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ALONZO CHURCH AND THE REVIEWS

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The journal of symbolic logic began publishing in 1936. From the outset, the JOURNAL included a Reviews Section, edited by Alonzo Church. The very first issue carried three pages of reviews, written by Bernays, Church, Rosser, and Quine.

As the first issue stated, "It is intended that this section of the JOURNAL shall serve as a complete bibliography of current literature in the field of symbolic logic, from January 1, 1936. To this end an effort will be made to include in it, at least by title, all publications in this field, both books and articles in journals, and as far as possible these will be accompanied by signed reviews." Thus the purpose of the Reviews Section was two-fold. For one, there was its bibliographical function: to provide a complete, suitably indexed, *listing* of all the publications—both books and journal articles—in symbolic logic, wherever and in whatever language published. And secondly, the reviews were to provide critical, analytical *commentary* on these publications, whenever possible.

The Reviews Section should be viewed as a continuation and expansion of Church's *A bibliography of symbolic logic*. The *Bibliography* was a listing, with some annotations, of the publications in symbolic logic prior to 1936. It was published as volume 1, number 4 of the JOURNAL. Church made the listing as complete as he could, of course. When additional pre-1936 publications came to his attention, they were initially added to the *Additions and corrections*, published in volume 3, pages 178–192; the ones found later were listed in the Reviews Section. (In 1984, the *Bibliography* was reissued, together with the *Additions and corrections* and the subsequently discovered items. The reissue is therefore the authoritative listing of publications in symbolic logic prior to 1936.)

Assembling the *Bibliography* required Church to formulate principles as to exactly what "symbolic logic" was or was not. The field was not simply *logic*—there are still works published with 'logic' in their titles but which make no use of formal or mathematical methods. Church drew the starting line at Leibniz's 1666 work, ***Dissertatio de arte combinatoria in qua ex***

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arithmeticae fundamentis complicationum ac transpositionum doctrina novis praeceptis exstruitur, et usus ambarum per universum scientiarum orbem ostenditur; nova etiam artis meditandi seu logicae inventionis semina sparguntur. This work received the designation 1***1*** (author 1, work ***1***) in the *Bibliography*'s chronological numbering system. From there, the *Bibliography* proceeded to list all the other pre-1936 publications in symbolic logic.

The guidelines Church used as to what was and what was not symbolic logic held up well over the years. The one exception to this was in set theory, where work eventually showed that, for example, measurable cardinals had foundational implications not initially evident. Gradually, the criteria for inclusion of works in set theory changed in the light of developments in the field.

Works thought to be of borderline relevance were listed "by title." That is, the full bibliographical information was provided, but without a signed review. (Moreover, reviews in other journals that were long enough and substantial enough were listed by title. In particular, some significant writings of Georg Kreisel were listed by title instead of being reviewed, because the writings were reviews of other works.)

It should be noted that the decision as to whether a certain work was to be listed by title or receive a full review was to be based on the degree of *relevance* to symbolic logic, not on the *quality* of the work.

In a letter of September 8, 1950, to Rudolf Carnap, Church wrote as follows about the purpose of the reviews:

> "Our first consideration must however be, as far as I am able to arrange it, to get a competent critical judgment of the book. As you know, we have never been satisfied with a mere abstract as a substitute for a review, and we have always felt that to offer such an abstract as a review was a mistake on the part of the reviewer, unless it was actually true that there was nothing that required criticism.
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> "Your suggestion to transform the Reviews section of the Journal into a collection of abstracts, without any attempt on the part of the reviewer to make any sort of judgment of the work for the benefit of the reader, seems to me so completely contrary to the original purpose of the Reviews section of the Journal that I would be very reluctant to consider it at all. The situation in mathematical logic has always been much worse than in other branches of mathematics, in the matter of the frequency of publication of matter containing errors and even absurdities, with the effect that there is serious danger of the field itself falling into disrepute, and of a situation being created in which the careful and competent workers in the field are unable to make themselves heard amid the confusion of incompetent and trivial publications about foundations. I believe that the Journal has made already considerable progress, not only in reducing somewhat the proportion of erroneous or

purposeless publications, but more important, in making it possible for the general body of mathematicians and philosophers to have at least some approximate idea as to how the publications in the field are to be sorted out and which ones are worth giving attention to.

"The argument is perhaps somewhat weaker for publishing critical remarks about publications which are themselves on a general level of competence, though the reviewer may find mistakes, or matters of opinion with respect to which he wishes to express disagreement. I believe however that it is impossible in practice to draw the line, and that there is also a very useful service to be performed by critical reviewers of publications whose general competence is admitted by every one, including the reviewer.

