PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON ENGLISH BRAILLE GRADE 2

SPONSORED BY
THE BRAILLE AUTHORITY OF NORTH AMERICA
AND THE
BRAILLE AUTHORITY OF THE UNITED KINGDOM

CONVENED AT THE
NATIONAL LIBRARY SERVICE FOR THE BLIND
AND PHYSICALLY HANDICAPPED
LIBRARY OF CONGRESS
WASHINGTON, D. C. 20542
U.S.A.

SEPTEMBER 13-17, 1982

RICHARD H. EVENSEN
EDITOR

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INTRODUCTION

Sixty-one persons from eight countries met at the offices of the National Library Service for the Blind and Physically Handicapped, Washington, D.C., 20542, USA, during the week of September 13, 1982, to discuss the contracted English Braille Grade 2 codes. Twenty-two men and women were official delegates, the rest were observers.

Those in attendance listened to oral summaries and delegate discussion of twenty papers. Two separate periods were set aside for observer comments. The final day of the five-day International Conference on English Braille Grade 2 discussed and passed fifteen resolutions. One of these was immediately implemented, i.e., the setting up of the International Co-ordinating Committee on English Literary Braille.

These Proceedings contained the full text of the Conference papers, summaries of conference discussion and the Conference Resolutions. Also included are the Conference Announcements, Guidelines for Preparing Papers, the official program, the banquet program, and list of delegates and observers.

Following is a resolution passed by the Braille Authority of North America on April 20, 1978, submitted to and approved by the Braille Authority of United Kingdom (then the British National Uniform Typed Committee). This resolution was the specific action that lead to the Braille Conference four years later.

Resolved: "Braille Authority of North America wishes to join with the National Uniform Typed Committee of the United Kingdom to explore the possibility of devising a common Literary Braille Code for the English language. The exploration should encompass both readability and computer implementation."

Correspondence flowed between the U.S. and the U.K. after this, leading eventually to the convening of a planning meeting in Toronto, Ontario, Canada, hosted by the Canadian National Institute for the Blind. The all-day planning meeting on July 24, 1981, addressed Conference policies on selection of delegates and submission and acceptance of papers; on Conference topics; and on procedures for handling the myriad details of such a conference. At the planning meetings, representing BAUK were John Lorimer and Martin Milligan; representing BANA were Maxine Dorf (U.S.), William Milton (Canada), and Richard Evensen (U.S.) who was monitorator of the meeting.

The meeting closed with the appointment of a Steering Committee. Representing BAUK were Messrs. Lorimer and Milligan (the latter later resigned and was replaced by James Hughes) and William Poole, BAUK's Chairman. Representing BANA were Darleen Bogart (Canada), Floyd Cargill (U.S.), retiring BANA Chairman, and Mr. Evensen who served as Conference Co-ordinator (and was elected BANA's Chairman shortly afterwards).

This committee took on the chores of planning Conference: Reviewed delegate applications and Conference papers, decided on the program, worked out Conference procedures and other details.

These Proceedings represent the thought, imagination, analysis, concern and hard work of many individuals. They have addressed several areas of contracted English braille; yet what they have done is to provide a springboard for further thinking, planning and action. Read on through this document and then assist us in whatever way you can to realize the high purposes of the Conference: a unified contracted English braille code, reform of that code where necessary and desirable, and the establishment of an effective International mechanism for accomplishing the other purposes.

Richard H. Evensen, Conference Coordinator
Lois Brown, Conference Secretary
November 1982

For further information on the Proceedings, contact: Richard H. Evensen, Project Coordinator, National Library Service for the Blind and Physically Handicapped. Library of Congress, Washington, D.C. 20542 USA

CONFERENCE ON ENGLISH BRAILLE GRADE 2

PRELIMINARY ANNOUNCEMENT

The Braille Authority of North America (BANA) and the Braille Authority of the United Kingdom (BAUK) announce the convening of a conference on English Braille Grade 2.

Dates: Monday, September 13, through Friday, September 17, 1982.

Place: National Library Service for the Blind and Physically Handicapped
Library of Congress
1291 Taylor Street, N.W.
Washington, D.C. 20542
U.S.A.
Telephone: 202-287-5100
TWX: 710-822-1969

PURPOSES OF CONFERENCE:

1. To register delegates' views on recommended changes in the British and American systems that will promote uniformity and facilitate production.
2. To report progress toward developing one Grade 2 braille code for countries using English braille.
3. To explore ideas for the improvement of reading, writing and producing English Braille Grade 2.
4. To register views on future research in English braille; and views on appropriate international mechanisms for cooperation in achieving uniformity and in communicating code changes.

CONFERENCE PARTICIPANTS:

A single delegation may be sent from any country where English Braille Grade 2 is used as a major reading and writing system for blind persons. Each delegation may have up to four persons. The delegation must officially represent an organization that makes and interprets braille rules for that country, or determines the application of braille rules to that country's needs. The delegation must also represent one or more organizations of blind persons provided the organization actively promotes interest in and production and use of English Braille Grade 2. The delegation must have among its members a person or persons expert in the braille code.

Any country wishing to send a delegation to the conference might express its desire to participate by *Friday, January 1, 1982*, in writing to the Conference Coordinator. Final application for participation in the conference must be received by the Conference Coordinator no later than *Friday, April 30, 1982.*

Papers on developing a uniform braille code and on other improvements in the braille system must be submitted as soon as possible but no later than

Thursday, April 15, 1982. A written intention to participate in the Conference might also include the subject or subjects of papers that might be prepared for and delivered at the Conference. Guidelines for submission of papers will be sent no later than December 15, 1981. The Conference Steering Committee will make the final selection of papers.

FINANCIAL SUPPORT:

All attendees will be expected to defray costs related to participation. Further information on the Conference will be mailed in a few weeks. Please direct responses and inquiries, in print or braille, to:

Richard H. Evensen, Coordinator
English Braille Grade 2 Conference
National Library Service for the Blind and Physically Handicapped
Library of Congress
Washington, D.C. 20542
U.S.A.
Telephone: 202-287-9288

If you know of any other organization that you believe should receive Conference information, please send the organization's name and address to the Conference Coordinator.

INTERNATIONAL CONFERENCE ON ENGLISH BRAILLE GRADE 2

GUIDELINES FOR SUBMISSION OF PAPERS

INTRODUCTION

Following are guidelines suggested by the Steering Committee of the International Conference on English Braille Grade 2. These guidelines should be followed as closely as possible by persons submitting papers for the conference. They will be followed by the Steering Committee in reviewing papers and in determining their acceptability for inclusion in the conference.

The International Braille Conference will meet in Washington, D.C., U.S.A., Monday, September 13, through Friday, September 17, 1982. A preliminary announcement of this conference was mailed in October 1981, and other announcements will follow.

The purposes of the International Braille Conference are:

1. To register delegates' views on recommended changes in the British and American systems that will promote uniformity and facilitate production and use;

2. To report progress toward developing one Grade 2 braille code for countries using English braille;

3. To explore ideas for improving the English literary braille code, the implementation of which might facilitate the learning, reading, writing and production of contracted braille;

4. To register views on future research in English braille; and views on appropriate international mechanisms for cooperation in achieving uniformity and in communicating code changes.

Please send all papers and related inquiries to Richard H. Evensen, Conference Coordinator, his address is given at the end of these guidelines.

GUIDELINES, DEFINITIONS AND UNDERSTANDINGS

1. A conference paper is a paper submitted for presentation at the conference and publication in the conference proceedings (see guidelines 1-11).

2. A reacting paper is a paper submitted in response to a conference paper (see guideline 12).

3. A presenter is a person who reads out the conference paper at the conference in September 1982.

4. A conference delegation is a group of from one to four persons proposed by a country where English Grade 2 braille is used as a major braille code, and accepted by the conference Steering Committee as a delegation.

5. The conference Steering Committee is a group of six persons established by the Braille Authority of North America (BANA) and the Braille Authority of the United Kingdom (BAUK) to review and accept or reject conference papers submitted, and to review and accept or reject delegation applications.

6. Conference papers, reacting papers, conference presentations, conference

discussions, and the conference proceedings will be in the English language; there will be no translation into any other language.

GUIDELINES

1. The deadline for submission of conference papers to the Conference Coordinator is April 15, 1982. Conference papers submitted by March 1, 1982, will be reviewed promptly, and early notice will be sent to the person or persons submitting the conference papers.

2. The deadline for completing minor editing of conference papers submitted, and for duplicating and distributing conference papers is June 1, 1982.

3. Every conference paper submitted will be reviewed by the Steering Committee who will determine the paper's appropriateness for the conference and who will notify the person or persons submitting the paper whether the paper has been accepted for the conference. Copies of accepted papers will be distributed to all delegates to the conference.

4. A conference paper's length should be 2500 to 3500 words or 10 to 15 typescripted pages. It is suggested that a subject requiring a greater length should be divided into two papers, each submitted by a different author.

5. Conference papers must be submitted in English Braille Grade 2, either British or American code. They should be submitted on eleven by eleven and a half inch braille paper suitable for Thermoforming. It would be appreciated if the person submitting the braille version can also accompany the master copy with six Braillon copies for the Steering Committee, but this is not absolutely required.

6. Conference papers must also be submitted in typescript, double-spaced on standard sheets suitable for photocopying (8 1/2 x 11 inches or the equivalent in the metric system). The typescript copy should be in final form, with all changes and corrections made neatly, so that the copy can be used in the preparation of the conference proceedings. The conference staff cannot retype conference papers.

7. The general or specific focus of a conference paper should be on the relationship of the paper's subject to present or changed English braille codes, and wherever possible on the attainment of a uniform braille code for English-speaking countries. The subject matter of conference papers may be broad. Some examples; comparison of major sections of the British and American braille codes; compromise promote proposals between strongly held positions on braille-code topics; the effect of present or proposed braille-code features on the teaching and learning of braille, on the speed of reading braille; other topics of like character.

8. A few hints common to preparation of such papers are as follows: A clear, concise, orderly manner; an objective rather than a subjective approach; precise definition of braille-code terms. The use of section headings and the numbering of significant paragraphs aids review, as does a summary of the paper's content, conclusions and proposals.

9. A second version of the conference paper must accompany the submission of the full conference paper. This shorter version will be the version read out at the conference. It is suggested that the version for presentation contain the highlights of the longer paper with respect to findings, proposals, conclusions, etc. The presentation version may be in braille or print according to the preferred format of the presenter. A presenter may be either the author or co-author of the conference paper or someone designated by the author or co-authors, provided the presenter is an official delegate to the conference.

10. The author or co-authors of a conference paper need not be a delegate to the conference; but in this case, the conference paper must be officially submitted to the Steering Committee on behalf of the author or co-author by a delegate to the conference or by a member of the Steering Committee.

11. Even though a conference paper is accepted for presentation at the conference and for publication in the proceedings, it may be the opinion of the Steering Committee that clarification of some points in the conference paper is advisable. The Steering Committee will ask the author or co-author to make such clarifications and to submit these to the Conference Coordinator by September 1982 so that they can be incorporated into the conference proceedings.

12. Any delegate who receives a conference paper may submit a reacting paper, covering one or more points in the conference paper at issue. Such reacting papers should be brief, no more than five typescripted pages double-spaced and the equivalent length in braille. Reacting papers may be prepared by the delegate or by a nondelegate, provided a delegate submits the reacting paper. The reacting paper must be received by the Conference Coordinator no later than July 31, 1982. Every effort will be made to distribute copies of reacting papers to delegates prior to the September conference. Reacting papers will not be read out nor summarized at the conference unless adequate time is found. The points raised in reacting papers are proper subjects for discussion periods at the conference. Where feasible, reacting papers will be included in the conference proceedings.

Typed and brailled originals and copies of conference papers and reacting papers, and inquiries about papers and the conference should be sent to:

Richard H. Evensen, Conference Coordinator
International Conference on English Braille
Grade 2
National Library Service for the Blind and Physically Handicapped
Library of Congress
Washington, D.C. 20542
U. S. A.
Telephone: (202) 287-9288

January 1982

INTERNATIONAL CONFERENCE ON ENGLISH BRAILLE GRADE 2
SEPTEMBER 13-17, 1982

CONVENED AT THE
NATIONAL LIBRARY SERVICE FOR THE BLIND AND PHYSICALLY HANDICAPPED

CONFERENCE ROOM
1291 Taylor Street, N.W.
Washington, D.C. 20542
United States of America

Conference Coordinator, Richard H. Evensen

Conference Sponsors:
Braille Authority of North America
Braille Authority of the United Kingdom

Host Sponsor
National Library Service for the Blind and
Physically Handicapped

Contributing Sponsors:
American Council of the Blind — Conference Banquet
American Foundation for the Blind — General Support
Braille Revival League — Conference Refreshments
Canadian National Institute for the Blind — General Support
National Braille Association — General Support

The above-named private and public organizations and agencies have provided specific financial assistance, facilities and services for the planning and conduct of this International Braille Conference. Thanks are also given to member organizations of the Braille Authority of North America and Braille Authority of the United Kingdom, and organizations in those countries represented at the conference which have given material support to their delegations. Finally, the success of this conference could not have been assured without the constant and diligent efforts of the six-member Conference Steering Committee, namely, James Hughes, John Lorimer, and William

Poole, of the United Kingdom; Darleen Bogart, of Canada; and Floyd Cargill and Richard Evensen, of the United States.

PROGRAM

Unless otherwise noted, conference activities take place at the offices of the National Library Service for the Blind and Physically Handicapped (NLS).

MONDAY, SEPTEMBER 13

Theme of the Day
TOWARD A UNIFIED ENGLISH BRAILLE GRADE 2
William B.L. Poole, United Kingdom
Chairman of the Day

8:30 am—10:00 am REGISTRATION AND REFRESHMENTS

10:00 am—11:15 am WELCOME AND INTRODUCTIONS

Richard H. Evensen
Conference Coordinator

Dr. Carol Nemeyer
Associate Librarian for National Programs
The Library of Congress

Frank Kurt Cylke
Director, National Library Service for the Blind
and Physically Handicapped
The Library of Congress

Maxine B. Dorf
Head, Braille Codes Section
National Library Service for the Blind
and Physically Handicapped
The Library of Congress and
President, National Braille Association

"The Sound and Touch of Reading"
Videotape Overview of the Library of Congress
Braille and Talking-Book Program

11:15 am—12 noon
Toward a Universal English Braille Grade 2
Terry H. Small, New Zealand
Discussion

Noon—1:00 pm LUNCH

1:00 pm—2:30 pm

Toward a Unified English Braille Code: A Transcriber's View
Norma Schecter, United States
Presented by Floyd Cargill, United States
Discussion

Views from Canada
Darleen Bogart, Jo Churcher, Jill Cooter, and
Phyllis Landon, Canada
Presented by Darleen Bogart, Canada
Discussion

2:30 pm—2:45 pm BREAK

2:45 pm—4:00 pm

Unifying the Codes for Numerals, Weights, Measures, Mathematical Coinage, Mathematical and Literary Signs
Edith York, Canada
Presented by Jo Churcher, Canada
Discussion

4:00 pm—4:30 pm BREAK

4:30 pm—5:30 pm RECEPTION

TUESDAY, SEPTEMBER 14

Theme of the Day
TOWARD A UNIFIED ENGLISH BRAILLE GRADE 2
Floyd R. Cargill, United States
Chairman of the Day

8:30 am—9:30 am REFRESHMENTS AND NLS TOUR

9:30 am—12 noon Paper to be Announced
Discussion

Braille Transcription Procedures
H. H. Cohn, United Kingdom
Presented by Martin Milligan, United Kingdom
Discussion

Some Considerations About Braille Composition Signs with Special Reference to the Capital Sign
Richard H. Evensen, United States
Discussion

Noon—1:00 pm LUNCH

1:00 pm—2:45 pm
The Recent BANA Code Changes
William B. L. Poole, United Kingdom
Discussion

Personalized Braille
Carlton B. Eldridge, United States
Presented by Floyd Cargill, United States
Discussion

2:45 pm—3:00 pm BREAK

3:00 pm—4:00 pm PARTICIPATION BY CONFERENCE OBSERVERS
Comments on general topics and papers

WEDNESDAY, SEPTEMBER 15

Theme of the Day
RESEARCH IN CONTRACTED BRAILLE
Martin Milligan, United Kingdon
Chairman of the Day

8:30 am—9:30 am REFRESHMENTS

9:30 am—12 noon "The Challenge of Braille"
A Videotape on the Braille System

Should There Be Two Grades of Braille?
Martin Milligan, United Kingdom
Discussion

Some Code Changes for Better Teaching and Learning of Braille
Marjorie Troughton, Canada
Discussion

Noon—1:00 pm LUNCH

1:00 pm—2:30 pm

The Space Saving Efficiency of Grade 2 Braille and the Possibility of Improving It
John Lorimer, United Kingdom
Discussion

Revision of Braillle Contractions with Particular Reference to Bridging Contractions
Leslie F. Pye, United Kingdom
Presented by John Lorimer, United Kingdom
Discussion

2:30 pm—2:45 pm BREAK

2:45 pm—4:00 pm

The Influence of Changes to English Braille on Sibling Codes
Connie Aucamp, Republic of South Africa
Discussion

THURSDAY, SEPTEMBER 16

Themes of the Day
RESEARCH IN CONTRACTED BRAILLE, and CONTRACTED BRAILLE—INTERNATIONAL COOPERATION
William E. Milton, Canada
Chariman of the Day

8:30 am—9:30 am REFRESHMENTS

9:30 am—12 noon

Braille as an Autonomous Script
William B. L. Poole, United Kingdom
Discussion

Now or Never?
Marjorie Bolton, United Kingdom
Presented by John Lorimer, United Kingdom
Discussion

Braille — User-Oriented
Rebecca Maxwell, Australia
Discussion

Noon—1:00 pm LUNCH

1:00 pm—2:15 pm

The Future of Braille
Bertil Nilsson, Sweden (representing the World Council for the Welfare of the Blind)
Discussion

Constitution for the World Alliance of Braille Authorities
Floyd R. Cargill, United States
Discussion

2:15 pm—3:15 pm PARTICIPATION BY CONFERENCE OBSERVERS
Comments on general topics and papers

3:15 pm—4:15 pm NLS TOUR

6:00 pm—7:00 pm CASH BAR
Holiday Inn Silver Spring
Silver Rooms, Fourth Floor
8777 Georgia Avenue
Silver Spring, Maryland

7:00 pm—8:30 pm DINNER

FRIDAY, SEPTEMBER 17

Theme of the Day
STATEMENTS OF OFFICIAL CONFERENCE VIEWS ON A UNIFIED ENGLISH BRAILLE GRADE 2 CODE ON FUTURE BRAILLE RESEARCH, AND ON ESTABLISHMENT OF APPROPRIATE INTERNATIONAL MECHANISMS
Richard H. Evensen, United States
Chairman of the Day

8:30 am—9:30 am REFRESHMENTS

9:30 am—Conclusion Presentation of Statements of Views
Discussion
Consensus

NOTE: As laid down by the Conference Planning Committee meeting in Toronto, Ontario, Canada, July 1981, formal votes on conference statements and actions will not be taken. The successful outcome of the conference depends on reaching agreement on broad issues and general procedures.

Adjournment

CONFERENCE RESOURCE PERSONS, NLS

Bernice Brown
Maurice Boyd
Frank Kurt Cylke
Wellington Datcher
Judith Dixon
Maxine Dorf
Mildred Dyson
Cornelia Frazier
Alice Freeman
John Jackson
Robert Kost
Donna Pastore
John Reiner
Martha Robinson
Donald Smith
Sandra Walberg
John Wilkinson
Mary Jack Wintle

CONFERENCE BANQUET

September 16, 1982
6:00 p.m.—8:30 p.m.

Holiday Inn Silver Spring
Silver Rooms, Fourth Floor
8777 Georgia Avenue
Silver Spring, Maryland

6:00 p.m.—7:00 p.m. CASH BAR

7:00 p.m.—8:30 p.m. DINNER
Oral Miller, National Representative
American Council of the Blind
Master of Ceremonies

1. Singing of National Anthems (words attached)
   A. God Save the Queen
   B. O Canada
   C. The Star-Spangled Banner

2. Roast Beef Dinner

3. Musical Entertainment
   Cornelia Frazier, Soprano
   National Library Service for the Blind
   and Physically Handicapped
   Library of Congress

4. Remarks; Introducing Head Table Guests
   Oral Miller, Master of Ceremonies

5. Call of Countries

6. Musical Entertainment
   Cornelia Frazier, Soprano

GOD SAVE THE QUEEN

God Save our gracious Queen,
Long live our noble Queen,
God save the Queen.
Send her victorious,

Happy and glorious,
Long to reign over us,
God save the Queen.

O CANADA

O Canada, our home and native land!
True patriot love in all the sons command.
With glowing hearts we see thee rise, the true north strong and free;
And stand on guard, O Canada, we stand on guard for thee.
O Canada! glorious and free!
We stand on guard, we stand on guard for thee,
O Canada! we stand on guard for thee.

THE STAR-SPANGLED BANNER

Oh say, can you see, by the dawn's early light,
What so proudly we hailed at the twilight's last gleaming?
Whose broad stripes and bright stars, thro' the perilous fight,
O'er the ramparts we watched, were so gallantly streaming?
And the rockets' red glare, the bombs bursting in air,
Gave proof thro' the night that our flag was still there.
Oh, say, does that Star-Spangled Banner yet wave
O'er the land of the free and the home of the brave?

DELEGATES
INTERNATIONAL CONFERENCE ON ENGLISH BRAILLE GRADE 2

AUSTRALIA

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Brunswick. Victoria
AUSTRALIA

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AUSTRALIA

Joan Ledermann
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Box 176, P.O.
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East Lansing, Michigan 48824

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Betty Epstein—(alternate)
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WORLD COUNCIL FOR THE WELFARE OF THE BLIND

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OBSERVERS

(The following list has been compiled from information on conference registration forms)

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INTERNATIONAL CONFERENCE ON ENGLISH BRAILLE GRADE 2 SEPTEMBER 13TH TO 17TH, 1982

Welcome and Introduction

Delegates and observers to the Conference were welcomed to Washington and to the Library of Congress by Dr. Carol Nemeyer, Associate Librarian for National Programs and Frank Kurt Cylke, Director of the National Library Service for the Blind and Physically Handicapped. Maxine B. Dorf, Head of the Braille Codes Section and President of the National Braille Association addressed the Conference briefly expressing the hope that the delegates would reach agreement on a mechanism for international cooperation and decide on procedures for the implementation of ideas.

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON ENGLISH BRAILLE GRADE 2

SEPTEMBER 13-17, 1982

NOTE: the order in which papers were presented is slightly different from that shown in the program; also two papers were presented and discussed at the Conference whose titles do not appear in the program.

In the summaries of discussions on Conference papers, the usual practice is to precede the paragraph with the name of the speaker whose comments appear in that paragraph. In a few instances, however, the comments of speakers are closely related, and a better arrangement is to incorporate the speaker's name in the appropriate sentences or to place the name in parenthesis at the end of his or her comment.

Another change is that Martin Milligan chaired the session on the first day instead of on the third day. William Poole chaired the third day's session instead of the first day's session.

Discussion of the resolutions is omitted since it had to do with clarifying and explaining proposed resolutions, the texts of which had not been distributed to delegates before hand.

TOWARD A UNIVERSAL ENGLISH BRAILLE GRADE TWO

Problems and Remedies as Seen from Outside Britain and North America

By Terry H. Small Head, Transcription Service, Royal New Zealand Foundation for the Blind and National President, New Zealand Association of the Blind and Partially Blind, Inc.

1. Introduction

The desire for a uniform literary braille code for the English language is not new. For more than a century each generation has witnessed and agonized through at least one significant endeavor towards this goal and, indeed, in 1932 and 1956 very real progress was made. 1982 and this present gathering in Washington will, I hope, set us on the path to a full realization of standardization in English Braille Grade Two not only for North America and the United Kingdom but in every country where English is the principal or strong secondary language. These countries, far removed from London or Washington, have had to endure existence in a braille "no man's land". The effects of this would have been worsened but for the sustained efforts of braille users to safeguard their precious key to literacy.

It is true that we look to major producers for the bulk of braille reading requirements. Nevertheless, there are significant aspects of non-standardization in the grade two code denying blind people the benefits they should derive through increased access to the printed word.

To begin with I would like to discuss some of these problems with specific reference to the South Pacific region, and then propose procedures which I see as essential in attaining a universal English Braille Grade Two.

2. Braille in New Zealand

2.1 In 1890 New Zealand was a very young British colony, but that year saw the establishment in the city of Auckland of the organization which is now the Royal New Zealand Foundation for the Blind, a national agency serving the needs of our six thousand visually handicapped citizens. We were fortunate in that from the outset the braille code was taught. Being a British colony it was natural we should use the British and Foreign Braille Association version of the code. Thus we were spared the vicissitudes of the "War of the Dots" raging in North America, and we lived quite peacefully through the relatively orderly transition to Revised Braille in 1905 and Standard English Braille in 1932.

2.2 It was at this time, 1931, that an organized effort was made to produce books in New Zealand by the formation of a volunteer braille club. This band of dedicated workers transcribed hundreds of volumes of New Zealand literature with slates and styli. Standard English Braille continued to prove entirely adequate and the quality of braille instruction to school

children and adventitiously blinded adults was sustained largely through the efforts of blind teachers employed in our residential school.

3. Changing Times

3.1 In the '50's the situation changed. A beginning was being made with the implementation of the concept of integrated education at high school level. The needs of these students both in textbooks and general literature for class study highlighted shortcomings in Standard English Braille that hitherto had not been apparent. There seemed little that could be done to remedy the situation.

3.2 In 1960, however, we received *English Braille, American Edition, 1959.* It brought with it a refreshingly clear-cut approach not only to the use of capitals but also to a number of considerations of format, particularly those relating to students' classroom requirements such as the brailling of poetry, plays, test materials and the like. It should be noted here that standardization of format is of great importance in enhancing the readability of braille. It is a question that cannot be ignored in our concern for standardization in the braille code itself.

3.3 Acceptance of the American code in New Zealand was by no means automatic and, for several years, the transcription of textbooks exhibited a strange British-American hybridism stemming mainly from the personal background or preference of the individual transcriber.

4. Standardization

4.1 We were heading for chaos. Braille transcribers (most of whom were blind at that time) and some of the more enlightened teachers in the residential school acknowledged that this "bastard" braille was likely to become more bothersome than no braille at all. Therefore steps had to be taken to reconcile the situation.

4.2 A New Zealand teacher visited the United States in the mid-'60's and returned not only with the latest revision of *English Braille, American Edition* but also the first edition of the *Code of Braille Textbook Formats and Techniques.* It was quickly apparent that this combination afforded scope for textbook presentation far superior to anything available heretofore.

5. Resistance

5.1 We did make one fundamental error in our procedure for change from Standard English Braille to the American code. We did not allow for consumer education and preparation relative to the proposed change and, quite understandably, what was regarded as "all this American nonsense" received considerable criticism and resistance especially from older braille readers. One may still occasionally hear mutterings from some when they encounter a heading written in full capitals.

5.2 It is pleasing to note that a component of consumer research has been part of the process for the determination of changes in the literary code implemented in 1980, but I believe greater consumer input is vital in all future changes. Let us keep our priorities right as of now: readability and meaning for the consumer must always take precedence over "braillability" for the computer. Where compromise must be made it must be in favor of the reader.

6. Beyond New Zealend

6.1 Since the mid-'60's, then, New Zealand has used the American literary code to good effect and, although outside the scope of this discussion, the Nemeth Code for the transcription of mathematical and scientific texts. Of course our National Braille Library continues to import many titles from British publishing houses.

6.2 For our nearest neighbor, Australia, which is some 1300 miles away from New Zealand, there are some marked differences in the development of braille. My comments on braille in Australia are not based on the pros and cons that have led to the present braille scene in that country. I merely wish to draw attention to the effect some of these differences has on braille in the Pacific area and highlight parallels between the Pacific and other regions of the world.

6.3 The history of braille in Australia extends back a century or more to the establishment of schools for the blind in Sydney and Melbourne. Later similar schools were started in other parts of the country. The vast distances separating populated areas and the institution of Federal/State governments in Australia prevented close liaison in the development of work for the blind. Unlike New Zealand with its single national agency providing services to the visually handicapped, each Australian state has a multiplicity of schools and agencies offering services. This appears to have worked contrary to the goal of standardized braille. Standard English Braille is the accepted code in Australia, yet a range of variations has evolved. Some schools teach the use of capitals while others do not. So far as I am aware the adoption of "English Braille, American Edition" has not occurred anywhere in Australia. However, I have observed the part-use of some of the procedures and provisions in the *Code of Braille Textbook Formats and Techniques*. For mathematics and the sciences only the British code is used.

6.4 To my mind this non-standardization in braille cannot be condoned. The lack of capitals, inconsistencies in format, etc., must detract from the standard of education attainable by blind students. There are those who say that once one learns braille it is possible to read any variation of the code. This may be substantially true for those who learn braille in infancy, but we must be mindful of those who are adventitiously blinded during their active working lifetime for whom learning to read tactually rather than visually demands the highest degree of motivation and determination. For such readers, and for those for whom English is a second language, every mis-

formed letter or inconsistency in code usage poses serious problems to the extent where some are deterred from persisting with the use of braille and consequently denied the riches of its benefits.

6.5 Recently there has been news of efforts to establish an Australian Braille Authority under the aegis of the Australian National Council of and for the Blind. I am unaware of how far this proposal has gone, but I do believe that proliferation of braille authorities in the English-speaking world is not in the interests of achieving a universal code. What we must seek is a World Braille Authority On English Braille Grade Two which will be representative of all English-speaking countries. I will return to this topic in section 8 of my paper.

7. Beyond Australia and New Zealand

7.1 Meanwhile it must also be remembered that there are dozens of other nations in the South Pacific where English is either an official language or a strong second language. Countries such as Papua New Guinea, Vanuatu, Fiji, the Samoas, Niue, Tonga, the Cook Islands and many more former American or British colonies all have a need for English braille because codes for their own native languages and dialects have not, for the most part, been devised. Furthermore, facilities for braille production in these countries do not exist and are not likely to for some time.

7.2 Such countries, with their comparatively small populations and consequently small numbers of visually handicapped citizens, are obviously going to be highly dependent on other countries for their braille resources. They will look both to the United States and Britain for much of their requirements and, because of their geographic location, they will also look to Australia and New Zealand for special needs such as school readers and other educational texts. The need in these countries for a standardized English Braille Grade Two is increased a hundredfold if we include the parallel to be found in so many countries of Africa and Asia, and especially in India. We will do well to remember that potentially, and perhaps in fact, there are many more braille users outside of the United States and Britain than inside those countries.

8. World Braille Authority

8.1 If we accept that there is a real need for international conformity in English Braille Grade Two, and if we are committed to achieving that goal, then we must set about the establishment of a World Braille Authority On English Braille Grade Two and provide this authority with the appropriate means to function effectively. Such a step calls for courage and real commitment especially on the part of Britain and the United States. Without the establishment of such an authority, however, the chance of achieving standardization is extremely remote and, perhaps, non-existent.

8.2 A sample of pertinent points with regard to the structure and function

of the World Braille Authority On English Braille Grade Two should include, inter alia, those listed below:

8.2.1 The World Braille Authority On English Braille Grade Two Shall Comprise:

(a) Three members appointed from BAUK and three members appointed from BANA;

(b) (i) one representative from a braille publishing house,
(ii) one braille instructor/teacher,
(iii) a volunteer braillist from an internationally recognized organization of volunteer transcribers,
(iv) two representatives of braille producers/consumers from countries other than Britain or the United States; provided that

(c) where the qualifications of any of the appointees from BAUK and/or BANA in accordance with (a) above fulfill the categories of membership prescribed in (b), that requirement shall be deemed to have been satisfied and no additional appointment shall be made thereunder; and provided that

(d) at least one half of the total membership of the World Braille Authority On English Braille Grade Two shall be legally blind persons in accordance with the definition of blindness in his/her country of residence.

8.2.2 Besides believing in the necessity for the immediate establishment of the World Braille Authority, I also contend that a single major change in English Braille Grade Two (followed by appropriate "fine tuning") is preferable to a series of lesser changes spread over many years. Given appropriate education of braille users to the needs and reasons for code revision, a single change will be much easier to accommodate by publishers, instructors/teachers, compilers of official codes and instruction manuals.

8.2.3 Accordingly, the World Braille Authority On English Braille Grade Two will be charged with:

(a) preparing a universal English Braille Grade Two code for adoption internationally in 1987;

(b) establishing such technical subcommittees and co-opting such expertise as the Authority considers necessary to achieve the requirement of (a) above;

(c) reporting approximately every six months to agencies of and for the blind throughout the English-speaking world on current progress and seeking comment where necessary on such progress.

8.2.4 At the completion of its work as prescribed above, or concurrently with it, the Authority must address itself to questions of standardized format and the reconciliation of the mathematics and science braille codes. Uniformity of format is essential to the recognition and understanding of the printed word according to the author's intention, and this is almost as true at kindergarten level as it is for those at college or university. With regard to mathematics and science notation, we can neither afford nor justify the

waste of resources and the barriers imposed on higher learning through the utter incompatibility of the American and British codes.

