reliable, accurate, and objective sources of information thrive in a paradise where people prefer to search for information.

[关键词] Online Library, Paradise Lost, Paradise Regained

## **Purpose Statement**

This think piece tells why the online library catalog fell from grace and why new directions pertaining to cataloging simplification and primary sources will *not* attract people back to the online catalog. It proposes an alternative direction that has greater likelihood of regaining the online catalog's lofty status and longtime users. Such a direction will require paradigm shifts in library cataloging and in the design and development of online library catalogs that heed catalog users' longtime demands for improvements to the searching experience. Our failure to respond accordingly may permanently exile scholarly and scientific information to a netherworld where no one searches while less reliable, accurate, and objective sources of information thrive in a paradise where people prefer to search for information.

## **The Impetus for this Essay**

The impetus for this essay is the library community's uncertainty regarding the present and future direction of the library catalog in the era of Google and mass digitization projects. The uncertainty is evident at the highest levels. Deanna Marcum, Associate Librarian for Library Services at the Library of Congress (LC), is struck by undergraduate students who favor digital resources over the online library catalog because such resources are available at anytime and from anywhere ([Marcum](#), 2006). She suggests that "the detailed attention that we have been paying to descriptive cataloging may no longer be justified ... retooled catalogers could

give more time to authority control, subject analysis, [and] resource identification and evaluation” ([Marcum](#), 2006, 8).

In an abrupt about-face, LC terminated series added entries in cataloging records, one of the few subject-rich fields in such records ([Cataloging Policy and Support Office](#), 2006). Mann (2006b) and [Schneiderman](#) (2006) cite evidence of LC’s prevailing viewpoint in favor of simplifying cataloging at the expense of subject cataloging.

LC commissioned [Karen Calhoun](#) (2006) to prepare a report on “revitalizing” the online library catalog. Calhoun’s directive is clear: divert resources *from* cataloging mass-produced formats (e. g., books) *to* cataloging the unique primary sources (e. g., archives, special collections, teaching objects, research by-products). She sums up her rationale for such a directive, “The existing local catalog’s market position has eroded to the point where there is real concern for its ability to weather the competition for information seekers’ attention” (p. 10). At the [University of California Libraries](#) (2005), a task force’s recommendations parallel those in Calhoun report especially regarding the elimination of subject headings in favor of automatically generated metadata.

Contemplating these events prompted me to revisit the glorious past of the online library catalog. For a decade and a half beginning in the early 1980s, the online library catalog was the jewel in the crown when people eagerly queued at its terminals to find information written by the world’s experts. I despair how eagerly people now embrace Google because of the suspect provenance of the information Google retrieves. Long ago, we could have added more value to the online library catalog but the only thing we changed was the catalog’s medium. Our failure to act back then cost the online catalog the crown. Now that the era of mass digitization has begun, we have a second chance at redesigning the online library catalog, getting it right, coaxing back old users, and attracting new ones. Let’s revisit the past, reconsidering missed opportunities, reassessing their merits, combining them with new directions, making bold decisions and acting decisively on them.

### **Why the Online Catalog Fell from Grace**

This brief account of end-user searching tells why the online catalog fell from grace.

#### *The Reign of the Online Catalog*

By the early 1980s, a critical mass of online catalog deployment had been achieved across the United States. A nationwide survey demonstrated that over 80% of library users held favorable views of this new form of the catalog ([Markey](#), 1984, 2; [Matthews, Lawrence, and Ferguson](#), 1983, 152). The decade and a half beginning in the early 1980s was the golden age of the online catalog, because library users depended on it almost exclusively for finding information on the topics that interested them

([Farber](#), 1984). The online catalog was and still is an appropriate place for people to start their search for information because books synthesize human knowledge about particular phenomena in and across disciplines. They span large intellectual spaces, tackle mammoth problems, make more intensive cases than all other literary genres, and undergo rigorous editorial review.