"The suggestion to put critical remarks into an article rather than a review is one which we have used on occasion, when the length of a review threatened to exceed our maximum allowance. However, generally speaking, I believe that this is not practicable, and an attempt to enforce a proposal that all criticism, or even all criticism at any length, should be made into an article rather than a review would simply result in the elimination of criticism in many cases, and the reduction, as I said, of our reviews section to a mere collection of uncritical abstracts.

"I realize that probably you have in mind a distinction between two different kinds of criticism. But again it is my belief that this distinction is impossible to enforce in practice, and that our only choice is between allowing critical reviews, and restricting ourselves to a collection of mere abstracts in place of reviews.

"I realize that (as you say) a comprehensive program of critical reviews does make many difficulties, and it is even possible that we may be forced to give it up. But, personally, I haven't sufficient interest in a program of publishing mere abstracts to give my own time to it, and I should certainly withdraw from the enterprise at once on this account, if it should appear that we would be forced to reduce our Reviews section to just a collection of abstracts."

Thus to the question whether weak publications should be reviewed, Church would have answered that it was *especially* important that such works received critical review.

Church was enormously successful in obtaining authoritative reviews. He was at Princeton, a major center of logic, and he knew the principal logicians personally (the field was smaller in those days). And he was usually able to persuade them to write reviews. Certain reliable reviewers were designated as "consulting editors" (their names were listed on the cover). Instead of being asked if they were willing to review a certain publication, the consulting editors could simply be assigned that publication which they were then obligated to review.

Of course some of the reviews were written by Church himself. Sometimes this was done because only a one-line review was needed, and the most expedient procedure was for Church to write the line. At the other extreme, some of the reviews written by Church were important contributions to the field, and were influential in subsequent work by others. Those reviews will not be discussed here, but are relevant to the other articles in the BULLETIN regarding Church's work.

The Reviews Section at this time constituted about one-third of the pages in the JOURNAL. (The size of the issues varied, of course. In 1944 an issue might be as small as 24 pages; by 1950 each issue was about 80 pages.) In fact in 1940 the reviews' 94 pages made up about half of the volume.

From the beginning, Church gave the reviews greater editorial scrutiny than would be given to a contributed paper. In a contributed paper, one presents one's own work, and presents it well or badly. But in a review, one writes about the work of another, and a badly written review can do an injustice to the author being reviewed. In addition to scrutinizing the content of each review, Church gave attention to the style. As one reads from one review to the next, there is a continuity in such stylistic matters as the spelling of 'premiss' and the principle of minimal capitalization, as in the name ***The journal of symbolic logic***. (Under Church this principle was used both in the reviews and in the contributed papers. It is still followed in the reviews; in the contributed papers it has gradually slipped away.)

The reviews used a system of cross-referencing by volume number (in roman numerals) and page number (in arabic numerals). For example, Turing's classic paper on computability was II 42—it was reviewed in volume 2, beginning on page 42. This system is most useful to the readers who have the past volumes of the JOURNAL readily at hand.

The reviews were indexed by author every two years, and were indexed by subject every five years. Church used a subject classification that was much more refined than the one used in ***Mathematical reviews*** and ***Zentralblatt für Mathematik und ihre Grenzgebiete***; it had scores of categories under *propositional calculus*, for example. Moreover, it was an "organic" subject classification, with new categories continually created to reflect changes in the field (the ***Mathematical reviews*** classification scheme is updated only about once a decade). And when a new category was created to accommodate a particular publication, a search would be made for the related publications that would also fall under that category.

Indexing the works reviewed by subject proved to be very expensive in terms of logician-hours. After the 1975 volume (volume 40), when the JOURNAL restricted its reviewing program (see below), the indexing by subjects was discontinued. When the JOURNAL was reviewing every publication in its field, the subject index afforded a means to locate, in principle, every publication on a given topic. When the goal of completeness was abandoned in 1975, the idea of indexing by subject seemed less attractive. The last index by subject, covering volumes 27–40, was published in the December 1980 issue, volume 45 number 4. (Much of the work for this final subject index was done by Perry Smith in 1977–78.)

In the 1950's several events influenced the reviews. Most dramatically, the publication rate in logic exploded in the mid-1950's. After the end of World War II, many young logicians received their doctorates, and began pushing forward in all fields of logic. And the number of papers (and later books) for potential review in the JOURNAL shot upwards.

On the one hand, Church ceased in 1950 to be an editor for contributed papers in the JOURNAL. On the other hand, he was working on his logic textbook, ***Introduction to mathematical logic***, Volume I, which appeared in 1956 (XXII 286).