8.2.5 "That's fine!" I hope I hear you saying, "but this is going to be a very expensive exercise. Who is going to pay?" I offer the following suggestion as a feasible means for financing the work necessary in standardizing English Braille Grade Two. The importance of this project as a means to greater literacy for potentially millions of blind people in the world cannot be stressed too strongly to all concerned with the amelioration of the condition of blindness. The strongest plea must go forth from this conference, therefore, to national and international agencies serving the blind and to governments and international bodies such as UNESCO, WHO, ILO, etc., for funding and sponsorship to eradicate once and for all the dilemma bedevilling the blind through non-standardization in English Braille.

9. Conclusions

The medium of braille is likely to continue to afford the best and most economical means of access to the printed word for the young and socially active blind population. It is the only system which enables the author to communicate directly with the blind reader without electronic or other human intervention. After more than one and a half centuries braille remains the priceless gift for which we share the responsibility of guardianship.

The need for review of the code is accepted and this is demonstrated by the fact that this Washington conference has been convened. We have to commit ourselves to a thorough reassessment and review of English Braille Grade Two. Our aim is to meet the needs of future generations of braille readers.

The problem is not merely the differences between braille usage in Britain and North America, and countries of this area do not hold sole rights in determining the range and nature of any changes to the code. All the English-speaking world, including those countries where English is a strong second language, have the responsibility for shaping a universal English braille code. I see the establishment of the World Braille Authority On English Braille Grade Two as undoubtedly the best means for achieving our goal. If we restrict ourselves to compatability with the existing English/American codes as the yardstick for determining the worth of any proposed changes, there is a very real danger that the outcome of deliberations based on such a premise will be highly ineffectual and perhaps useless. We will be merely tinkering.

Objectivity is imperative, and high on our criteria for change must be demonstrably cogent and logical reasons why any such change will enhance readability for the braille user. Before addressing ourselves to what changes are necessary in the existing codes, we must first provide the vehicle by which changes can be designed and implemented. This is why I urge this conference to accord priority to the formulation of resolutions covering the following points:

(1) agreement on the establishment of a World Braille Authority On English Braille Grade Two;
(2) determining the structure of the Authority (see 8.2.1 above);
(3) defining the specific tasks of the Authority and prescribing a time frame within which these tasks should be accomplished (see 8.2.3) above;
(4) providing for accountability, that is, prescribing the frequency of reports by the Authority and to whom these should be circulated;
(5) initiating steps to secure adequate funding for the function of the Authority for a minimum of five years.

Resolutions in line with the foregoing points will set us on the path for action. While being cognizant of current practices and preferences on each side of the Atlantic, our task is not so much to compromise nor appease within those practices and preferences but, rather, to ensure the preservation of braille as the best key to literacy and education available to English-speaking persons throughout the world.

Adoption of these concepts will provide the tools with which to do the job.

Conference Discussion

Discussion focused on Small's proposal for a World Braille Authority with hope being expressed that it would cooperate with the newly-formed Braille Committee of the WCWB (Nilsson).

Lee and Poole questioned the proposed membership. Why should consumers and producers be linked together instead of having separate representation? (Lee). Why only 50 per cent blind? "This is one instance where parity with the sighted is *not* enough!" (Poole). They were assured by Small that his was but a first proposal for an international organization. Lorimer proposed that any change to the code be made now and not piecemeal, creating a code that would stand for the next 50 years, and favourably quoted Small's statement "Readability and meaning for the consumer must always take precedence over brailleability for the computer."

TOWARD A UNIFIED ENGLISH BRAILLE CODE: A TRANSCRIBER'S VIEW

Submitted by Norma L. Schecter, Literary Braille Specialist California Transcribers and Educators of the Visually Handicapped

A. Dictionaries

There are many discrepancies between various reputable dictionaries as to syllabication. Some dictionaries offer a separate section on Foreign Words and Phrases whereas others embed these foreign words in the main body of the dictionary, indicating foreign words and phrases with a preceding double dagger or other print indicator. This may cause differences in transcriptions using various dictionaries, although these differences should present no particular problem to the braille reader.

Transcribers would appreciate a ruling from the joint BANA/BAUK as to the acceptability of various dictionaries, as well as specific limitations on the age of the dictionary being used. In the U.S., we are advised to use Webster's New World Dictionary, with a copyright less than 10 years old; this is the dictionary available in braille for the use of proofreaders. When the new voice-indexed tape-recorded dictionary becomes available from NLS, it will raise this question.

Why cannot we simply specify ANY reputable dictionary with a copyright less than 10 years old, and inform the proofreader of the specific title?

B. Specific Points Where the British Rule Might Govern

(Note: Opinions expressed in this paper are the opinions of the individual submitting it; they are not intended to express the opinions of any group or agency or organization.)

(Throughout the following pages, the following abbreviations will be used: BBC for British Basic Code; BAC for British Advanced Code; ALC for American Literary Code.)

1. *BBC Rules 26 and 30: ALC Rules 37 and 41 (Revised).*

The so-called "natural pause" between, *a, and, for, of, the, with* or *to, into, by* and the following word makes for greater ease in the flow of the reader's thought; and presents the student with a clearer comprehension of English grammatical structure. Although these rules were recently done away with in the U.S., most textbook braillists in this country are simply following the former rule, feeling it renders better service to their clients.

The feeling is particularly strong throughout the state of California, whose Board of Directors of the California Transcribers and Educators of the Visually Handicapped has sent several official letters of protest over this 1980 ruling.

2. *BAC Rules 45 and 50*

In italicized passages, where the total number of words determines the need

for the double italics, the presence of a spaced double-dash or an ellipsis in such a passage creates a problem.

British usage is to count the spaced double-dash or the ellipsis as a word, though it should never itself be preceded by the *italic* Sign. American usage does not speak to this point. The British solution seems eminently logical.

3. *BAC Rule 60, ALC Rule 24.*

British usage permits the use of contractions in names of books, plays, operas, works of art, wines, dishes, etc., *when printed in ordinary type.* American usage says contractions should be used in all proper names, English or foreign, occurring in English context.

In books containing a number of foreign names, in both English and foreign context (such as books on American Southwest history, with much Spanish), this ruling has created serious problems for transcribers, particularly in areas where there is an effort afoot to increase the reference holdings of the regional libraries.

Following the British rule would place the *author* in the deciding position as to the foreign or anglicized character of a name; if the author uses regular type, it is considered anglicized, and contractions may be used; if the author italicizes the name, he considers it foreign, and no contractions should be used.

4. *BAC Rule 68, ALC Rule 24.a.(2)*

British usage states "A foreign word or name consisting of a single letter should not be preceded by the Letter Sign: e.g. Ortega y Gasset, adagio e cantabile, U *Th*ant." Since the reader knows from context that these are not English one-cell words, the British rule seems more sensible than the American rule which states: "When a foreign phrase or passage occurs within English context, the letter sign must be used before any letter or group of letters which can be confused with an alphabetic contraction or short-form word."

5. *BAC Rule 106, ALC Rule 27.e.*

The various print presentations of abbreviated dates present a problem to the transcriber; the numbers can be separated by a variety of print marks, such as the hyphen, slash, period or abbreviation point, etc. Also, the print sequence varies from country to country, some presenting the month first followed by the day-date, some reversing this sequence.

The British system of eliminating the print separating punctuation, and simply repeating the Numeral or Letter Sign as required, seems to present fewer problems to the transcriber, whether human or computer, as well as being easy for the reader.

6. *BAC Rule 173, ALC Rule 25.*

The American rule simply covers the diphthongs or diaereses "ae" and "oe", stating that the "letters comprising parts of these diphthongs and diaereses, even if not printed as such, should not form a part of a contraction."

Example: Goer*ing*.

The British rule goes on to state "...contractions should not be used when the letters AE, OE, or UE represent [a with an umlaut, o with an umlaut, or u with an umlaut], respectively." Examples include Goer*ing* and Gruenfeld.

It seems much more logical to extend the rule to all three umlaut vowels; thus German names which are anglicized by replacing the umlaut with an "e" will be handled uniformly, so that the *en*-sign will not be used in Koenig, the *er*-sign will not be used in Goer*ing*, the *ed*-sign will not be used in Baedeke*r*, and the *en*-sign will not be used in Gruenwald.

This would bring "ue" into conformity with "ae" and "oe".

7. *BAC Rule 188, ALC Rule 34.b.(1).*

British rule states "When words beginning or ending with "ea" form parts of unhyphenated compound words, the "ea" should be contracted." Examples include: mo*th/ea*ten, spe*akea*sy, spre*adea*gle.

American usage permits the use of "ea" and the double letter signs "where a word ending or a suffix is added to the base word" such as in se*a*man, but prohibits their use where a prefix is added, such as in the word: uneasy.

Since the dot-2 would be in the middle of the word in either case, it should be equally easy for the reader whether the "ea" is preceded by a prefix, or is followed by a suffix. The usage should remain uniform in either case.

C. General Comments, Questions, and Suggestions for Discussion

1. *BBC Rule 6 and ALC Rule 31, Abbreviations of Weights, Coinage, etc.*

The two countries are fairly well in agreement in current usage. However, in American textbook usage, abbreviations which are presented in letters in print, with the period (abbreviation point), are brailled as printed.

Proposal for discussion: That abbreviations presented in print letters, followed by the period or abbreviation point, be brailled and spaced in accordance with print copy. Further, that special print symbols be brailled either preceding or following the number, in accordance with print sequence and spacing; and that the symbol which follows the print number be brailled with a preceding dot-4 such as the presentation of these symbols in a typing text. Examples:

5 yds.  £2 

45° 

(Among the matters to be discussed by this joint meeting, I hope, will be the differences in the presentation of the decimal point, the mathematical comma, and fractions in ordinary text.)

2. *BBC Rule 37, BAC Rule 54, ALC Rule 47.b.*

British rules permit the use of "Short-Form Words" as either whole or parts of English proper names "except where the name might be difficult

to recognise." ALC Rule 47.b. states "A short-form word should be used as the whole proper name only: and gives examples such as: L*ou*is *Brl*, Thomas Ll, but not in Hapgood nor Doolittle.

Since most countries using English braille now contain a population of very mixed origins, the American rule seems to provide more uniformity in ease of reading and accuracy of spelling. A brief perusal of a small local telephone directory brought forth dozens of names in which one needs to know, for example, whether the combination "gd" means simply "gd" or "good", such as, in full spelling: Goodale, Gdalia, Goodan, Goodart, Gdur, Gdonitz, Gdurek, Goodin, Gdynya, Migdal, Magdziar, Magdanz, Begoodle, Bagdon, Dugdale, Degoodale.

3. *BAC Rules 88 and 151, ALC Revised Rule 10.h.*

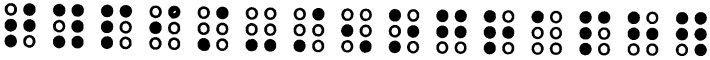
These cover the problems of quoted matter which appears interspersed with regular body of text. The American rule, which requires that a change of type be brailled as italics, has caused many problems to transcribers. This is particularly a problem when the quoted matter is presented simply in a smaller-size type-face, and has within the quoted matter the frequent use of italics for emphasis. It is especially bothersome when used copiously throughout a textbook.

Proposed: That quoted matter which is presented in a different size or style of upright type, or within different margins, be set off from the body of the text with a blank line preceding and following the quoted matter; and that italics be used only when they are present for emphasis or distinction within the print text (this includes boldface or underscoring for emphasis or distinction).

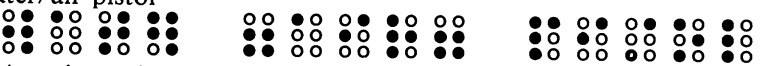
4. *BAC Rule 126, ALC Rule 28.e.*

The British rule states, about the slash (or oblique stroke), "An appropriate substitute, such as a hyphen, brackets, or the word OR, should be used instead of the oblique stroke when it could reasonably be read as the contraction for ST." Examples include:

typist/stenographer



water/air pistol



American Literary braille usage states "The sign (dots 3-4) represents the oblique stroke, bar, or slash, and is used whenever the symbol it represents appears in ink print, except when it is used to denote shillings ... or in the writing of dates ...."

American Textbook usage, instead, prescribes a two-cell sign, dots 4, 3-4, to avoid confusion with the *st*-contraction. Some American readers enjoy this usage and find it very clear; others say they find it a bit difficult to read, as the dot-4 seems too far away from the following oblique stroke.

Suggestion: Instead, may I suggest the two-cell sign, dots 4-5-6, 3-4 wherever the slash or oblique stroke occurs between words or letters, so that the reader is forewarned that it does not mean the *st*-contraction.

5. *American Rule 46.b.*

This rule states "The contraction ness should be used in such easily read words as: b*aroness*, gov*er/ness*, lio*ness*." To this one might add words such as de*aconess* and patro*ness*, I presume. This rule goes on to add: "but not where the root words end in *en* or *in*. Ex: *ch*ieftai*n*ess, citize*n*ess."

Since there is a clear structural syllable division between the base word and the feminine suffix -ess, it would seem more logical to retain in all these words the rule which forbids overlapping between a base word and its suffix, and not use the -ness sign in any words like these.

6. *Request for a New Contraction.*

We have the single letter *h* used to mean "have", and dots 4-5-6 *h* to mean "had". Why is there no contraction for the word "has"? *Proposed*: Dots 4-5 h to mean "has".

D. Request for BANA/BAUK Continuity

When the time finally arrives that there is but one code for English braille throughout the world, we hope sincerely that this joint committee will not be disbanded. Rather, we fell that it should continue to function with annual meetings (and frequent correspondence) to discuss specific problems or requests for clarification or changes that may arise during the course of time.

Instead of an on-going BAUK, and an on-going BANA — or rather, in addition thereto — it is hoped that there will be an on-going BANA/BAUK so that international uniformity of English Braille may be preserved.

Conference Observers

Poole agreed in principle with the last point — some on-going committee of BANA/BAUK — and commended the list of proper names which point out problems encountered by liberalizing contractions. Single-letter foreign names *do* present some problems in English braille, however, as does print change of type which might argue for some sort of extra composition sign. Churcher preferred the British method of dates, while Maxwell argued that since the purpose of print type face is to make the material stand out visually, braille should make it stand out tactually using "locator" indicators.

Lorimer suggested that the dots 5, 2 be inserted between two words for the slash because first, it is easily recognized and second, it very clearly separates the two elements.

Jernigan cautioned that the Conference could either work toward a mechanism for setting out a new code or deal with detailed braille matters. Milligan agreed that the Conference might be in danger of "falling between two stools", but felt that the Conference must both consider the mechanisms of a new code and hear points of view on the details.

VIEWS FROM CANADA

Darleen Bogart:
Chairman, CNIB Braille Standards Committee; Secretary, Braille Authority of North America (BANA)
Jo Churcher
Supervisor, Quality Control (Braille), National Library, The Canadian National Institute for the Blind (CNIB); Member of CNIB Braille Standards Committee
Jill Cooter:
Member of the Technical Literary Committee, BANA; Member of CNIB Braille Standards Committee
Phyllis Landon:
Braille Transcriber Instructor, National Library, The Canadian National Institute for the Blind; Past Braille Convenor, CNIB

Introduction

The following is not a research paper. It is a discussion of several of the problem areas in braille, and the authors draw upon a wide-ranging experience in teaching, transcribing, and proofreading. The value of this experience has been enhanced by the background in which braille knowledge and expertise have been acquired.

Canadians are in the unique position of having used first the UK braille code, which was later modified to adopt some American practices, and finally, in 1978, Canada changed fully to the American braille code. This changeover was felt to be necessary because already blind schoolchildren were receiving their textbooks in American braille, and this was the system being taught in the schools. Canadian readers, therefore, now have the advantage of familiarity and ease with both codes, and those of us who have been involved for some time with the teaching and production of braille can claim to have much more than a superficial knowledge of the UK and American systems.

We hope that some of this dual experience is reflected in this paper, and that the various topics brought forward will provide stimulating and productive matter for discussion.

The following subjects are considered, and proposals are made with regard to them: Terminology; Word Division; Foreign Words and Phrases; Contractions and Major Syllable Divisions; *Ea* Versus *Ar*.

Terminology

The terminology of braille should be standardized to facilitate intelligent discussion of the subject and to ensure that instruction in braille (for both the reader and the transcriber) is clear.

An examination of American terminology shows their system to be precise and logical. The terms, however, are cumbersome because of their length and they can easily be confused with one another (particularly when spoken).

British terminology makes use of simpler terms. Some, however, are easily confused with the same terms in their more general sense.

The proposal which follows is precise, logical and simple. It adopts the British distinction between word signs and contractions (instead of American whole-word contractions and part-word contractions). It eliminates the British term "compound signs", and substitutes the American term "short-form words" for the British term "abbreviated words".

General Braille Terms

dot
cell
    character
    space
sign
letter (alphabet)
number
punctuation signs
composition signs
upper signs—all signs containing either dot 1 or dot 4 excluding the italic sign
lower signs — all signs not containing either dot 1 or dot 4 plus the italic sign
blank line
page
volume
book

It should be noted that many feel it is necessary to distinguish between signs and symbols and to consistently use one of these terms when referring to braille and the other when referring to print. The basic terminology of braille consistently uses the term sign. The distinction should therefore be: braille signs — print symbols.

General Terminology

Following is a listing of the differences between American and British terminology used in the explanation of braille rules. Awareness of these parallel terms will facilitate discussions.

American	*British*
print practice, ink-print practice	letterpress practice
period	full stop, abbreviation point
question mark	interrogation mark
parenthesis	bracket, round bracket, parenthesis
bracket	square bracket
single quotation mark	quotation mark, inner inverted comma

double quotation mark	quotation mark
oblique stroke, bar, fraction-line	oblique stroke
number sign	numeral sign
base word	root
root word	stem

Word Division

This matter is dealt with in Section 5A of the American code, which says that "As a general principal, the maximum number of spaces in a braille line should be utilized; also, words may be divided between pages, and compound words may be divided at any syllable." The section concludes: "Any braille produced employing a computer for translation from print to braille need not comply with this rule as to dividing a word at the end of a line." The UK code does not address this point, and it is herein proposed that the above quotations be deleted from *English Braille, American Edition.*

The chief, perhaps the only advantage to bringing the braille as close as possible to the end of a line is that a certain amount of space is saved; the size of a volume may be reduced by a page or two, probably not so much. The computer, more and more commonly used by most major producers of braille, must, of course, be exempted from the "general principle", but for the code to be compelled to state such a differentiation begins an unnecessary fragmentation of rules, tending to separate computer-translated material from the body of braille produced by other means.

At a time when braille users and producers alike are more than ever concerned with the faithful rendering of a printed page into braille, only the most imperative reasons should determine a disregard of standard print practices. Such things as the division of a word after only one letter (e.g.: a-way), or the addition of a second hyphen in the division of a compound word (e.g.: well-in-formed) are contrary to print usage. In print, the final word of a paragraph is not divided, nor is a word split between pages if the first page has to be turned.

Canadian braille followed these print practices before the American code was adopted in 1978, and there are several points to be made in their favour: for the average reader of braille, the smooth flow of reading is increased, unbroken by the single letter plus hyphen seen so often at the end of a line; in the transcription of braille, considerable time and risk of error may be saved for the transcriber who would be less rigidly bound to the counting of cells at the end of lines; and for blind schoolchildren now being educated in a print-oriented world, there would not be the unnecessary complication of learning two sets of contrary instructions for word division.

It is our suggestion that the division of words be regarded as a matter of formatting on which each braille-producing agency will formulate its own

policy. In such case, a recognized system for correct hyphenation may be chosen, and there need be no discussion of word division in *English Braille, American Edition.*

Foreign Words And Phrases

The purpose of this paper is to formulate a consistent method of transcribing foreign words and phrases, which will reflect the author's intent.

We have borrowed ideas and methods from *Standard English Braille; English Braille American Edition, 1959, Revised 1980; English Braille, Grade 2 (Canada), 1967.*

1. *General*

Where throughout the text these are printed in a different typeface or enclosed within quotation marks, these distinctions should be retained and braille contractions should *not* be used. The difference in typeface implies that the author considers that the word or phrase should be distinguished from the English text.

Example:

In general literature translations from another language will often retain many expressions from the original work and these are printed in italics. Some of these may be listed in an English dictionary. It would not be consistent to use contractions in the listed expressions, but not contract the others. Since these expressions were not translated, presumably it was to retain the "local colour" of the original text. The braille transcription should reflect this.

2. *"Anglicized" Words and Phrases*

In English many foreign words and phrases are used so frequently that they have become "anglicized." When these are printed in the same typeface as the English text they should be considered as English, and contractions should be used where applicable.

The Accent Sign (dot 4) should precede any letter shown with an accent or other mark in print.

The diphthongs "ae" and "oe" should be written out. Sometimes these are written separately in print.

Examples:

*con*noisseur, *ch*au*ff*eur, r*en*dezv*ou*s,
b*ou*tique, p*er* c*en*t, *com*muniqué,
Ph*oe*nix, *en*cyclopaedia, en r*ou*te

3. *Specialized Terminology*

Foreign words and phrases are used frequently in technical material, such as books on law, music, medicine and cooking. Scientific classifications, especially in botany and zoology, are based on Latin. They may be printed in italics only the first time they appear. If the meanings of these terms are explained in the text or in a glossary, they should be transcribed retaining the print typeface and/or quotation marks and contractions should be used. This would include made up words in Science Fiction and Fantasy.

Examples:

in cam*er*a, hab*eas* corpus, s*in*e die,
p*er* m*en*sem, b*edych*ium coron*ar*ia

4. *Foreign Proper Names*

Where names occur in an *English* context, whether italicized or not, they should be contracted. These include:

(a) Foreign place names: countries, towns, streets and buildings, mountains, rivers and lakes, etc.

Examples:

Fr*ance*, V*er*ona, place de la *Con*corde,
Lor*enz*kir*ch*e, F*in/st/er*see

(b) Foreign personal names, including the style of address (title) and company names.

Examples:

H*er*r Professor Fu*gg/er*
Le *Com*te de P*ar*is
*Com*rade Y*ar*oslav
La *Com*pagnie du Nord

(c) The names of foreign books, operas, plays, wines, dishes, etc.

Examples:

*The*y re*ad* IM WE*ST/EN* NI*CH*TS NEUES.
*The*y sang "GÖTT*ER*DÄMM*ER*UNG."
One of the dis*hes served was* FETTU*CCIN*E ALLA P*AR*MIGINA *AND* we drank *Ch*ianti.

Note:

Where names occur in a *foreign* context, i.e. in a foreign phrase or sentence within an English book, contractions should *not* be used.

Examples:

"Jeanne et moi, nous avons visité Windsor Castle," repli*ed* Hen*r*i.

Contractions And Major Syllable Divisions

Another area of code differences is that of contractions related to major syllable divisions. Both Standard English Braille and the American Edition of it agree that a contraction should not be used where a division would be bridged or masked between a compound word and between the base word and a prefix or suffix added to it. There are some exceptions. The words beginning with "ar" being the most notable, e.g. *around*, *ar*ise, in which case the division between the base word and the prefix is bridged by the contraction "ar". The use of the "ar" contraction in this manner does not seem a hindrance in readability or in pronunciation of the words affected. The same could not be said of che*mother*apy, swee*the*art, pre*d*ate, de*r*egulate where the use of the contractions does mask the major syllable divisions and hinders word recognition and pronunciation.

The difference between the two versions of the code in this area occurs

in the use of contractions bridging the syllable division between root word and the prefix or suffix added to it. American braille regards this as a major syllable division and, as a general rule, does not permit the masking of this division by a contraction, e.g. profeessor, erect, ed*ition*, reduce, freedom. United Kingdom braille, on the other hand, uses contractions between prefix and suffix and the root word to which it is attached, e.g. pr*of*essor, e*r*ect, *edition,* re*d*uce, free*d*om.

Pronunciation difference between the two countries should be noted in this case. The American practice is to emphasize the division more so than in the U.K. Each code is reflecting its country's pronunciation.

Canadian braille readers for many years have handled both versions, as braille produced in the U.K. and U.S.A. is widely read.

In 1978, Canada officially adopted American Edition of Standard English Braille and so has gone full cycle from British to American usage.

The main reason for this change was because the school children for some time had been taught the American version. It is believed that the no-contraction rule helps word recognition and thus readability.

In our experience it is easier for a transcriber to apply this American rule. The exceptions are fewer and not as illogical as r*en*ew, d*en*ote.

We would recommend on the basis of our unique experience of having worked in both codes that:
contractions should not mask boundaries between:

(1) compound words;
(2) prefix and base and/or root words;
(3) base and/or root word and suffix;

that the exceptions be brought in line with the rule as far as possible; and that pronunciation idiosyncracies be minimized.

"EA" Versus "AR"

The American preference for using "ar" rather than "ea" is in accordance with Section 42C of the code which reads: "Always use any alternative one-cell contraction in preference to 'ea' and the double-letter signs." In the UK, on the other hand, the rule which governs this point says: "In general the 'ea' contraction should be used whenever 'ea' occurs within a word." In this paper, we recommend adoption of the American practice for the following reasons:

Such usage insures that whenever this three-letter group appears in general reading it has the same unmistakable configuration of dots, even to the inexperienced reader. If, on the other hand, the "ea" is prefered except when the "e" is part of a prefix, or the root word begins with "ear" and has a prefix, the dot configuration changes, even in words of similar appearance: e.g.: une*ar*ned, unle*ar*ned; re*ar*m, re*ar*; e*ar*ly, ye*ar*ly. This shift of configuration seems particularly incongruous in the one-syllable words such as "e*ar*l" and "pe*ar*l", where the use of the "ar" is necessary because of the "ea"

cannot be used at the beginning of a word. In this example, the pronunciation of "ear" is the same in both words, with no question of its being distorted by use of the "ar" contraction.

There is also a possibility when the "ea" is used of confusing it with the initial-letter contraction "right", so that "b*ea*rd" may be read as "b*right*", or, even more likley, "f*ea*r" as "f*right*".

This is the point most commonly made by braille users, who are often not aware of the more esoteric reasons behind the forging of rules in a system which they can fortunately take for granted. Their concern is with readability, and that means ready and immediate recognition of the braille characters they will encounter in their day-to-day reading.

We propose the universal adoption in English braille of the "ar" in preference to the "ea" in the letter group "ear" to promote uniformity and immediate recognition of this group whenever it appears in literary braille.

Conference Discussion

Poole welcomed the view that the author's intention should be primary, supported the preference for "ar" over "ea" contraction in "ear" words, and agreed that word division could be left to braille producers. To Maxwell's criticism that the hyphenation proposal would add to the rules, Churcher replied that the suggestion was to *drop* the rule; Ledermann agreed. Lorimer suggested a simplification rather than an abolition of the rule.

Question: Do you use a specific dictionary? (Evensen).

Answer: No. (Poole).

UNIFYING THE CODES FOR NUMERALS, WEIGHTS, MEASURES, COINAGE, MATHEMATICAL AND LITERARY SIGNS

by Edith York, Supervisor, Transcription Services, CNIB. Consultants, Linda Evans: Literary Braille, Mary Facey: Nemeth Braille, The Canadian National Institute for the Blind, B.C.-Yukon Division, 350 East 36th Avenue, Vancouver, British Columbia, Canada, V5W 1C6

I Introduction

It is now over one hundred and fifty years since Louis Braille devised the Braille Code. In that time it has undergone changes to accommodate social and political decisions, educational systems, printers' preferences, technological developments, and the dynamic quality of the English language.

The way in which numerals, weights, measures, coinage, mathematical and literary signs are used and printed in Canada, the United Kingdom, and the United States of America, has been affected by these forces of change. Canada has adopted the metric system, thus changing the common usage from pounds to kilograms and feet to meters; the United States and Canada have mainstreamed blind children into the public school system, thus making it vital that the braille using student has the same textbook containing the same abbreviations and symbols as his or her sighted peers. In all three countries the printer with his variety of type, has lent his imagination to the use of symbols, capitalization and spacing, to create an almost endless variety of problems for the braille transcriber.

The blind person too, has not been unaffected by these forces. More blind persons are highly visible in the community, in the educational institution, the work place, and the social environment. It is therefore increasingly necessary for the blind person to have a precise transcription of print to braille. This has already been done in the case of mathematics and scientific notation through the development of the Nemeth Code by Dr. Abraham Nemeth; it offers a precise method of presenting print expressions in braille.

The task, then, is to bring together the needs of the braille reader, the dynamic quality of language and printing, and the braille codes as presently authorized by The Braille Authority of North America and the Braille Authority of the United Kingdom, in one unified literary code, for the transcription of numerals, weights, measures, coinage, mathematical and literary signs.

II Definitions

A. *Mathematical Signs (operational and comparison)*

Mathematical Signs are defined as those signs used to show operation or comparison such as $+$, $-$, x, $\div$, $=$.

B. *Literary Signs*

Signs used in literary work to represent whole words such as ampersand, at, paragraph, section.

III Problem

A. To establish a set of rules for the transcription of expressions of numerals, weights, measures, coinage, mathematical and literary signs.

B. To establish a set of braille signs to represent the print symbols for numerals, weights, measures, coinage, mathematical and literary signs.

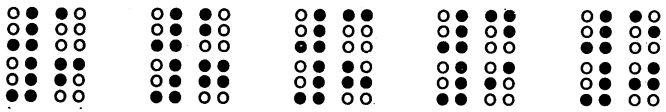
C. To make the rules and symbols such that they will allow for the dynamic character of the English language, political situations, and human society, without requiring frequent formal revision.

IV Numerals

A. *Current Usage*

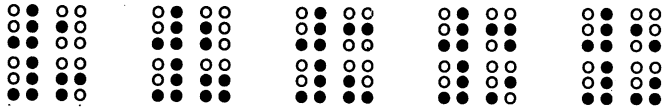
1. *Literary Braille*

In both North America and the United Kingdom, literary braille numerals are braille letters a-j preceded by the number sign dots 3456 which could be called "upper case" numbers.



2. *Nemeth Braille*

The Nemeth Code also uses the number sign with the numbers 0 through 9 appearing in what could be called the "lower case" position, that is using the bottom four dots of the braille cell.



B. *Proposal*

Literary "upper case" numbers be discontinued, and that all Arabic numbers be represented by the Nemeth "lower case" braille signs. This would eliminate the need for the blind student and transcriber to learn two number systems.

V Punctuation Signs and Punctuation Indicator

A. *Punctuation Signs*

There is only one punctuation sign which differs in Nemeth from that used in literary braille, that is the comma;

Literary Dot 2  Nemeth Dot 6 

B. *Punctuation Indicator*

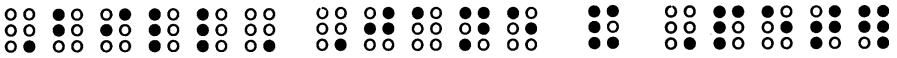
In the Nemeth Code the punctuation indicator dots 456 must be placed

before all punctuation signs which follow numerals, except the comma:

C. *Proposal*

1. That the dot 2 literary comma be deleted and the Nemeth comma dot 6 be adopted to represent all commas whether they follow the word abbreviation or the numeral:

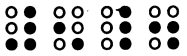
Bill, Jane and Peter



5, 10 and 15

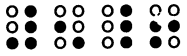
2. That the punctuation indicator dots 456 precede all punctuation which follows a numeral, with the exception of the comma, hyphen or dash, which would not require the punctuation indicator.

5.

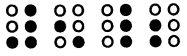


5?

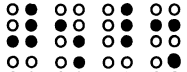
5!



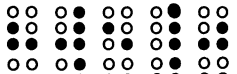
5;



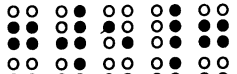
5:



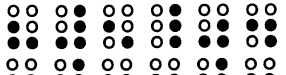
"5"



(5)



"5".



