

The New Encyclopædia Britannica

in 30 Volumes

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15 TH EDITION



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Fifteenth Edition

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and
HER MAJESTY QUEEN ELIZABETH II

It is appropriate that this
15th edition of the Encyclopædia Britannica
be regarded as a memorial
to its Publisher, William Benton (1900–1973).
Though he would have rejected the idea
of the Britannica as the vision or the work of one man,
it is a fact that his faith and inspiration
were necessary to its conception,
and his dedicated determination and guidance
were necessary to its completion.

Foreword

The Fifteenth Edition of the *Encyclopædia Britannica* represents a revolution in encyclopaedia making. It began with the organization of the Board of Editors in 1947.

The Board's task was to engage in long-range planning. This necessarily involved criticism, favourable and unfavourable, of *Britannica* as it then was. That encyclopaedia was based on the Fourteenth Edition, published in 1929. Annual printings were kept up-to-date by changes that took into account the most important new developments.

Britannica could claim at that time to be the best encyclopaedia in English; but the process of annual revision was necessarily partial. Articles were eliminated and new ones substituted. Alterations were made in other articles. But the encyclopaedia as a whole could not be reexamined. Single articles were changed, but other articles connected in some way with them, which might run into hundreds, often could not be. The relations among the articles became in some fields more and more tenuous. Hence the possibility of understanding those fields through planned reading in *Britannica* became more and more remote.

The program of annual revision led to a compilation of accurate articles. In the nature of the case it could not lead to an encyclopaedia edited in accordance with a plan. The excellence of *Britannica*, which was undisputed, rested on the authority of the scholars who wrote the articles. As 1929 receded, it became more and more difficult to discern the plan on which the encyclopaedia was based.

It soon became clear to the Board of Editors that *Britannica* had, or could have, two functions: it was a reference work, and it could be an educational instrument. Although information is often confused with education, a moment's reflection will convince the reader that they are not the same. Facts are indispensable to education, but the possession of any quantity of facts does not guarantee that understanding which alone deserves to go by the name of education.

The Board of Editors found that the reference function of *Britannica* was on the whole well performed. If one wanted to discover the birthday of Marie Antoinette or obtain a summary of the work of Isaac Newton, one could do so and be confident of the accuracy of the information received. It was harder to discern Marie Antoinette's place in history and the background and consequences of the Newtonian revolution.

In short the Board's problem was how to make *Britannica* more than a "hunt-and-find" book, how to

make it an instrument of education. Nobody wanted to sacrifice the reference function. *Britannica* had to continue to furnish correct, up-to-date information. Was it possible, while maintaining *Britannica*'s standing as a reference work, to make it a means of understanding?

The problem is illustrated by the "topical" encyclopaedias, which present subjects to be learned, but from which it is frequently hard to gain information.

The Board, after many years of debate, came to the conclusion that *Britannica* should be both informational and educational.

The Board decided that the reference function should be carried out by a number of volumes giving, in capsules of 750 words or less, statements of fact about the subject and indications showing where further information about it could be found in the set. One who wanted the answers to questions of fact could find them in these reference volumes. These volumes would also show the reader where he might locate places in *Britannica* that gave him the chance for systematic study.

Chances of this kind would be offered in the larger articles in the set, contained in other volumes, all assembled according to a plan designed to lay the circle of learning open to the reader. This plan evolved from the studies that Warren E. Preece, then Secretary of the Board of Editors, began as early as 1961.

These principles having been adopted, the question became one of execution. No such encyclopaedic venture had ever been attempted. There were no models to imitate and no horrible examples to shun. Clearly, the cost of the enterprise, involving the organization and writing of more than 42 million words, would be staggering.

At this point the character of the Publisher, Senator William Benton, was decisive. Although he believed that *Britannica* was already a work of which he and his associates could be proud and although he was under no pressure to publish a new edition, his own standards led him to conclude that he must do what he could to make *Britannica* better still. As a member of the Board of Editors he had taken part in all the meetings that had led to the new program. He committed the company to its realization, and he never wavered. It is distressing that he did not live to see the completion of a project to which he devoted so much time and effort and which he justly regarded as one of the great contributions he had made to the cause of education in the course of a long and distinguished career.

Having authorization to proceed, the Board of Edi-

tors faced a new order of questions: What was the plan to be? The Board spent several years debating this issue, making experiments, and reviewing preliminary drafts by various hands. Between 1965 and 1968 Mortimer J. Adler, a member of the Board of Editors, worked out the scheme of the new encyclopaedia. In addition to his celebrity as a philosopher, Dr. Adler had been the moving spirit in the publication by Britannica of *Great Books of the Western World* and had had the responsibility for the *Syntopicon*, a task that had required him to organize and present the vast range of knowledge in *Great Books*. The architectural design of the Fifteenth Edition as developed by Dr. Adler in consultation with the Board of Editors was approved. His own description of it follows on page 5. Dr. Adler became Chairman of the Editorial Planning Committee in 1966, Chairman of the Editorial Executive Committee in 1969, and project manager thereafter. It is safe to say that without his learning, imagination, and drive the Fifteenth Edition might never have been started or brought to completion.