The end result was that a substantial backlog of unreviewed publications gradually built up. But then in 1957 Sputnik was launched, and the U. S. government, through its National Science Foundation, took an increased interest in science and mathematics. Starting in 1961, Princeton received a "logic project" grant from NSF. Francis (Frank) Oglesby came to Princeton as a postdoctoral fellow under this grant. Gradually he began to assist Church on the 25-year index. And in 1962, Church was able to hire under the grant a qualified editorial assistant, Jacqueline Brown. This marked, of course, a great change from the time when Church did everything himself, with only modest secretarial support from the Princeton Department of Mathematics. Jacqueline Brown remained as the editorial assistant until mid-1968 after the operation was safely ensconced at UCLA (see below).

With help from Gerald Massey, and additional support from the U.S. Steel Foundation, Oglesby was able to produce the 25-year index of papers, abstracts, and reviews, published (in 1964 and 1966) as volume 26 of the JOURNAL. (The subject index to the reviews included the pre-1936 items from the *Bibliography*.) And systematic procedures for obtaining and processing reviews and for keeping accurate records were established. This was also the time when the JOURNAL itself was put back on schedule: In the 1950's the issues of the JOURNAL started appearing at dates increasingly behind their cover dates, to the point where the December 1960 issue was actually published 22 months later, in October 1962. Through an accelerated publishing schedule in the early 1960's, this lag time was eliminated.

In late 1964 NSF awarded a grant, administered by the American Mathematical Society, specifically for tackling the backlog situation with the reviews in the JOURNAL. This allowed an increase in the editorial staff under Jacqueline Brown's supervision. And in 1965 Ann Singleterry (later Ann Ferebee), who had just completed her Ph.D. at MIT, came as an assistant to Church. And in the year 1966–67 Thomas Frayne came on leave from the University of San Francisco.

At the same time, there was another crisis approaching. Princeton had a mandatory retirement age of 65, an age Church was to reach in 1968. Moreover, after retirement Princeton's support of the JOURNAL (e.g. providing office space) would cease.

Church had no interest in retiring at this point. (And as a matter of fact, he was to continue as the editor of the Reviews Section until 1979, to continue teaching until 1990, and to continue his research and writings until he died in 1995.) He was able to obtain an appointment at UCLA, under terms that provided support for the Reviews Section as long as Church was its editor. This support took the form of both office space, and the salary of an editorial assistant. Thus in 1967, the entire operation moved from Princeton to UCLA. Ann Ferebee moved to California as well, which provided a valuable element of continuity.

Church now had for the reviewing operation both adequate office space and financial support from NSF. Given these nourishing conditions, the operation grew. The staff of editorial assistants was initially supervised by Mary Meyerhoff (later Mary Cresswell). The logicians working for Church included, in addition to Ann Ferebee (until 1972), Herbert Enderton (1968–1973 and from 1975 on), Krister Segerberg (1968–1969), William Gould (1968–71), C. Anthony Anderson (1969–71), Perry Smith (1969–71), and Judith Ng (1969–71).

These people searched for publications in symbolic logic (there were some 300 journals that were scanned regularly), and proposed suitable reviewers. But before a letter asking someone to write a review went out—a letter essentially committing the JOURNAL to publishing that review subject only to certain standards—Church's approval was required. And of course Church always read the manuscripts of the reviews before they went to the typesetter.

Naturally, during these years the size of the Reviews Section was healthy indeed. In the 1970 volume, there were 250 pages of reviews (including the index); in the 1971 volume there were 243 pages of reviews. But this is not to say that everything was getting reviewed. One problem was that of sheer numbers—exponential growth pulls away from polynomial efforts. And another problem is that certain publications are simply very difficult to review. For example, Quine's 1960 book ***Word and object*** was never reviewed. Possibly Church encountered difficulty in finding a reviewer he would trust to raise the objections he wanted to see raised. Wittgenstein's ***Philosophical investigations*** also was never reviewed. In this case Church wanted to write a review himself, and his copy of the book has numerous notations in the margins towards such a review, which was never completed.

The funding from NSF was not to last indefinitely. And without it, the reviewing operation would need to cut back. In early 1972 Dana Scott, then the ASL President, visited UCLA briefly and studied the situation. His analysis was that the two functions of the Reviews Sections mentioned at the outset—providing a complete bibliography on the one hand and providing critical commentary on the other—needed to be separated. He proposed that while the ASL could continue funding the latter operation, grant support was required for the former. The UCLA office prepared estimates of the funding that would be needed for maintaining a reasonably complete bibliography, in machine-readable form (these were pre-Web days).