### *Paradise Lost*

From the start, users wanted subject searching improved in online catalogs ([Besant](#), 1982), they told us subject searching was difficult ([Markey](#), 1984, 81–84; [Matthews, Lawrence, and Ferguson](#), 1983, 155–164), and they wanted tables of contents and journal articles added to the catalog's database ([Markey](#), 1984, 84–87; [Matthews, Lawrence, and Ferguson](#), 1983, 118–120). Through its Bibliographic Service Development Program ([Haas](#), 1978), the Council on Library Resources sponsored a long list of researchers to demonstrate subject access improvements to online catalogs (see list specifics in [Drabenstott](#), 1991). By the early 1990s, researchers recommended these solutions:

1. Make subject searching in online catalogs easier using post-Boolean probabilistic searching with automatic spelling correction, term weighting, intelligent stemming, relevance feedback, and output ranking ([Hildreth](#), 1989, 1995; [Drabenstott](#), 1991; [Walker](#), 1989)
2. Streamline users' book selection decisions at the catalog by adding tables of contents and back-of-the-book indexes to cataloging (i. e., metadata) records ([Atherton](#), 1978; [Wormell](#), 1981; [Markey and Calhoun](#), 1987)
3. Reduce the many failed subject searches by expanding the online catalog with *full texts*—journal and newspaper articles, encyclopedias, dissertations, government documents, etc. ([Drabenstott](#), 1991; [Tiefel](#), 1991)
4. Increase finding strategies in online catalogs through the library classification ([Markey and Demeyer](#), 1986; [Larson](#), 1991)

The reasons why these solutions were not applied to online library catalogs to transform the user experience are subtle, nuanced, and varied: (1) the library profession's longtime obsession with descriptive cataloging, (2) the focus of the technical services department on other priorities, e. g., retrospective conversion, cataloging backlogs, authority control, etc., (3) the profession's conscious shift away from supporting technical services in favor of public services, (4) the ever increasing per-item cataloging cost, (5) the failure of the research community to arrive at a consensus about the most pressing needs for online catalog system improvement and to field cost-conscious solutions, (6) failure of the library staff issuing the Requests for Proposals (RFPs) to act in concert about needed system improvements, (7) lower-than-inflation funding allocations for libraries, (8) the costs of building collections and licensing resources pushing well beyond the rate of inflation giving rise to the open-access movement, (9) the high cost of integrated library system (ILS) technology generally, and (10) the failure of ILS vendors to

monitor shifts in information-retrieval technology and respond accordingly with system improvements. In the end, widely disconnected organizations and market forces failed to converge in a direction that kept users queuing at the online catalog.

### *The Reign of Google*

In the late 1990s, the World-Wide Web grew exponentially. For-profit software vendors deployed search engines such as Alta Vista, Excite, and Hotbot to showcase full-text searching to prospective software purchasers specifically and to Internet searchers generally. Ironically these systems embraced post-Boolean searching, the very technology that online catalog vendors eschewed ([Calhoun](#), 2006, 26; [University of California Libraries](#), 2005, 17; [Yu and Young](#), 2004, 168). By the early 2000s, Google, a for-profit company with the objective of "organizing the world's knowledge" ([Google](#), 2005), registered 700 times more searches on a daily basis than the online library catalog for the statewide campuses of the University of California served on a monthly basis ([Cooper](#), 2001; [Sherman](#), 2003).

Google now reigns. Given the company's tremendous investment in digitization projects ([Google](#), 2004), Google has every intention of keeping its exalted position for some time to come. The company has deep pockets, innovative leadership, high-level technical talent, and a proven track record on delivering successful products to the marketplace.

### **Why Do People Prefer Google as a Starting Point?**

To answer this question, this section summarizes a quarter-century of research findings about people's information-seeking behavior.

### *Searching for Information in the Library Puts People on an Emotional Roller Coaster*

"I despise searching the library for books and other sources. It takes a long time and rarely can you find sources needed. This difficult process is the first thing I think of when I think of using the library" ([De Rosa et al.](#), 2005, 1-22).

The frustration that this 18-year-old expresses about searching for library resources fits the Information Search Process (ISP) model to a "T" ([Kuhlthau](#), 1993). Not only does the ISP model tell us that people experience a wide range of negative and positive emotions during their search for information, it tells us exactly what they are doing when their emotions roller coaster up and down ([Kracker](#), 2002; [Kracker & Wang](#), 2002; [Swain](#), 1996).