After the formulation of the plan came its execution. This responsibility was assumed by the Editor, Warren E. Preece, who had been variously Secretary of the Board of Editors, Editor, General Editor, and, again,

Editor. The breadth of his education, his clear conception of what an encyclopaedia ought to be, his wide acquaintance in the learned world, and his ability to build up a devoted editorial staff made possible the completion of a task the magnitude of which would have daunted a less capable and less dedicated man.

The result is a revolution in encyclopaedia making. This work combines the reference and educational functions. The reference function, and the index function, too, is performed by ten volumes called the "Micropædia." The educational function is carried out in two ways: through an introductory volume called the "Propædia," which is an outline of knowledge and guide to the *Britannica*, and through 19 volumes called the "Macropædia," made up of more extended treatment of fields of human knowledge and major topics of human interest. These three—the *Propædia*, the *Micropædia*, and the *Macropædia*—are designed to meet the encyclopaedic needs of the reader, whatever they may be.

The Board of Editors is proud to have had a part in one of the great publishing ventures of our time. The Board believes that the Fifteenth Edition is an important step toward the goal all its members share, a learning society.

ROBERT M. HUTCHINS

Chairman, The Board of Editors, 1947–1974

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Preface to the Fifteenth Edition

Bibliographically, the volumes that follow this preface constitute the Fifteenth Edition of the *Encyclopædia Britannica*. For the first time in more than four decades, the editors of this work have determined that the times require an encyclopaedia so new and so fundamentally different from those that have gone before it that the practice of annually revising the printing of the previous year would have to be replaced by a one-time return to the preparation of a totally new and newly numbered edition.

To understand the importance of such a step requires some understanding of the nature of encyclopaedias, some knowledge of the history of this encyclopaedia in particular, and some insight into what it was about the state of knowledge in the world that appeared to make changes of the order herein offered a necessity.

The First Edition of the *Britannica* appeared serially, beginning in 1768 and culminating in three bound volumes in 1771. For more than 150 years after that, the set was sporadically revised in new numbered editions as were required in the view of its editors. Each of the editions varied in the amount and kind of change introduced in it. The Third, for instance, was the first edition in which articles were prepared by working authorities in the fields of knowledge to be covered, rather than by editors who abstracted from the learned literature of the day. The Ninth brought an almost wholly new orientation, requiring that its articles be longer and deeper and systematically arranged. The Eleventh marked a return to a combination of relatively long "systematic" articles supported by thousands of shorter and more specific entries.

By 1929, and the appearance of the Fourteenth Edition, it had become clear to almost everyone that the system of numbered editions, revised in a major way only erratically and supplemented by new material only occasionally, could no longer meet the demands of a serious encyclopaedia and its users. A new policy, called "continuous revision," was instituted, under which articles were assigned to academic specialists for periodic review, were then scheduled for revision on the basis of the needs suggested by advisory reports concerning them, and new versions of them were introduced into the set as required by the subject matter and permitted within the limited flexibility allowed by the alphabet and the state of printing technology.

Clearly, the system was an improvement over that which it replaced. In each of the last several years, annual revision programs have seen the introduction into the set of from three to eleven million words of new or

substantially revised material. To note that the present set, by its very nature, constitutes a temporary return to the earlier practice of extensive change as implied by renumbered editions is not, therefore, to assert the end of the program of continuous revision that worked so well that for more than 40 years no two editions of the *Britannica* were ever completely similar, and so effectively that despite an increase of knowledge almost without parallel, successive users of this reference work have had at their disposal a collection of volumes that provided in balanced and thorough fashion a continuing account of the size and shape of the expanding world of knowledge.

Works, at first encyclopaedic in spirit and content, and, later, in form, have existed throughout the world almost since the development of the written word. Before the name itself had been created, men were trying to capture within the confines of written pages the content and organization of the knowledge at their disposal as they understood it. Every seriously intentioned encyclopaedia has been based on—has been a reflection of—the quantity and quality of the scholarship of its time and the degree to which it was disseminated among men. Obviously, much of this year's *Britannica* simply could not have been written for the Eleventh Edition of the set published 1910-11; hardly any of the scientific theory that was to lead to either the nuclear bomb or the conquest of space had been formulated, and much of it had been only guessed at by a handful of advanced workers in each of the fields involved; quantum mechanics as a name had little currency; psychoanalysis and Marxism were barely at the threshold; Russia was still the domain of a tsar, Hitler was hardly known even in his own city, and Sun Yat-sen was leading a revolution in China. World War I had not been fought. In art, in literature, in music, in economic theory, in medicine, in almost every aspect of man's mental and technological activity it was, beyond dispute, a world almost unrecognizable today. And it is no denigration of the Eleventh Edition to note now that it reflected its world so perfectly that it has value today as little more than a historical novelty of interest largely to sentimentalists and those whose work requires that they know and understand the scholarship of an earlier age.