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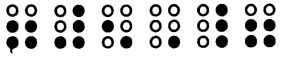


VI Weights, Measures and Coinage

A. *Current Rules*

1. *North America*

(a) Literary Braille (See *Eng. Br. Am. Ed. Rule VIII*)

31. When in ink print a number or letter is preceded or followed by a symbol or abbreviation for coinage, weight, measure, or other special sign, including the individual terms of a sequence, the corresponding braille symbol or abbreviation, without the period or plural "s", should always be placed immediately before the number or letter to which it refers. However, the order and spacing of compound abbreviations of measurement should follow the ink-print copy. When a measurement consists of a symbol and an abbreviation,

the symbol should appear before the number and the abbreviation should follow the number. Ex:

86°34′10″

3 yd, 2 ft, 4 in

(b) Textbook Format Braille (See *Code of Braille Textbook Formats and Techniques*, Rule VI)

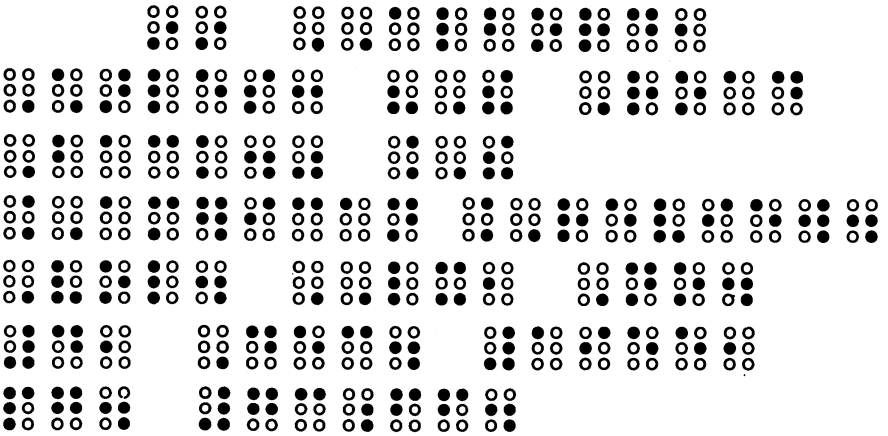
Textbook format follows the literary braille code except in the case of references, which follow print:

(d) Abbreviations should be brailled as printed, and the literary braille forms (e.g., *v* for volume, *p* for page, (*ch*) for chapter) should not be substituted. The letter sign must be used before any single letter which is not followed by a period and before any letter combination which corresponds to an English short-form word. When such letter combinations as *ch*, *st*, etc., stand alone, the braille contractions should not be used. No letter sign is required when these letters are written out. The braille contractions should be used when they do not constitute the entire abbreviation, e.g., (ch)ap, (st)at, etc.

(e) When periods are omitted in print, they should be omitted in braille.

Examples

*ALBORD, Charles: "The Road Back." *The American Review.* Vol. LX, No. 4, Dec. 1955, pg. 73ff.



(c) *Nemeth* (See *The Nemeth Code for Braille Mathematics* Rule VIII, S.54 a.)

54. Spacing with Abbreviations:

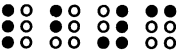
a. In transcribing abbreviations, the English Braille techniques of transposition (writing an abbreviation in front of its number) and condensation (using braille abbreviations shorter than their ink print counterparts) must not be employed.

(12) 4 yd 2 ft 1 in

2. *United Kingdom*

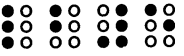
(a) *Literary Braille* (See *Standard English Braille, 1971 Ed.*)

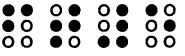
16. *Abreviations of Value and Measurement* — When in print a symbol or literal abbreviation of value or measurement follows a numeral, the corresponding literal abbreviation or its equivalent, without the abbreviation point, should be placed in braille before the numeral sign, thus:

 3 lbs.

B. *Comparison of Placement and Spacing Rules*

In both the American and British Codes, the type of weight, measure or coinage is always placed before the value, for example:

5 lbs. 

5. ft. 

5¢ 

The only value to this arrangement appears to be that it saves one space. This would not seem sufficient reason in view of the need for

(1) the reader to cognitively reverse the type and value to common usage,

(2) the blind student and the transcriber to have to learn the rules relating to this reversal.

C. *Proposal*

That all weights, measures and coinage be transcribed into braille by a "follow print" rule as to placement and spacing thus:

5 lbs. 

5 ft. 

5 ¢ (symbols discussed in Section 7)

VII Symbol Indicator (Accent Sign Dot 4)

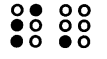
The accent sign dot 4 ⠘ has already been adopted in English Braille American Edition, Textbook Format Code and the Nemeth Code, as a sign to indicate that a print symbol appears rather than a word or abbreviation. Therefore, this usage is familiar to both transcribers and consumers. It could be renamed the SYMBOL SIGN, its use could be extended and it would continue to be a composition sign along with the capital, italics, termination, number and letter signs.

VIII Braille Signs for Print Symbols

A. *Current Usage*

1. *North American*

Word or Sign	Ink Abbreviation	Braille Abbreviation
annas	an	an
centimeters	cm	cm
cents	¢	c
chapters	ch	*ch*
degrees	dg or °	dg
deutsche mark	dm	dm
dollars	$	lower d
dozens	dz	dz
examples	ex	ex
farthings	f	f
feet	ft or ′	ft
florin	fl	fl
francs	fr	fr
gallons	gal	gal
grains (also grams)	gr	gr
guineas	g	g
hours	hr	hr
hundredweight	cwt	cwt
inches	in or ″	*in*
kilocycles	kc	kc
kilocycles per second	kc/s	kc/s
kilometers	km	km
kilowatts	kw	kw
line	l or ll	l
lire	l	lr
megacycles	mgc	mc
megacycles per second	mgc/s	mc/s
meters	me	mt
miles	m or mi	m

millimeters	mm	mm
mills	m or mi	ml
minutes	min or	m*in*
ounces	oz	oz
pages	p or pp	p
paragraph	par or ¶	p*ar*
pence	d	d
per cent	%	
pesetas	p	ps
pesos	p	po
pints (also points)	pt	pt
pound (Australian)	£A	la
pound (sterling)	£	l
pounds (weight)	lb or #	lb
quarters	qr	qr
quarts	qt	qt
roubles	r	r*ou*
rupees	rp	rp
seconds	sec or ″	sec
section	sec or §	
shillings	s	s
stones	st	*st*
tons	t	t
volumes	v	v
yard	yd	yd

2. *United Kingdom*

pounds	l
new pence	p
shillings	s
pence	d
dollars	lower d
dollars (Australian)	lower da
cents	c
francs	f
marks (deutsch)	dm
rupees	r
tons	t
hundredweights	cw
quarters	qr
stones	st
pounds (weight)	lb
ounces	oz
grammes	dot 6 g
kilogrammes	kg
miles	m
yards	yd
feet	ft
inches	i
metres	dot 6 m
kilometres	km
centimetres	cm
gallons	gl
quarts	qt
pints	pt
litres	dot 6 l
cubic centimetres	cm middle c

hours.....hr
minutes.....mn
seconds.....se
degrees.....dg
volume *or* volume;
verse *or* verses v
book *or* books .....bk
chapter *or* chapters .....ch
(contract in Grade II)

page *or* pages .....p
line *or* lines l
paragraph *or* paragraphs ...par
(contract in Grade II)
section *or* sections .....dot 3 s
kilowatts .....kw
hertz .....hz
kilohertz.....khz
megaherts .....mhz

3. Nemeth Code:

Monetary Signs

Cent ¢ 

Dollar $ 

Pound Sterling £ 

Percent Sign %₀ 

Degree ° 

Plus + 

Minus − 

Multiplication (times)

Cross (Cartesian product) × 

Dot • 

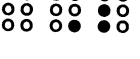
Division (divided by) ÷ 

Plus or Minus ± 

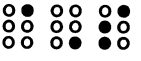
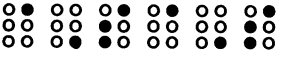
Equals = 

At @ 

a. Ampersand (and, logical conjunction): & 

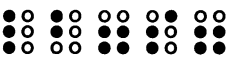
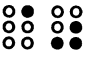
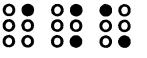
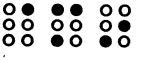
Paragraph Mark ¶ 

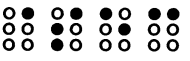
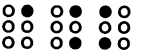
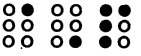
Section Mark

Single	§	
Double	§§	

B. *Proposal*

That all symbols be preceded by the symbol sign Dot 4, and placed and spaced according to print. The suggested print symbols and/or abbreviations and their braille equivalents are listed below:

	Abbreviation		Symbol	
	Print	Braille	Print	Braille
Weights				
Grams	g			
Litres	l			
Pounds	lb(s)			
Measures				
Feet	ft		′	
Inches	in		″	
Meters	m			
Miles	m			
Coinage				
Cents			¢	
Dollars			$	
Pounds (Sterling)			£	
Mathematical				
Percent			%	
Degrees	dg(s)		°	
Minutes	min(s)		′	

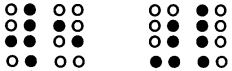
	Abbreviation		Symbol	
	Print	Braille	Print	Braille
Seconds	sec		″	
Plus			+	
Minus			−	
Multiplication (times)			×	
Division			÷	
Equals			=	
Literary				
And			&	
At			@	
Paragraph			¶	
Section			§	

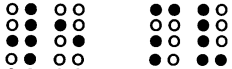
Discussion of Symbols

(a) *Weights*

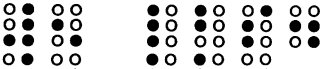
The abbreviations g for grams and l for litres would follow print as to placement and spacing; however, a letter sign may be required with any single letter according to current *English Braille American Edition* rules. In the case of double letter abbreviations such as ml for millilitres and kg for kilograms, these would not, of course, require a letter sign. The abbreviations for pounds and ounces would follow print as to spacing as well as punctuation. Examples as follows:

5 g 

5 l 

5 ml 

5 kg 

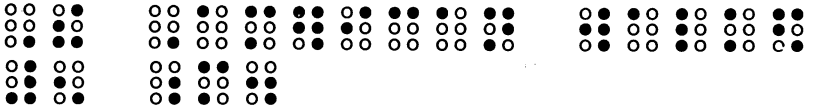
5 lbs. 

5 oz. 

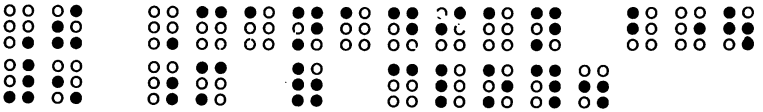
(b) *Measures*

The abbreviation m for meter and m for miles would require the letter sign. Meters or miles would be indicated by the context and the country in which the book was published.

The American walked 5 m.



The Canadian bought 5 m of cloth



The prime signs which are the symbols for ft. (′) and ins. (″), do not seem to be appropriate in literary material for two reasons:

(i) They occur less frequently than do the abbreviations for feet (ft) and inches (in)

(ii) The dot 3 is also the apostrophe which does occur quite often in literature even in relation to numerals, such as 1930's.

Therefore, the abbreviations for feet (ft) and inches (in) have been selected to be preceded by the dot 4 symbol sign:

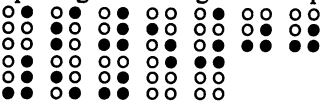
10′5″

(c) *Coinage*

The Nemeth symbols for dollars and cents have been selected with the placement and spacing following that of print:

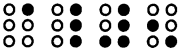
\$5.00

50 ¢



The pound sterling symbol has been represented by the L preceded by the dot 4 and placed and spaced according to print:

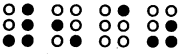
£5



(d) *Mathematical*

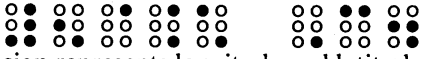
The Nemeth sign for Percent (%) has been selected and is used as in print:

5%



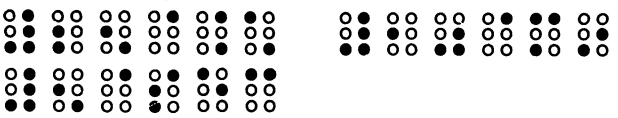
The Nemeth sign for an open circle has been selected to be preceded by the dot 4 as the degree sign (o). (In Nemeth it would be preceded by the superscript dots 4,5).

5° C.



When the degree sign represents longitude and latitude and the prime signs for minutes and seconds are used, the abbreviations for minutes (min) and seconds (sec) would be used, preceded by dot 4:

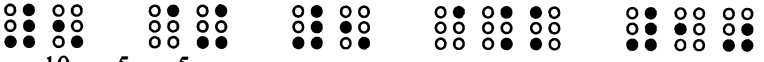
25° 10′ 5″



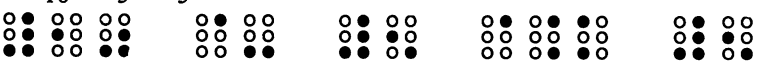
There is increasing use of the mathematical signs of operation and comparison in literary work, thus it would seem advisable to include a set of the more commonly used signs in any new literary braille code.

The Nemeth signs have been chosen and would be used with the dot 4 symbol sign if not already incorporated.

5 + 5 = 10

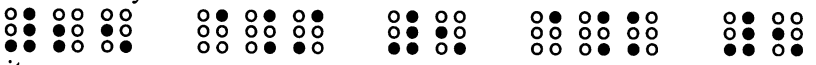


10 − 5 = 5



5 *x* 5 = 25

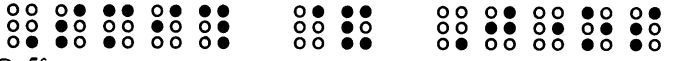
25 ÷ by 5 = 5



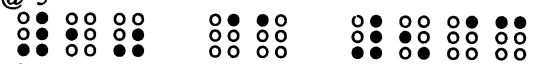
(e) *Literary*

These are the Nemeth signs which would be placed and spaced as in print:

Smith & Jones



10 @ 5^{c}



¶10 §5

IX Recommendations

1. That the Nemeth lower case numbers be adopted as representing the print Arabic numbers 0 through 9.

2. That the Nemeth comma dot 6 replace the literary comma dot 2 in the unified literary code.

3. That the punctuation indicator dots 4,5,6 be used when punctuation, with the exception of the comma, hyphen or dash, directly follows the Arabic number.

4. That the transcribing of numerals, weights, measures, coinage, mathematical and literary signs, follow print as to order of value and word, abbreviation or symbol as to placement and spacing.

5. That the braille signs set out in Section VIII B be adopted to represent the print symbols and abbreviations.

6. That the accent sign dot 4 be renamed the SYMBOL SIGN.

7. That the SYMBOL SIGN immediately precede the braille sign for a print symbol if not already incorporated.

X Conclusion

The recommendations outlined here are not original solutions to the problems encountered when transcribing numerals, weights, measures, coinage, mathematical and literary signs, but a distillation of the best solutions currently being used in four different codes, and the results are

(1) A rule and a set of symbols which will simplify the amount of learning required by both producer and consumer.

(2) A precise representation of the print.

(3) An ability to permit changes, caused by political decisions, printers' decisions and the evolution of the English language, to be accommodated without major changes in the rules.

References

English Braille American Edition, 1980, AAWB, AEVH, NBA, American Printing House for the Blind, Louisville, Kentucky.

Code of Braille Textbook Formats and Techniques, 1977, AAWB, AEVH, NBA, American Printing House for the Blind, Louisville, Kentucky.

The Nemeth Braille Code for Mathematics and Science Notation, 1972 Revision, AAWB, AEVH, NBA, American Printing House for the Blind, Louisville, Kentucky.

Standard English Braille Grades I and II, 1971, RNIB, London, England.

UNIT ABBREVIATIONS

by Tom Maley
This paper has been prepared by the Braille Editor of the Royal National Institute for the Blind, London, with the help of three other members of staff: Brian Hitchon, Brian Law and Mee Ling Ng.

Unit Abbreviations

Abbreviations for units of weight and measurement occur in Standard English Braille when they occur in the printed text and in some instances where they do not occur in print. They do not correspond exactly to the print because of the existence of some symbols which cannot be accommodated in the 63 character set of braille. They also differ from print because there is an attempt in braille to standardise abbreviations where print inevitably allows inconsistency.

There are lists of braille unit abbreviations in the *Braille Primer* and in the *Restatement* of Standard English Braille, Part I. The purpose of this paper is to assess how satisfactorily these abbreviations convey the meaning of the print to the braille reader and to stimulate discussion of the braille rules brought about by them.

Theoretically, the limitations of braille can cause ambiguity: for example, 'pounds Sterling' and 'line' are represented by l; 'New Pence' and 'page' by p. But obscurity is probably more of a nuisance than ambiguity. The list of unit abbreviations in the braille manuals includes rupees but not roubles; Australian dollars but not Swiss francs. Rods and poles are not there. Guineas, however, remain and quarters (qr...) will baffle many. Every schoolboy may know that a quarter is twenty-eight pounds (lb28), or a quarter of a hundredweight. Would he remember this on seeing a braille sequence of tons, hundredweight, quarters, stones, pounds and ounces? 'In the case of *compound numbers*, ... (e.g. Yds and ft.), only the abbreviation for the highest denomination is written ...' says the *Primer* (p. 55). As non-metric expressions become gradually more archaic, it would surely be better to adopt the more expansive style of print and repeat the units within a sequence.

Units are not always abbreviated in the same way in print. Seconds might be secs. or secnd.; months mn. or mths.[1] Braille irons out these differences to achieve better recognition and fluency. There must be a lot to be said for this, but the tidying up mission can only be extended to listed abbreviations. Beyond the list, the rule must be to follow print, and then the inconsistency will be carried over into braille.

'In braille the abbreviation is written first and the number follows immediately,' states the *Braille Primer*. This order of precedence probably owes its origin to the print practice in respect of certain common units of coinage. If the abbreviation were written after the number, as is usual in print, either an intervening space or a letter sign would be required — and possibly an

abbreviation point thereafter. The precedence rule does not put meaning in jeopardy and it can save space. But it is certainly irritating to read 'p 5' (p5) when everyone says '5 p' — and it is probably printed as '5 p'. This is an example of the disruption of familiar speech patterns in the search for condensed forms to render braille faster to read.

There are some very familiar print abbreviations which are lost in braille because of having to put the abbreviation before the number. 'Miles oblique stroke hours 60' is a poor representation for 60 m.p.h. or 60 mph. 'Centimetres cubed 10' (cm to the third power 10) is not as good as 10 c.c.'s or 10 cc's. These distortions arise out of the quest for consistency. There is no virtue in consistency if we have to bear too great a burden in terms of density or distortion in order to attain it. There is, moreover, a choice of consistencies: consistency within the rules of braille, and consistency in following print.

The precedence rule when it is applied within the maths and science codes leads to strings of abbreviations before the numeral sign: e.g. 'Joules per kilogramme, degrees Celsius' is rendered as J/kg °C.. . When ambiguity might arise a separator can be inserted between the constituent abbreviations. Such strings of abbreviations are undoubtedly cumbersome. And they are not limited to maths and science textbooks because when such expressions occur in S.E.B., editors tend to resort to the special codes in an effort to keep to standards. To follow print would mean using more space and the letter sign or the abbreviation point. But it cannot be emphasised too much that these classes of abbreviations are not intended as space savers. Their existence in the braille text derives from the fact of their being an abbreviation in print. The reason for the original abbreviation must be conveyed through the text to the braille reader. It is not an exercise in economy of space.

As indicated earlier in this paper, the ambiguities caused by unit abbreviations are largely theoretical. 'Fourteen pounds sterling' could never be confused with 'line 14', although they are both written 'l14'. 'Page ten' of an introduction to a book whose pagination is in roman numerals might be referred to as 'px' without being taken for 'x new pence'. But the use of algebraic terms is not uncommon in literary contexts: x for quantity and n for order. Although strictly correct, 'lx' for 'x pounds sterling' is not very convincing—perhaps because of the proximity to L for roman fifty. At this point, as elsewhere in the discussion of unit abbreviations, the absence of upper case letters in braille is a handicap.

In the braille *Primer* list of unit abbreviations, volume and verse share the letter v as their abbreviation. It would usually be beyond doubt whether 'vn' should be taken to mean 'volume n' or 'verse n'. But vn could also mean 'n volumes' where the printed text was 'n vols.' RNIB monthly book lists has recently been standardised so that 'vn' is used in both senses.[2] But 'vols.' is still to be found in the expression: 'lx per vol.' i.e. x pounds per volume'.

According to the rules as stated the abbreviation should be only for quantity as in 'n volumes' and not for order, as in 'volume n'. This is an anomaly that must either be cured or ignored.

On title pages of RNIB books the abbreviation 'v...' indicates which volume of the book is enclosed. The total number of volumes in the book is written in full further down the title page. Assuming that the standard format is well understood, there should be no confusion between volume number and number of volumes.

Book labels normally display only the volume sequence number (after the title). Library of Congress books, however, appear to try to be more helpful by stating in abbreviated form the volume number and the total number of volumes. The form used is 'vn of xv'.[3]

Volume and verse being at the same level of magnitude, present less danger of confusion than example and exercise which share the same abbreviation: 'ex...'. But this degree of ambiguity is thought to be acceptable in print too, where they often appear in the same abbreviated form.

One curiosity in the *Primer's* list of abbreviations is 's'...' for section. The dot 3 after the s is the old abbreviation point. Its retention is anomalous since confusion with shilling, also s, is as unlikely as for line with pound sterling, or page with new pence.

Unit abbreviations can be used to head columns in a table, in which case they need not be followed by a numeral sign or an abbreviation point. In practice this applies to the pound sterling and percent symbols. Perhaps we could afford to be more liberal about the percentage symbol. This two-character symbol, needing neither abbreviation point nor letter sign, could stand alone after the number it qualifies without causing difficulty to the reader. Such a change could be made without prejudice to the general rule that unit abbreviations must precede the numeral sign.

The lack of a full and definite list of unit abbreviations is not a bad thing. Kitchen shorthand, for instance, can be used in cookbooks as print dictates. So 'tablespoon' (tbsp.) and 'teaspoon' (tsp.) can follow the number. But it could be problematical as people come to covet billions rather than millions and measure their time on earth in nanoseconds. But braille readers do actually complain about T for tesla and Pa for pascals, which are both standard *S.I.* abbreviations.[4] Braille must, however reflect and translate the conventions of print so that braille readers can communicate with the sighted world. Consequently, RNIB editors invent standard braille abbreviations as the occasion demands. Invention is necessary because not all print abbreviations allow simple literal transfer: Upper case and greek letters have to be distinguished or amended as the case may be.

If a fresh approach to unit abbreviations were to be adopted, perhaps the best principle would be to follow *S.I.* (*Systeme Internationale* abbreviations as to form and order. Current tables of *S.I.* abbreviations could be made available in braille instead of the incomplete and somewhat archaic lists now

published in the manuals. Such established print practice as using the negative indices to define the relationship between linked units as in 'metres per second' (now rendered: M/s... but alternatively Ms – 1...) could be introduced.

To sum up: unit abbreviations are not intended primarily to save space. They do not cause serious ambiguity. It would be better if they followed the printed order and style rather than attempting the impossible by setting up a separate braille method. There will always be inconsistencies in printed text. In the interests of the braille reader, braille editors must always be prepared to innovate.

Notes

1. An RNIB internal report which was read on tape recently contained the remarkable statement that a bread-and-butter DP task was performed by a new computer in only three months. Was the reader confused by an inconsistency in print abbreviations? Should it have been minutes?

2. Formerly '5 vols.' could be found in one section of *Monthly Announcements* and 'v5' in another, both meaning the same.

3. The letter sign is not used.

4. Some recent braille innovations are:
WB for Weber, (braille: WB...).
T tesla, (braille: T...).
ns for nanoseconds, (braille: ns...).
ps for picoseconds, (braille: ps...).
ev for electronvolts, (braille: ev...).

Conference Discussion

Brown: Both papers were very difficult to understand when read aloud. Not much useful work can be done here at this Conference on such papers which must be read very carefully and examined in detail.

Aucamp: When South Africa converted to the Systeme Internationale (SI) the SI rules were followed.

Evensen: A broader sampling of both mathematics systems is needed before adopting one. Braille readers, unfamiliar with the Nemeth mathematics code, feel no need to unnecessarily elongate numbers and the argument that it greatly benefits young students who form only 20% of braille readers is not necessarily a good one. The suggestion of a symbol indicator could certainly be adopted.

Poole: While it is clear that the present British mathematics code needs overhaul, it would *not* be possible to adopt the Nemeth system in the U.K. at this time. While it might bring the U.S. literary system into line, it would not be true of the British system. The French system for numbers is different from both the British and American systems. The method of writing numerals is one of the few international braille conventions in existence.

Bogart: Having adopted the SI system, Canada now experiences confu-

sion with "miles" and "meters". "The blind should have the same ambiguities as the rest of us."

Jolley: We are overly concerned with print which conveys the author's meaning visually to the reader while braille conveys it tactually. "As a mathematician I am very happy with the British code."

Small: Plus, minus and equals signs need looking at in the American code. New Zealand changed to metric and to American braille at the same time.

Troughton: Since pupils are taught that upper and lower cell letters mean different things, it would be confusing to teach them that upper and lower cell numbers mean the same thing.

Burling: It is obvious that there must be some changes in mathematics codes. The British code for unit abbreviations seems to give a better indication of the author's intention.

BRAILLE TRANSCRIPTION PROCEDURES

by H.H. Cohn, B.A., M.C.S.P.
Hans Cohn, familiar with the braille codes of several European countries as well as English braille, is a member of the Executive Council of the Royal National Institute for the Blind; Editor of Viewpoint, *the organ of the National Federation of the Blind of the U.K.; and Editor of* Braille Chess Magazine.

Definition

This paper deals with all the matters of the transcription of print into braille which are not related to braille codes or systems. Other terms used for the matters dealt with here are "braille lay-out" and "braille format".

Objects

The present position is that braille printing houses adopt a considerable variety of transcription procedures. This is unsatisfactory in as much as it causes confusion and uncertainty among readers. It is, therefore, important to devise an agreed method of practice which will produce uniformity where hitherto there has been too much diversity. The principle underlying the proposals in this paper is that EVERYTHING THAT IS IN PRINT MUST BE REPRODUCED IN BRAILLE. It may be surprising that this is not already the case, but the fact that it is not has produced the phenomenon familiar to all braille publishers, the braille editorial department. This makes, mostly arbitrary, choices as to what can usefully be left out for the sake of economy, clarity or other usually quite unexplained motives. The adoption of an agreed procedure as proposed below should make the position of braille editor superfluous. His duties will be wholly taken over by the braille compositor (type setter), his only area of choice being, not what to present, but how to present it.

Limitations

There is one area where it may be well-nigh impossible to apply the above principle. Print as a visual medium is amenable to all kinds of variations in shape, size, prominence, spacing and colour, most of which are quite unrepresentable in as static a script as braille. At present a small number of different cell sizes are in use, and it may be possible to develop a kind of "macro-braille" and "micro-braille" either side of normal braille, but whether it is economically feasible to incorporate different sizes of braille cell into a single printing machine or computer, is beyond the scope of this paper. Yet it cannot be denied that these visual elements inherent in print are extremely powerful aids in retaining the information provided by the text; they are, for instance, commonly used in school textbooks to separate facts from, say, narrative and commentary, and lack of access to them may act as a definite educational handicap. This aspect is touched on later, but it

is a field where the greatest amount of innovative ingenuity is required to solve the problem.

Presentation

Like all the papers at this conference this is a set of proposals up for discussion and not necessarily the final agreed document on the subject. I would, however, strongly urge delegates to bear the following proposals in mind:

1. Although in a few instances alternative solutions are put forward here, the agreed proposals should, for the sake of the uniformity we seek, restrict a choice between alternatives to the barest minimum.

2. I have thought it most convenient to divide this paper into a general section, listing proposals more or less applicable to all books, and a special section in which some special cases demanding particular solutions are listed. That arrangement allows for the addition of further special cases in disciplines unfamiliar to me. In other words, it should be realised that this paper is open-ended. It should also be noted that this paper refers to books rather than other printed material which may, in some instances, present different problems.

Finally, having stated the principle of faithful reproduction as well as the admission that some elements of print are not reproducible in braille, it follows that some braille transcriptions must contain additional information not in the print to elucidate any special signs that have been used to make certain information available.

I. General Proposals

1. *The Dust Jacket*

In conformity to our general principle, all the information presented on the dust jacket of a "hard-back" or any information similarly presented which is not strictly part of the book should be reprinted in braille, possibly in a separate pamphlet, so as not to add to the bulk of the first volume. Such information should include:

(a) the name and address of the printer;
(b) the publisher's blurb about author and book;
(c) advertisements of other publications by the same author or publisher;
(d) the price of the print publication;
(e) details of previous editions and impressions of the print publication;
(f) extracts from press reviews of the book.

2. *The Outercover of the Braille Volume*

Both the front and the spine of the outer cover of the braille volume should be utilised to provide information which will facilitate use of the book to the visually handicapped.

The front of the outer cover should contain the title and author together

with the number of the braille volume in print (possibly large) and braille. The braille information should be provided on a long, narrow strip of self-adhesive labelling, stuck vertically close to the spine. It should be restricted to a single line which may mean that the title has to be contracted.

There is a good case for presenting this information on the spine as is done in Germany since this would obviate the book having to be pulled out from its normal position on the shelf. While this would be fine as regards the print information, reading the braille might present difficulties at any but convenient heights, i.e. reading braille while crouching or standing on a ladder.

3. *Braille Information Not in Print*

In order to process all the information of the print original into braille, it is clearly necessary to resort to some special symbolography.

Any braille information, not contained in print, is best presented in a separate pamphlet. If it is presented in the most obvious place, say just after the title page, it might require the reader, particularly if the information is lengthy and complex, to carry two volumes instead of one around with him. If the specific information is brief it can be included at the back of the title page of each volume. This information should include:

(a) name and address of braille printer or publisher;

(b) date and price of braille edition;

(c) a full explanation of all special braille symbols, such as special brackets, code symbols, such as abbreviations and contractions not in use in either of the (possibly) two tiers to be adopted in the future and

(d) directions regarding the lay-out of the braille edition.

4. *Contents List*

The entire contents list of a book should be reprinted in volume 1 or in a separate pamphlet, if such has been decided upon for other reasons. It is quite invidious and totally unacceptable that readers of braille should be put in the position of having to pick up every one of a multi-volume work to inform themselves of its entire contents. That practice alone, introduced by publishing houses run almost exclusively by sighted people, demonstrates the attitude of paternalism towards the blind prevalent in some countries. It is not seen in, for example, the Soviet Union or the Germanies where publishing houses are controlled by blind people themselves.

Adopting this practice will, of course, cause some inconvenience as the contents list cannot be completed until the whole book has been transcribed, but that is a small price to pay for a convenience that no normal reader would do without.

The contents list should further contain the number of the braille page of each item listed (if the list appears in the first volume) and the number of the print page of each item listed. The practice in Germany is to reprint the contents listed in volume one, giving braille and print page numbers for

all the listed items contained in that volume, and print page numbers only for the remaining volumes. In the Soviet Union the entire contents list is multiplied by the number of volumes of the work in question, subdivided into volumes, and a copy of this list is then placed in each volume. Either practice has something to recommend it, but the former is preferable.

The reason for giving print page numbers is that in an educational, vocational or even social setting where works are studied in groups, it is clearly of the utmost importance for blind readers using the same editions to find their place quickly according to the print numbering. As today's light fiction or "trash" may be tomorrow's set book in a School or University English Course, it is far better to make the practice uniform.

5. *Paragraphing*

The pernicious practice, introduced in an age of rationing and utility and still practised by some braille publishers, of leaving three spaces after the sentence that ends a paragraph and beginning the new one in the same line in order to save space, is to be abandoned. Taking a new line and indenting the new paragraph two cells is recommended as the standard practice, but the French practice which combines the saving of space with the advantage derived from indentation should be mentioned here.

The full stop ending the last sentence of a paragraph has dot 3 added to it in the next cell, thus: the new paragraph is then started in the same line, but the next line is indented two spaces so that, in order to find the beginning of any new paragraph, the reader merely passes his hands along the line above the indented line.

Variable indentation can be used as a method of reproducing otherwise unrepresentable features of print in braille, such as fat print etc. blank lines can also be used for this purpose, but it must be made quite clear in the braille instructions what any particular deviation from ordinary print the braille substitute is used to represent.

6. *Page Headings*

Page headings, including the page numbers of the braille edition, should appear at the top of the right-hand page, only. A forced line should not be used nor should the title or author of the book be given here. A list of what should appear is roughly as follows, but may vary from case to case: the print page number(s) covered by both sides of the braille sheet on which the information appears on the extreme left, with the braille page number on the extreme right; in between these two numbers (which should always be in the top line, even if the requisite information takes up more than one line) should appear the number of the chapter (and part, if any) and title, number of section (if any), number of subsection (if any). Should these sections and subsections be named as well as numbered, the name of the subsection should

take precedence over that of the section and the name of the section over that of the chapter.

In order to get all the information into one line in certain cases, the following space saving devices can be used with numbers: three different arabic numbers can be given preceded by a single numeral sign by putting the middle number of the three as a lower-cell sign without a space intervening between any of the three; a similar procedure can be adopted with two numbers by printing the first in the lower-cell dots. Numbers 1 to 63 can be given in two cells (including the numeral sign) by using the braille code sequence, i.e. A to J as 1 to 10, K to T as 11 to 20 etc.

The number and title of that chapter, section or subsection shall appear on the top right-hand line which takes up most of the space of the sheet to which it belongs, i.e. if a section ends on the first side of the sheet, the name of the section to appear in the top line shall be that of the following section; if a section ends on the second side, it shall be the name of that section.

7. *Margin Indication*

As well as giving the print page number(s) in the top line it is important to indicate the exact place where the print page ends and a new one begins. This is vital for blind teachers teaching a sighted class as well as for blind students in an integrated setting. But for quick reference it is equally important to indicate this place in the left-hand margin of the braille page at the level of the relevant line.