### *Putting One's Information Needs into Words Is Downright Difficult*

Many researchers express surprise at the brevity (from one to three words) of the queries people submit to online systems ([Markey](#), in press). Belkin (1980, 137) tells

why so few words make up their queries, "Precisely because of the inquirer's lack of knowledge about a problem area, it is impossible to specify what would resolve it." For Belkin, the saving grace is the inquirer's ability to *recognize* what he or she wants or does not want during the course of the search. Therein lies an important solution to the problem—information systems that report results for *easy eyeballing* and *instantaneous recognition of relevant possibilities*.

### *Domain Expertise—It's All about Knowing What You Want and Where to Look*

Domain experts—scholars, scientists, and experienced researchers who have expert knowledge of their discipline as a whole and in-depth knowledge about a couple of ideas that ranks them amongst the world's experts—know the unanswered research questions, sticky controversies, and active scholars in their discipline. Rarely, if ever, do they need to conduct the brute-force subject searches that characterize the searches of domain novices (Ellis, 1989; Land & Greene, 2000; Drabenstott, 2003). When they are stumped, their standing in the field gives them *carte blanche* to contact the world's experts to get answers to questions about who is doing research or has published on a topic. Primary sources are truly the intellectual playground of domain experts: they use primary sources to make new discoveries, and the by-products of their research are the creation of new primary sources.

Most people are domain novices about their topics of interest. Undergraduate students especially are just beginning to learn the summary knowledge of a discipline. They have no depth, do not know the discipline's influential authors, important questions, cutting-edge research, or research methodologies. Building a catalog of the future that is biased toward primary sources does not serve the interests of domain novices. Imagine a future University of Michigan co-ed whose professor assigns her a term paper on Kukulcan. Before cracking open her textbook to learn the absolute basics about Kukulcan, she searches Calhoun's online library catalog of the future and retrieves images of Kukulcan sculptures from the University's Kelsey Museum. Because she has no knowledge of Kukulcan nor the Mesoamerican culture from which Kukulcan derives, she would not understand what the sculptures mean, how to make sense of the minimal metadata usually associated with museum objects such as these, and how the images now figure into her ongoing search for information or the term paper her instructor has assigned her to write.

Diverting our existing online library catalogs away from books to primary sources will drive this co-ed and her peers back to the simplicity of Google as quickly as one can say "Kukulcan."

### *Searching for Something One Does Not Know Is Frenetic, Aimless, and Random*

Because many people are searching online systems for something they do not know, their behavior is neither targeted nor direct. "Students often use very chaotic, what they themselves term 'random,' methods for finding materials for their papers.

A characteristic comment is: 'I felt kind of aimless, kind of like shooting in the dark, you're going to get something eventually' " ([Valentine](#), 2001, 112).

[Debowski](#) (2001, 378) makes similar observations, "It was evident that [people] spent more time inputting, rather than planning a suitable search process. There was little evidence of search quality assessment ... with most entering the next search statement very rapidly ... [People] who search without a solid foundation fail to gain a stronger understanding of the search process. Instead, they appear to develop further erroneous habits as they continue." [Land & Greene](#) (2000, 57) attribute such meandering to low levels of metacognitive knowledge, "the process of reflecting on or monitoring the effectiveness of the search process and then refining the process when necessary," and note its pervasiveness in the searches of domain novices.

### *People's Starting Point Is Google and the Web*

People start their quest for knowledge and understanding with Google ([De Rosa et al.](#), 2005; [Awre et al.](#), 2005; [Griffiths and Brophy](#), 2005; [Fast and Campbell](#), 2004; [Pew Research Center](#), 2003; [OCLC](#), 2002; [Outsell](#), 2000). It ranks the most basic, elementary, and easy-to-understand information at or near the top of the heap. If you are not convinced, do a search for something you know nothing about like "kukulcan." Right at the top of Google's list are web sites that tell who Kukulcan is, alternative names for this Aztec god, and, in the case of the Wikipedia entry, links to both online and print sources for learning more.