Only 18 years later, when the Fourteenth Edition appeared, there was a different—neither necessarily better nor worse—world to be contended with. A World War had cut gashes across the globe, redrawing the political boundaries of many of its lands and testing the political loyalties of many of its peoples. Com-

munism had become a force to be dealt with and there was new knowledge at large. Not everyone accepted Freud's explanations of themselves, but few could doubt the reality of his influence. Scientific theory had changed. Depression on a vast scale was about to test man's understanding of his economic systems and to demonstrate (if demonstration was required) that the nations of the world would have to exist (if they were to exist at all) interdependently. In Germany, Hitler was only a few years away from a political victory that would influence history until after his death.

Indisputably, an encyclopaedia suitable to the world of 1911 would have been found to have only little relevance to the world of 1929, and even less to that of 1974. There are limits after which the mere addition of new information at the ends of old articles cannot be made to suffice. There are periods after which it must be recognized that what once seemed to be truths may have been at best little more than half-truths. There are times when only a totally new statement of the past as currently understood and the present as now glimpsed will meet the requirements of a general encyclopaedia. A *Britannica* that set out seriously to report the general state of intellectual knowledge in 1974 could, for instance, hardly assign 30 of its pages to a study of Chivalry, 30 to an analysis of Heraldry, and three to the legal position of pornography, obscenity, and censorship. Even if it were possible to do so, it would be little more than quaint to treat each year's exploits in space as simple chronological continuations of Columbus' explorations of the Atlantic. It is not irrelevant to note here that in the last several printings of the Fourteenth Edition, there was but one article dealing with acclimatization. It was 3,800 words long and was supported by only three references elsewhere in the set. When the editors and the experts with whom they worked in preparing this Fifteenth Edition reexamined the same subject, they found that a single article was required, but that man's present understanding of the phenomenon would demand the further support of 43 additional references elsewhere in the set.

First work on this edition of the *Britannica* began, as has been pointed out elsewhere, in 1947 with the appointment of a Board of Editors under the leadership of Robert M. Hutchins. It took on a new seriousness and a new immediacy a few years later, when innovative developments in printing technology opened the way to more extensive annual revisions, thus making it more necessary than it had been before that the set's editors have a set of goals and criteria against which such annual printings could be planned. It continued in an even more serious way after 1957 when Dr. Hutchins and the late Lord Crowther, then vice-chairman of the Board, led investigations into what a totally new encyclopaedia—one planned, for instance, as if it had no earlier versions with which to comport—might be like. It moved further forward from 1961 and 1964 when the Center for the Study of Democratic Institu-

tions in California undertook to determine the ways in which it might prove to be (or, equally, not to be) the case that conditions in the world had changed to the extent that such a genuinely new encyclopaedia was (or, equally, was not) required. At a more immediate level, planning began in earnest in 1966, with the appointment of an enlarged staff of senior editors and advisers to work out the topical contents of a new set under the direction of an Editorial Planning Committee established especially for that purpose.

Elsewhere in this volume, the Director of Planning, who was Chairman of that committee, has described the basic intellectual document on which the contents of the present set find their foundation—*i.e.*, the outline of the traditional body of knowledge which at some level of generalization must be included within the pages of any serious general encyclopaedia.

The editor of the First Edition of the *Britannica* wrote in his preface that only to the extent that it was useful could it, or any other set of similar volumes, lay claim to the approbation of mankind. Every succeeding editor of the set has accepted the dictum as his own. The question that had to be answered before work on the new set could begin in full seriousness had to do, then, with what it would mean in the last quarter of the 20th century for an encyclopaedia to be as useful—or, even, more useful—in its time, as its predecessors had been in theirs.

Though encyclopaedists frequently debate the question of utility in terms of whether their works should be "alphabetical" or "topical" in organization, the fact is that the argument misses the point. In itself, knowledge does not exist in either a topical or an alphabetical form and knowledge can be organized only in a method that is both topical and alphabetical. By implication, then, what is at stake to the editors of encyclopaedias has to do only with the presentation of knowledge which traditionally has tended to be either topical or alphabetical.