For the indication on the line a sign which cannot be confused with anything else, such as two lower G's close up, should be used. For the marginal indication it may be possible to use a star as was customary for braille music produced in the U.K. by the "bar by bar" system for sections of music which are to be repeated. However, with the increasing use of computers for braille printing it may be impossible to introduce this type of symbol into the programme. It may be possible to incorporate a "forced" cell at the beginning of the line, when a symbol like dots 1-2-3 would be quickly identifiable by its prominence. Unless this or some other method are feasible it will be necessary to sacrifice the first cell of every line in order to make room for this facility.

8. *Footnotes*

It is in reprinting footnotes that the greatest diversity is currently practised. The most common practice, reproducing footnotes at the end of each volume, should be discontinued because it is tedious and time-consuming to have to abandon and then relocate the page of text after having read the footnote. Putting the footnotes in square brackets immediately after the portion of text to which they belong or at the end of the paragraph is equally impracticable. Footnotes should be made easily identifiable, not embedded in the text because they may sometimes need to be read by themselves.

Where footnotes are short and infrequent they may be placed at the bottom of the page to which they belong, separated from the text by a line of middle C's. Where they are frequent and ample they should be provided in a separate volume or pamphlet, if necessary, one of the latter for each chapter. They should always be numbered according to the print (usually chapter by chapter). The number should appear in the braille text as in the print. In reproduction they should be identified by their chapter, number and reference to the braille page and line of the text to which they belong.

9. *Index and Bibliography*

It goes without saying that these should be transcribed in line with the above-stated general principle. Where bibliographies appear at the beginning of each chapter, they should, in the braille version, be reprinted in the same volume/pamphlet as the footnotes. If the print page numbers are given in the text as indicated under 6. above the page reference given in the print index is sufficient for the braille version. For greater convenience, each braille volume should give an indication of the number of print pages its text covers, preferably on the same page as the contents list for that volume.

II. Some Special Cases

Obviously, everything that has been said under Section I. of this paper applies equally to the following cases. I have simply considered it more expedient to keep special cases separate rather than clutter up a section on general procedure with them.

1. *Dictionaries and Reference Books*

Here it is essential that each volume should indicate the letter(s) covered by it, and, where a letter extends over more than one volume, the first and last word covered by each volume. This information should be given in print (preferably large) and braille on the spine to avoid having to extract the volume to glean the information.

2. *Translations for Foreign Language Texts*

What is referred to here in particular are works of philosophy and other classics where the original is in a foreign language and also in several recognised editions. For instance, Kant's CRITIQUE OF PURE REASON exists in two editions, the original and a revised, both authenticated by Kant. They are different and so, of course, are their translations. They are referred to as "(a)" and "(b)" in standard works and quotations from them are accordingly referenced in the text (at the end of the quotation in brackets). Such references should appear in the braille page heading to the exclusion of other information. If, as a result, the page heading runs into two lines the second line should be centered.

3. *School and Other Textbooks*

It is books like these that make particularly frequent use of italics and "type-facing", in order to emphasize salient features of the text. The parts of the text thus set off from the rest are useful as aids to memorisation and particularly revision, and if blind children and students are deprived of them they may be additionally educationally disadvantaged. They are set off from the rest so that the eye can easily identify them. The only way of reproducing this feature in braille is to start such words, sentences or passages in a new line indented in such a way that they cannot be mistaken for new paragraphs, sections etc. When the text returns to normal print the braille should start on a new line unindented. For further emphasis italics can be used (not just dots 4-6, but also dots 5-6, dot 4 by itself or dot 6 by itself, so long as the use of these special symbols is fully explained in the braille instructions.

4. *Archaic English Texts*

I have in front of me Ben Jonson's THE ALCHEMIST in the new Mermaid edition of 1966. It consists of an introduction, including "date and sources", a critical discussion of the play itself and a "note on the author" and takes up altogether 35 pages in braille. This is followed by the play itself (180 pages) and notes (71 pages). The notes themselves are subdivided into "notes on the play", explaining the literal meaning of words and phrases no longer current in modern English or which have changed their meaning, and "additional notes", elucidating literary allusions to events of the day etc. Each set of notes is subdivided into the various scenes of the play and the line references are given. In the text the lines are numbered after every five.

In braille the work is in two volumes, the first containing the introduction, the first two acts of the play and the notes thereto. Volume two containing the rest. There is only one attached bookmark when there should be three, one each for the play and each set of notes. Furthermore, the line numbers are hidden in the body of the text.

In the text I come across the word "VIZARD" and find in "notes on the play" that it means "feigned facial expression". For further comprehension of the passage I turn more pages (hopefully) and find under "additional notes" that the passage starting with that line refers to "a catalogue of the common charges against puritans". I painfully find my way back to the text at the point where I had left it which means more often than not that I have to count forward or backward from the nearest number (divisible by five) on a page of continuous text where lines are simply separated by the poetry sign (dots 3-4-5). By this time I have lost the context and the study of the play, with the above experience often repeated becomes a nightmare, even for the mature student and, of course, extremely time-wasting.

This is how the work should be presented in braille (and works similarly edited, like the Arden Edition of Shakespeare's plays): the text of the play

and nothing else should be in a single volume and the rest, introductions and both sets of notes in another. In the text of the play the line counts should appear in the left-hand margin without a numeral sign which, since they frequently run into three figures, means that the text can start in the fifth cell of the line. Each line of blank verse should start on a new line with any overspill into the next (braille) line being indented two cells, even if this means that the text of the play runs into two volumes. "Notes on the play" and "additional notes", though separate in print and most likely on the same page as the text to which they refer, since the capacity of the printed page is almost infinite, should appear consecutively in braille, with the latter set of notes marked off from the former by the use of the italics sign before the numeral sign of the line reference.

5. *Poetry*

The habit of writing poetry as if it were prose with the use of the poetry sign should be abandoned. The printing of poetry line by line, whether rhymed or not, makes a visual impact which can be reproduced in braille, particularly in metres where a long line is followed by a short one. This helps scansion and ultimately comprehension. Some of this effect is obviously lost where the line of verse spills over the line of braille, the over-spill having to be indented two cells in the next line. Nevertheless, the practice should be universally adopted for all poetry and verse plays. Perhaps a longer braille line is the best answer to this problem. So long as over-spill has to be accommodated on a second braille line stanzas must be marked off from one another either by indenting their start by four (instead of two) cells or by leaving a blank line between them.

In collections of poetry, particularly Anthologies consisting of many volumes, it is most obnoxious to have to pick up each volume to discover what the anthology contains. Here is an excellent case for a separate volume giving the complete contents, volume by volume, index of first lines, index of authors, footnotes, all duly referenced as set out above.

6. *Other Special Cases*

It is impossible here to lay down rules for every case without the help of the specialty concerned. Two further cases may be briefly mentioned:

1. Where books are accompanied by diagrams, these should appear in a separate volume with appropriate cross references in the text and on the diagram.

2. Where books on music are accompanied by compact cassettes with the musical examples they contain, both text and example in sound should be equally cross referenced.

It would be quite impossible to summarise this paper without repeating it. I hope it will be felt that adoption of the above proposals will add to the pleasure of braille reading and to the stimulus of learning braille. Finally,

I must acknowledge my debt to Mr. M. O. Milligan M.A., although I am responsible for writing the paper it would not have been nearly so comprehensive without his help.

Conference Discussion

Van Eeden: The turn of print page indicator used in South Africa is dot 3 in the margin and dots 5, 2-5 at the end of the last word on the page.

Aucamp: Publishers should include the braille catalogue number for ordering where relevant.

Nilsson: Nothing was mentioned about how to do things in paperless braille. We should be ahead of the manufacturers and publishers in devising formats.

Poole: Changes in manual braille transcription along the lines of the Cohn paper had been contemplated at RNIB. The U.S. has gone farther in its changes and while Britain would not agree with all of them, there must be more formatting legislation. The braille editor should be free to order the text to suit the braille reader. The ideas in the paper should be experimented with. Note should be taken of the French paragraphing technique. Both methods of writing poetry — line by line, and the use of the poetry sign — should be retained. Marginal stars may be a problem in paperless braille and computer-produced books. Two-line headings and the suggestion that the page with the maximum amount of material should be the heading are not good ideas.

Jernigan: Footnotes are there for the purpose of reference. If they were important enough to be in the text, they would be there. One should be able to read the text without being disturbed by the footnotes which should be at the end of the volume, not at the bottom of the page — and certainly not in the text.

Evensen: The current U.S. practice for footnotes of indenting in Cell 7 with the carry-over in Cell 5 seems a good one. As a result of the recent evaluation of paperless braille, it will be a long time before braille is produced on cassette at the Library of Congress, for both technical and economic reasons.

Lorimer: It is frustrating to have a short note saying that the pictures have been omitted with no indication as to what has been left out. Some information should be given.

Small: The paper made no reference to the U.S. Textbook Code, although even there, some of the guidelines with regard to material left out ("ask your teacher") are not entirely satisfactory.

Ledermann: One should not be tied to only one method for footnotes since it is sometimes necessary to have a footnote where it is — in hand-outs to university students, for example. The use of the poetry sign is to be preferred for quotations in work of criticism.

Milligan: Insufficient familiarity with Textbook Code is a defect that will be remedied.

SOME CONSIDERATIONS ABOUT BRAILLE COMPOSITION SIGNS WITH SPECIAL REFERENCE TO THE CAPITAL SIGN

By Richard H. Evensen, Project Coordinator National Library Service for the Blind and Physically Handicapped and Chairman, Braille Authority of North America

Under Rule II in *English Braille, American Edition — 1959*, revised 1972, eight special braille composition signs are listed: number sign, accent sign, italic sign and decimal point, double italic sign, letter sign, capital sign, double capital sign, and termination sign. They are called special braille composition signs because, with the exception of the number sign and decimal point, there is no directly equivalent symbol in print. The composition signs are necessary to present clearly to the braille reader what print does in other ways. For example, a number sign is necessary in braille to avoid reading the symbols as letters; italic signs are necessary because there are no special styles for writing braille — only one; and the capital sign is necessary because there is no distinction between upper-case and lower-case braille letters.

In this paper I present data on different uses of the composition signs, in particular, the capital sign; discuss differences between the British and American codes on these matters; and suggest accommodations between the two codes. I will not deal with all composition signs. Time constraints dictate narrowing the scope of discussion.

I will make reference to several sources throughout this paper (see list of references at the end for full citations), and will adopt shorthand names for the major sources, i.e., EBAE for *English Braille, American Edition — 1959*, and SEB for *Standard English Braille*. I will also refer to the BANA rules and the BAUK rules rather than British and American rules. The acronyms refer to the major organizations that make and interpret braille-code rules — the Braille Authority of North America and the Braille Authority of the United Kingdom, respectively. BANA includes an organization from Canada as well as organizations from the United States, hence "North America" in the name rather than the former Braille Authority of the U.S. At least one other nation, New Zealand, follows BANA rules — and others may do so in the future. Similarly, countries in addition to Great Britain follow BAUK rules.

At this writing (1982) the writer represents the National Library Service for the Blind and Physically Handicapped on BANA and is BANA's Chairman. I firmly believe that reasonable accommodations can and should be made with respect to composition signs such as the italic sign. I favor retaining and using the capital sign, and I favor certain BAUK practices on the use of italics. The data, discussion and recommendations presented need

further scrutiny by experts in literary braille — I hope as part of a new international body, but certainly by the literary braille committees of BANA and BAUK.

Italic Sign

Anne P. Clarke (1974) sees only slight differences between the two codes on use of the italic sign. Bogart and Cooter (1980) note the same differences. Clarke wrote from the New Zealand perspective (followers of SEB rules until the 1960's), while Bogart and Cooter, who are Canadians, have transcribed print to braille formerly using the SEB rules but since 1976 using the EBAE rules. The comparison also indicates Canadian practice, which in some instances strayed from SEB practice and followed EBAE practice.

The SEB rule is that units in series of books, periodicals, hotels, etc. will be treated like any italicized word or phrase. The EBAE rule is to use a double italic sign before each unit in the series, with a single italic sign before the last word of the last unit.

Here is an example. The sentence contains the titles of three books. The first four-word title would have a double italic sign before the first word but no other italic sign, according to the BANA practice. The BAUK practice would have a double italic sign before the first word and a single italic sign before the last. BANA practice requires a double italic sign before the second single-word title, while BAUK practice requires just a single italic sign. The final two-word title, according to BANA practice, would have a double italic sign before the first word and a single italic sign before the second (and last in the series). Under BAUK practice there would be a single sign before each word. Here are the renditions (in the print version, a word has one or two underlines to indicate single or double italics, respectively):

BANA: Read the following books: *Adventures* of Sherlock Holmes; *Babbitt*; and *Little Women*.

BAUK: Read the following books: *Adventures* of Sherlock *Holmes*; *Babbitt*; and *Little Women*.

The BAUK version follows more logically the rule about using double italics. It should be easier for the individual transcriber and for the computer translation of print to braille, and machine input where the amount of human intervention would be lessened.

The greater simplicity of the SEB rule is also recommended when italicizing compound words, i.e., each word must have an italic sign (or the double-italic rule shall be used). Thus the compound adjective out-of-the-way would be written: *out*-of-the-*way* (SEB), not *out*-of-the-way (EBAE).

Following this practice would virtually eliminate the need for a termination sign where only part of a compound word is italicized. BAUK does not have a termination sign but ends partial italicizing with a hyphen. Thus *white*-collar, where there is a single italic sign before the word "white", according to BAUK practice means that only "white" is italicized. The same is accom-

plished according to BANA rules by inserting the termination sign dots 6, 3 after "white" — and there is still a hyphen.

The only other major difference has occurred since adoption of BANA changes (1980), namely, that italics, not quotation marks, will be used when "a quoted or other extended passage" is set off by blank lines and the matter in print appears in italics or change of type. This simplifies practice for both human and computer transcription. The only problem has been how to treat an italicized word or phrase within an italicized passage. The usual solution is to end the italics just before the portion in question, e.g., a book title, and to resume italics for the word following the book title.

Letter Sign

I intend to deal with the letter sign in two small areas where I believe simplicity is called for. Introducing the letter sign into the discussion is necessary because it plays a part in the discussion of the capital sign to follow.

Bogart and Cooter (1980) point out that BAUK employs a letter sign before any letter that follows a number, whether close up to the number or separated by a hyphen. The issue of capitalization does not enter, of course. The BANA rules are more complex. The letter sign is used after a number, whether close up or after a hyphen, for the uncapitalized letters "a" through "j". In all other instances, whether uncapitalized or capitalized letters follow a number, the letter sign is not used. Both human and automated transcription would benefit from a single rule: that the letter sign will be used before a single letter that follows a number, whether close to the number or separated from the number by a hyphen.

Clarke (1974) raises another difference. BAUK requires the use of a letter sign before a letter even when enclosed in parentheses. BANA does not, on the theory that in such a combination the letter will be read as a letter. I agree.

The BAUK usages of the letter sign in the foregoing ways may arise from the non-use of the capital sign. If one sees **22b** or sees **(a)** in an outline one does not know under BAUK practice whether the letters are lower case or upper case. These could be significant differences.

Capital Sign

My guess is that the difference in the use of braille composition signs already discussed can be removed easily enough and perhaps along the lines of the solutions suggested here. Not so easily removed, I fear, are the different positions on the value of the capital sign.

An issue often raised on either side of this question — whether the capital sign is necessary or useful, or not necessary or useful — is whether it aids clarity or masks clarity. During the planning meeting for this conference (1981) one BAUK representative indicated that capital "a" could be misread as the contraction "still." This would not be true for all braille readers, and

context gives cues.

I digress a little to approach more broadly the point of clarifying or masking meaning. SEB and EBAE have been modified several times since the joint U.K.-U.S. conference in 1956. The changes on each side have tended to make the two codes more divergent. An early change in SEB relates to mathematical signs: the distinction between mathematical and nontechnical works was abolished.

Two mathematical punctuation signs were changed. The mathematical comma was henceforward to be dot 3, not dot 2 as is still the case under BANA practice for nontechnical works; and the decimal point was henceforward to be dot 2 (the old comma). The BANA decimal point is dots 4, 6. A braille reader skilled in the BANA rules might find reading a long number where commas are used a little odd at first, but he could certainly manage it. Greater confusion would occur in reading a number employing a decimal point. Clarke (1974) grants this, pointing out that the four-digit number 5643, with a dot 2 after the five, would mean five decimal point six four three for the reader understanding the BAUK system, but for the reader using the BANA code it means five thousand six hundred and forty-three.

Possible confusion in reading a simpler number was also raised at the Planning meeting (1981). Four comma one, meant to be read as four decimal point one under the BAUK system, might be misread as forty-nine — the dots 2, 1 read as dots 2, 4.

I suspect that such misreadings — 49 and "still" — would happen infrequently. Two larger points are worth keeping in mind in the remaining discussion. The BANA people saw little possibility in reading capital "a" as "still", and the BAUK people saw little possibility in reading four point one as 49. I suggest the reason is the same: familiarity with the particular convention. Investigations into braille-code changes must somehow get at the effect of familiarity, a condition that occurs after the learning and novelty effects have been minimized.

The second point is that adoption of different mathematical signs was known to be in the offing. The National Uniform Type Committee (predecessor name to BAUK) went ahead with the adoption. The U.S. did not follow but continued using the older Taylor code in nontechnical works. Any such unilateral changes — on either side — if it were to happen after the conclusion of this conference would, I believe, vitiate the shared aim of the conference: to work toward one braille code for English braille. It is not useful to scold each other on such unilateral changes. Let us avoid it from now on.

Keeping in mind the issues of clarity, of familiarity, and of cooperative action, I return to the main topic of the capital sign. The lines have been drawn rather tightly for or against the use of the capital sign. Canadians, who are recent "converts" to EBAE, tend to take an even firmer stand than people in the U.S. I feel less sanguine about mutually acceptable solutions

than I do about solutions for differences in use of the italic sign and the letter sign.

I have already stated my position: that the capital sign be retained. My evidence comes mainly from North American sources although a British source and a British example are also used. I shall now turn to these data.

Braille Research Newsletter No. 11 August 1980 contains an article by J. M. Gill of the University of Warwick, England, entitled "A Study of Braille Contractions." Appendix I of this article contains 34 questions and answers from a survey of braille users.

In all, 301 persons participated. As is often the case, not everyone answered all the questions. All 301 said they read Grade 2; 299 said they use the English braille code; no one uses the American code. Yet of the 279 who answered question 28, whether they would prefer the capital sign, 64 or 23% said they would like it. Although a minority, it is significant. The BAUK rules for capitalization are the same as the BANA rules, but it is recommended that the capital sign be omitted. In practice, I was told (planning meeting 1981), the capital sign is almost never used. When print would use a capital—as with an acronym — the BAUK system uses a letter sign, e.g., before the first letter of rnib (Royal National Institute for the Blind).

The data reported by Gill do not tell us why the 64 persons would like the capital sign used. One obvious application is the need to know when common words are capitalized, e.g., to be aware that the agency I work for is properly called the National Library Service for the Blind and Physically Handicapped (of the nine-word title, only the small words "for", "the", and "and" are not capitalized). Yet it might be known to some as the library for the handicapped (no capitalization).

A second application is already very important in the U.S. and Canada, and is growing in Britain. I refer to integration of blind (and other handicapped) students into classes for the seeing. Integration means, among other things, that the local school's textbooks are used — and the conventions of such books are followed, including capitalization.

Dr. Dean Tuttle, Professor of Special Education at Northern Colorado University, addressed these points with respect to capitalization and some other issues. His comparison of British and American braille is enclosed in a personal communication dated December 15, 1981. At my request he analyzed an article in British braille, from *The New Beacon*, which I receive regularly. The article chosen was "The Proof of the Pudding" by Edward Kaulfuss (issue of September 1981, print pages 225-227; braille pages 1-9).

Dr. Tuttle further illustrates the points just made. Does one know that the reference to the blind club is to its proper name or generically — a club for blind people? He also points out the importance of reinforcing one's knowledge of capitalization through practice as when one learns typing — and blind children learn this skill early.

Tuttle also points to possible confusion in determing whether the word

is "I" (the personal pronoun) or "in" — from the upper and lower parts of the braille cell, respectively. My own count (in the braille edition) was that "I" appeared six times at the end of the line, "in" once. Only when one picks up the new line can one be sure which word is intended. Consider a different case from page 5, line 15, braille edition. As it appears in braille, one might misunderstand the meaning: our bill always comes. ... Up to this point one does not know whether the "bill" referred to is a demand for payment or a male. The fifth word clears everything up — it is a male: our bill always comes home. ...—but how much easier if written: our Bill always comes home. ...

Tuttle addresses another touted advantage for omitting capital signs. The print copy shows 170 words capitalized. This does not mean 170 cells saved in braille since some of the savings are counteracted by using empty cells at the end of lines. He indicated that with the American code 61 extra cells would have been used — only 1-1/2 lines. *The New Beacon* braille edition uses as much space as possible by starting a new paragraph on the same line—leaving three blank cells rather than one. Many readers including British readers dislike this format because it hampers scanning an article.

This space-saving advantage was shown to be even less signifcant by a comparison that I made. At my request, the National Braille Press of Boston, Massachusetts, ran a copy of *New York Times Large Type Weekly* for February 1, 1982, omitting capital signs. In other respects, BANA rules were followed. The same line length — 38 cells maximum — and the same page length — 28 lines maximum — were followed. The magazine is produced via computer, one result being that no words or names are hyphenated at the end of lines. Finally, the omission of capital signs was not replaced where necessary with an indicator such as used under the BAUK system, e.g., NATO (the initials for North Atlantic Treaty Organization) was left without any indicator for an acronym-like the letter sign.

I counted the number of braille characters on page 5 of this issue, including the blank cells between words but excluding empty cells at the end of lines. The version with capital signs had 929 characters, the version without the capital sign 920. The version without capital signs had picked up one extra line already — the text having begun on page 3.

The striking point is that the edition using capital signs took 85 pages, the edition without capital signs took 83 pages. Fifty-four additional lines were used to accommodate the capital sign — 2.27% of the total magazine pages. As I said previously, various proper names are not known unless capital signs are used. This is important in a news magazine that contains many names that are not self-evident as names.

Morland and Grober, graduate students in special education at Northern Illinois University, prepared for the conference a useful statistical study of the space taken up by the capital sign. They examined four books in the Ginn Reading Program. The braille editions were used, of course, with a 38-cell

line and a 25-line page. They examined every fifth page if the book had 250 or more pages to accumulate a 50-page sample; or every third page if the book had less than 250 pages. I shall select from the complete data they presented. The full study is available (in typescript only) by writing to BANA.

Two of the four reading books are at the second-grade level, one at the fourth, and one at the sixth. The first second-grade book had an average of 17.02 capital signs per page of the 50 counted. The second one at this level had 25.24 capital signs per page. The fourth-grade book had 25.56 as the average, and the sixth-grade book had an average of 25.68 per counted page.

Doing some projections to the whole of each book, Morland and Grober show that the first, with 177 pages in all, would have an equivalent of 3.17 pages used by capital signs or 1.79%. The next with 205 pages would have 5.44 pages used by capital signs or 2.66%. The third with 387 pages would have 10.41 page equivalents used by capital signs or 2.69%; and the last with 605 pages would have a 16.35 or 2.70% page equivalent. Certainly, this is very little space saved.

Bogart and Cooter (1980) point out that capitalization was being taught in classrooms even before Canadian adoption of EBAE. This was because of the integration of more children into classrooms with sighted children. It was probably also because of the strong influence of the U.S. materials, many of which found their way into Canada and under Canadian readers' fingers.

Summary and Conclusions

Special braille composition signs are necessary to make information clear to the braille reader within the limited number of braille symbols possible in the three-high, two-wide braille cell, and because of the physical restriction of the cell. BANA and BAUK rules and practice sometimes differ in the treatment of some braille composition signs. BANA's special treatment of series (of book titles, etc.) could be dropped in favor of the general rule for italicizing words and phrases. This same generalized rule could also be used in compound words.

Universal use of the letter sign before a letter that follows a number is also recommended. This recommendation and those relating to the italic sign should also simplify automatic computer input and translation and, one hopes, produce accurate braille with less human intervention and a lower cost.

I see no such easy recommendation with respect to the capital sign—unless both BANA and BAUK agree on its complete use of complete omission. Compromise solutions do not appear helpful. One has been to drop the capital sign at the beginning of sentences because the previous punctuation will indicate the end of that sentence. This is not always so, e.g., when a sentence ends with a dash, elipsis, or a colon. Furthermore, how would one treat a sentence that begins with a proper name? This is especially a problem

(although solvable) for computer translation.

Another compromise solution is suggested by the ease with which I obtained an edition of a news magazine minus capital signs. Certain adjustments would have to be made and could be made, I am sure. I am told that it is merely the flick of a mode switch that includes or excludes the capital sign. Following this would actually maintain the difference between BANA and BAUK — and this is not the right spirit for our future deliberations.

I recommend that the capital sign be used universally — albeit some changes in its use may be recommended after study. I believe that capital signs are useful cues to the braille reader. Some examples have been given. As useful cues I believe they also aid in obtaining and maintaining a good reading speed. This is especially true if reading is taught and used by reference to context, not just character identification which, I believe, has been the emphasis in teaching braille reading and in braille research. Systematic studies along these lines — the usefulness of context and contextual cues — are necessary as well as the studies of word frequency, character recognition, and the like. Day-to-day braille reading is contextual reading.

I close by recalling that the data used in this paper have not been tested thoroughly for accuracy and consistency. They do point in some specific directions. These should be examined closely, as I am sure they will. The examination should be broad, not just the logic of a rule, nor the logic of a program, nor the personal preferences of a user — but all of these and more!

Note: This paper was prepared on a braille cassette machine. With the cassette output and with proper interface procedures, the paper original in braille distributed to conference delegates, was produced on an automatic embosser.

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Restatement of the Lay-out, Definitions and Rules of the Standard English Braille

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S.E.B. (see Restatement, etc.)

Tuttle to Evensen, December 15, 1981.

Conference Discussion

Poole: One should go for either complete use or complete non-use of the capital sign since that would give exact print practice. I favour non-use of the sign. The figure of 23 per cent quoted from the Birmingham/Warwick Study is significant — it means that 77 per cent don't want it. The capital sign contains no information: for a non-skilled reader, it is more difficult to process a lot of cells that have no information content. The Kederis Study shows that the capital sign is more common than any contraction.

Nilsson: The capital sign should be used. As to the value of questionnaires — if a questionnaire had been sent out before the introduction of metric in Britain, what would have been the response? There must be a thorough field testing, probably for two years.

Churcher: Continually switching from braille materials with and without capitals has presented no problems. Reading with capitals does not slow down reading speed. It is important to have the information that the capital sign conveys and I strongly favour its retention.

Aucamp: In South Africa one printing press uses the capital sign and one does not. Properly used, the capital sign educates the student and aids the poor reader to orient himself to the beginning of the sentence.

Maxwell: Although theoretically opposed, while reading the Conference papers I was unaware whether the capital sign was used or not.

Jernigan: When reading contextually, one doesn't really notice whether the capital sign is there or not, but it does give information — if not, why is it used in print?

Milligan: Having begun with no strong convictions either way, I have become convinced that the capital sign should not be used. Its use in print where it provides an emphasis, is an historical accident. In braille, whatever it does, it does not provide an emphasis. What we are following is all too often "house practice" since the rules for the proper names are themselves obscure.

Brown: The capital sign does give prominence, not because of the dot 6, but because of the extra space.

Small: We must be careful in this discussion because it is an emotive issue. We would gain more from retaining the capital sign than from abolishing its use especially in mainstream education and in situations where small and capital headings are both present in the text. Like Churcher, I would not like to go back to its nonuse. "This is a s-m-a-l-l point of view, but is it a

small one or is it a Small one?"

Bogart: Canadians having gone from the nonuse to the use of the capital sign, are even more forceful than the Americans about its retention. From the transcriber's point of view (although this is admittedly not the most important one), it solves many problems — in the transcription of poetry, for example.

Jolley: Since I was brought up by Irish Christians, I was taught to use the capital sign simply because the English did *not* use it. I am concerned at the tenor of the previous remarks and would like to see more sense of compromise. If BANA/BAUK is going to do research, the use of the capital sign should be included.

Ledermann: The British practice of not using the letter sign if an acronym can be pronounced as a word should be discontinued.

Maxwell: The use of italics in print is to draw attention. However we use the italics sign in braille, it does not do tactually what italics does visually. We are looking for a "locator" in the text, not for an indication of what the print says. We need more tactual indications such as an obstruction in the left hand margin. (I use a reinforcement.)

Evensen: The use of the capital sign conveys more information than just print practice.

THE RECENT BANA CODE CHANGES

By William Poole
William B.L. Poole is Chairman of the Braille Authority of the United Kingdom; compiler of a new edition of World Braille Usage *under UNESCO sponsorship; and formerly Braille Editor at the Royal National Institute for the Blind.*

In September 1979 a document was issued by BANA entitled "Braille Code Recommendations proposed by the Braille Authority of North America Technical Committee on Literary Braille". Changes called for in this document have since been implemented in countries under BANA jurisdiction, but not, so far as I know, in any other country where English braille is used, and not by BAUK. On May 13th, 1980 I wrote at length to Richard Evensen in his capacity as Chairman of the Technical Committee to express my personal reactions to these changes prior to their implementation. Since then the matter has been discussed by BAUK, and in particular its Research Committee at its meeting on October 15th, 1981 gave detailed consideration to the contents of the document and reached a collective view on some of the issues involved. I have been instructed by BAUK to lay before the Washington Conference the results of our deliberations, and the following paper is in fact a summary of my letter of May 1980, updated to take account of the views expressed at the meeting of October 1981. The items are numbered in accordance with the document of September 1979.

1A. The Slash (Oblique Stroke).

BANA was asked to consider adopting a two-cell sign, dots 4, 3-4, for the slash, but recommended that no change should be made. My comments:

(i) it would be undesirable to use a two-cell sign for the slash in some instances only;

(ii) dots 4, 3-4 could easily give rise to perceptual difficulties;

(iii) the frequency of the slash in print has increased markedly in recent years. Kederis and his colleagues in their Frequency Count of the Symbology of American Braille (1965) do not even identify the slash as a braille element, though they do include the fraction line. We cannot afford to follow earlier braille code designers who did not treat the slash seriously;

(iv) it is not only when the slash adjoins the letters "st" in a compound word that confusion can arise as to how dots 3-4 should be read. This can also happen when either of the components is unfamiliar, e.g., if it is a pronounceable abbreviation of a recently formed organization, or a semi-foreign technical term. In addition a compound such as "air/ink" (which I have actually come across) gives rise to a colloca-

tion of braille signs which is clearly undesirable;

(v) the alteration of a computer translation program to accommodate a two-cell sign for the slash would be negligible;

(vi) we therefore favour the adoption of a two-cell sign, but are open to persuasion as regards to what it should be. In that case the British provision for replacing the slash with something else in the interests of clarity would be abolished.

1B. Division of a Compound Word After the Slash.

We agree with BANA that a hyphen should continue to be inserted after a slash whenever a compound word of this kind is split between two braille lines. It is after all possible, though rare in literary braille, for the slash to be the terminal sign in a string. However, the sentence in the BANA document "A computer program for braille translation that does not divide words at the end of a line does not have to follow this practice either" leaves it ambiguous as to whether the computer is expected to treat all such compounds as indivisible or whether it is absolved from the need to insert a hyphen after an end-of-line slash.

2. Sports Scores, Odds, Votes etc.

BANA was asked to rule on the end of line divisibility of a number sequence joined by a dash; but, recommended that sports scores and the like should in the future always be joined by a hyphen instead of a dash. My comments:

(i) this recommendation creates a new, although minor, divergence between British and American braille usage;

(ii) since this recommendation was prompted by considerations of computer convenience, it would surely have been more logical to propose that whether a hyphen or dash is used should be determined by print, and this is in fact what we advocate;

(iii) British braille usage permits the division of number sequences after a dash, but not before one, exactly as with the hyphen;

(iv) the dash is still quite commonly used by British printers to join sports scores and the like, but the hyphen is rapidly gaining ground;

(v) British braille practice requires the repetition of the numeral sign after a hyphen when this is preceded by a fraction.

3. The Natural Pause.

BANA has abolished the natural pause rule in relation to the contractions for to, into and by, and sequences of and, for, of, the, with, a. My comments:

(i) this change magnifies the difference between British and American braille practice;

(ii) the main reason for this change is clearly to ease computer translation;

(iii) we agree with BANA in rejecting the abolition of the contractions for to, into and by, and the prohibition of sequences of and, for, of, the, with, a as a means of solving the natural pause problem. All published frequency counts show that a considerable proportion of the space saved by grade 2 as against grade 1 is achieved by these items. However, in devising new sequences for a revised code care would have to be taken to select those least likely to give rise to natural pause situations;

(iv) in British braille usage there is no presumption in favour of sequencing in doubtful cases; rather the contrary. A natural pause rule, if justified at all, is justified in the interests of readers, not writers, of braille, and in particular of readers whose skill and fluency is below average, and of those who read aloud. Denial of this involves a failure to acknowledge real differences between visual and tactile methods of perception, since writing words in sequence must lead the reader to expect that they belong closely together in sense, and there is no analogue for this on the printed page;

(v) we welcome those aspects of the BANA change relating to sequences in contact with the italic and capital sign, which simplify the rules and also bring British and American braille practice closer together; and we think that there are sequences at present not permissible in British braille which could without disadvantage be allowed;

(vi) nevertheless we would regard the total abolition of the natural pause rule as not in the best interests of readers, though if a dual standard were to be adopted, this might well be an area for differentiating between manually- and computer-generated braille.