Dana Scott resigned as ASL President later that year and his plans were not pursued. But it should be noted that later the Omega project under Gert Müller took up the challenge of assembling and maintaining the sort of bibliography that was envisioned. Photocopies of the material in the UCLA files were sent to the Omega project, and incorporated into their database.

The inevitable decision was reluctantly made that things could not go on as they were. Church was asked to bring his operation to an "orderly close," while the ASL Council struggled with plans for what to do next. The last volume under the old plan was the 1975 volume. In addition to informing all the reviewers of the 1975 deadline for their reviews, Church listed many works by title in the 1975 volume, for example papers in collections that had been reviewed only in part.

As for the post-1975 plan, Church felt—as he always had—that it would be a grave mistake to adopt a quality-based "star" system, of reviewing only the publications judged, somehow and by someone, to be most deserving. Instead he proposed that the JOURNAL do exactly what other journals that publish reviews normally do: review only books. And moreover, his intent was to review all and only those books in symbolic logic for which the publishers sent review copies.

In the June 1976 issue, the bad news was announced in the prefatory statement to the reviews: "With this number, the JOURNAL initiates its restricted reviewing program. The Association intends to continue its Review Section indefinitely, but the scope of reviewing will be limited by its financial resources. In particular, the attempt to cover completely the published literature in the field has been discontinued. At the present time, only books are being reviewed, and not journal articles. The reviewing policy is a matter of continuing study."

The size of the Reviews Section plummeted; for a few years the JOURNAL published about 40 pages of reviews annually.

With the publication of the 1979 volume, Church retired as the editor of reviews. He had often offered his resignation to the ASL Council, should it disapprove of his handling of the reviews, and each time the Council had declined his resignation, and encouraged him to continue. But eventually he made the decision to resign, not in protest but perhaps from the feeling that the modest book-reviewing operation was not at all what he had originally envisioned; it probably pleased neither him nor the Council. His 1950 comment about not having "sufficient interest in a program of publishing mere abstracts to give my own time to it" could perhaps be transferred to the 1979 situation.

It should be made clear that the reviewing program that followed his retirement was not at all one of his choosing. He felt that it was most unwise for the reviews editors who succeeded him to follow a policy of *selecting* some publications to review according to unclear and possibly subjective criteria.

The ASL Council appointed William Craig and Herbert Enderton as the reviews editors. The outline of the new scheme was stated in the September 1981 issue: "Since 1976, when it became necessary to end the policy of attempting to review the entire literature in the field, the JOURNAL has reviewed only books. Beginning with this number, it will also publish some reviews of articles or groups of articles. These will be chosen under the guidance of the Consulting Editors of the JOURNAL. Although the number of items that can be reviewed is of necessity limited, the intent is to present a useful collection of reviews, covering work in all areas pertaining to symbolic logic."

The idea of having Consulting Editors, which had been dropped, was revived but with a different purpose: they were to propose books and articles in their fields of interest that should be reviewed. This arrangement did not work as well as had been hoped. It was later abandoned, and instead the number of reviews editors was increased from two to five. In this form, the Reviews Section continues today. In 1990, the December issue was another cumulative index of the papers, abstracts, and reviews (this time indexed only by author and not by subject) published since the first 25-year index. And recently there have been fewer than 100 pages of reviews annually.

In summary, the history of the Reviews Section in the JOURNAL can be viewed as having three eras: the first twenty years when the field was smaller than it is now, the second twenty years when it had funding from outside agencies (primarily NSF), and the last twenty years in which the original goal of completeness was explicitly abandoned. In each era, in different ways, it has performed a valuable function to scholars in symbolic logic: calling their attention to publications of interest, providing an informative introduction to work they might want to pursue in depth later, and even in pointing out shortcomings. (To be sure, at times these functions have been performed more adequately than at other times.) Another rôle of the Reviews Section has become significant as the research papers in the JOURNAL have become increasingly specialized and technical. The reviews have, by and large, been something that a wide segment of the ASL membership could still read and appreciate. The reviews have been accessible to logicians working in areas "next door" to the subject of the review, while the research papers often have not.

Alonzo Church edited the Reviews Section for 44 years. His work here contributed to the growth and development of symbolic logic in a critical period. It was a time when the field grew from a small group of logicians—misunderstood by their fellow mathematicians and philosophers—to a respected and dynamic enterprise that now includes theoretical computer scientists and linguists as well. Had there been no Alonzo Church, the reviews would never have played so well their important rôle of covering the literature for the information and guidance of scholars interested in the developing field of logic.

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