What seems to be the more important issue surrounding the question is the degree to which knowledge is to be either fragmented or synthesized around some organizing principle. In the so-called "alphabetical" presentation, the editorial effort is usually on finding the smallest part or parts into which the segments of the whole of the circle of knowledge can be broken. Such works are likely to be long on short entries, on articles that focus wherever possible on a single—or at the very most on a few—aspect of larger topics. They are sometimes called "look-it-up" books because their organization makes it more or less simple for the user to equate a topic about which he desires factual information with a plausible matching title and then go directly to the volume containing such a title within its segment of the alphabet. The problem with such sets is that they imply that these small bits of knowledge will either be meaningful and intelligible in themselves or that, if they are not, the

reader will (1) already know the background necessary to understand the relation of each to the whole or (2) be willing to go to another article to secure that background information. What usually happens, instead, is that the reader assumes that a smattering of knowledge is better than nothing at all and proceeds as if background information, relationships, contexts, are all of no consequence. It is as if the significance of the reoccupation of the Rhineland in the period between the two World Wars could be understood without any prior knowledge of the history that had led to the demilitarization of the zone in the first place.

Experience indicates that contemporary encyclopaedia users use, or on separate various occasions would like to use, encyclopaedias in three ways.

First, there are the occasions on which a reader desires to look something up—the “something” in such cases being more often than not quite limited in its scope—the size of the whale, the feeding habits of the robin, the achievements of Rudolf Virchow, or the circumstances surrounding the discovery of radium.

Second, the user may turn to an encyclopaedia for information about a broader, but still relatively limited, subject. He may, on such occasions, be more interested in the causes of the war in Vietnam than in the casualty statistics of the Tet offensives that were a part of that war; he may want to know how interest rates can be used to control the volume of currency in circulation rather than how to define compound interest; he may be interested in a broad survey of French literature and not necessarily—at the time, at least—in the date or occasion of the publication of a book by Camus.

Third, a user may on occasion seek that genuine understanding that in itself somehow defines what the world means by the word education. On such occasions, his interest is in neither the size of the whale nor the taxonomic characteristics of the family to which the lion belongs, but in an insight into what has been known and conjectured about the whole sweep of life on Earth. In such instances the reader is interested not in zoology or botany (or biology which is the older combination of both) but in an understanding of the objects of studies of all of the sciences as they relate to something grander than the disciplines themselves.

Starting, then, with the decision that an encyclopaedia is nothing at all if it is not a summary statement of the traditional knowledge of the culture that has produced it, and that utility is in fact the name of the unit in which encyclopaedias must inevitably be measured, it was clear that any new edition of the *Britannica* would have to set out to meet all three of these functions and do so without detracting from the degree to which it also met the others.

The three-part organization of the present encyclopaedia, into *Propædia*, *Macropædia*, and *Micropædia*, seemed almost to suggest itself as the obvious solution to the problem thus posed. It must be emphasized

here that although there are circumstances in which each user will wish to exploit only one of the several ways in which the set may be utilized, and although each of the three parts might appear to lend itself superlatively, if not exclusively, to one or another of the uses, the fullest value of the set is to be attained only in the utilization of the whole. The Fifteenth Edition of the *Encyclopædia Britannica* is not three encyclopaedias; it is one encyclopaedia specifically planned to be usable in three different ways.

A written statement of editorial policies to govern the construction of the Fifteenth Edition began with an enumeration of goals expressed in terms of the qualities for which the *Britannica* so long had been famous that its name had become almost a generic word meaning “encyclopaedia”:

The existing *Britannica* is marked, to a greater or lesser degree, by six encyclopaedic qualities that must be attained to an even greater degree in the new *Britannica*:

- a. *Authoritativeness*: Whether it speaks in its own voice, or in that of its contributors, the new *Britannica* must speak from and with authority;
- b. *Comprehensiveness*: The proper scope of a general encyclopaedia is the whole circle of learning. The presence of all parts of that circle must be a demonstrable characteristic of the new *Britannica*;
- c. *Encyclopaedic brevity of condensation*: A general encyclopaedia is a summary statement of learning. In the new *Britannica* even the longest articles on even the most major subjects should be less lengthy than books or treatises on the subject and must be scaled so as to be commensurate with the purposes of an encyclopaedic survey;
- d. *Accessibility*: By the imaginative use of an alphabetical arrangement of articles, a useful alphabetical index, internal cross-referencing, and other devices, the contents of the new *Britannica* must be efficiently available to its users;
- e. *Accuracy*: No matter how clearly the new *Britannica* manifests its other qualities, it will fail to the extent that inaccuracy renders its contents undependable;
- f. *International orientation*: While the new *Britannica* is uniquely a product of the culture of the West, it must not be parochially Western in its view of learning.

In connection with the point just made, the editors note with some pride that in their determination to secure the best authorities and the best writing skills available anywhere in the world, they have produced a version of this set in which for the first time in its more than 200 years of publication, only about one-half of its authors have been drawn from the country within which the enterprise is owned and largely directed. Articles on subjects spread across the whole of the broad spectrum of knowledge have been assigned to experts without regard to their place of origin, of residence, or of occupation. The entry on electric power is by a member of the Japanese Atomic Energy Commission; that on nuclear fusion is by a Russian, and that on defense expenditure by an Englishman. An Australian has written on Vladimir Nabokov, a Canadian has written on the history of Rome, and a German has written on the history of China.