4. Coinage, Weight, and Other Special Symbols.

Agreement in principle was reached by BANA that it should be fairly easy and by implication would be desirable, to follow print practice with regard to the spacing, position and form of what we call unit abbreviations (including what BANA is proposing to call division symbols). My comments:

(i) this proposal, if systematically and unilaterally implemented, would greatly extend the divergence between British and American braille practice in this area;

(ii) our present practice gives rise to difficulties in connection with automatic inputting, but otherwise causes few problems of coding or interpretation outside scientific and mathematical contexts;

(iii) treatment of unit abbreviations in such contexts is bound to affect and be affected by their treatment in literary braille, and since British and American mathematical and scientific notations differ fundamentally, this is perhaps an area where some lack of uniformity in the literary code may have to be accepted;

(iv) our practice has the merits of compactness and standardization to set against its major deviation from print;

(v) in response to a questionnaire circulated in 1977, which formed part of the Birmingham/Warwick project "A Study of Braille Contractions", 60% of those who expressed a view said that they wished to keep the present convention of writing unit abbreviations before numbers, while 76% said that they supported using the same abbreviation in braille as in print. Unfortunately the worth of this latter figure is vitiated by the fact that the question was invalidly exemplified. Also many braille readers are grossly ignorant of what the adoption of print conventions would actually involve. So until further research is undertaken, I remain convinced (on the basis of informal discussion only) that the wholesale changeover to the BANA proposal would be widely unpopular in the UK;

(vi) even if we were to reach agreement in principle with BANA on this matter, there would still be residual differences in practice, so long as we continue not to use the capital sign in literary braille;

(vii) neither BAUK nor its Research Committee has as yet taken up a firm position on this issue, but a paper dealing in detail with the topic is expected from another British contributor.

5. Quotation Marks.

Two basic changes, each of which increases the divergence between British and American braille practice, have been made by BANA in this area, and I will deal with these separately.

5A. *Single and Double Inverted Commas:*

The one- and two-cell braille quotation signs, instead of representing respectively outer and inner quotation marks as is broadly the case in the UK, now represent respectively the double and single inverted commas of print in North America. My comments:

(i) the form of inverted commas used in print is not authorial, but simply a matter of house style, and the use of single inverted commas for dialogue is becoming increasingly common in books printed in the UK;

(ii) according to the Kederis count (1965) outer quotation marks are nearly 100 times as frequent as inners, so with the change there is an increasing likelihood that a lot of extra cells will be occupied by braille characters which convey no substantial information content, and this will irritate learners and less skilled readers of braille;

(iii) people learning to write braille without reference to print will naturally use the one-cell signs for outer quotes, while being mystified by the diversity of practice they will come across in the books they read;

(iv) we are not convinced that the change from a functional to a formal criterion for the use of braille quotation signs is either desirable or necessary, and we believe that most of the problems here connected with automatic inputting can be solved by the modification of translation programs.

5B. Change of Type or Margin:

BANA has decided that in what are called quoted or other extended passages, quotation marks should no longer be added in braille to represent a change of type or margin in print, but italics should be used for the former, and normal paragraphing for the latter, with lines skipped in accordance with print. My comments:

(i) the British practice of relying so completely on the addition of quotation marks is unsatisfactory;

(ii) however, the substitution of italics for other changes of type is not free from difficulty either: it no more accurately represents the form of print than does the addition of quotation marks, and italics may be needed in such a passage for odd words which actually are italicized in print;

(iii)there are many situations where the leaving of blank lines is desirable in braille; but much manuscript braille in the UK is still written interlined, so that this practice would create large and ugly gaps in the text. In addition, care may have to be taken to ensure that a blank line is not absorbed by a turn of page, and in doing this an odd line at the beginning or end of a passage may be left in unwelcome isolation. Print has greater flexibility in the disposal of its text than braille has. On the other hand, rapid alternations, marked off in print by blank lines, between normal and special type may become bewildering in braille if some positive indicator such as quotes or italics is not used for the special type;

(iv)there is no simple solution to these problems, and no concensus has yet been reached by BAUK.

6. The Apostrophe.

BANA discussed the use of this sign in braille, especially in relation to plural abbreviations, but without reaching any conclusion. My only comment is that there is clearly scope for narrowing the gap between print and braille in the usage of this sign.

7. The Hyphen.

BANA has decided that computer translation programs should be explicitly exempted from the American braille code rule governing word division. My comments:

(i) experiments have been tried in the UK with translation programs which do permit word division in some measure. I assume that if such programs were to be used in North America, they would have to conform to the rule, at least to the extent that word divisions prohibited by it would be unacceptable;

(ii) this raises a question of general principle as to whether a code book needs to specify that braille produced with the aid of a translation program does not have to comply with the rules relating to a feature which is absent from that program. I think that it should;

(iii) the merits and drawbacks of abandoning hyphenation seem about equally balanced: not very much space would be wasted, and greater clarity might be achieved because braille words would always appear in a standard form; on the other hand, I suspect that a fast reader is slightly retarded by lines of very uneven length, and in addition, blind people would be unable to learn through direct experience what word divisions are acceptable to the sighted. This of course is on the assumption that braille would not allow divisions which are unacceptable in print, where practice varies greatly;

(iv) we reached the view that hyphenation should be largely a matter of house rules, but that the range of variation should not be unlimited, and the rules should not be oppressive.

8. The Dash.

BANA proposes no change in its code book having regard to the consideration that most translation programs treat two words joined by a dash as an indivisible group. My comments:

(i) in the UK, translation programs do allow division at the line before or after a dash;

(ii) the absence of this facility would tend to accentuate still further the unevenness of line length;

(iii) we have not found any serious problems in allowing the dash to begin or end a braille line in computer-generated braille.

9. Conclusions.

(i) Most of the above changes, or proposals for change, were designed to assist the processing by computer of material to be put into braille. In particular, the advent of automatic inputting has been a major factor in determining BANA's thinking on these matters. The use of automatic inputting is becoming increasingly widespread in the UK, and its potential benefit to braille readers is fully recognized here. It should be noted, however, that some of the above changes, such as the abolition of the natural pause rule, are really more concerned with translation programs than with automatic inputting. In my paper "Braille as an Autonomous Script" I have already advocated a dual standard as the most rational solution of these problems, and will say no more about this here;

(ii) the changes recommended by BANA came into force on October 1st, 1980, when it was known that there was a desire on both sides of the Atlantic to convene an international conference which should have as one of its objectives the creation of a unified English literary braille code. It therefore seems to us regrettable that it was not found possible to postpone the implementation of these changes.

Conference Discussion

Evensen: As chairman of the committee responsible for the code changes, I consider the paper a negative response, one that omits the argument of reasons for the changes. The 1979 report was not a public document but a report to the BANA Board which adopted the changes, subject to field testing, in November 1979. It was sent to the U.K. for reaction. In the belief that only a minor concern was expressed, the implementation date was set for October 1980. Poole's letter of May 13th, 1980, did not reach me until late June.

In explanation of the changes themselves:

1. The slash as one cell is easier.
2. For sports scores, American print uses the "en" dash which is slightly longer than a hyphen.
3. Computer programs for hyphenation do exist but they are complicated and expensive.
4. The natural pause rule helps the human transcriber as well as the computer.
5. The quotation mark is a concern of the inputter, not the programmer.
6. Long braille passage in italics come out of italics for odd words which are actually italicized in print.

Maxwell: Braille readers are as entitled to diversity of presentation as the sighted. Braille authorities should not be too dictatorial. They should not be too rigid in what we can experiment with and must allow the code to change. Lorimer's suggestion of yesterday for the slash (dots 5,2) is welcome because it indicates a balance between the two words.

Milligan: Braille authorities are fine-sounding ("We're boss class!") and have to make rules, but they must conduct field trials and encourage experiments. It is sometimes a matter of saying "you may" to those who would like guidance. To encourage the use of braille, to promote braille, is not beneath our dignity. On past changes in codes, let's let bygones be bygones — both have sinned.

Ledermann: The Australian Braille Authority does actively promote braille.

Lorimer: An unwritten agreement made in 1956 that there should be no changes on either side was unknown to Evensen. The generating force of the BANA changes — to comply with the needs of the computer — was an unhappy one. Whatever change is made should be at least as much for readability as for ease of computer translation. As far as possible, it should be the rule that one braille sign in a given position should have one meaning and one meaning only.

Small: In the unification of Grade 2 braille, all changes to the codes must be measured by one final yardstick — the advantage it gives to the user.

Poole: It is unfortunate that divergent changes were implemented. The use of quotes is a problem to the computer that can probably be solved by

computer experts; hyphenation does complicate programs. The problem of going out of italics for brief words is addressed in the British Restatement Part 2, Rule 88.

BRAILLE CODE RECOMMENDATIONS PROPOSED BY THE BRAILLE AUTHORITY OF NORTH AMERICA TECHNICAL COMMITTEE ON LITERARY BRAILLE

September 1979

The following recommendations are proposed for action by the Board of the Braille Authority of North America. Review of these recommendations by appropriate committee chairmen has been requested.

1. The Slash

A. *English Braille, American Edition—1959*, revised 1972 (herinafter called the official code) deals with the slash (there called the oblique stroke, bar or slash), in Section 28e. The sign (dots 3-4) "is used whenever the symbol it represents appears in ink print,...). Some exceptions follow that are not pertinent to the present discussion.

A member-transcriber of the California Transcribers and Educators of the Visually Handicapped (CTEVH) has asked whether the sign for the slash can be changed to a two-cell symbol (dots 4, 3-4). This would clarify its use as a symbol in such words as typist/stenographer. Presently the slash might be read as another representation of the contraction "st". The suggested change follows its use in the textbook code as a stress symbol in foreign-language material.

The committee considered the following points: (a) The slash occurs many times in written material today; it is perhaps overused. (b) The appearance of the slash in the sample word probably causes momentary confusion; certainly it slows down the reader. (c) The proposed symbol would cause the same confusion. (d) The occurrences of words like the sample word or ones that either end the first word with an "st" (fast/slow) or begin the second word with an "st" (stop/start) are limited. (e) A computer program like the Duxbury Systems Program can easily handle the use of the proposed symbol in the few special cases. (f) Although a small exception, this is going in the wrong direction; the number of exceptions or special cases should be diminished.

> Recommendation: The sign for the slash shall remain as a one-cell symbol, dots 3-4. Clarity for the braille reader is not enhanced by the proposed change, and computer programming and processing would have to change to adopt the proposed symbol universally or as an exception, and neither approach is justified.

B. Division of a Compound Word After the Slash—The same transcriber from CTEVH asked whether a hyphen is necessary if a compound word like the sample could not fit on one line and had to be divided after the first word. In short, if the slash serves the same purpose as a hyphen? The committee believes that it does not and therefore the hyphen must be inserted

(See Section 5a. of the official code).

The sample word would therefore read (if proper division was to be after the first word): typist-stenographer. This practice will not affect computer production since no widely used program hyphenates words for purposes of division at the end of a line.

> Recommendation: Compound words joined by the slash that must be divided after the first word shall show such division by inserting a hyphen after the slash. A computer program for braille translation that does not divide words at the end of a line does not have to follow this practice either. No word changes are necessary in the official code. This recommendation is an interpretation of Section 5a.

2. Sports Scores

A third question by the California transcriber is whether a sports score should be divided after the dash when the whole score will not fit on one line. Section 28a. NOTE of the official code says: "(NOTE: When writing sports scores...a dash should be used instead of a hyphen to separate the numbers.)"

The dash has been used to distinguish scores, votes, etc. from inclusive numbers. If the dash is kept, the committee believes that the whole number set should be kept on the same line, that there would be no separation after the dash.

A broader question is involved, mainly, how does the computer handle this matter, and the corollary is: How are sports scores, etc. written in print? The Duxbury program requires the inputter to place a dash between the numbers. The translation program handles it as a dash between numbers (no space before and after the dash) and always places the number set on the same line.

The *Washington Post* for September 20 was consulted. Sports scores are written with a hyphen between the numbers, and no space before and after. Two style manuals (The *Chicago Style Manual* and *Words Into Type*, by Skillin and Gay) indicate the following: The en dash is used between sports-score numbers. The en dash is slightly longer than the hyphen. In typescript, the hyphen is used for the en dash. The conclusion from these reference sources, then, is that the hyphen is commonly used for scores.

If manual inputting is replaced by automatic inputting as with compositor tapes, then a braille translation program would read scores as two numbers joined by a hyphen and convert to braille as such. Not only would this change present practice with respect to use of the hyphen instead of a dash, but it would also mean that the number sign before the second number would be omitted (See section 28a.).

There might be some confusion on the part of braille readers to distinguish sports scores, votes, etc. from inclusive number, but context will usually clarify the meaning.

Recommendation: Sports scores, results of votes, etc. shall be joined by a hyphen, not a dash. The number sign will not be repeated after the hyphen. Section 28a. will be changed to omit the note at the end of the paragraph, and the final item in the list of examples will be changed accordingly. The revised section will read as follows:

"a. The effect of the number sign is not terminated by commas, colons, hyphens, fraction signs, and decimals. However, after a space or a dash the number sign must be repeated."

The final item in the list of examples will read:

The bill passed #403-13.

This rule change will simplify computer processing and manual inputting. It will greatly facilitate automatic input of print for translation to braille.

3. The Natural Pause.

Gene Apple, a member of the Board, suggested that to facilitate computer processing the natural-pause matter should be settled. He referred specifically to Section 41 which covers contraction rules on "to," "into," and "by." The committee went further with respect to these contractions when capital signs and italics are used before and after them. We also included the whole-word contractions "and," "for," "of," "the," "with," "a" in Section 37.

The present rules read as follows:

"41. There should be no space between the lower-sign contractions "to," "into," and "by," and the word which follows if there is no natural pause between them. If in doubt about the pause, they should be joined...." and

"37." The word signs "a," "and," "for," "of," "the," and "with" should follow one another without a space between if there is no natural pause between them. ..."

The natural-pause problem with "to," "into," and "by" could be solved by prohibiting the use of the contractions at any time. This would mean a big change in present practice. The natural-pause situation does not occur often, and the present rule even permits joining when there is doubt. The better change is to permit the joining of any of these three words to the word following. In effect, this does away with the natural-pause part of the rule. This will simplify the matter for the human transcribers, the translation program, and the inputter. (The latter must code the natural pause.) Finally, it will simplify the matter when automatic input is involved.

Recommendation: Section 41 shall be changed to permit joining "to," "into," and "by" to a word following whether or not there is a natural pause.

Section 41 will now read:

"41. There should be no space between the lower-sign contractions "to," "into," and "by" and the word which follows. Wherever "into" must be written out, the "in" sign should be used. Ex:"

The examples will be changed (except the first one) as follows:

"I meant (to) get (into) town (by) noon.
It was referred (to) yesterday.
He was passed (by) while others were taken.
What trouble have you gotten (into) this time?
(to) and fro (to) or from (by) and by (by) and large

42.b. should also be changed. The prohibition of use of the italics or capital sign both before and after "to," "into," and "by'; is not necessary. Reader confusion is minimal, whereas computer processing and manual or automatic input are greatly facilitated.

Recommendation: Section 42b. shall be changed to permit the use of italics before and after "to," "into," and "by" and the use of the capital signs under the same conditions. This rule will now read:

"b. The contraction for "to," "into," and "by" may be preceded and/or followed by a capital sign or an italic sign."

The examples will be as follows:

HOME (TO) INDIA (By)Jove *(by)*default
Do right (by) him. (By) *default.*

The discussion on natural pause for "to," "into," and "by" are pertinent for the common whole-word signs covered by Section 37.

Recommendation: Section 37 shall be changed to permit joining of the word signs "a," "and," "for," "of," "the," and "with," whether or not there is a natural pause. This rule shall be changed to read:

"37. The word signs "a," "and," "for," "of," "the," and "with" should follow one another without a space between. They should not be written together when punctuation or composition signs occur between them. Ex:"

The fifth example will be changed as follows:

Him we think (of)(and) love.

4. Rule VIII Coinage, Weight, And Other Special Symbols.

Two general points were agreed upon. 1. The title of this rule should be changed to reflect more accurately the coverage of the rule. The probable title: Coinage, Weights, Measures, and Division Symbols. Division symbols in particular are noted, e.g. the paragraph sign, section sign, etc. 2. In general, following print practice should be fairly easy; i.e., if the symbol follows the number after a space, the braille copy would do the same; if the print symbol follows the number immediately, the braille copy would do the same; inserting the letter sign as dictated by Section 12; and if the symbol precedes the number, the braille copy would do the same.

Normal print practice and approved abbreviations must be checked. This could not be done for the present report. It will be checked, and appropriate recommendations will be made.

5. Quotation Marks

Important changes were discussed and agreed upon. The changes reflect

the intention to facilitate automatic inputting and computer processing. The braille reader will still be clearly aware that a distinction has been made.

Present practice, as dictated by Section 2a., is that the double quotation mark is substituted for the print single quotation mark, the latter reserved for the inner quotation mark. The inputter must make this change, but such a change is not possible with automatic input. But the committee believes that no problem in readability will occur because normal print practice is followed. Books printed in England use the single quotation marks oftener than U.S.-printed books, frequently in long dialogue passages.

A more difficult matter is presented by the change proposed in Section 26b. The present practice calls for substituting the quotation mark when italics, boldface, etc. are used in print. This substitution is easy enough with manual input, whether a braille transcriber or a computer input operator, but is impossible with automatic input. Change of type, for example, may be employed for purposes other than a quoted passage.

The subsection will be greatly changed since the use of italics will correctly put this rule in Section 10h. A cross reference to this rule will appear in Section 2b.

Section 2a. now reads:

"a. In ink print, even though the normal sequence of quotation marks is occasionally reversed, in braille the one-cell signs are always used to represent the outer quotation marks and a two-cell sign to represent the inner quotation marks."

> Recommendation: Braille practice shall follow print practice with respect to the use of the double or single quotation marks as the outer quotation marks.

Section 2a. will now read:

"a. In print, the normal sequence of quotation marks is occasionally reversed, with the single quotation mark representing the outer quote, and the double quotation mark representing the inner quote. The braille copy will follow the print copy, using the appropriate one-cell or two-cell sign."

The present Section 2b. reads:

"Quotation marks should be substituted where the ink-print copy employs change of type, italics, or a change of margin to indicate quoted passages when they are not separated from the text by blank lines. In such cases, the italics should not be used except where necessary to show emphasis or distinction.

"If, in the ink-print text, lines are skipped before and after quoted matter which is written in italic type, lines should be skipped in braille, and the italics omitted. However, if the ink-print copy skips lines and encloses quoted material in quotation marks, lines should also be skipped in braille, but quotation marks should be retained."

> Recommendation: Quoted or other extended passages represented in print by change of type shall be shown in braille by the use of italics.

The full statement on such use will be shown in Section 10h.

Change of margin to indicate a quoted passage will appear in braille in the normal paragraph form, with a blank line before and after the passage.

Section 2b. will read:

"b. The italics shall be used where the print copy employs change of type or italics to indicate quoted passages. If, in the print text, lines are skipped before and after quoted matter, lines should be skipped in braille."

"Where the print employs change of margin to indicate quoted passages, in braille lines should be skipped before and after the quoted passage and normal paragraphing used.

"(See also Section 10h)."

Section 10h. will be changed to indicate that the use of italics is for any extended passage including quoted passages. At present, it reads:

"h. Quoted matter which is set off in inkprint by blank lines should also be preceded and followed by a blank line in braille. If such matter appears in inkprint in italics or boldface type, or is indicated by change of margin, normal paragraphing and margins should be used, and the italics should be omitted unless necessary to indicate emphasis or distinction."

Recommendation: Section 10h. shall be modified to require the use of italics to indicate a quoted or other extended passage when the print indicates such a passage by change of type. Normal paragraphing shall be used in braille when the print indicated an extended passage by change of margin, but in braille a blank line will precede and follow the extended passage.

Section h. will read:

"h. A quoted or other extended passage which is set off in print by blank lines should also be preceded and followed by a blank line in braille. If such matter appears in print in italics or change of type, the italics shall be used in braille. If such matter is indicated in print by change of margin, normal paragraphing and margins shall be used in braille."

6. The Apostrophe

Discussion was held in its use in braille. Difficulties were noted especially with plural abbreviations. Further study is required. There is no recommendation at this time.

7. The Hyphen

Although theoretically possible, most computer translation programs do not hyphenate words at the end of a line. The committee believes the present practice should be reflected in Section 5 by exempting the computer translation programs from the rule. There is no loss of clarity to the braille reader; there may even be a gain because braille words are always seen in their normal form.

Recommendation: Section 5a. shall have a statement at the end of the

paragraph that exempts computer translation programs from the rule stated in that paragraph.

Section a. will read (the new sentence as shown by italics):

"a. As a general principle, the maximum number of spaces in a braille line should be utilized; also, where it may be divided between pages, and compound words may be divided at any syllable. When dividing a word at the end of the line, the division should be made between syllables, even though this prevents the use of a contraction. No space should be left between the last syllable on the line and the hyphen. The hyphen must never be put at the beginning of a new line. *(Any braille producer employing a computer for translation from print to braille need not comply with this rule as to dividing a word at the end of a line.) Ex:*

8. The Dash

In most computer translation programs, two words joined by a dash are treated as one word. The whole grouping appears on one line, that is, there is no division before or after the dash. Section 6 says nothing that prohibits the practice. No word change is required.

Respectfully Submitted,

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Edwin G. Brown
Maxine B. Dorf
Technical Committee on Literary Braille
Braille Authority of North America

PERSONALIZED BRAILLE

By Carlton B. Eldridge
Carlton Eldridge, a user of literary and music braille and a church choir director for many years, has taught music and other subjects at several colleges in the U.S. Midwest.

Growing Illiteracy

Illiteracy among our sighted high school graduates is a scandal. Illiteracy acy among our blind high school graduates is a tragedy. Fifteen to twenty percent of the blind people in the United States are of school age. The tools of literacy are at hand, but fewer blind children in school today can read or write. Is there reason for concern?

In 1929, I could not be accepted at a major university until I proved literacy in both literary and music braille (music being my major). Today, literacy is not a requisite for college admission for blind students, although it is for students with sight. In 1978, there were between 5,000 and 6,000 legally blind students in the colleges and universities of the country, according to the Office for the Blind and Visually Handicapped, within the Rehabilitation Services Administration, U.S. Department of Human Services. It has been estimated that not more than one half of these students could use braille effectively. In other words, fifty percent of all blind college students were illiterate. And this, in an environment in which the written and printed word is the very substance of the matter.

College administrators and teachers are increasingly complaining of what they consider excessive dependence of the average blind student on both reader and instructor, which would amount to virtual *rote* learning. One dean expresses it thus: "These students are being passed on from year to year and we, at the advanced level, are expected to certify them."

It is evident that we are settling for lesser educational standards for blind students than for sighted students. There are some obvious contributing causes for this tragic trend and some actions that can be taken to reverse it.

Teach Braille

In the past, the first order of business for the blind student and the newly-blinded adult was to learn braille — today it is "how to flip a switch". In most traditional schools for the blind and the mainstream programs, the recorded and spoken word have supplanted personal literacy.

To tape a lecture is understandable, if it is later compressed into braille notes. To "cram" for a semester examination by means of ten miles of plastic ribbon, when forty pages of notes in braille would do the job, is without logic. It is beyond comprehension that a sighted graduate should leave his university with a trunk filled with books and note folios which are easily

referred to by merely being opened, while a blind student leaves with hundreds of cassette tapes illegible until electronically activated. Let us hope that, at least, this student has sufficient knowledge of braille to attach identifying labels.

Ironically, there is a negative element intruding into the classroom, which may compound the plight of the blind college student crippled by total reliance on the tape recorder. Increasingly, teachers are objecting to the recording of lectures, as students are using tapes as evidence against them.

Because of personal problems, there are those who find it difficult to learn braille. This situation is found most often, among those who lose their sight in adult life. However, in the days when it was fashionable to accord blind people the dignity of independence in literacy, many older people (even those in their 70's or 80's) learned and cherished this skill. Nowadays, many rehabilitation counselors and teachers find their jobs easier, when they have convinced their clients that it is more pleasant to be read to, than to read for one's self. In these times of "convenience", lethargy is more alluring than "energy."

While science has provided the blind with many accommodations for life and living, no viable substitute for braille literacy has been found. Machines for reading the printed page are being developed, but they are not now for the individual — in price nor portability. However, technology is providing the blind new and exciting means of producing braille as reading material. Computers, after storing the printed text, can drive transcribing machines to produce information in that grade level of braille most convenient for the reader. One of the most intriguing devices which may not be far distant is *paperless* braille, reproduced in full page format, from a single cassette which may contain the text of an entire book.

But again, the medium is braille. Will there be braille readers to benefit from this technology? These time-saving, cost-saving, and labor-saving inventions notwithstanding, the number of titles produced by our braille presses here and abroad, has declined dramatically in the past ten years. The flow of braille is sufficiently extensive to meet the literacy needs of each blind person. The blind student should be taught and expected to read and write braille every day, as the sighted student is exposed to print. Speed reading and writing should be encouraged until total literacy has been attained. The teaching of braille to the blind adult should be thorough, and he or she urged to practice until usable skill has been mastered. Computerized braille transcribing systems can, by the turning of a switch, provide material in grades one, one and one-half, two, two and one-half, or three. Thus it is possible to give to the reader a wider choice of format.

Two obstacles to learning and using braille will be addressed in the remainder of this paper: 1. the tools employed to write braille for personal use; and 2. the braille system itself.

Simple Tools

One of the first tools of learning put in the hands of a sighted child is the pencil. At an earlier time, one of the first tools of learning which was put in the hands of a blind child was the slate and stylus. I know, because I was a blind child, and my classmates were blind children. The National Association of Blind Teachers is researching the visually-impaired teachers of the country in preparation for a national directory. By April 1, 1982 there were 107 respondents. Of these, 70 take notes with the slate and stylus, 33 with felt tip pen or standard pen, and 4 with cassette. But these people are of an earlier generation than those being prepared in our primary and secondary schools of today.

Today, when and if the writing of braille is taught, it is by the cumbersome braille writer, which, like its inkprint counterpart, the typewriter, is non-portable. Imagine "lugging" a typewriter about, whipping it out of its case, and finding a flat surface on which to set it, merely to jot down a telephone number. Recently, we met a blind college student, who had been denied the slate and stylus and was forever condemned to go hither and yon with her braille writer "bumping" along in a backpack.

The slate and stylus is for the blind as the pencil is for the sighted. The *Reader's Digest*, March, 1979, contains an article entitled, "*Everything* Begins with a Pencil", with the tag-line: "Seven inches of wood and graphite, it may be the most under-rated intellectual tool man has ever invented." According to the article, "some 2.5 billion pencils (enough to circle the world 11 times at the equator) are manufactured and sold annually in the United States". It has been said that, if the pencil would suddenly disappear, the world of scholarship, science, industry, business, and the arts would come to a grinding halt. Denying the blind child the slate and stylus is tantamount to denying the sighted child the pencil.

Like the pencil, the slate and stylus can be slipped into the pocket (or purse) to be used whenever and wherever the need arises. Nearly every sighted person owns and carries many pencils, but few blind people own a slate and stylus. They do not possess, nor can they use, the basic tools of intellectual life. It is inconceivable that many blind students of today are permitted to *drift* through college without this skill. Taking notes in class or from a reader can be done very unobtrusively and almost noiselessly with a simple slate and stylus using thin soft paper on a pad. But that is the very tool which many educators of the blind are relegating to the status of an artifact.

As I write this paper (with slate and stylus), I discover another advantage important to the student. The arrangement of dots and the contour of the braille symbol are constantly being reviewed, (albeit in reverse). This is a plus which could not be realized with the braille writer.

In writing, nothing has ever supplanted the clay tablet and stylus, the pen and pencil, and, for the blind, the slate and stylus. This last must once again be made the first and basic tool of writing, so braille can fulfill the personal

needs of each and every blind person.

The Braille System

Many of my sighted friends have learned to read and write braille (with slate and stylus). For them, and for the blind student, the greatest barrier to learning is the multitude of rules and the exceptions to those rules. The effectiveness of a rule is indirectly proportionate to the number of exceptions. Every rule or exception to a rule that is not basic to the structure of the braille code should be eliminated. The large number of differences between the practices followed in Great Britain and the United States in formatting for contracted words indicates that many of the rules reflect personal preference rather than necessity. The cultures of our countries are too similar and the potential for exchanging braille materials is too great to let artificial barriers created by unnecessary rules continue to exist.

A rule that depends upon the free exercise of personal preference or judgement is no rule at all. While all occasions of conflict requiring user choice cannot be avoided, an effort should be made to do so. The Braille Authority of North America took a major stride in that direction in 1980, when it abolished the "natural pause" rule.

The rule(s) defining the use of contractions that either break a syllable or cross two or more syllables should be modified, if not abolished. These rules and their application vary among the English-speaking countries. Being arbitrary, they are so inconsistent and rely so completely upon human judgement and exceptional knowledge of spelling and syllabication, that they constitute a serious obstacle to teaching and learning of braille. If the rule forbids the crossing of syllables why permit such contractions? i.e., "ation", "ally", "bb", "cc", "dd", etc.

There are words which appear alien when a contraction crosses syllables— "che-mother-apy", "for-ed-oomed", "swee-th-eart", "al-time-ter". On the other hand, there are words with contractions crossing syllables, which present little confusion — "aqueduct", "commandeer", "denominator". An "Alphabetical Guide to the Contracting of Words", prepared in Canada, contains so many inconsistencies in the use of contractions that it stands as material evidence of the need to modify these rules. Why should the "con" sign be used in "conning" but not in "conn" or "conned"? Or, why should the "one" sign be used in "cone" but not in "coned"?

In learning contractions, many, at first, seem strange. Computer programmers are developing improved software to deal with the exceptions and inconsistencies in the braille code as it now exists. Since a computer cannot recognize a syllable, as it cannot recognize a "natural pause", braille produced in this manner frequently contains all contractions, regardless of syllabication. Anyone who has read such material knows that even unusual combinations become manageable after only a few encounters. The mind can cope with the consistent computer combinations more readily than with

the arbitrary variations demanded by the code.

The braille system can be personalized by re-instituting a grade one and one-half with some additions from other grade levels. It can be modified to include the double-letter sign, "bb", "cc", "dd", "ff", "gg". The "k" should represent "know" rather than "knowledge". Some of the more easily recognizable short-form word-signs could be included: "ab", "abv", "alm", etc. All contractions should be selected on the basis of ease of recognition and their direct relation to the alphabet. This level of braille should be designed for the person who loses vision as an adult and wishes to go beyond grade one but not to the two-cell and part-word signs of grade two.

Grade two braille is for the young blind person whose early education is in reading and writing and for the occasional adult with the aptitude and desire to learn it. Grade two should be regarded as the *standard* for literacy for the adult who trains for a career without vision. It should be the avenue to functional literacy for professional people. However, any complicating rules which create inconsistencies should be abolished. To be included, however, are most two-cell signs using dots 4-5, 5-6, 4-5-6, and dot 5, which are now restricted to grade three. Two-cell word signs using right-hand dots should be written together without a space. Only those two-cell word signs which involve a letter of the alphabet should be included in the transfer from grade three. These are only suggestions. It must be made clear that any decision on signs or format should be given serious scrutiny and even *field-testing*.

The utilization of space is an important factor. Paper, especially the grade needed to produce high quality braille, is expensive. The act of turning of page interrupts the flow of reading for a braille reader more than a reader of print. In the United States, 6.5% of the paper and page turning could be saved by adding just one line to each page and one cell to each line. Additional space could be saved by omitting blank spaces often found: between running page titles and chapter headings; before and after lines of dots separating articles in magazines; on pages only partly consumed by such as a table of contents; and, at the bottom of a page when only one line of text follows a topic heading. *Caution*: the binding should never obscure the first letter of the line.

To be truly personalized, the braille reader should have a choice of grade level format. Computer technology makes this reachable, almost with the flip of a switch. The braille library system could offer such personalized service with few, if any, additional copies of titles by using depositories to serve larger geographic areas. After all, in a program almost totally dependent upon mail delivery, one, two, or three hundred miles would cause little or no change in the quality of service. The added encouragement to use braille should be the greatest concern.