The World-Wide Web has become the people's *encyclopedia* of choice. Google and other web search engines give people a good start, and, in fact, with Wikipedia links in hand, it gives them a *running* start, for building on their bare-bones, basic knowledge of a topic. The web also satisfies people's voracious appetites for full texts ([Bar-Ilan and Fink](#), 2005). Instead of strolling in the library stacks to find a book, people want to stay put in their homes and offices and retrieve full texts with a click of a button. Asked about the reliability, accuracy, and objectivity of the information they retrieve on the web, people express concern, but there is little evidence that they act on their concern ([De Rosa et al.](#), 2005; [Griffiths and Brophy](#), 2005; [Fast and Campbell](#), 2005; [Marcum and George](#), 2003; [Outsell](#), 2000). As such, searching the web specifically, and searching for information generally, conforms to the *principle of least effort*, "The design of any ... information system should be the system's ease of use ... If an organization desires to have a high quality of information used, it must make ease of use of primary importance" ([Rosenberg](#), 1966, 19).

### **A Second Chance to Redesign the Online Library Catalog**

To regain the online catalog's lofty status and win back its fair-weather fans, let's redesign an online library catalog that embraces: (1) post-Boolean probabilistic searching, to ensure the precision of searches in online library catalogs bearing

the *full texts* of digitized books, journal articles, encyclopedias, conference papers, etc., (2) subject cataloging, to take advantage of the user's ability to *recognize* what they want or do not want during the course of the search, and (3) qualification cataloging, to enable users to *customize* retrievals that are in keeping with their level of understanding and expertise in a domain.

### ***Embrace Post-Boolean Probabilistic Searching***

Long overdue is the replacement of our outdated Boolean-based catalogs with post-Boolean, probabilistic retrieval methods that characterize Google and other web search engines ([University of California Libraries](#), 2005, 17). Why does post-Boolean probabilistic searching do so well? [Susan Feldman](#) (1998, 40-41) sums it up best:

"These systems are doing what you as [expert] searchers have learned to do yourselves. They look for terms that can distinguish one document from another, they ask for the terms to appear close together in the document, they stem words, and they count words that appear in the title more heavily than those appearing in the rest of the text... Some systems also try to match query concepts... They enlarge a search beyond the boundaries that the query originally defined."

In the post mass digitization era, every word and phrase from millions of digital texts of all literary genres will be at the fingertips of online library catalog users. Giving users a Boolean-based system to search digitized texts is comparable to giving Captain Kirk a Mercury-era space capsule to travel the galaxy.

### ***Embrace Subject Cataloging***

When people can search every word that has ever been written, one is hard pressed to find evidence in support of subject cataloging. Yet such evidence has been right under nose for several years, thanks to a report Marcia Bates prepared for the Library of Congress. The evidence pertains to the 30-to-1 ratios that characterize access to stores of information ([Dolby and Resnikoff](#), 1971). With respect to books, titles and subject headings are 1/30 the length of a table of contents, tables of contents are 1/30 the length of a back-of-the-book index, and the back-of-the-book index is 1/30 the length of a text. Similar 30 to 1 ratios are reported for the journal article, card catalog, and college class. "The persistence of these ratios suggests that they represent the end result of a shaking down process, in which, through experience, people became most comfortable when access to information is staged in 30-to-1 ratios" ([Bates](#), 2003, 27). Recognizing the implications of the 30-to-1 rule, Atherton (1978) demonstrated the usefulness of an online catalog that filled the two 30-to-1 gaps between subject headings and full-length texts with tables of contents and back-of-the-book indexes.

In the post mass digitization era, subject headings, class numbers, classification captions, and entries from tables of contents entries and back-of-the-book indexes should figure *prominently* in the post-Boolean probabilistic catalog's:

1. Ranking algorithms. Such algorithms should be profiled to give much higher weights to subject headings, classification captions, and entries from tables of contents and book indexes than to words buried deep in the text.
2. Brief-document displays. Everyone is familiar with Google's brief-document displays that list keywords, phrases, and sentence fragments from retrieved web pages. Users scan these displays to determine what the page is *about* and whether to link it. Even better would be document titles, subject headings and classification captions to expedite scanning for relevant items in long lists of retrievals.
3. Relevance feedback ("find more like") mechanisms. Relevance feedback algorithms should weight titles and subject headings much higher than words buried deep inside texts. North Carolina State University's new Endecca online catalog gives us previews of relevance feedback for virtual classification browsing points and for faceted LC subject headings ([Antelman, Lynema, and Pace](#), 2006). Mann ([2005](#); [2006a](#)) extols the benefits of maintaining LC subject headings in their current form; [Anderson and Hofmann](#) (2006) advocate faceting LC headings.