Earlier studies of the rate at which new information is being produced, and the degree to which specialization is producing a kind of deleterious academic fragmentation felt even in the faculties of major universities, suggested that the utility of the new *Britannica* would in the end be measured in part by the degree to which it could maintain its superiority in terms of the qualities mentioned above and, at the same time, achieve new qualities based on these new realities.

First, it was clear that knowledge is proliferating at rates, and specialization is developing in ways, such that a general encyclopaedia can no longer hope to be useful (if, indeed, it ever had been) to the specialist in his own field. It is a fact of which no encyclopaedist can possibly be ignorant that the finite and limited pages available in a general encyclopaedia for the treatment of any given subject make the bound volumes of such sets inappropriate sources of information for the professional reader in his own field. It was assumed, therefore, that although all readers of the *Britannica* might be specialists—or have the interests of specialists—in some area of knowledge, they will turn to a general encyclopaedia only as generalists interested in fields outside of their own.

A consequence of grave editorial importance followed from such a conclusion. It was clear that although many years of almost worldwide experimentation in mass education had produced an educated readership hardly even imaginable to earlier editors of the *Britannica*, they had in many cases also produced a readership so specialized that workers in all fields found it increasingly difficult to communicate with each other across fields. It must also be noted that the proliferation of education for all had not necessarily raised the *general* educational background of all. A general encyclopaedia can exist, *Britannica's* editors were warned by more than one academic, only if it can find a language with which to keep some kind of communication common to all, open to all.

The new objectives of the new *Britannica* were described in the statement of editorial policy as follows:

1. Readability by, and intelligibility to, the curious, intelligent layman. Although the user of the *Britannica* may be, and frequently will be, a specialist in some field of knowledge, it is assumed that he will never turn to its pages to meet his own needs within that field. The user is therefore presumed to be, on every occasion of use, a curious, intelligent, but nonspecialist reader. While the specialist must not be offended by the encyclopaedia's treatment of his own specialization, that treatment should not attempt to be adequate to his needs within it.

- a. Articles should, therefore, be positioned at a level of generality above that of purely specialized detail and should be characterized by an appropriately reduced density of detail rather than by an apparent determination to pack everything known about a subject into an allotted space.

- b. Further, articles should not assume detailed background knowledge on the part of the reader: if forced to choose between more facts unexplained and fewer facts

explained, the treatment should always tend toward the latter.

- c. Finally, in the treatment of certain subjects that are by their nature irreducibly difficult and technical or communicable only in a language understood solely by specialists, at least some portion of the article should be readable to the layman to whom, at a minimum, the significance and general bearings of the subject must be made comprehensible.

2. Integration and coherence. As a summary report of the whole circle of learning, the new *Britannica* will function efficiently only to the degree that its treatment of the subjects that make up that circle is consistent, coherent, and integrated.

- a. Subjects that are related to each other, as parts of a whole or as wholes encompassing parts, must be treated so that their relationships to each other and to their wholes are manifest to the reader.

- b. Subjects that are alike in kind, quality, or scale should be treated alike and at a similar scale.

3. Controlled fragmentation and duplication. To the extent that the circle of learning is seamless, any survey of it consisting of more than one article is destined to be marked by some degree of fragmentation and therefore some degree of duplication. An overriding goal of the new set is to achieve a minimum of fragmentation and a maximum control of duplication.

- a. Although any given subject may be treatable in several contexts, its major treatment should be developed in one article rather than in several separate and unconnected articles. Articles dealing with subjects demanding treatment in different contexts must, therefore, be planned with this requirement in mind.

- b. Complex subjects that call for unity of treatment should be developed in articles dealing with them as wholes rather than in disconnected articles about their parts; and in such cases the consolidated article, whenever possible, should be oriented toward detailed treatment of its subsidiary parts. The unity of the subject and the interconnections of its parts should be the controlling principle in the consolidated treatment.

4. Objectivity and neutrality.

- a. Articles should be so written that they avoid expressions of bias or prejudice on any matter about which a respectable and reasonable difference of opinion exists.

- b. Further, in all areas in which the scholarly world acknowledges significant and reputable differences of opinion, diverse views concerning such differences should be fairly presented, though the majority or accepted view may be so designated.

5. Topical as well as alphabetical accessibility to the contents of the set. By combining topical and alphabetical accessibility, the new *Britannica* will function more effectively as an educational instrument and an ordered statement of learning to be read and studied as well as a reference tool containing information so organized that it can be easily "looked up."

- a. The aim of topical accessibility is to serve the needs of the reader who asks "What can I learn from study in the encyclopaedia and how can I learn it?"

- b. In offering an answer to this question, topical accessibility can provide a systematic outline of the whole circle of learning, so structured that the parts can, if the reader desires, be reassembled as a whole.