Summary

Illiteracy among the young blind population is too high and seems to be increasing. The literacy needs of those losing vision in later life are being grossly neglected. Factors contributing to this unacceptable reality include: 1. apparent lethargy and reluctance to teach braille on the part of teachers, rehabilitation teachers, and counselors; 2. an exaggerated belief that it is sufficient *just* to be read to; 3. the almost exclusive use of heavy, noisy, nonportable, unaffordable equipment in the school system for writing braille, (braille writer versus slate and stylus); 4. a false dream that technology for reading printed material will soon make braille unnecessary as a medium of personal literacy for blind people, (writing is half of literacy); 5. a set of rules for the braille code which is so complex and inconsistent that it hinders the learning of braille and discourages its use; and 6. slowness to take advantage of computer technology to make literature available in a variety of formats and levels of condensation.

The International Conference on English Braille Grade Two, scheduled to convene in Washington, D.C., September 13-17, 1982, will have within its power the ability to make braille a more useful and personalized avenue to literacy for blind people. This can be done by subscribing to the following:

1. Adopt a strong resolution that the active promotion of the teaching and use of braille are just as important as the technical rules for producing it.
2. Keep the blind individual, using a slate and stylus, as the primary person to be served.
3. Eliminate as many rules as possible and place tight restrictions on exceptions to rules that govern the braille code.
4. Eliminate all practices in formatting for using contractions that unnecessarily consume space.
5. Promote the use of technology to provide literature in personalized braille for all blind people at their level of ability to use it:
   a. Grade One Braille for the older persons who cannot, or choose not to master the entire system;
   b. An improved Grade One and One-Half, or Grade Two system for the average school student or reader; and
   c. An advanced contracted form, either Grade Two and One-Half or modified Grade Three for the more proficient reader.

Conference Discussion

Maxwell applauded the suggestion that the slate and stylus be the primary tool, while Lorimer, Troughton and Gore preferred the braille writer as the first tool with the slate and stylus being introduced later. Grade 2 reduces embossed space over all by 25% rather than 17%. There are far too many rules, (Nilsson concurred), although the cause of failure may be the method of teaching rather than the rules. The beginner needs only about 30 rules which often do not need to be taught as rules but as part of reading braille;

moreover, children enjoy deducing the rules by themselves. (Lorimer)

Calling Eldridge "a big hit in Australia", Ledermann emphasized the need for "exposure to braille every day", since the sighted child sees print every day whether he likes it or not.

Poole: Since the Birmingham/Warwick figures are now available, we are past the stage where we can make suggestions for rule changes without reference to the stastics. Using "k" for "know" instead of "knowledge" for example, does not in fact result in any space saving.

Aucamp: It must be the job of this Conference to make those books that are in braille available.

Small: Braille authorities have an educational role to play. It should be their function to see that younger generations are properly skilled.

Conference Observers

Tuesday, September 14, 1982.

Abraham Nemeth: In North America today, we live in a society where mainstreaming is the norm. When the blind take their places in this world, it is extremely important that there be a two-way system of communication between them and the sighted. Braille *is* a communication system. There is a greater variety of formats in print. What is important is that I should receive via braille a direct signal from the person beside me transmitting it. What bothers me is that this signal is being edited. Many braille rules edit the signal I receive. The time will come when I have to reply; I must reply in kind. All editing does a blind person a disservice. Braille must be only a communication medium.

Les Pye: I speak as a producer of braille for the National Library for the Blind, but many producers are first and foremost consumers. It is not necessary to give "blurbs" since they are mostly advertising. A comprehensive contents page should appear in the first volume. Diagrams, graphs and illustrated materials are very complicated, since getting an exact reproduction is time-consuming and costly. Can anything really be gained by feeling? Perhaps a verbal representation would suffice. Footnotes and reference materials are better at the end of a volume than in a separate pamphlet. Greater use should be made of margin indentation. We must be aware of changing print practices. With reference to the "capital debate", much more field testing is needed, but as a producer, I feel the capital sign would be helpful.

Maxine Dorf: Information on the dust jacket of the print book should be included, but not in a separate volume; the glossary could sometimes be in a separate volume. Two bookmarks could be bound in a book for text and notes. Many ideas raised in Cohn's paper are treated in BANA's textbook code; for example:

1. Complete contents are given in the first volume; in subsequent volumes, the contents for the particular volume are given.
2. Special signs and symbols (color codes, etc.) are shown on a symbols page.
3. The basic literary code requires paragraph indentation to the third cell. In most cases, footnotes begin in cell 7 with carry-over in cell 5.

Norma Schecter: There is a paperless braille project being conducted now in California where Versabrailles are being used in a number of public schools and high schools.

Bernard Krebs: I am pleased to see John Lorimer here since we met in 1956. I am also pleased to learn that Canada, New Zealand, and half of South Africa have adopted the capital sign — and that the radicals are still with us! It is sensible in using contractions not to overlap a prefix or a suffix since when a contraction is used incorrectly, it slows down the reader. There has

been some talk of "Let's do it all at once!". This is a language — you can't make changes all at once.

Alice Mann: When blind students were integrated into the public schools, textbooks in braille were needed and volunteers were called in to meet this need. Many of the transcription problems encountered were not covered in the basic code and, after testing on various problems, the textbook code was devised so that we could have uniformity across the country. At the present time, the use of the Versabraille does not warrant a set of rules.

Roger Petersen: Why is there an assumption that braille should be any easier to read than print? Why should all the inconsistencies be ironed out? Should American print books then all look like English print books? I would put adherence to print ahead of readability. There is also an assumption that the blind can't read maps. Perhaps that's because there aren't any. By making some changes in the code, we can facilitate and proliferate braille material. In future, when everyone will have on-line computer access, those who have Versabrailles and can read today's newspapers today will become better braille readers.

Harold Snider: If Americans and English can agree to different spellings for colour (color) and plough (plow), can we agree to differ on the use of the capital sign? As a consultant in Zambia, I questioned local braille users, all of whom had a British heritage. The most prolific braille producer — Malawi — wanted the British Code. All others, where integrated education exists, wanted American. But the Association *of* the Blind preferred the British system. If we save three percent of space by dropping the capital sign, does that mean we'll get that much more braille as a result? The International Federation of the Blind was not invited to take part in this conference and it should have been.

Edith York: When proposing the use of lower signs for the numbers in my paper, I meant, of course, that they be attached to the number sign. I apologize to the British for not having examined the British mathematics code. The paper grew out of the problems encountered while mainstreaming students and adopting the metric code. It is important to represent what the print says so that a child knows what is going on in his own country.

Pamela Lorimer: In schools in the U.K., braille reading is taught first; students do not learn the use of the capital until they learn to use the typewriter. Although we don't teach capitals in braille, we do teach their use in print. The final stages of some of the newer reading programs contain the teaching of capitals.

Maxine Dorf: Putting information on the spine of the volume and identifying reference material by a key on the bottom line to say what is on the page are both good ideas.

Roberta Werth: The Lutheran Braille Workers who produce braille in both Grade 1-1/2 and Grade 2, find the requests run about fifty-fifty. A book which has 72 pages in Grade 1-1/2 braille has 59 pages in Grade 2 braille.

We start our transcribers with a slate and stylus. The completion rate for the Grade 1-1/2 braille transcriber's course is much higher than that of the Grade 2 course.

Roger Petersen: We have to think towards computer translation and home computers. In order to have maximum access to print, we must accept variations in the grades of braille — 1, 1-1/2, 2. In the future, material will be available in ASCII and the output may be print, voice, or one of many grades of braille.

Abraham Nemeth: In my classes I use an Apple II Plus computer with an "electronic blackboard" program. Using the bottom six keys as a brailler, I can enter material in braille which appears on the screen for my sighted students in the exact print, complete with subscripts, superscripts and mathematical symbols.

Lorraine Evensen: We should address ourselves to the problem of where we are to get good teachers of braille. This is an area of great concern.

Richard Evensen: For the record, I must correct Mr. Snider. A letter of invitation to participate in the Conference was sent to Mr. Sontag of the International Federation of the Blind from the Conference Steering Committee.

SHOULD THERE BE TWO GRADES OF CONTRACTED ENGLISH BRAILLE?

by M.O. Milligan
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Purpose of this Paper

1 'This Committee asks those concerned with research into braille contractions to aim at facilitating the bringing into use of two grades of contracted English braille, namely "Basic Braille" which would contain considerably fewer contractions than present Grade 2 braille but which would save 20-25% of space as compared with Grade 1, and "Advanced Braille", which would contain many more contractions than present Grade 2 Braille and which would save 40%-50% of space as compared with Grade 1. The Committee believes that difficulties encountered by new learners of braille should be borne in mind in the devising of "Basic Braille", and that "Advanced Braille" should be conceived as meeting the needs of those wishing to read or write extensively in braille. It believes that ease and speed in reading and writing braille should be regarded as a major desideratum in the devising of both grades, that "Advanced Braille" should incorporate all the contractions in "Basic Braille", and that the two grades should be devised with reference to each other and produced simultaneously, though "Basic Braille" might well be introduced into use before "Advanced Braille".'

2 The above is the text of a resolution adopted unanimously by the British National Uniform Type Committee as it then was — now the Braille Authority of the United Kingdom — on 8 June, 1978. The purpose of the present paper is to provide a commentary on this resolution which will sketch in something of its background, report relevant developments since the adoption of the resolution, review some of the things that can be said for and against two grades of contracted Braille of the kind indicated in the resolution, and suggest conclusions. Although its author is an officer of the Braille Authority of the United Kingdom (BAUK), this paper is a personal essay and, except where otherwise indicated, only the author can be held responsible for the views herein expressed.

Background

3 The idea of there being more than one grade of contracted English braille is of course not at all new. In the Introduction to 'Standard English Braille', the code-book edited jointly in 1932 by the British National Uniform Type Committee and the American Committee on Grade 2, it is stated that 'Braille is in four grades: Grade I, uncontracted; "Grade One and a Half", simply

contracted; Grade II, moderately contracted; and Grade III, highly contracted.' A code-book on Grade 3 had been published by the National Institute for the Blind in London in 1910, and a revision in 1919. Few books in Grade 3 braille have ever been published in the United Kingdom, however, and none at all, it seems, for over fifty years. (It is said that in the U.S.A. books in Grade 3 were still being produced in the 1950's, but that none are now being produced.) For some considerable time Grade 3 code-books have been out of print in the U.K. Nevertheless, although Grade 3 braille never seems to have been taught regularly in any school for the blind in the U.K., both before and after the second World War a number of blind people in the U.K. taught themselves Grade 3, and regularly used it — or, more accurately, perhaps, an approximation to it — in their own note-taking and in private correspondence. As recently as June, 1978, Dr John Gill of Warwick University, reviewing the results of a questionnaire on braille circulated to braille readers in the U.K., reported the astonishing fact that 32 of the 301 respondents — just under 11% — stated that they would prefer to read Grade 3 to either Grade 2 or Grade 1. It is known that other respondents who did not commit themselves to this statement nevertheless would have liked to have been able to read some books in Grade 3, and it therefore seems that the producers of braille who have offered nothing in this grade may in this respect have misjudged the needs of a significant group of braille readers. If so, the braille authorities of the U.K. and North America must also bear some responsibility, for if three grades of contracted English braille are recognised in the 1932 code-book, only one is described and prescribed for, and it can hardly be doubted that had the braille authority in the U.K., at least, ever issued a code-book dealing with Grade 3, more material would have been produced in that grade.

4 The reluctance of braille authorities and producers to consolidate and use Grade 3 as it stood is, however, understandable. 'The aim of Grade 3' wrote Miss H.C. Russell in the Introduction to her 1910 presentation of the code 'is not only to reduce the bulk of braille books, but also to assist rapid reading by bringing as much into the line as possible, and to save time and labour in writing.' Grade 3's greater wealth of letter-group signs, word-signs, and short-forms undoubtedly enables the braillist who has mastered these to write a good deal more quickly than he could in Grade 2, and this has been the great attraction of Grade 3; but 'bringing as much into the line as possible' does not necessarily facilitate either rapid reading or rapid writing if, as is the case with the complex sequencing and outlining rules of Grade 3, it frequently confronts the writer with the need to make difficult on-the-spot judgments about what may be obscure or ambiguous, and if it frequently confronts the reader with great masses of dots whose meaning only clearly emerges after a good deal of back-and-forward scrutiny. By 'sequencing' is meant the writing of words contiguously without intervening blank spaces, and any satisfactory form of advanced contracted braille will almost certainly

contain more sequencing than does present Grade 2; but the sequencing rules of Grade 3 are so demanding that they seem mostly to be ignored by writers of Grade 3 other than dedicated transcribers. To apply them properly takes too much time, but to neglect them is also wasteful, for the Grade 3 contraction system seems to have been designed very much with sequencing in mind. In any case, as modern frequency counts of letter-groups and words make clear, the contractions of Grade 3 are not all well-chosen, and, since it incorporates into itself all the contractions of Grade 2, it preserves in advanced braille the very serious defects of Grade 2 as a contraction system.

5 If, therefore, BAUK could not think of trying to resurrect Grade 3 braille, it has nevertheless for some time felt itself to be under serious pressure to do something to meet the desire of those many blind people who for a very long time have been asking for a more highly contracted braille than present Grade 2. This has been particularly so since 1976, when changes in the composition of BAUK (or NUTC as it was) gave more adequate representation than hitherto to organisations of blind people. Clearly, the voice of braille *users*, even more than that of those who produce or teach braille, ought to weigh with a braille authority, and after 1976 there could be no doubt at all as to what that voice was asking for; again and again the representatives of the National League of the Blind and Disabled and of the National Federation of the Blind of the United Kingdom, the two chief general-purpose organisations of blind people in Great Britain, as well as of the Association of Blind and Partially-Sighted Teachers and Students, probably the organisation with the largest concentration of intensive Braille users in the country, called upon the Authority to move in the direction of providing blind people with more highly contracted braille.

6 At the same time, BAUK was also under what appeared to be a counter-pressure. Some of the research workers engaged in the recently-initiated 'Study of Braille Contractions' at Birmingham and Warwick Universities, supported by some teachers of braille, urged upon the Authority the desirability, from the point of view of some potential learners of braille who were being deterred by the task of having to learn 189 contractions, of replacing present Grade 2 by a much reduced contracted code, which, it was argued, with a few new contractions, could save as much space as present Grade 2, and the use of which need not significantly reduce braille reading speeds — a contention which seemed to be receiving confirmation from experimental investigations of the effect on reading speeds of reduced Grade 2 codes being carried on at Birmingham University. Some of the representatives of organisations of the blind opposed and still do oppose this line of argument, contending that there is no clear evidence that any significant number of blind people are deterred from learning braille by the number of contractions, that on the contrary there is evidence that blind people *enjoy* learning contractions, and that to have less rather than more contractions would be to move in exactly the wrong direction.

7 In any case, in the light of studies of the perception of braille such as that by Nolan and Kederis and of the four major counts of contraction frequency conducted during the past thirty years, the Authority was impressed with the acute unsatisfactoriness of present Grade 2; and eventually, helped by an unpublished paper by the late Hamish Lochhead (who in 1954 with John Lorimer had organised the first major count and survey of braille contractions for the NUTC itself), the majority of members of the Authority came to believe that what had originally seemed to be opposed views about the future development of braille could in fact be complementary. In this very brief paper, Lochhead proposed the replacement of present Grade 2 by a 'Basic Braille' and an 'Advanced Braille'. I shall shortly consider the main arguments for and against this proposal, but meanwhile some up-dating is called for.

Up-dating

8 At its meeting of 8 June 1978, at which it passed the resolution quoted at the beginning of this paper, BAUK also resolved to ask its Research Committee to begin work on the devising of both a basic and an advanced braille code. A year later, on 28 June 1979, the Research Committee reported to the Authority that it had examined two basic codes presented by members, one of 100 contractions and the other of 75 contractions, to the second of which had been appended a sketch indicating some possible elements of an advanced code. In the light of these, the Committee recommended (1) That Basic Contracted Braille should save at least as much space as does present Grade 2; (2) That it should have no more than 100 contractions, and preferably fewer; (3) That no more than 30 of these at the very most should be new to Grade 2 readers; (4) That Basic Contracted Braille should if possible have no more rules than present Grade 2 *that the braille beginner must learn in order to become a reasonably competent* reader and writer of braille; and (5) That in devising the new code it is better to use a new sign for an already-contracted word or group of letters than to use different signs to represent the same group of letters in different positions within words. These recommendations were accepted by BAUK. Further work on the codes was subsequently delayed for some time whilst awaiting valuable statistical data from Warwick University which was eventually supplied, and by other factors, but has now recommenced. The present aim of those working on the advanced code is that its use should save on average about 20% of the *total* (not just the embossed) space taken by the use of Grade 2 (i.e. 40% of the space taken in Grade 1). Since it could be misleading to call a form of contracted braille 'basic' without qualification, the practice has grown up within BAUK of referring to the two envisaged forms of contracted braille as 'Basic Contracted Braille' (BCB) and 'Advanced Contracted Braille' (ACB), and this practice will be followed in the remainder of this paper; but BCB can also appropriately be referred to as 'New' or 'Revised' Grade 2, and ACB

as 'New Grade 3'.

9 There has been some recent evidence of support among the braille-reading public in the U.K. for BAUK's move in the direction of a two-tier system of contracted braille. In 1979, at the annual conferences of the National Federation of the Blind of the U.K. and of the Association of Blind and Partially-Sighted Teachers and Students, BAUK's position was endorsed by large majorities; and when Mr. Poole, the Chairman of BAUK, published his article on braille reform in the *New Beacon* for June 1981, in which he discussed this matter briefly and asked for comments, a substantial majority of his respondents favoured a two-tier contraction system. The question remains, however: Would it be advantageous on balance to adopt such a system?

Arguments for ACB

10 The arguments in favour of devising two grades of contracted braille consist almost entirely of the arguments specifically supporting one or other of the envisaged grades (although an argument *against* two grades as such will be considered in Para.18), and we begin with the arguments for ACB. For many, the most important of these is that a highly contracted system of braille would make it possible to write a given amount of material in braille with less effort and more quickly. It is sometimes said that this argument no longer has any force now that most braillists have braille writing machines. But, apart from the consideration that outside the wealthy countries most braillists may *not* have braille writing machines, that seems wrong for two reasons. First, because of the weight, the bulkiness, the dependence on external power supply or ancillary equipment, the noisiness, the nature of their products (sheets brailled on only one side, or linear paper or digital tape), their liability to malfunction, or the costliness of braille writing machines (including electronic equipment much as 'paperless braillers'), a very great deal of braille writing is still done every day by hand, and will probably have to be for the foreseeable future. A blind person able to write braille only with a machine is as seriously disabled as would be a sighted person able to write only with a typewriter, and the evidence that schools are beginning to revive the teaching of the writing of braille by hand is therefore to be welcomed. How much of an asset a highly contracted grade of braille can be to those who have to write braille by hand needs no stressing: suffice it to say, by way of a single illustration, that for the present writer the availability of old Grade 3, with all its defects, made the difference between being able to get satisfactory lecture notes as a student and not being able to do so. Secondly, even where a braille writing machine can be used there can often be significant advantages in also being able to use a highly contracted grade of braille, as where there is only a limited space in which to insert writing, or where the laboriousness of writing is increased by the physical impairment of the writer or limitations of the machine, or where it is desirable

to reduce the noisiness of the writing process by using the machine as economically as possible, or where there is need to increase the speed of writing beyond what the writer could manage even with a machine in ordinary Grade 2 braille. The conclusion seems irresistible that the argument for a highly contracted grade of braille from the need to increase the ease and speed of writing retains great force: if advanced contracted braille were to save 20% of total space over Grade 2, and if it contained considerably more 'sequencing' than Grade 2, then the amount of time and effort saved in writing it as against Grade 2 would not amount to 20%, but it would be likely to amount to 15% at least, and that would be a very worthwhile saving.

11 A second reason often given by blind people for wanting a much more highly contracted grade of braille than Grade 2 is that it would enable them to read more quickly. In an experiment reported by Tobin and Lorimer (*The New Beacon*, November, 1980, Experiment 9), sixteen blind readers who on average read a passage in Grade 1 at just under 67 words per minute read the same passage in Grade 2 at an average speed of just over 110 wpm — an increase in speed of over 64%. Granting that they were much more used to reading Grade 2 than Grade 1, there can be no question of uncertainty on their part as to the meaning of any of the signs used in Grade 1, and this experiment must be taken as strikingly bearing out the common belief among blind readers that the presence of contractions permits faster reading and that *up to a point* the more contracted the braille the quicker it can be read. 'Up to a point' has to be inserted, however, for increases in the number of contractions, assuming that contractions are well-chosen throughout must bring diminishing returns not only in the saving of space but in increase of reading speed, and carried far enough must eventually tend to *decrease* reading speed. If it is argued that other experiments reported by Lorimer and Tobin (*Journal of Visual Impairment and Blindness*, October, 1979) suggest that returns have already diminished to vanishing point within Grade 2, then two points must be made in reply. (1) In Experiments 2 and 3, where readers read passages in modified codes with more than 100 fewer contractions than Grade 2 at speeds which on average did not differ significantly from the speeds at which they read the same passage in full Grade 2, the passages in question were so short that they did not adequately reflect either the space-saving or speed-promoting potential of Grade 2: in one of them 45% of the contractions of Grade 2 did not occur in the full Grade 2 version of the passage and in the other 63%, so the number of Grade 2 contractions actually eliminated in the modified-code versions must have been quite small. It is clear that the absence of contractions saving only 2% to 4% of space may not materially affect reading speeds, but that it is still possible and indeed likely that the presence of contractions saving 10% or more of space will significantly increase reading speeds if the contractions are well-chosen (that is, if they represent groups of letters or words which occur relatively

frequently, and if they are not too hard to recognise and remember). In Experiment 1 a modified code expanding the space occupied by a passage by 6% produced a significant reduction in reading speed. (2) Experiment 4, in which it was found that a group read a passage written in a code consisting of present Grade 2 plus 37 new contractions significantly more slowly than the same passage written in unsupplemented Grade 2, provides no serious evidence against the proposition that a more highly contracted code than Grade 2 would permit higher reading speeds unless this proposition is taken to mean that the higher speeds would follow straight away upon first acquaintance with the more highly contracted code — something which no one need or would assert. For in this experiment the readers were supplied with a list of the new contractions no more than three weeks before the test, and had very little practice material in the new code before the test. In the experiment in which readers were found to read Grade 2 more than 60% faster than Grade 1, the readers had all been acquainted with and had had almost daily practice in, Grade 2 for over five years. If when the experiment was conducted they had had long experience with Grade 1 but only three months' or even a year's experience of Grade 2, it seems very likely that their reading of the passage in Grade 2 would have been the slower. Since if ACB were to save 20% of space over Grade 2 it would probably have to contain at least 300 to 400 new contractions as well as more sequencing, readers would have to have at least a couple of years' experience of reading and writing pretty regularly in this new grade before they could be expected to read in this new grade more quickly than in Grade 2. It is sometimes said that a new grade of advanced contracted braille should not be launched on the braille-reading public at large before experimentation has tested the claims made for it, and this is reasonable; but it is also reasonable to point out that any such experiment would have to be carried out over a protracted period during which the group of participants were supplied with a good deal of material in the new grade that they really wanted to read, and throughout which they promised to make fairly regular use of the new grade in their own braille writing. To fix on a period such as two or three years is of course to some extent arbitrary, but it seems likely that if significant gains to braille users were not apparent after fairly regular use of ACB over some such period then their achievement would be judged to be too costly in time and effort; and on the other hand it seems that if they *were* apparent after some such period — if users of the new grade could read and write in it on average, say, 10% more quickly than in the less contracted grade then current — it would be very worthwhile to make this more highly contracted grade generally available, since the longer it was used the more it would be likely to save in time and effort. If a good advanced contracted braille can be designed, then the probability of such a prolonged and demanding experiment having this desirable outcome seems to be high enough *a priori* to make the undertaking of it worthwhile. (Incidentally, the conduct of such an experiment

should include the offering of some systematic instruction in the use of the new grade, the offering of some special instruction in the use of speed-reading techniques in the reading of the new grade as well as of the less contracted grade, and the investigation of the effect of using the new grade on the speed of reading material presented by 'paperless braillers'.)

12 A third argument in support of ACB is that its use would enable producers of braille to use formats which could considerably speed up and facilitate the retrieval by readers of material stored in braille without increasing the bulk of their products. Examples of retrieval-assisting format-improvements would be the more spacious setting out of certain material to give emphasis or draw attention to it, the use of page headings for *every* page rather than every second page of braille, and a much more liberal use of blank lines to separate paragraphs and other blocks of material — possibly also the leaving of two blank cells at the end of every sentence. Such devices are perhaps of little importance in material for leisure reading, but they could be of great value in improving the usability of text-books, reference books and other working material, where braille is at great disadvantage as compared with print because of its paucity of resources for making material stand out on the page — a disadvantage which can best be reduced by a more 'generous' attitude to the use of space, which cannot readily be acquiesced in, however, so long as it would mean an increase in the present enormous bulkiness of braille.

13 A fourth argument for ACB — and for many blind people this argument is enough by itself to establish its worthwhileness — is that its use, even if accompanied by more space-extravagant formatting, could significantly reduce the bulkiness of braille material. This is a consideration the importance of which is constantly under-estimated by people other than actual blind users of braille, with whom, however, it is a constant preoccupation. It is true that the universal use of means of writing braille which would permit writing on both sides of each sheet would reduce bulk more than would ACB, but the use of *both* would reduce bulk still further, and so long as one-sided braille *is* widely used, the pressure to reduce bulk by using more contractions must be very strong, especially by those who use braille as a working tool. If ACB were to save 20% of space as against Grade 2, then even with very space-extravagant formatting the reduction in bulk would be certain to be well over 16% — something which would be very welcome to such braille users.

14 Finally, there is the argument that material produced in ACB will cost less than it would in a less contracted code, since it will take less paper, which is now very expensive. This directly concerns all who wish to write in braille, but perhaps even more important is the indirect effect on braille readers of the cost which have to be borne by the publishing houses and libraries producing material in braille; for it is almost certainly the case that higher costs for braille producers mean either higher costs or fewer books for braille

readers, and conversely that lower costs for producers bring benefits to all braille users.

Arguments against ACB

15 I have dealt with some of the arguments *against* ACB in the course of expounding the case for it, but there are still some objections which must be noticed. One is that it is not worth going to the considerable bother involved in devising and establishing ACB, since it is only wanted by a small minority of braille users. This is a very bad argument which no braille authority can accept. In the first place, it is not by any means clear just how small the minority is: it almost certainly includes the great majority of those who use braille intensively in their daily work (not only blind students and professionals, but also, in the U.K. at least, hundreds of braille shorthand writers, some blind telephonists, some activists in trade unionism and politics, and many others who are just voracious braille readers or enthusiastic writers of braille), and although these people are probably a minority of the total population of braille users, it may well be that the greater part of braille that is used is used by such people. But even if this is not the case, they are a specially important group for the future of braille, just because braille is of special importance to them. Blind people are a small minority of the whole society to which they belong, and braille users are a small minority of blind people: if we were to disregard the needs of small minorities there would be no braille at all, and if we disregard the needs of the minority that use braille intensively there may quite soon come to be no braille at all. It is worrying in this connection that, although braille is still in many ways by far the best medium in which blind people can study and work, there has been a tendency in the U.K., and still more, it seems, in the U.S.A., for blind students to turn away from its use and to rely on media which are in important respects greatly inferior. It is not difficult to think of reasons for this, but there are those who say 'Whatever the reasons, we dare not at such a time make significant changes to braille or we will frighten off its remaining adherents.' The very reverse is the truth. At such a time of decline, the only alternative for braille authorities to presiding over the eventual death of braille is, first, to make it a more flexible and more powerful instrument for the performance of the many and various functions that it has, and then, confident that we have a braille system that is as good as it can be and that blind people can find interesting, to launch a campaign of teaching and propaganda to show that the learning and use of braille does not impose unrewarding burdens. The production of a grade of braille which, in the many respects indicated above, meets the needs of those who are or should be intensive braille users better than does present Grade 2 is an essential element in the evolution of a contemporary braille that we can take pride in and have the confidence to fight for.

16 'But won't having to learn a very large number of contractions deter

people, and is it a burden that ought to be placed on older school students, for instance, who have so much else to learn, or on people who have to use English braille for study purposes but whose first language is not English — particularly people in the developing countries?' The general answer is that *for people who expect to have to use braille a good deal* a considerable body of contractions to be learnt generally constitutes an attraction rather than a deterrent. The writer has had some experience of groups of older school students learning Grade 3 and also of considerable numbers of young and middle-aged, recently-blind adults learning Braille Shorthand. What was striking was the pleasure they took, almost uniformly, in mastering new contractions, especially good ones, and the interest in braille which an advanced contraction system generated. In the case of older school pupils going on to further study, nothing could be more appropriate than that they should spend a small amount of time achieving advanced competence in a medium that it will be to their advantage to be able to use well for the rest of their lives. In any case, the effort needed to achieve a useful degree of reading and writing competence in an advanced grade of contracted braille must not be exaggerated. It is not remotely comparable, as is sometimes suggested, with the effort required to learn a new language. Advanced contracted French and German braille contains 500-600 contractions — about the number envisaged for an advanced contracted English braille. Yet blind English-speaking students whose knowledge of these languages has always been extremely defective have found that they can learn to read and even write in their advanced contracted codes after a few weeks of pretty desultory effort, and have reported that they have enjoyed doing so. The learning of English ACB is not likely to constitute any sort of obstacle, therefore, to students from developing countries. Of course most of the people mentioned in this paragraph have been already well-motivated braille users, for that is the kind of people for whom ACB is intended, but particularly striking has been the fact that when almost 100 new special contractions were introduced into the *Braille Radio Times*, the braille publication with the largest circulation in the U.K., there was some adverse reaction to a few of the innovations, according to the then Braille Editor of the Royal National Institute for the Blind, but the vast majority of the new contractions seemed to be taken by the vast majority of the readers in their stride.

17 'But wouldn't it do to use a number of special short-forms in specialist works, which could be listed at the front of the books in question, to supplement a less highly contracted grade of braille?' No: first, because if this practice were confined to short forms for words which appear frequently only in works in a particular specialism, the practice would save only a very small amount of space and nothing like the amount of space, time and effort aimed at in ACB; and secondly, because if special short-forms were not so confined, then either you could have the same word represented by different short-forms in different specialisms, which would be very undesirable since

many people read books in more than one specialism, or, if there were central regulation, then an advanced contracted code would be in process of creation. The practice of adding a few listed special short-forms to certain types of books could, of course, sometimes usefully supplement the use of either ACB or BCB, and one of the uses of ACB would be that it would provide transcribers with an already-thought-out stock of short-forms with which to augment particular sorts of transcriptions into a more simply contracted braille — eg religious works, radio programmes, etc.

18 It is time now to come to the objection not so much to ACB as to two contracted grades of braille as such. This is sometimes put in the form of the question 'But who would decide as to which grade should be used for a particular book?' The direct answer to this question is 'Immediately, the producers who decide to put the book into braille.' Of course, sometimes the producer might decide to let each particular consumer decide, especially where the book was computer-produced and where translation programmes for both grades existed: here the book could be produced in both grades and supplied to each consumer in the grade desired. But even with a computer the production of a book in two grades of braille is likely to add to its production costs in terms of precious editorial time, and if ACB's advantage in cost, mentioned in para 14, is to be adequately realised, then probably most books would have to be produced in one grade or the other but not in both. Even so, producers would in the long run undoubtedly be guided by the demand from consumers as to which grade to use, and the principle which should guide them at the start is clear and seems likely to be fairly easy to apply. It is that indicated in the BAUK resolution quoted at the beginning of this paper — that books or periodicals only likely in any case to be read in braille by intensive braille users — advanced study material, specialist material for blind professionals (teachers, lawyers, social workers and research workers, physio therapists, etc.), exceptionally long novels, biographies, etc. — should be issued in ACB, and the rest in a more simply contracted braille. (In the UK this would mean, to begin with at least (for it is possible that the demand for ACB would grow considerably), that the bulk of the production of the Students' Braille Library would be in ACB, but the bulk of the output of the National Library for the Blind — a general-purpose library — would be in the more moderately contracted grade of braille.) There would thus be plenty of motive for braille beginners to learn the simpler grade of contracted braille, since this alone would give access to a great deal of material; but there would also be motive and opportunity for the fluent braillist to master ACB. It is sometimes suggested that someone might want to read something in ACB who for some reason could not learn ACB. But for what reason? No plausible answer has been suggested, for the truth — which is very much worth repeating — is that for anyone with a moderate competence in braille the reading of material that he really wants to read in a highly contracted braille is *not very difficult*, provided that the contrac-

tions are well-chosen and that he has to hand a well set-out code-book.