### ***Expand with Qualification Metadata***

Metadata that is essential for users in the post mass digitization age must facilitate their document-selection decisions. Here is a list of document attributes that would enable users to qualify retrievals with greater precision and customize them according to their level of understanding and knowledge of a domain:

- *In* a discipline: in biology, in computer science, in the history of art, in mathematics, in meteorology, in physics, in theology, etc.
- *With* knowledge of this subject at a particular academic level: with an elementary education, with a high school education, with a college education, etc.
- *To what extent* the author is an authority on the topic at hand.
- *For* a particular class of people: for teens, for seniors, for shut-ins, etc.
- *Is* a particular genre or *of* a particular literary nature: encyclopedias, law, newspapers, poetry, history, bibliography, research, diaries, statistics, state-of-the-art review, dissertation, first-person account, fiction, etc.
- *When* the particular subject took place: 16th century, Age of Enlightenment, Victorian Era, 1939-1945, etc.
- *What* can be done with the document: buy, read, solve, calculate, download, play games, chat, sell, gamble, search, listen, watch, etc.
- *How others* benefited from using the document, i. e., reviews and ratings.



- *What* kind of experience the user gets from the document: scary stories, sad pictures, funny jokes, break-your-heart lyrics, etc.

The above list is by no means comprehensive. Examine the major databases across the disciplines to expand on the above list and to gather the controlled vocabularies these databases use for each attribute. If I was starting my search for Kukulcan, I might be inclined to qualify retrievals by setting *with* at "a high school education" and *is-of* at "encyclopedias" attributes. If I was farther along in my exploration, I might up the ante by setting *with* to "a college education," and *is-of* to "history," "research," and "bibliography." If I was settling a bet, I might not be concerned about the *to-what-extent* setting but if I was integrating what I had found into my senior thesis, I would be tempted to set *to-what-extent* at a "high" level to limit retrievals to domain experts writing in their chosen field.

Again, North Carolina State University's Endeca online catalog gives us a preview—it shows how existing metadata elements can be used to qualify search results. Adding the qualification metadata listed above could make our future post-Boolean probabilistic catalogs even more versatile than what is possible with the metadata in today's cataloging records. Today, people voluntarily add metadata (they call them tags) to texts and multimedia, e. g., web sites (del.icio.us, Shadows, and MyWeb), blog posts (Technorati and RawSugar), images (Flickr), and videos (YouTube) (Wash and Rader, 2006; Xu et al., 2006). Instead of eliminating metadata, our field should be studying user-added metadata and adding what users want to metadata in the future online catalog.

### **Ameliorating the Full-Text Retrieval Problem**

The recommendations presented in this think piece about post-Boolean searching, subject cataloging, and qualification metadata are intended to ameliorate the full-text retrieval problems inherent with Google/Open Content Alliance digitized text (Tennant, 2005). In the online catalog of the post mass digitization era that searches millions and millions of full texts, imagine the results of your searches for the queries "kukulcan," "aztecs," or "spanish conquest." Each search will result in millions of hits with no guarantee that the top-ranked ones will address your desired topic in depth or at your level of understanding. Enlisting post-Boolean retrieval algorithms on rich, authority-driven metadata is imperative for ensuring the precision of search results in the online catalog of the future.

### **Building the Future Online Catalog Now**

Before mass digitization projects make significant headway, the library community must act on building the future online catalog joining forces with researchers, practitioners, and system designers in related and allied fields to: (1) gather relevant information, (2) test prototype post-digitization-era catalogs, (3)

evaluate results and make decisions, (4) assign tasks to willing parties, and (5) execute them.