Against the background of these considerations and the broad statements of policy growing from them, an expanded group of senior editors and university advisers

ers met almost daily to create an outline of knowledge on the basis of which a list of all of the topics requiring treatment in a general encyclopaedia could subsequently be prepared and the treatment of them assigned as appropriate to one or another of the sections of the set. Of more interest to encyclopaedists than to lay readers, the meetings today seem notable as one of the few known instances in which senior editorial people representing all of the fields of knowledge could meet regularly to discuss the disposition of that knowledge within—as it were—a circle and could relate their actions to decisions made concerning the whole of the circle rather than the individual parts as presented by the specialties of the editors and advisers involved. It was at no time the intention of those involved in the process that the evolving outline should represent a particular system of knowledge, and none of the staff of this reference work would want to argue that knowledge can be organized in only one way; that any monolithic system can be made to serve the needs of a general encyclopaedia. Nor would any want to argue that the outline that evolved from their sessions necessarily constitutes the best such outline. All that was hoped for, and what was achieved, was the construction of a workable and defensible outline, one that, without contentiousness, would set forth in some orderly way the major topical rubrics that must ultimately be dealt with in a general encyclopaedia.

On the basis of advice from experts not previously associated with the development of the outline itself, the first draft of that document was revised and the editors next began to compile a list of the articles that would be required in order to deal in some appropriately balanced way with all of the topics named in the statement of intentions—then the working name of the “Outline of Knowledge.” Predictably, it was found that there were instances in which several rubrics might find their best treatment combined in but a single article; that in other instances, sections or even subsections of single rubrics might require treatment in several articles. The important consideration was that wherever possible fragmentation and duplication be eliminated, and that wherever this was impossible, they be, at the very least, rigorously controlled.

In a drastic departure from past *Britannica* practice, each projected article was then outlined as to its content. The purpose of such outlines—each author was informed—was to assure that all of the circle of knowledge would be covered somewhere in the set, that wherever possible each of its parts would receive its major treatment in only one place, and that each of its parts would be treated on a scale determined by all of the other parts. As authorities, authors were, of course, given wide latitude in reordering the presentation of the material called for by their outlines, and much latitude in reevaluating the amount of space to be assigned to each of the topics for which they were to accept responsibility.

Senior editors were required to nominate as potential contributors for each of their own articles three authors whose work they had read and could interpret as indicating that the nominee, in addition to being an expert in the subject matter involved, could—and equally importantly, presumably would be willing to—write for the curious, intelligent lay reader. It was further required that in every case at least one of the contributors nominated be from a country other than the United States.

The processes and policies described so far had their greatest influence in connection with the development of the 19 volumes of the current edition of the *Britannica* that became known as the “Macropædia.” The articles in these volumes total 4,207. But long before any of the work on this part of the set had been seriously considered, it had been recognized that such volumes and such articles could, in fact, be used satisfactorily only if a way could first be found to lead the reader from what might be a very general or, in some instances, a very specific interest to an article either less, or more, general in concept. The role of the Outline of Knowledge in leading the reader from some general interest in a whole field of knowledge to the separate arcs under which segments of the circle are dealt with in the *Macropædia* is considered in the preliminary pages of the “Propædia” section of this volume.

As to the other side of the coin, it has long been recognized that the educational values of general encyclopaedias could be enhanced, could, in fact, be realized at all, only if readers could be brought to use an index as their first point of entry into the set. Every editor’s file contains instances of complaints that a given topic is not dealt with in a set, when all that the reader really means is that it is not dealt with in an article bearing the name under which he had expected to find it, and that he has not yet troubled himself to refer to the index—where, as often as not, he might find several references to his topic of interest. In planning this Fifteenth Edition of the *Britannica*, it was assumed that one solution to the problem might lie in making the index volumes a uniquely indispensable key to the whole, on the one hand, and a valuable source of reference information about the subject being researched, on the other. It may, then, be asserted that the reader who turns first to the appropriate part of the *Micropædia* will learn immediately whether or not the subject in which he is interested is treated in the set and, even more importantly, will find there much of the so-called “reference data” concerning that subject and may indeed—if his point of interest was specific in nature—find there the answer to the question that led him to the book in the first place. In such cases he will, obviously enough, need to look no further, though hopefully the short *Micropædia* article may succeed in arousing his interest to the point at which he will wish to learn more. In such cases, he will find how the sub-

ject is treated in the set, where in the *Macropædia* his topic of interest is dealt with in its more general aspects, where else in the *Micropædia* he will find further related data. In addition to serving as an index to the whole of the set, the *Micropædia* will, then, be seen to constitute in itself a 10-volume source of encyclopaedic information.

The editors believe that no other arrangement of the whole of the circle of knowledge to be dealt with in the confines of a general encyclopaedia can serve so well the varied uses to which encyclopaedias are put by those who turn to them.