19 Finally, we must notice an objection not so much to ACB itself as to some of the arguments used for it in this paper. This is that such arguments have been or soon will be rendered out of date by technological developments: here what is in mind is not so much developments which will render braille otiose, such as the development of a cheap device enabling blind people to read all types of print tolerably easily at speeds comparable to the speeds which can be attained in braille — for it seems very improbable at present that such developments will take place in the foreseeable future — but rather 'paperless braillers'. With these, it is said, fast, silent writing should be possible in moderately contracted braille, and the bulkiness of braille ceases to be a problem. A partial reply to this has already been made in para 10, but in addition it can be said that with all existing paperless braillers retrieval of information is very often likely to be more difficult and slower than with conventional braille books, despite the sophisticated indexing capabilities of these braillers; that although with such equipment the storage of braille is no longer likely to be a problem, yet space-saving contractions and sequences could still be a boon where, as in the case of the most portable of such braillers, only one very short line can be presented at a time; and above all that the high cost of such equipment makes its widespread use unlikely for a long time to come. If it is rejoined that further technological developments may soon solve these remaining problems, then it must be said that at this point in time it is quite impossible to be sure about this, but that this is a question about which it may be possible to be more confident towards the end of the present decade. If it then seems that such problems *will* soon be overcome, then it may well be agreed that ACB would not on balance be worth the effort it would take to establish it; but if it then seems likely that such problems will *not* be overcome in the foreseeable future, then the use of the time between now and then to prepare two grades of well-contracted braille will be seen to have been constructive, and a failure to use this time in this way may be thought wasteful.

Arguments for BCB

20 ACB could of course be developed retaining present Grade 2 as the grade of moderately contracted braille in use, but there are three main reasons for putting in its place a revised Grade 2 with far fewer contractions — say around half the present 189 — whose use would nevertheless save at least as much space as does present Grade 2. The first is that such a grade would be easier to learn and to read, and would thus encourage more braille beginners to become regular users of braille, to their advantage. I have already indicated that there is evidence that well-motivated people positively *enjoy* learning braille contractions, but this may not be so with braille beginners who lack confidence or a strong desire to learn braille. Although it is very strange that the researchers who have argued for a less highly contracted form

of braille than Grade 2 as it now is have produced no research evidence at all that the number of contractions to be learnt affects anyone's desire or ability to learn braille, it does seem likely that some people would be more willing and able to learn a braille system with 90 contractions than one with a hundred more, especially if the latter did not accomplish anything more than the former in space-saving or other terms. The advantage of a more economically contracted grade would not be only that there would be fewer contractions to learn: in present Grade 2, 88 of the contractions occur on average less than once in every thousand words, 31 of these less than once in every five thousand words (Lorimer: frequency of contractions in four counts). If in a revised Grade 2 all the contractions occurred at least twice in every 1,000 words, then it ought to be easier and quicker to read as well as to learn for those who do relatively little reading in braille, since studies of the perceptual factors in braille reading have stressed that familiarity with braille signs speeds up their recognition, and more frequent encounters with contractions are likely to make their recall easier.

21 There are other ways in which a revised Grade 2 with fewer contractions could make the perception of braille text easier for beginners and inexperienced braille readers. It could do so if it were so constructed as to reduce the frequency of occurrence of signs which are particularly often misperceived by such readers — eg lower signs standing alone — and if it eliminated some contractions which are frequently occasions of errors in reading — eg the contraction for 'also'.

22 The third main argument in favour of a revision of present Grade 2 is that, apart from its effects on braille beginners and infrequent users of braille, it cannot be good to have a grade of braille which is often very uneconomic in its use of braille signs, whether that grade is the sole grade of contracted braille or a basic grade on which an advanced grade is to be built. Though present Grade 2 has many good contractions, that it is often very uneconomic cannot be doubted. For instance, while it has no contractions for very common words such as 'is', 'on', 'he', 'at' and 'or', all of which occur more than seven times in every thousand words on average (Gill count), it wastes precious single-cell signs, some of which could be used for such words, on words such as 'go', 'us', 'enough', 'child' and 'knowledge'— words which do not occur on average once in a thousand words, and whose contractions each save on average less than one cell per thousand words (Lorimer, op.cit.). Similarly, the five medial double-letter contractions used in Grade 2 between them save on average about seven cells per one thousand words (Lorimer, op.cit.), but had medial signs been used for oo, ee, tt, and pp, the saving would have been about thirty cells per one thousand words, according to Lorimer and Lochhead's report of the NUTC 1954 survey (Table IV), and according to the same source the use of single signs for 11 and ss (medially and finally), for ly, es, and le (finally), and for re (initially), would save on average more than 75 further cells in every one thousand words. It

also seems clear that there is scope for the introduction of some further sequencing into a basic contracted grade which, far from making reading more difficult, would tend to make it easier and quicker, especially for some new braillists. In these circumstances it seems extremely doubtful whether braille authorities have the right to require the braille-using public to go on using a grade of braille which rewards the effort of learning so unnecessarily poorly, and which makes both reading and writing braille unnecessarily laborious and slow. A better-constructed basic contracted braille would be a boon to new braillists, and of great advantage, too, to experienced braillists, not least by making it much easier to construct and to learn a rational advanced contracted braille.

Arguments against BCB

23 The strongest argument against BCB is that whilst it will bring advantage to some new learners of braille, and, if it forms the basis of ACB, to those who go on to use ACB, it brings no advantage to those many braille readers who have mastered Grade 2 and read a bit in it and perhaps use it occasionally for writing, but who neither are nor expect to be intensive users of braille. Such people, probably the majority of existing braille readers, will have the bother of having to learn the new code for no reward. There is force in this, and it is quite certain that quite a number of people would vigorously protest against the replacement of present Grade 2 by BCB. It is also certain that after a time these protests would die away, not from despair, but because people were discovering the attractions of the new code. If the new contractions were well-chosen, people would become pleased with them as they got used to them, and would begin to use them in their own writing for themselves and their friends, almost certainly together with many of the old contractions of Grade 2 which had been officially discontinued — an 'impurity' which would do no harm and would enable them to reduce the laboriousness of their writing. Nevertheless, there is enough force in this objection to make it seem desirable that BCB should actually save *more* space than present Grade 2 whilst using many fewer contractions — a quite attainable aim. Even if it only saved 3-4% of space over Grade 2, this would probably be enough to convince the majority of readers of Grade 2 that the change to BCB was worthwhile, or at least worth tolerating for the sake of those who would benefit more substantially — new braillists and braillists interested in ACB. What must be stressed, however, is that in any case the change from Grade 2 to BCB, even if temporarily irritating to some, would not only not impose lasting loss on anyone, but would not at any point impose serious difficulties on anyone. With two-thirds of the new code identical with the old, the learning of thirty new contractions would not pose a serious problem for anyone, even if there were changes of meaning for some of the signs of Grade 2. There is no evidence to suggest that the extreme conservatism of braille authorities in the past on this matter has been

anything other than irrational timorousness: on the contrary, the evidence we have, cited at various points in this paper, suggests that that is just what it has been.

24 Some of those who recognise the case for a revision of Grade 2 nevertheless argue that the revision could be less radical than that envisaged by BAUK. They point to experiments at Birmingham such as Experiment 6 (Tobin and Lorimer, *New Beacon*, November, 1980) where a group of readers read a passage in a modified Grade 2 code from which 79 Grade 2 contractions had been eliminated and to which 18 new contractions had been added at a speed insignificantly different from that at which they read it in straight Grade 2. Since this was done at short notice and with very little practice, it bears out what has just been said at the end of the last paragraph. But, first, a reduction of Grade 2 that leaves two-thirds of its present number of contractions still to be learnt by beginners may not be enough to make it significantly more attractive to the poorly-motivated or unconfident braille learner; and secondly, because the modified code rested on the acceptance of the no-substitution rule — the rule that no new meaning for any braille sound must be substituted for an existing Grade 2 meaning — it necessarily retained many of the wasteful features of present Grade 2 and could not have served as a satisfactory basis for Advanced Contracted Braille. It must be stressed that the adoption of the no-substitution rule renders impossible the making of any major improvement to Grade 2, and at the same time that it seems clear, from the replies to the Gill questionnaire and from the responses to Mr Poole's June, 1981, *New Beacon* article, that the braille-using public do not want changes in the braille code that do not bring substantial advantages.

25 But the most frequently heard objection to making major changes in Grade 2 of the order contemplated by BAUK in BCB is that they would render immediately obsolete the large existing stocks of books in present Grade 2 braille. As thus expressed this objection seems to have no force, for what it asserts is simply untrue. Even if (as is to be hoped) all existing braille readers learnt BCB, this would not render them in the slightest incapable of reading the old Grade 2. The braille shorthand systems in the UK have been and are far more radically different from Grade 2 than would be BCB, but the many hundreds of people in the UK who have learnt braille shorthand and used it daily have never found any difficulty in continuing to read Grade 2. It is a different matter with writing, as has been indicated in para 23, but as has also been suggested there, no great harm is done if people's private braille writing is 'impure'. In the early days of new Grade 2 there might indeed seem to be a problem for braille beginners, for they would not of course be expected to learn simultaneously two versions of Grade 2, and would therefore not know the braille in which most books were written. What should probably happen is that for some time after books begin to be published in BCB, beginners should go on being taught the old grade only, but that when a fair

stock of books have become available in the new grade, then teaching should switch to the new grade. After a year or two of experience of the new grade, the more committed of these recent braillists would find it relatively easy to learn the old grade as well. Gradually, of course, the old Grade 2 stocks will become obsolete and BCB will take over. But there is no need at all for libraries to feel that their stocks become useless the moment a major revision of the braille code takes place: they will remain accessible and useful to the great bulk of braille users for a long time to come.

Conclusions

26 It must be held that braille codes should rarely be revised, but it cannot be held that they should *never* be revised. Changes in the environment in which it is used make it possible, necessary and right that occasionally it should undergo quite substantial change. In the UK Grade 2 English Braille has been almost unchanged for the greater part of this century, and it has undergone little change in any part of the English-speaking world for fifty years. Research into braille reading and into the frequency of occurrence and space-saving effect of braille contractions over the past thirty years and especially during the past decade or so have made it clear, however, that Grade 2 is an extremely defective contraction system in a number of respects. At the same time, the increasing numbers of blind people who have gained access during this period to advanced study and to various kinds of employment in which braille should function as a working tool have made it desirable that this tool should be greatly improved, and the increasing use of computers and of automatic inputting in the production of braille, which can bring enormous benefits to braille users in quantity and speed of production of material in braille if properly managed, also calls for a re-examination of present Grade 2 braille. Now would therefore seem to be one of the rare times when major changes in the braille code might be appropriate. It is desirable that these changes should be carried out so well that no further changes of any significance will be needed during the next fifty years at least.

27 From the review of the arguments for and against two grades of contracted English braille in place of present Grade 2 which has been offered in this paper, the conclusions that emerge seem to be (1) that if grades with the characteristics of ACB and BCB as indicated in this paper *can* be devised, they *should* be devised, and that the work of devising them which has begun should be brought to a conclusion as speedily as possible, preferably eventually at an international level; (2) That when this work has been done as well as it can be done, field tests of the newly devised codes should be carried out, preferably in a number of countries and certainly over a considerable period of time — two to three years at least: these tests would require the co-operation on a large scale of braille producers; (3) That after these tests there should be a period of review of their results, culminating in a further international conference to take or initiate final decisions about the matters

discussed in this paper — the whole process to last over the next five to seven years.

Conference Discussion

Lorimer: The statistical evidence of Birmingham/Warwick makes it clear that there is a good case for radical change. The idea behind Birmingham/Warwick was that there should be one reduced code and that is still my view. Perhaps there should be a simplified code for children. A tiered code would not satisfy the majority who would like a code more or less like the present one.

Jolley: The use of statistics when discussing frequency counts is a concern. We must make a distinction between reading and writing braille. Space-saving is not a strong argument and I am skeptical of achieving 40% against Grade 1 braille.

Nilsson: More than one level of contraction creates a problem for producers — which book should be produced in which code?

Churcher: Lorimer's suggestion of a third code raises the question — "Why not a fourth? a fifth?". The proposal makes for less likelihood of standardization.

Burling: The three tiers would be: Grade 1, simplified contracted braille, and advanced contracted braille. There would be a basic, easy-to-learn, "slim-line" braille on which would be based an advanced code.

Cargill: We must take advantage of research. Going back to a simplified system might be difficult. The ones who most need braille are professional people who have developed their own advanced braille. Advanced braille should not be an alternative for high school or library books. We must make the standard code easier.

Evensen: Advanced braille could be an option, but to spend time developing such a code is not a high priority. There must be a compelling reason to change the present Grade 2.

Ledermann: Knowledge of British Shorthand is a tremendous advantage in taking notes.

Brown: Braille is more than rule-making. The idea of making it more useful for more people can be accomplished by a basic code plus a code for serious students.

Aucamp: When the work of the Conference is completed, a code for rapid writing should be developed. This could be tested to decide whether or not it should be printed.

Maxwell: One advantage in formalizing a code is the familiarity you have in reading it.

Milligan: An advanced code could be an experiment in the early stages but it would be a great pity if nothing were written in it. When and if the computer can produce both codes, the decision would be governed by the fact that only good braillists will want certain books. I regard the development of an advanced code as a high priority.

SOME CODE CHANGES FOR BETTER TEACHING AND LEARNING OF BRAILLE

Mrs. Marjorie D. Troughton, Canada. Marjorie Troughton, Braille Remedial Teacher at the W. Ross Macdonald School in Brantford, Ontario, Canada, has had many years' experience teaching braille to children of varying abilities.

About the Author

Mrs. Marjorie D. Troughton is at present the Remedial Braille Teacher at the W. Ross Macdonald School in Brantford, Ontario, Canada. She has taught nearly 200 children to read and write Braille and has helped over 50 others improve their skills in a remedial setting. She has taught students from ages 5 to 20 with I.Q.s ranging from 50 to 150. Since 1954 she has observed the pitfalls as well as the good points of Braille as it is used in an educational setting. She has done extensive reading, testing and research on the topics of Braille.

She is a graduate of McMaster University and Hamilton Teachers' College. She is one of the Canadian delegates to the Conference.

This paper is submitted as a suggestion to be considered under the third purpose of the International Braille Conference. It is an attempt to explore ideas for improving the English literary braille code. It has been shown both by research and practical use that these ideas facilitate the learning, reading and writing of braille for many students.

Few people who could use braille do in fact use it. Fewer people use it well. Why? Three different reasons have been given: the lack of availability of braille material, the complexities of the code itself and the abundance of tapes and other audio equipment. However, the main reason for the lack of braille usage is the braille code itself.

The Grade 2 braille code as it stands now is very useful to some. The Grade 3 code is also useful to some. What I am advocating is the creation of a simplified braille code to be used by those people who find the present Grade 2 code too difficult. Sighted children are given other opportunities eg. Bliss Symbols. This is not a replacement for Grade 2 but a supplement. The group using the simplified code would include children with learning problems as well as elderly people attempting to learn braille for the first time.

When you hear children reading slowly because their brains can't sort out all the information and when you have watched children who desperately want to learn to read, struggle and be defeated by the complexities of the code, you know you must do what you can to help. And then when you give them a chance with a simplified code, you know it's the answer when you hear the joy in their voices and the excitement in their "I can do it."

Many researchers and teachers have shown the need for a simplified code. It has been demonstrated that a less complex code is not only easier and faster

but also it uses very little more space.

Before explaining my own research and its results, I shall give the conclusions of several others on this topic.

Summary of Research Done By Others

At the conference on research needs in braille in Sept. 1961, in New York, Carl Rodgers stated that time is consumed by the labour of determining the position of characters which are like other characters except for the level in their line and that the double consonant contractions proved especially difficult. He also said that horizontally extended characters are more difficult to read than vertical characters. At the same conference Samuel Ashcroft said that the incidences of many of the more difficult short form words in general literature are so low, that little space saving is actually accomplished and many multiple cell contractions present an inordinate amount of difficulty because of the nature of their configuration. He found the evident problem in connection with lower signs is the number of meanings they carry in different contexts. He said code revision should be directed toward decreasing the variability in the endings of words and that care must be taken to separate code problems from reading problems.

Bernard Krebs said that any research should include proficient readers as well as those just learning the code. He also stated that anything that makes you look twice is a bad form of education. He felt that most braille users could overcome most code problems with practice.

In the January 1972 issue of The Teacher of the Blind from the United Kingdom, John Lorimer said that the braille system is cluttered with a good deal of dead wood. Its removal would reduce learning and reading difficulty and the resulting increase of space occupied would be almost imperceptible. The research findings indicate that any revision of Grade 2 braille should be in the direction of reducing the number of contracted forms.

In the July 1973 issue Bernard Best said that there is a real need for a simpler form of braille. He feels that the rules of braille have become too complicated and too difficult for some to learn. He said that only by simplifying braille can it be brought into more popular use. Voluntary braillists could learn the simplified form more easily. He suggested a school braille code which has about 100 signs and no rules.

In the Spring 1975 issue Barry Hampshire states that the highly contracted braille code is responsible for inhibiting higher speeds of braille reading. Also that there are interesting numbers of blind children and adventiously blind adults who find the present Grade 2 braille code just too difficult to learn. A simple base code should be devised for braille from definite principles which have their basis in research. He continued saying that such a well established system as that associated with the provision of braille will have a great deal of inertia against any changes, despite the dissatisfaction of many people who use it.

The same author in the New Outlook for the Blind suggests that certain simplifications in the braille code and changes in the mode of presentation would considerably improve the efficiency of braille reading. The principal limitation to information intake either visual or tactual appears to be cognition and not the sensory channel that is employed. The most obvious cognitive variable in learning to read braille is the often difficult task of decoding braille symbols. The extra complexities of the braille code are likely to retard reading development since the long-term memory will have to contain the many rules and regulations associated with using contracted braille. The braille code itself is responsible to a large extent for the slowness of braille reading. Considerable improvments could be made in the case of reading braille by making the contraction system far less complex and by taking advantage of how language is processed by the reader in deciding the contractions to be used.

In an article Science and Blindness: Retrospective and Prospective, P.A. Kolers says that if the set of marks we use for reading is such as to require extended intellectual effort for their perception, as is the case with braille, substantially less of our cognitive resources will be available for making contact with our stores of information, for interpreting or thinking about the information we are perceiving.

Carson Nolan and Cleves Kederis in their book Perceptual Factors in Braille Word Recognition state that recognition time is increased by contractions. Familiar contracted words are easier to recognize than familiar uncontracted words but unfamiliar contracted words are harder to recognize than uncontracted unfamiliar words. Lower mental ability slows the speed of character recognition and the time required to integrate information. Many characters should be eliminated from the braille code and this would result in increased speed and very little more space.

In the December 1965 issue of The International Journal for the Education of the Blind. C.J. Kederis, J.R. Siems and R.L. Hayes published A Frequency Count of the Symbology of English Braille Grade 2 American Usage. They showed that many of the braille elements seldom appeared or saved much space in the books they surveyed.

The History of Braille Codes

We should take a moment to look at the history of the development and acceptance of the Grade 2 braille code. How did it become so complex? Why is there not now a simplified code?

Robert Irwin in his booklet The War of the Dots describes the struggle of people attempting to get consensus on a uniform English braille code. It was mainly a battle of personalities, politics and administrators rather than a discussion eminating from research and practical use. After many many years and several different codes the decision was a compromise and the best that could be done under the circumstances. But we are in different times and different circumstances and we need to take a different look to make

sure that we are doing the best that can be done now.

There once was a simplified braille code called Grade 1 1/2. However the simplified code was sacrificed because it was impossible both physically and financially to publish books in 2 different codes. However with today's computers and technology it is no longer impossible. We must have material available in 2 different codes. It is time that a larger percentage of possible braille users be given the opportunity to have a code that is useful to them. The code must be determined from research and practical use. This is what I have done, drawing from my students and research. This paper will briefly outline the research, the code which we tried and the results which it produced. Time was too short for conclusions over long periods but this is what we found.

Outline of Brantford Research

I will attempt to describe how it was determined what should be included in the simplified braille code.

(a) Over 200 students of varying ages and abilities were tested in both reading and writing to determine which elements were causing the most difficulty. The results were studied to determine which errors were eliminated over time, which errors were more common in reading, which errors were more common in writing, which errors were made by highly intelligent students and which errors were usually made by slower learners.

(b) Many books, articles and research projects done by others were checked to discover what results and conclusions they had reached.

(c) Lists of the most commonly used words were checked to see how often each braille element was used in those words.

(d) The frequency count of Kederis, Siems and Haynes was utilized to see how often each braille element was used there and how much space was saved.

(e) Other items were checked and then retested to determine if the suggested change was in fact an improvement. Short forms were examined to see if the letters used did in fact give the best clue at the beginning of a word. The signs most often confused were studied to see if the number of choices could be lessened. Upper and lower cell confusions were given a special study because of their high frequency of error. Studies were done to see if fewer choices for one symbol aided the reader. Various forms of punctuation and elimination of punctuation were tried as well as different forms of spacing.

(f) Over 200 students, teachers and adult braille users were surveyed for their suggestions for change.

(g) The brain functions used in reading (as far as they are understood) were examined to see if the braille elements were interfering with or hindering their efficiency. Some errors were doublechecked to make sure they were braille errors and not reading or spelling errors.

(h) Some rules of usage were eliminated to see if their abandonment helped or hindered the reading and writing processes.

(i) Spelling was compared orally, using Grade 2 code and using the simplified code. A check was made of typing errors to see if any could be caused by use of braille contractions.

(j) Reading passages some with Grade 2 braille and some with the simplified braille were compared for speed, errors and hesitations. The characteristics of good braille reading such as smooth hand movement and light finger pressure were also observed.

The Rating System

A rating system was drawn up to include the results from the following areas: reading, writing, frequency, space saved, spelling, typing, confusers, rules, groupings and survey.

Those words causing the most problems were given 10 demerit points. Those causing several problems were given 5 demerit points. Those causing a few problems were given 2 demerit points. Those causing no problems in that particular area received no points. When points from all the areas were added together, the following list shows the demerit points each element received. Those with more than 20 points were eliminated. Those with less than 20 points were included in the simplified code.

about	0	because	24	conceiving	52
above	5	before	22	could	2
according	45	behind	32		
across	2	below	44	day	21
after	5	beneath	39	dd	39
afternoon	7	beside	33	deceive	52
afterward	35	between	26	deceiving	52
again	2	beyond	65	declare	47
against	4	ble	27	declaring	47
ally	45	blind	14	dis	50
almost	5	braille	14	do	2
already	9	but	4		
also	35	by	37	ea	45
although	10			ed	7
altogether	35	can	2	either	34
always	4	cannot	29	en	15
ance	39	cc	52	ence	52
and	4	ch	12	enough	49
ar	7	character	52	er	5
as	9	child	11	ever	34
ation	37	children	2	every	17
		com	45		
bb	41	con	50	father	25
be	40	conceive	52	ff	39

first	10	much	5	should	12
for	2	must	7	sion	52
friend	5	myself	5	so	2
from	6			some	29
ful	52	name	24	spirit	52
		necessary	50	st	15
gg	34	neither	37	still	2
gh	2	ness	40	such	2
go	2	not	2		
good	0			th	5
great	0	o'clock	24	that	4
		of	27	the	2
had	30	one	37	their	32
have	4	oneself	35	themselves	28
here	22	ong	27	there	36
herself	5	ou	10	these	54
him	0	ought	47	this	2
himself	0	ound	30	those	52
his	35	ourselves	35	through	43
		ount	34	thyself	32
immediate	45	out	21	time	24
in	15	ow	0	tion	45
ing	10			to	35
into	32	paid	22	today	10
it	2	part	30	together	2
its	8	people	2	tomorrow	12
itself	12	perceive	52	tonight	10
ity	47	perceiving	52		
		perhaps	27	under	22
just	17			upon	42
		question	36	us	7
know	22	quick	4		
knowledge	18	quite	15	very	2
less	49	rather	11	was	45
letter	10	receive	42	were	45
like	2	receiving	52	wh	7
little	0	rejoice	52	where	44
lord	35	rejoicing	52	which	2
		right	23	whose	55
many	44			will	2
ment	45	said	0	with	4
more	2	sh	15	word	49
mother	24	shall	9	work	24

world	41	you	2	yourself	12
would	0	young	26	yourselves	32
		your	0		

Abbreviations To Keep For Simplified Code

about
above
across
after
afternoon
again
against
almost
already
although
always
and
ar
as

blind
braille
but

can
ch
child
children
could

do

ed
en
er
every

first
for
friend

from

gh
go
good
great

have
herself
him
himself

in
ing
it
its
itself

just

knowledge

letter
like
little

more
much
must
myself

not

ou
ow

people

quick
quite

rather

said
sh
shall
should
so
st
still
such

th
that
the
this
today
together
tomorrow
tonight

us

very

wh
which
will
with
would

you
your
yourself

Changes to be Made for Simplified Code

(a) Eliminate capitals. Then use dot 6 for italics and any other occasion where emphasis is needed such as underlined words, words where all letters are capitalized and the word I.

(b) Eliminate hyphens both at the end of lines and in hyphenated words. If there is not enough room at the end of a line for all the word, put the whole word on the next line. Then use dots 3 and 6 for opening and closing quotation marks.

(c) Eliminate rules as much as possible. Keep the rule that whole word meanings can only be used alone.

(d) Accommodate any changes made in Grade 2 braille which would apply to simplified braille; for example, if it is decided in Grade 2 braille to change the meaning of the letter k from knowledge to keep, then that change would be made in simplified braille.

Results of Using the Simplified Code

After the elements of the simplified braille code were determined, a story was brailled in Grade 2 braille and also simplified braille. 8 better readers read the first half simplified braille and the second half Grade 2 braille. 8 other better readers did the reverse. The same pattern was followed with two groups of eight poorer readers. After reading they were asked ten comprehension questions. The results are as follows:

In reading the Grade 2 braille the better readers made 72 character errors and 45 other errors for a total of 117 errors. They used 145 minutes and 30 seconds.

In reading the simplified braille the better readers made 21 character errors and 30 other errors for a total of 51 errors. They used 140 minutes and 40 seconds.

Thus the time difference was 4 minutes and 50 seconds less for the simplified braille — not really significant. The errors were 2¼ times fewer for the simplified braille. The comprehension was equally good for both.

In reading the Grade 2 braille the poorer readers made 286 character errors and 94 other errors for a total of 380 errors. They used 383 minutes and 30 seconds.

In reading the simplified braille the poorer readers made only 32 character errors and 40 other errors for a total of 72 errors. They used 303 minutes and 30 seconds.

Thus the time difference for the poorer readers was 80 minutes or 1/5 less for the simplified braille. There were 308 fewer errors or 5¼ times fewer errors for the simplified braille. The comprehension was almost twice as good with the simplified braille.

The changed forms for italics and quotation marks completely eliminated errors involving them in both groups. The elimination of capitals caused no errors.

The Grade 2 braille took 126 lines. The simplified braille took 132 lines or less than 5% more. A small price to pay for the benefits received. Naturally, if double spacing between lines is used then the number of pages is doubled.

Conclusions About Simplified Braille Code

I recommend that the delegates at this conference seriously consider the implementation of this simplified braille code. I know I will use it with any students that I teach that will benefit from a simplified code.

There is overwhelming evidence both from research and from practical use that a second code, a simplified braille code, is needed for those people who cannot handle the more complex Grade 2 code.

Conference Observers

More information about the methodology used was requested by Lorimer, Evensen and Aucamp. In his research, Lorimer had observed the opposite result for the use of the double-letter sign. More teachers should be involved in research (Lorimer) and they should be encouraged to publish their findings (Nilssen). More research is needed on what contractions can be most easily learned by young children (Bogart), and on whether difficulties encountered are caused by braille rules or vocabulary development (Maxwell). Special education for braille teaching cannot be paralleled to the sighted curriculum (Cargill). There are too many teachers who are not proficient braillists; braille certification does not gain a teacher any more money (Small).

THE SPACE SAVING EFFICIENCY OF GRADE 2 BRAILLE AND THE POSSIBILITY OF IMPROVING IT

by John Lorimer
(Vice-Chairman of the Braille Authority of the United Kindgom and Lecturer on the teaching of braille to two courses for teachers of the visually handicapped in the University of Birmingham.)

1. Introduction

1.1 The major, if not the primary, objectives of this conference are, first, to have one contracted braille system and one set of governing rules which will be used throughout the English-speaking community and, second, to incorporate in that system modifications of the present code and rules specifically to facilitate automated production. The achieving of both objectives is obviously highly desirable, yet no less desirable is the need for giving serious and detailed attention to ways of improving the code's efficiency in conveying meaning to the reader. In our efforts to ease the problems of computer translation we must never lose sight of the fact that the braille system is first and foremost a medium for communicating the written word through the tactile sense, and not merely a set of symbols to be processed as economically as possible by a machine.

1.2 Researches during the past two decades in the United States and in Britain have shown that the Grade 2 code is not as efficient a communication medium as it might be. As will be noted later, they have indicated ways in which braille might be made easier to learn, more satisfying to use, and therefore more widely accessible. Code revision which ignores or pays insufficient attention to the findings of these researches will fall short of what is needed and what is expected by many braille users. A thorough revision of the present system of contracted braille which better meets the needs of different categories of users is long overdue.

1.3 I strongly urge that a comprehensive review and revision of the present contracted code will be accepted as a task of primary importance which will now be jointly undertaken. This conference provides the opportunity, wasted at the last revision of Grade 2, of developing a system which will be more efficient and which should stand for at least fifty years. I hope that the opportunity will not this time be cast aside. I also urge that we do not now adopt any change which, however attractive to computer programmers it might be, would clearly erode the efficiency of the present code. There are no doubt some changes which can be agreed on here and now without prejudice to the larger task, but in making them we should be careful not to add to the already considerable perceptual and cognitive difficulties inherent in learning and mastering the use of contracted braille.

2. A Citation

2.1 Some observations by Emerson Foulke, made at the New York Workshop on braille held in 1976, are particularly relevant to the foregoing and to the main topic of this paper:

> "Reading matter written in braille certainly takes up a great deal of space, and I certainly have no objection to saving some of that space. However, I would not want to save space at the expense of readability. Readability is the most important factor to be considered, and it should not be sacrificed either for saving space or for facilitating mechanical translation. ... I think it would be unnecessary and wrong to allow facilitation of the machine translation of braille to shape the rules governing the use of contractions and abbreviations."

3. Purpose

3.1 The main purpose of this paper is to consider the efficiency of the Grade 2 code in terms of space saving and the extent to which the saving of more space can be made with advantage to braille users.

3.2 However, it should be borne in mind that, although the saving of space has a considerable influence on speed of reading, there are other features of the code which have no less an important bearing on readability and which need further research. Among these features are: the forms and number of contractions used and their effect on ease of learning and recognition; the complexity of the rules governing the use of contractions; and the effect of varying density of contracting on level of redundancy. The saving of space in braille, rather than any other component of code efficiency, has been chosen as the subject of this paper because of the over-riding importance that has always been attached to it and because, unlike the other components mentioned, it can be measured precisely and in terms that are easily understood.

3.3 Space saving will be discussed under the following heads: definitions of the often loosely-used term "space saving"; explanation of a simple method of estimating the effect on present Grade 2 space of deleting contractions or adding new ones of known frequency; a brief assessment of the space saving efficiency of Grade 2; the extent by which Grade 2 can be reduced and simplified without loss of space saving efficiency; and the possibility of improving on the space saving effect of the present code. Finally, I shall attempt to demonstrate that there is a limit — lower than perhaps might be expected — by which further space saving effort would be unnoticeable and even counter-productive. No code changes will here be proposed. The intention, rather, is to present information and considerations relating to code efficiency which it is suggested should be taken into account in making decisions about change.

4. Definitions of "Braille Space"

4.1 In reading by touch the braille cells encountered by the fingers can be divided into three categories: (a) embossed spaces in words; (b) punctuation and composition signs; and (c) blank spaces between words. All three types taken together constitute the total or overall space covered by the fingers as they trace along lines of text.

4.2 Published estimates of the space saving contribution made by contractions are sometimes ambiguous and a little misleading, for it is not always clearly stated whether the space reductions quoted refer to word length or to overall space. Space saving values given as percentages will differ according to whether the spaces saved are expressed as a fraction of the cells in words or of total space. For example, the frequency count by Kederis, et al (1965) shows that Grade 2 (American) reduces Grade 1 spaces in words by 31%, but, as the authors point out, this saving falls to 26.5% when punctuation is also taken into account. Had between-word blank spaces been included in the reckoning, the figure would have been still lower, probably a little below 25%. Space saving values, therefore, will have precise meaning only if it is known to what kind of braille "space" they relate, i.e. whether to embossed spaces in words or to total space.

4.3 Likewise, it is necessary to know whether savings refer to reductions of Grade 1 or of Grade 2 space. It has been generally the practice to measure space saving against Grade 1, for uncontracted braille is a fixed base. But there are many contractions which have a considerably larger impact on Grade 1 than on Grade 2 embossed space in words. For example, in the space saving order against Grade 1 and Grade 2, the shortform word BEFORE ranks respectively 64th and 120th (Birmingham/Warwick, "A Study of Braille Contractions", 1982). Performance against Grade 1 is thus not a very reliable indicator of performance in a Grade 2 text.

4.4 The effect of change on Grade 2 rather than on Grade 1 space is likely to be of greater interest to users. As by far the greater part of reading time is spent in perceiving and processing characters in words, shortening the average length of words in a Grade 2 setting is considered to have a more important bearing on ease and speed of reading than is reduction of total Grade 1 space. The average number of embossed spaces contained in words in Grade 2 texts will therefore be used as the base against which the effects of possible code changes on present space saving efficiency will be estimated.