The information-gathering phase must include definitions of the future online library catalog. Will books dominate or will future catalogs feature the full gamut of scholarly products and by-products? To get us started is [Christine Borgman](#) (2006, 2007) with her extensive research on the future of scholarly communication. With regard to subject access in the catalog of the future, we should consider all options, e.g., continuing the status quo, enlisting human indexers to apply faceting, restricting faceting to computer-based approaches, assessing automatic subject cataloging and classification, eliminating subject analysis altogether. Here are examples of subject-access functionality in future online catalog prototypes that should be assessed in the testing phase:

- Ranking algorithms that give the highest weights to the summary data in metadata records such as titles, subject headings, class numbers, and qualification metadata to ensure the precision of ranked output
- Relevance feedback (i.e., "find more like this") mechanisms that weight subject headings, titles, class numbers, and qualification metadata higher than words and phrases buried deep inside digitized texts
- Data elements that users want to see in the catalog's brief displays of retrieved items
- Document attributes that are most useful for qualifying retrievals so that retrievals are relevant and users are intellectually prepared to understand their contents
- Qualification attribute selection routines that are easy for searchers to understand and use
- The role of citation data for searching, ranking, retrieval, relevance feedback, and display
- Ability to display and manipulate full texts, e.g., searching, navigating, underlining, note-taking, writing in the margins, sharing with peers, etc.
- Metadata assignment (i.e., tagging) procedures that encourage users to participate, perhaps by rewarding them for their assignment
- Integration of online library catalog searching into the larger scenario of information seeking generally—Google and the Internet generally, journal searching, searching the invisible web, institutional repository searching, etc.

In the past, the library community has left decision-making to a few key individuals, advisory groups, organizations, or professional societies for reasons that deserve examination elsewhere. No longer should decisions be left to a few. First, we have the technology to be inclusive in the decision-making phase. Second, we are facing an uncertain future in which we may experience a shift in the balance from the primacy of a few large institutions, their collections, authority, and staff expertise to a federation that requires the participation of all in the creation of a new and

different comprehensive whole. Third, successful deployment of shared, technology-based decision-making could set the standard for future decision-making within the discipline and inspire other disciplines to embrace the approach. Being inclusive during the decision-making process may be a necessity to secure everyone's participation during task-assignment and execution phases. Finding today's equivalent to yesterday's Bibliographic Services Development Program to support such an ambitious plan of action would certainly facilitate the building of the future online library catalog.

## Conclusion

Whether the library community adopts this think piece's recommendations or goes in a different direction, the time is right to rethink library cataloging and online catalogs. Reading and synthesizing Marcum, Calhoun, Bates, Mann, Hildreth, Borgman, Anderson, etc., should be mandatory for everyone who cares about the future of the online library catalog. The next steps must be to engage all interested parties in serious dialogue, system prototyping, decision making, and action so the online library catalog of the future hits the ground running just as mass digitization projects end. Should we fail to act until all the books are digitized and the copyright problems are solved, the last person to leave to digitization workroom may be turning off the lights on the library.

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The online library catalog: paradise lost and paradise regained?â€ K Markeyâ€ D-Lib magazine 13 (1/2), 17-30, 2007â€ Dewey Decimal Classification Online Project: Evaluation of a Library Schedule and Index Integrated into the Subject Searching Capabilities of an Online Catalog. Final Report.â€ K Markey, AN Demeyerâ€. Paradise Regained is a poem by the 17th-century English poet John Milton, published in 1671. It is connected by name to his earlier and more famous epic poem Paradise Lost, with which it shares similar theological themes. â€ Excerpted from Paradise Regained on Wikipedia, the free encyclopedia. 26945Paradise RegainedJohn Milton. John Milton. Contents[edit]. Book I. Book II. Book III. Paradise Lost, Paradise Regained, Grammar, Dictionary (imperfect). I heard that after he was blind that he was writing a Latin dictionary (in the hands of Moses Pitt). Vidua affirmat6 she gave all his papers (among which this dictionary, imperfect) to his nephew, a sisterâ€™s son, that he brought up â€!â These laudatory poems first prefaced Paradise Lost in 1674. The Latin verses by Samuel Barrow concentrate on the expulsion of Satan and his followers from Heaven and its classical precedents, the defeat and punishment of the Titans and Giants. Given the literary triumph of this section of Paradise Lost, Barrow confidently welcomes Milton onto the stage of world poet. ry (where he has been ever since).