Several more practical editorial decisions and developments flowed naturally from the same series of considerations that had led to the decision to proceed with the creation of an entirely new edition of the *Britannica* in the first place. They are considered here in an order that does not necessarily reflect the editor's sense of their importance:

1. In a world characterized by academic and professional specialization, it is not uncommon for the author of an encyclopaedic article to find it necessary to refer to workers, living or dead, whose names may be unknown to his lay readers no matter how well educated they may be in other fields. *Britannica* authors were asked, therefore, to identify, whenever such identification appeared to be reasonably necessary, all names not the "common property" of all educated readers. Because such identification so frequently has involved the designation of a nationality and a status within an academic discipline (e.g., "eighteenth-century French mathematician") it has sometimes seemed that the internationalism proclaimed in the statement of editorial policy was in danger of being violated in the execution of that policy. Such, of course, was not the intention of the editors, who were well aware that such phrases normally constitute the minimal identification with which dictionaries of biographies begin their articles. That men and women may be born in one country, practice in another, and die in a third, or may follow careers that do not lend themselves to unique description, makes the device difficult but does not render it useless.

2. Although the editorial policies set out for the set as a whole could not always be met in the case of mathematics, which remains both a subject matter and a language in itself, two devices have been introduced in the effort to make science articles in general more intelligible to the lay reader. In the first place, wherever possible, equations and formulas have been verbalized or "written out" as statements in words as well as a series of letters and symbols; in the second, such equations have, in many of the mathematics articles, been removed from the text of the article (where their places have been taken by more generalized statements in "natural" language) to boxes, where they remain available to the reader able to utilize them.

3. In logic, it is possible to make only one assump-

tion about the language capabilities of the *Britannica* user. Since this encyclopaedia, though it is available in many countries throughout the world, is printed only in an English-language edition, it has been assumed that all users of the set must inevitably share the ability to read in that language with some degree of fluency. Many, of course, speak other languages; many more read other languages. Nonetheless, since English is the only language known for certain to be understood by the *Britannica* user, *Britannica* authors and editors have been at pains to limit the use of non-English words and phrases and to provide translations or paraphrases of such wherever their use has been unavoidable.

4. Importantly, in assuming that the specialist turns to a general encyclopaedia for information only about fields in which he is not a specialist, the editors accepted, as well, the corollary that the *Britannica* user should be required to deal in general only with the language and the literary conventions of the literate man and woman, and not with those of the specialist. The editors recognize that technical language and technical conventions have a valid utility within each academic specialty. They provide a precision and a unique method of communication between people who work within that specialty. They may, however, be confusing and uninformative to the reader from another specialization. Since a general encyclopaedia cannot deal in the vocabulary and literary conventions of all specialties, it was determined that it should, wherever possible, deal in the vocabulary and conventions of none. Professional jargon has been eliminated where possible and its terms defined wherever its elimination was impossible.

5. Bibliographies at the ends of articles in which they have been included have in general been lengthened for the benefit of the reader who wishes to read more deeply in the subject matter involved. At the same time, they have, by design, been annotated so that the lay reader might know in advance the likelihood of his deriving benefits from turning to any given work. Authors have been urged to avoid the inclusion of titles likely to exist only in small numbers of rare copies carefully guarded in but one or two libraries throughout the world.

6. The use of place names and personal names in an encyclopaedia prepared for distribution in many countries has always been a particular problem to the editors of general encyclopaedias. Whether to use the name of a country or a city preferred within the place itself or one generally used in other countries is a problem that admits of no easy solution. On the advice of experts who have consulted with *Britannica* on the problem, this edition of the *Britannica* uses place names as recommended by the boards of geographic place names in the United States and the United Kingdom. Exceptions to this general rule are few and are limited to cases in which the recommended name

would have little meaning in most of the world in which the *Britannica* is used. Similarly, in the case of personal names, it was tempting to rule simply that such names will be in the forms as used by the persons whose names they are or were, and this rule was, in fact, adopted, save for certain exceptions in which the result would fall strangely on too many ears. Thus, though the contemporary Russian composer is officially Dmitry Dmitriyevich Shostakovich, he is known in the *Britannica*, as he is in most of the West, as Dmitry Shostakovich; the earlier Russian composer Pyotr Ilich Chaykovsky remains, as in past editions, Peter Ilich Tchaikovsky; and a figure such as King Saud is known thus, as he was in the newspapers, while his father is Ibn Sa'ūd. A constant effort has been made to retain the level of such exceptions to the barest minimum. In the case of Japanese names, as in Japan, the family name is stated first, and the given name last.

7. The older *Britannica* custom of publishing an atlas in the final volume of the set has been abandoned in the conviction that maps belong where they will be most useful to the reader—i.e., throughout the set in proximity to the articles that depend on them for clarity.

8. The use of diacritics, the transliteration of non-Latin alphabets, and the translation of certain non-English languages have been standardized on the basis of rules worked out over a three-year period by *Britannica* editors and advisers.

9. Tables and charts have been used extensively in the *Micropædia* volumes. Geographical statistics, including demographic factors, economic reports, and other similar data, are thus to be found for each country in convenient boxes (accompanied by a picture of the flag of the country) with each *Micropædia* country article. Special large charts providing bases for international comparisons of such data are published in a separate section at the end of Volume X of the *Micropædia*.

10. Finally, it is expected that most readers will find the new lists of major works appended to the biographies of most workers in the arts of great reference value, but the editors would be the first to concede that the definition of "major" is not easy to agree on.

Because it will be asked, it may be said here that all *Britannica* entries after editing are returned for approval to the men and women who first submitted them. Changes required by objections to the editing are seriously considered and, when they involve matters of factual accuracy, or do not violate established editorial policy or stylebook rules, are incorporated in revisions prior to printing. In that fortunately small number of instances in which authors have felt for rea-

sons of their own that the results were still unacceptable to them, the proposed entries have been submitted to a recognized peer of the author and, when such advisers have said that the manuscript was factually accurate and would reflect credit on both the *Britannica* and its contributors, the entry was printed without identification of the author.

The preparation of a general encyclopaedia containing more than 42 million words in 30 volumes obviously has to be the work of more than a single man, a single committee, or a single staff. In the case of the Fifteenth Edition of *Encyclopædia Britannica*, that work involved (in addition to its late publisher whose faith and investment were indispensable, and others listed in appropriate places in this volume) the efforts of an editorial staff of hundreds, an advisory staff of more than 200, and more than 4,000 contributors. It is tempting to list at least all those who as staff members made significant contributions to the outcome of the work. It is also impossible to yield to the temptation.

One must, however, pay particular credit and express particular thanks to Philip W. Goetz and Donald E. Stewart, each of whom brought to the work more than 20 years of encyclopaedic experience that on more than one occasion provided the expertise necessary to keep success from becoming failure. As executive and managing editors respectively, they directed the efforts of all the editors and supervisors whose work was crucial to the completion of the entire project. In England, Christopher H.W. Kent, as Deputy Editor for London, performed with similar distinction his own role with that part of the editorial staff located there.

As assistant project manager, Normand LaJoie worked effectively to assure that the normal reluctance of editors and writers to complete manuscripts for release to printers on time did not impede the achievement of publication dates. Raymond Majesty served as a worker of miracles in looking after all of the difficult operations that must be done early if articles are later to appear in proper alphabetical order on pages in volumes, both with numbers that do not yet exist, and the volumes are to be printed so that they all come out in proper sequence and on time. Mrs. Anne Long, as Executive Secretary of the Editor, coped with more problems than she should have had to and did so always with good humour, good grace, and great intelligence.

In citing the few who can be listed above, the editors are equally aware of the tremendous dedication and abilities and efforts of those listed opposite and of the many who must simply now be listed overleaf.

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Helps for the reader

Important information to assist the reader in the efficient use of this edition of the *Britannica* has been provided as follows:

1. The use of the *Propædia* is dealt with in the section *How to use the Propædia* in the *Propædia* volume, pages 8–9, and in the *Table of contents* in the *Propædia* volume, pages 10–16.
2. The use of the *Micropædia* is dealt with in sections entitled *How to use this volume*, opposite page 1 in volumes I–X; *Introduction* to the Addenda in the *Micropædia* in volume X, pages 910–911; *Maps in Encyclopædia Britannica*, with glossary and abbreviations of geographical terms, in volume X, pages 1027–31.
3. The use of the *Macropædia* without reference first either to the alphabetical list of subjects in the *Micropædia* or to the topical list of contents in the *Propædia* is not to be encouraged. The *Micropædia* in particular is designed as both a Ready Reference and an Index to the *Macropædia* (as its title indicates) and should be so used.
4. In consulting the *Micropædia* as a guide to the use of the *Macropædia*, always make sure that you are following the reference that fits your need at the moment. For example, if you want geographical information, current economic and population statistics, a review of current cultural activities, or topographical details, you will find these in the country articles carrying such titles as “Soviet Union,” “Spain,” or “France.” But if you want information on the evolution or historical development of the political, economic, and social institutions of these same countries, look under the “History of” articles, such as “Russia and the Soviet Union, History of,” “Spain, History of,” “France, History of,” etc.
5. The Addenda at the end of the *Micropædia*, volume X, should be especially noted. Beginning on page 907, there are more than a hundred pages of comprehensive world statistical tables in 12 sections. These are followed by the *Macropædia* map legend and glossary and abbreviations of geographical terms; the texts of six of the great charters of the Western tradition; and flags of the world in full colour.
6. The initials at the ends of *Macropædia* articles are those of contributors, whose names are provided in the list entitled *Initials of Contributors and Consultants to the Macropædia* in the last section of the *Propædia* volume, pages 7–104; a list of *Names of Contributors and Consultants to the Macropædia* follows on pages 105–121.