5. Method of Estimating Effect of Code Changes on Present Grade 2 Space

5.1 To establish this base it was necessary to determine the average number of each of the three types of spaces occurring in a Grade 2 passage of standard length. For this purpose an analysis was made of the space content of 30 samples of adult literature covering about 30,000 words of running text. Selections were made from sources that are known to have a wide appeal, e.g. popular novels, short stories, articles on topics of general interest and

magazines dealing with aids and services for the visually handicapped. Learned works and textbooks were not included. One thousand words of running text were chosen as the standard length of a sample (about four and a half pages of interpoint Grade 2 braille). A unit of this length is small enough to be comprehended easily but not too small for statistical purposes. The results of the analysis are shown in Appendix 1.

5.2 Using these results, the percentage loss or gain on Grade 2 space resulting from deletion of existing or addition of new contractions of known frequency can easily and immediately be calculated. It will be seen in Appendix 1 that 1,000 words of Grade 2 contain about 3,200 embossed spaces in words. Taking this figure as a base, it is possible to determine accurately:

(a) the percentage contribution that the addition of a new contraction or group of contractions would make to the reduction of Grade 2 spaces in words;

(b) the approximate number of these spaces which would need to be saved to achieve any desired percentage of space reduction.

5.3 (a) A 1% reduction of Grade 2 word length would require the saving of about 32 embossed spaces in 1,000 words. A saving of one space is equivalent to a 0.032% space reduction. The percentage reduction for any given number of spaces saved can therefore easily be found by multiplying 0.032 by that number. The same procedure would, of course, give the percentage increase of present Grade 2 space resulting from the deletion of existing contractions. To estimate reduction of Grade 1 word length, substitute 0.022 (1% divided by 45) multiplied by the number of spaces saved by the contractions(s) against Grade 1. For example, a group of contractions saving 50 embossed spaces between them in 1,000 words would shorten average word length by about 1.6% against Grade 2 and 1.1% against Grade 1.

(b) Using the fact that 32 embossed spaces are equal to about 1% of Grade 2 spaces in 1,000 words, estimation of the spaces which need to be saved to achieve a given percentage reduction is simply a matter of multiplying 32 by the percentage figure.

6. The Space Saving Efficiency of Grade 2

6.1 During the past 30 years there have been four major counts of the occurrences of Grade 2 contractions in general literature (see appended list of references). All the surveys clearly show that Grade 2 is not as efficient as it might be in reducing word length. Many of the signs are so seldom needed that their retention in a code for general use cannot well be justified.

6.2 Words and groups of letters which have a very high frequency of occurrence in the English language (more than once in every 100 words) are in the main represented in contracted form, there being 22 signs in this category. But the tail of the frequency order is both long and weak: 88 of the contractions occur less than once in 1,000 words; 31 less than once in 5,000 words; and 20 of the latter have a frequency of less than one in 10,000

words. As can be seen in Table 2, the best 10 in the frequency order of contractions occur almost as often as the remaining 179 together, and the top third accounts for nearly 90% of all the occurrences.

6.3 The upper part of the frequency curve for word-signs does to some extent parallel that for words in the English language (see the Brown Corpus, 1967) but the curve for braille appears to dip towards the lower frequencies more rapidly. The early designers of the contracted code did not have the linguistic counts now available to us to guide them in their choices and, as is well known, the choices they did make were somewhat biased by their major interest in producing braille editions of the scriptures. There is still evidence of the bias in the present code and it explains the very low frequencies of the tail-end short-form words. Almost all of the 20 short-form words occurring less than once in 10,000 words are commonly used in religious works.

6.4 As might be expected, the graph of the space saving values of contractions is very similar. The following are the more striking of the facts revealed by Table 2: in reducing the average length of Grade 1 words, the first 14 contractions save as much space as do all the rest put together; 90% of the work is done by the top 83 contractions; and the weakest 42 signs each saves less than one space in 1,000 words. In terms of space saving against Grade 2 text, the statistical data assembled in the Birmingham/Warwick study from four frequency counts show that the last 60 signs in the space saving order against Grade 2 would, if they were dropped, increase embossed cells by a little under 1%, i.e. by one cell in roughly every 35 words. The removal of the last 40 signs would have a barely perceptible effect on Grade 2 space, adding only one embossed cell in every 90 words. Thus present Grade 2 is effectively a code of not more than about 140 contractions.

6.5 It is clear from the foregoing figures that there is in the Grade 2 code a good deal of dead wood. If it were pruned out and a few new signs added to compensate the loss of space saving, the learning task for the beginner would be easier and reading and writing speeds would not be likely to suffer.

7. Experiments with Simplified Contracted Codes

7.1 There has been a growing belief among British teachers, whether of children or adults, that there is a need for a shorter and simpler contracted system which could yet be read as fast as the present Grade 2 code. It was a major aim of the recently completed Birmingham/Warwick project on braille to explore the possibility of devising alternative codes which might meet this need. At the same time an attempt was made to determine how far simplification could go without sacrificing code efficiency.

7.2 In trials of codes containing 120 to 130 contractions (including about a dozen new ones) and saving slightly more space than Grade 2, reading speeds were on average a little lower than on the standard code but differences were statistically non-significant. If subjects could have had longer than two or

three weeks of practice, it seems reasonable to assume that reading rates on experimental codes would have equalled and perhaps surpassed those for Grade 2. Shortening the code by as much as one third would therefore be unlikely to have any noticeable adverse effect on reading speed.

7.3 Simplification also requires a reduction of the number and complexity of governing rules. Such changes would be welcome, not least by computer programmers. Even if the code were to remain unaltered, there is undoubtedly room for some clarification and simplification of rules, but would a shortened code have any marked effect on them? An analysis of the rules as stated in the official manual on Standard English Braille (U.K. edition) and in the R.N.I.B. Primer showed that about 90% of them relate to the 90 contractions which do 90% of the saving of embossed spaces against Grade 2, and that the removal of the weakest 60 signs would make virtually no impact on the reduction of rules. In the light of the fact that the last 100 signs in the space saving order are involved with only about 10% of the rules, it is clear that removing signs purely on the basis of low space saving value will have but little effect on reducing the number of current rules.

7.4 A considerable impact could, however, be made by deleting the whole of one or more of the "family" groups of signs which generate many rules and exceptions. The lower signs and the two-space initial wordsigns, for example, account for almost half of the rules associated with contractions, but discarding all 52 of the signs in these two groups could not seriously be considered, for it would entail an unacceptably large increase of embossed spaces (over 10%).

7.5 Alternatively, large reductions of both rules and code content could be achieved if changes of meaning and use of some of the existing contractions were adopted. That this is indeed a possibility has been demonstrated in two basic codes, one of 100 and the other of 75 contractions, which have been proposed by two members of the Braille Authority of the United Kingdom. Both codes save at least as much embossed space as Grade 2, but whether either of the codes, or something like them, would in fact be easier to learn and to read than the present system has not yet been established.

7.6 It thus seems that, unless radical changes are made, it is impossible to devise a simplified contracted code which at one and the same time significantly eases the learner's task and yet can be read and written at least as rapidly as Grade 2. One of the findings of the Birmingham/Warwick project suggest that, within the limits set by the investigators, a code containing about 120 contractions (including a few new ones) would be an optimal size, allowing scope for some reduction of rules while well maintaining the space saving efficiency and ease of reading of the present Grade 2 code.

7.7 Simplification is not solely a matter of shortening the code and cutting out rules. Any changes made, whether in the interest of simplification or of saving space, need to be considered in relation to perceptual factors affecting readability. Reference to some of these factors has already been

made in paragraph 3.2. One such factor is the number and distribution of dots within words. Nolan and Kederis (1969) have shown that word recognition times increase not only as words become longer but also as the dot content of cells increases. Consequently, the effect on dot density of removing a contraction or adding a new one should be considered before decisions about change are taken.

8. How Far could the Grade 2 Code be Usefully Expanded?

8.1 At the same time that some teachers and users of braille in the U.K. are calling for a simplified contracted code, many highly competent and extensive users are seeking change in the opposite direction. They claim that space and therefore reading and writing time could be reduced significantly (10% at least) if about 400 contracted forms were added to Grade 2 and if the meanings of some of the existing signs were changed. It is argued that greater signal density would increase input rate, it being assumed that the presence of many more contractions would not noticeably slow down the reading finger's speed of travel across the page. So far as is known, there is no published evidence supporting or refuting this claim for English braille. The purpose here is to indicate in terms of space saving how far the expansion of Grade 2 can usefully be carried.

8.2 The Brown Corpus (1967), containing a million words of American literature, lists about a thousand words which on the average appeared more than once in 10,000 words. Of these words not already represented by word-signs, as many as possible were allocated signs in a way which would achieve the greatest saving of embossed spaces. The aim was maximum saving of space, not an expanded code for serious consideration as such. Therefore readability, though not disregarded, was not given priority consideration. In designing the contractions it was assumed that present meanings will remain unchanged, even though there is now good statistical ground for some change (Gill, 1980). It is also assumed that, despite the desire in some quarters for a multi-level system, there will be only one contracted code for educational and general use.

8.3 The suggested signs and their space saving values (including spaces saved by derivatives) are listed in descending order in Table 5. The percentage reduction of embossed spaces achieved by these signs was computed on the basis of the average cells content of a thousand running words of Grade 2 text (see Section 5, pg. 123). Table three shows the number of new contractions which contribute to each successive 1% decrease of Grade 2 spaces in words. The number of spaces saved (per thousand words of text) against Grade 2 by successive groups of 10 new signs are shown in Table 4.

8.4 *Results and Comments:* The 166 signs listed in Table 5 shorten word length in Grade 2 and in Grade 1 respectively by 8.6% (270,713 spaces per million words) and 7.7% (346,556 spaces). The corresponding figures for total or overall reduction of space are 6.4% and 6.1%. Present Grade 2

(British braille) reduces embossed spaces in Grade 1 by about 30% and total space by almost 25%.

8.5 The reductions quoted above would, of course, be possible only if all the new signs were adopted. However, it is obvious from a perusal of Table 5 that many of them, especially some of the higher ranking ones, would not be acceptable in a code for general use. Indeed, some are good examples of bad contractions because they would pose perceptual difficulty or are equivocal in meaning. The only alternatives to including such signs are, on the one hand, replacement by more easily readable signs probably saving less space or, on the other hand, leaving the words concerned coded as at present. In either case an increased number of signs will be needed at each 1% step in space saving. At best, it seems that only half of the listed signs could be used, reducing Grade 2 embossed spaces by not more than 5%.

8.6 *A Suggested Limit to Code Expansion*: It will be seen from inspection of Tables 3 and 4 that, as would be expected, there is a fairly rapid increase in number of signs needed and decrease of spaces saved by each sign at each successive 1% reduction of space. The number of signs required rises from two at the first 1% step to 40 at the eighth, and 88 spaces per thousand words are saved by the first group of 10 signs compared with only three spaces by the 16th group. These trends would be even more marked if acceptable contractions only were added in sufficient number to achieve the same total of space saving.

8.7 A point will be reached beyond which the addition of contracted forms will have virtually no further effect on reducing embossed spaces. It seems reasonable to predict from the trend in Table 4 that, if a 17th group of 10 new signs were added, it would save less than one space, i.e. less than a space per contraction in 10,000 words. Thus, on the basis of the figures in Table 4, it is suggested that the addition of more than 170 signs to the present code would have no noticeable further effect on the saving of embossed spaces. The very slight additional savings made would be more than offset, even for some highly competent readers, by the resulting greater complexity of the code and its governing rules. The extended use of unspaced sequences has not been considered because they reduce total space, not embossed spaces in words.

9. Summary and Conclusions

9.1 While it is highly desirable to seek uniformity of code and practice, effort to improve the efficiency of Grade 2 as a communication medium is no less desirable. It is strongly urged that we now commit ourselves to a thorough investigation of ways of making contracted braille easier to learn, more satisfying to use and more widely accessible. There is particularly a need for further study of the features of the code which affect its readability; the saving of space, albeit important, is but one of them.

9.2 The statistical information here presented clearly indicates that there

is scope for improving the space saving efficiency of Grade 2 without increasing the size and complexity of the code. If 40 or so of the weakest contractions (the dead wood in the code) were removed and replaced by 40 of the best space saving signs listed in Table 5, Grade 2 would remain a code of fewer than 200 signs but occupy about 5% less embossed space. It is suggested that the saving of at least one space in a thousand words of Grade 2 should be the criterion used in selecting a contraction for a revised code.

9.3 An attempt has been made to determine how far the present code could be either simplified or expanded with advantage to users. Research-based evidence suggests that a code of not less than about 120 signs (including some new ones) could be read as easily and rapidly as Grade 2 and would need slightly fewer rules. On the other hand, a massive expansion of the code seems unlikely to bring a substantial gain for readers and could even be counter-productive. It is concluded from the statistical evidence that the addition of not more than 170 contractions could reduce embossed space by as much as 8%; beyond that point very large numbers of signs would be required to achieve only modest additional space saving. The effect of an advanced code and of unspaced sequences on reading speed is not known and should be investigated.

9.4 The reduction of word length clearly has a bearing on reading speed, but it may be that we have been too preoccupied with the saving of space and not enough concerned with improving readability. It cannot be assumed, as some people do, that an x% reduction of space will lead to an x% saving of reading time. There is the danger that overenthusiasm for contractions could actually inhibit ease of learning and reading and so make Grade 2 an even more esoteric code than it already is.

Statistical Appendix

Table 1

Approximate mean space content of a million words of text in Grade 2 and Grade 1 braille

Embossed cells in words in Grade 2	3,125,000
Punctuation and composition signs	180,000
Total Grade 2 spaces (as above plus blank spaces between words)	4,250,000
Embossed cells in words saved by Grade 2 contractions	1,350,000
Total Grade 1 spaces (all embossed cells and blank spaces between words)	5,655,000

Grade 2 (British braille) reduces Grade 1 embossed cells in words by about 30% and total space (all embossed cells and blank spaces between words) by almost 25%. Account was taken of unspaced sequences of words (AND, TO, etc.).

Table 2

Number of contractions contributing to each successive 10% (approx.) of the total of (a) occurrences and (b) embossed spaces in words saved against Grade 1

Frequency			Space Saving		
%	No. of Signs	Cumulative Total	%	No. of Signs	Cumulative Total
9.4	1	—	11.5	1	—
20.6	2	3	21.3	2	3
30.3	2	5	28.4	2	5
38.5	2	7	40.0	4	9
49.1	3	10	50.3	5	14
59.8	5	15	60.0	8	22
69.6	7	22	70.1	12	34
79.9	14	36	80.0	18	52
90.1	28	64	90.1	32	84
99.0	79	143	99.0	69	153
100.0	46	189	100.0	36	189

The removal of the 60 weakest contractions would increase Grade 2 spaces in words by a little under 1%.

Table 3

Number of possible new contractions (listed in Table 5) contributing to each successive 1% reduction of Grade 2 spaces in words

%	Signs
1st	2
2nd	4
3rd	6
4th	12
5th	16
6th	20
7th	26
8th	40
0.6	40
TOTAL	166

These 166 contractions shorten word length in Grade 2 and in Grade 1 respectively by 8.6% (270,713 spaces per million words) and by 7.7% (346, 556 spaces). The corresponding figures for total or overall reduction of space are 6.4% and 6.1%.

Table 4

Spaces in words saved against Grade 2 by successive groups of 10 possible new contractions (see Table 5). Figures given are the averages per 1,000 words

No. of Signs	Spaces	No. of Signs	Spaces
10	88	100	10
20	30	110	8
30	22	120	7
40	19	130	6
50	17	140	5
60	15	150	4
70	14	160	3
80	12	166	1
90	10		
		TOTAL	271

Table 5

Possible new contractions in descending order of space saving against Grade 2

Space savings quoted are per million words. The list is divided into sections to show the contractions which contribute to each successive 1% reduction of spaces in words.

Except where otherwise stated, contractions are used as words and parts of words.

(W) = used as word only.
(I) = initially, used at the beginning of a word.
(M) = medially, used between characters in a word.
(F) = finally, used at the end of a word.

Bold print indicates use of contraction.

First 1% 2 signs saving 20,000 (approx.) and 10,756 spaces

1. ES dots 1-5-6 (F)
2. AT dot 2 (W) immediately before next word.

Second 1% 4 signs (10,156 — 7,000)

3. IS dots 3-4-6 (W)
4. HE dots 1-2-4-6 (W)
5. VE dots 1-2-3-6 (F)
6. TT dots 3-5-6 (M)

Third 1% 6 signs (6,755 — 3,532)

7. ON dots 1-3-5 (W)
8. EX dots 1-3-4-6 (I)
9. BEEN dots 1-2-6 (W)
10. UN dots 3-4-6 (I)
11. AN dots 3-4-5-6 (W)
12. PRESENT dots 4-5P

Fourth 1% 12 signs (3,494 — 2,253)

13. ONLY dots 4-5-6O (letter)
14. OTHER dots 4-5O (letter)
15. ALL dot 4L
16. PLACE dot 4-5-6P
17. IMPORTANT dot 5I
18. DEVELOP DVP
19. HAS HS (W)
20. MEMBER dots 4-5M
21. BACK dot 5B
22. MADE MD (W)
23. INDIVIDUAL **IN**DV
24. OVER dot 4O (letter)

Fifth 1% 16 signs (2,214 — 1,797)

25. WHAT **WH**T
26. TAKE dots 4-5T
27. LOOK LK (W)
28. TURN dots 4-5-6T
29. WELL WL (W)
30. NEW NW (W)
31. GENERAL dots 4-5-6G
32. MAKE MK
33. RESULT dots 4-5-6R
34. EXPERIENCE dots 4-5E
35. THAN **TH**N (W)
36. NUMBER dots 4-5-6N
37. INTEREST dots 4-5-6 lower I
38. POSSIBLE dot 4P
39. PUBLIC PBC
40. FOLLOW dots 4-5-6F

Sixth 1% 20 signs (1,752 — 1,430)

41. BUSINESS dots 4-5B
42. REQUIRE REQ (W)
43. EXAMPLE dots 4-5-6X
44. PROVIDE PVD
45. YEAR dots 4-5Y
46. SEEM dots 4-5S
47. SPECIAL dot 5S
48. DIFFICULT dot 4D

49. CHANGE dots 4-5**CH**
50. EVEN dots 4-5-6E
51. COURSE dots 4-5C
52. GOVERNMENT GOVT
53. OFFICE dots 4-5-6**OF**
54. LIFE dots 4-5L
55. DIFFERENT dots 4-5-6D
56. HOUSE dots 4-5*H*
57. WAY WY (W)
58. SCHOOL **SCH**L
59. DID DD
60. WHILE dots 4-5-6**WH**

Seventh 1% 26 signs (1,416 — 1,005)

61. MOVE MV (W)
62. MIGHT MT (W)
63. REASON dots 4-5R
64. THREE dots 4-5-6**TH**
65. SAME SM (W)
66. UNTIL dots 4-5-6U
67. SECOND SEC (W)
68. MAN MN (W)
69. PROBABLY PBY
70. SMALL SML
71. COMPLETE dots 4-5-6/3-6
72. BETTER dots 4-5-6B
73. CAME CM (W)
74. INCREASE **INCR** (W)
75. DURING dots 4-5-6/2-5-6
76. VALUE dots 4-5-6V
77. PROBLEM P**BLE**M
78. DOES DS (W)
79. CONSIDER **CONSD**
80. HOWEVER dot 5**OW**
81. PLAN PLN (W)
82. ROOM RM (W)
83. NIGHT dots 4-5N
84. DOWN dots 4-5D
85. CLOSE CLS (W)
86. WEEK WK (W)

Eighth 1% 40 signs (1,002 — 599)

87. CONTROL dots 4-5-6/2-5
88. BELIEVE **BE**LV
89. CERTAIN CTN
90. AVAILABLE AV**BLE**
91. CHURCH **CH/CH**
92. SOCIETY SOC (W)
93. STORY dot 5**ST**
94. OUTSIDE dots 4-5-6**OU**
95. TOOK TK (W)
96. IDEA dots 4-5-6I
97. NOTHING N**TH** (W)
98. CONTINUE **CON**T (W)
99. SAY SY (W)
100. HEAD HD (W)
101. VOICE dots 4-5V
102. ESPECIALLY ESP (W)
103. NEXT NX (W)
104. KNEW KN (W)
105. SHORT dot 5**SH**
106. MUSIC MSC
107. INCLUDE **INCL** (W)
108. SEVERAL SVL
109. BOTH B**TH** (W)
110. EARLY dot 5**ER**
111. TELL TL (W)
112. EXCEPT dots 4-5X
113. EXPLAIN dot 5X
114. LAST L**ST** (W)
115. KEEP KP (W)
116. INFORMATION dots 4-5**IN**
117. WHOLE **WH**L
118. FUTURE FUT (W)
119. BOOK BK (W)
120. LEVEL LVL
121. STRAIGHT dots 4-5-6**ST**
122. WANT WNT (W)
123. FEW FW (W)
124. VARIOUS dot 5V
125. STRONG dots 4-5**ST**
126. THOUGHT **TH**T (W)

0.6% 40 signs (583—144)

127. WITHOUT dot 5**WITH**
128. COMMON dots 4-5/3-6
129. WATER WT**ER** (W)
130. GAVE dots 4-5G
131. AROUND dot 5**AR**
132. STOOD **STD** (W)
133. SQUARE SQ (W)
134. HELP HLP
135. ARRANGE dots 4-5**AR**
136. LEFT LFT (W)
137. WOMAN WMN
138. DON'T DN dot 3T
139. REST R**ST** (W)
140. FORTUNATE dot 5**FOR**
141. NEAR NR (W)
142. TOWARD TWD
143. SOON SN (W)
144. YET YT (W)
145. TOLD TLD
146. LOCAL LCL
147. HALF HLF
148. DIDN'T DDN dot 3T
149. ARTICLE dots 4-5-6**AR**
150. OFTEN dot 5**OF**
151. BEST B**ST** (W)
152. FELT FLT
153. FRONT FRNT
154. REACH R**CH** (W)
155. SAW SW (W)
156. BEGAN **BE**GN
157. BODY BDY
158. PAST P**ST** (W)
159. SHIP dots 4-5-6**SH**
160. BOTTOM BTM
161. MAKING MKG
162. WOMEN WM**EN**
163. KEPT KPT
164. INSTEAD **IN/STD**
165. READY RDY (W)
166. YES YS (W)

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Nilsson: Do people in general have much braille at home? How much braille is bought? How much space is needed?

Evensen: There is some confusion with the figures used. What material does the Gill Corpus represent? We need a longer learning and practice time for testing and must carefully evaluate experiments.

Maxwell: We must beware of those people who search out experimental work in blindness simply to forward their own research, thereby using funds which could be better spent elsewhere.

Milton: Increasing efficiency in space-saving through contractions would perhaps allow more room for formatting, but we must guard against an over-emphasis. Both thermoforming and computer braille have doubled the volume of braille, yet both have been of great benefit.

Jolley: Should there be research into whether the dot size is the optimum one? If a smaller dot were used, we might be able to have Grade 1 braille. There is little value in tinkering with the code merely to save space.

Aucamp: We must not lose this opportunity of looking at code efficiency in *all* respects in any direction. It might not come again.

Cargill: We must teach braille effectively. Just the number of contractions discourages many people; if we can drop some, let's do it. We mustn't attack research, but work towards a universal code plus an advanced code for a minority.

Troughton: The Birmingham/Warwick study has made a good contribution to one aspect of code change.

Lee: Present braille readers are familiar with Grade 2 and resist change. If a new braille code is devised which will improve readability, older users will accept the changes and new readers will learn more easily.

Burling: Space-saving is but one criterion for a new code. It is left to others to explore other aspects and to develop an easier, basic code which will act as a springboard from which an advanced code will be developed at a later date.

Lorimer: Since nearly half of the material in the Gill Corpus came from the Fast Document Service, there was, in fact, a degree of bias. Adding hundreds of contractions to the code won't save much space, but taking out the weakest contractions will greatly simplify the code.

REVISION OF BRAILLE CONTRACTIONS WITH PARTICULAR REFERENCE TO BRIDGING CONTRACTIONS

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Introduction:

In discussing "revision of braille contractions," we are embarking on an examination of the very essence of the Braille Code. In stating this, I am naturally not unmindful of the fact that, fundamentally, braille is a character-for-character representation in embossed type of printed symbols; but historically, a contracted form of the Code has inevitably evolved in all major languages. Indeed, the overwhelming majority of braille users, despite the counter-claims of a vociferous minority, would not welcome the abolition of contractions, and no braille authority would adopt such a retrograde step as the promulgation of a single-grade braille code.

A contracted grade of braille is both necessary and desirable for two very important reasons:

a) The saving of spaces used, compared with Grade I (uncontracted) braille.

b) The increase of facility to the touch reader.

This paper will seek to show to what degree these criteria are being met already in Standard English Braille; and also how, by effecting some changes, a greater code-efficiency may be achieved.

I should say at the outset that since I speak as a British user, (though advocating, I hope, an internationally acceptable standpoint and not merely a specifically British one), all my examples and definitions are taken from "A Restatement of the Lay-Out Definitions and Rules of the Standard English Braille System" (Revised 1969-70.), which is hereafter referred to as Restatement (I or II). North-American braillists will readily see whether such examples equally apply to their usage; however, where direct comparisons between British and American practises are necessary, I have drawn on "English Braille, American Edition, Revised 1972" to set beside the Restatement.

1. Contractions and Space-Saving:

One of the prime functions of a contracted form of braille (Grade II) is the saving of total spaces over Grade I, thereby reducing the bulk of the material produced.

How efficient are contractions in saving space? From the most recent scientific study of the space-saving of Grade II over Grade I ("Analysis of a Corpus containing 2.25 million words (Gill, 1979)"), we learn that Grade II braille saves only 25% of the space required for the same text in Grade I. It was

found that the approximate mean space content of a million words (including blank spaces between words) in Grade I, was five million 650 thousand; whereas the same million-word text in Grade II yielded an approximate mean space content of 4 million 250 thousand.

Clearly, this comparatively "low return" of 25% from 189 contractions is disappointing enough; but when we bear in mind that this saving is virtually achieved by only two thirds of the contractions, the overall inefficiency of the Code is strikingly demonstrated! Indeed, 60% of the total space saved is attributable to the thirty most frequent contractions; whereas no fewer than 60 contractions — the ones with the lowest frequency count in all corpora analysed — combine to save only 1% of the total space over Grade I.

How could efficiency be improved? From the foregoing remarks on space-saving, we can deduce that, by removing the sixty least "efficient" contractions (approximately one third of the total) from Grade II, we would in no way be significantly increasing the bulk of the material produced. Such a step, in association with a revision of the rules governing the use and non-use of contractions, together with the introduction of new contractions, would give a percentage gain (albeit not a considerable one) in space saved over Grade I.

It is difficult to quantify the advantages gained in space-saving by relaxation of braille rules; in fact, it is doubtful whether even a policy of complete "permissiveness" in allowing contractions on all occasions would yield a saving that would justify the discomfort to readers that would probably ensue. Nevertheless, a new, hard look needs to be taken at rules which prohibit contractions in foreign words, in words affected by the "natural pause", and words containing prefixes or suffixes.

Introduction of New Contractions: Although this paper is not designed to advance a new Grade II Code, any consideration of a *revision* of Standard English Braille must naturally be concerned with possible changes to the Code. The Gill Corpus Survey (as, indeed, each of the other similar surveys) indicates that, just as there are many contractions in the Code which are not "pulling their weight" in terms of frequency of occurrence, there are words and letter-groups with high frequency counts which are at present unrepresented in the Code but which, however, have a strong claim to be included.

I do not suggest by this that a change of meaning should be given to a present contraction which represents a word or letter-group with a very low frequency count. Apart from any other consideration, this would mean that accummulated stocks of braille books in libraries and other institutions would become obsolete overnight! Rather, I suggest that in any final revision of Standard English Braille, a number of new contractions should be introduced to represent "popular" words or letter-groups. For example, the words *back, been, he, only* and *other* have a strong claim, and could be assigned new

contractions; and similarly, the letter-groups *or*, *an* and *at* when they occur medially in a word. There are many unallocated signs that could be used: the wordsigns introduced by dots 4-5 are only five in number. *O* preceded by dots 4-5-6 could stand for *only*; dots 4-5 followed by *p* for *person* and so on. Similarly, the sign for *ble* could stand as a single-cell wordsign for *been*, and *ing* for *on*.

To sum up then, the question of contraction revision related to space-saving: present Grade II saves only 25% of the space required for text in Grade I; this same percentage saving — or even a better one — could be achieved by a reduced code which nevertheless would contain a few new contractions.

2. Contractions and the Braille Reader:

In turning to a consideration of Grade II braille as an aid to reading, and an assessment as to how this aid may be improved, let me reiterate a remark from my introductory comments: that the overwhelming majority of braille users *want* a contracted code. The question is: are they in fact making the most efficient use of the present code?

Grade II is essential to the touch reader in order to minimize the time taken for the fingers to scan a word, which in turn assists continuous and fluent reading. We are, of course, not concerned here with perceptual problems of individuals, nor methods of teaching — important though these factors are — and to some degree we are on less sure ground statistically than when measuring the efficiency of Grade II as a space-saver over Grade I.

In my thirty years as trainer of both sighted transcribers and blind copyists and proof readers, the most commonly expressed criticism of Standard English Braille is "if only the rules were more clear-cut and there were less exceptions!" and I have a great deal of sympathy with this viewpoint. Indeed, it is often difficult to defend the various apparent anomolies and examples of dubious logic. In determining whether or not a contraction should be used, is one to consider phonetics at the expense of derivation or other philological factors? How far should one allow contractions because of "long use and custom" — as a previous edition of Restatement put it — even though a contraction in certain circumstances would violate syllabic division.

Contractions and Pronunciation:

Unfortunately, the use of a contraction all too frequently predetermines a mode of pronunciation on the part of the reader. To take a somewhat extreme case: the contraction for *the* occurring in the middle of *Fathead* would dispose the braille reader to pronounce the word in three syllables *Fa-the-ad*; or again, *one* contracted in the name *Boone* would suggest *Bo-one*. However, whilst the proposition I have just illustrated may be true, I am by no means convinced that the converse is true: do we in fact give a *positive* and *definitive* indication of correct pronunciation by *not* contracting?

If I may elaborate this point, for it is one that has exercised me considerably in preparing this paper: does a sighted reader, particularly a child, reading a script where there are no contractions, pick out letter groups and ascribe preconceived pronunciations to those letter groups? To take my example of *Fathead* mentioned above, is not a sighted beginner, through over-familiarity with the letter group *the*, likely to seize upon that group from the rest of the word, and accord it its usual pronunciation? If so, then surely we are in danger of too easily assuming that a contraction will show a prejudice for a particular pronunciation. I am by no means advocating such licence that would permit gross distortions, such as *unto* in *untouched* or *these* in *hypotheses*; but I see no reason why we should not allow contractions when one letter forms part of a diphthong: *Phoenix*, *Oedipus* etc., after all we allow *ar* to be contracted in *bazaar*; *ed* in *freedom*; *of* in *proof*, without implying that these contractions pre-suppose a diaeresis.

Bridging Contractions:

We come now to a consideration of perhaps the most controversial aspect of contractions: should one use them to bridge syllabic division, to bridge root words linked with prefixes or suffixes? It is in this area that the charge of "inconsistency" is levelled at the heads of braille authorities. Why allow *ea* to be contracted in *create* but not in *Montreal*? Why *ed* in *dukedom* but not in *predate*, why *er* in *prerogative* but not in *prerequisite*? etc., etc.

It is obvious that any eventual revision of Standard English Braille must seek to lessen these apparent contradictions. This plea is not by any means conditioned by considerations of computer-assisted braille production, even though programmers would no doubt welcome the removal of as many "exceptions" as possible from their programming.

Prefixes:

In the area of prefixes, word-origin and structure have been allowed to assume an importance far greater than that given to pronunciation. Rule 167 of Restatement II says "When a prefix is added to an English word to form another word of the same part of speech and with a meaning closely related to that of the original word, a contraction should not be used to bridge the prefix and the remainder of the word", and the American Edition, rule X para. 34, says "A contraction must not be used where the usual braille form of the base word would be altered by the addition of a prefix". But surely recognition by the reader, and consequent pronunciation, is not going to be adversely affected whether the *whole* base word is present or not. For example *ed* should be contracted in both *predecessor* and *predecease; st* in both *mistake* and *mistrust*; *en* in *denominate* both *renew* and *renumber*. Hardest of all to defend is the contracting of *en* in *denominate* but not in *denationalise*! But possibly the frustration of would-be transcribers is summed up appropriately with the allowing of *dd* contraction in *Goddam* but not *Goddamn* — simply because in the latter case the whole word is present.

I would propose that the contractions for *ed*, *en*, *er* and *of* should be

allowed when prefixes are joined to root words, whether those root words are complete or not. In Appendix II to this paper I set out a list of words taken from Appendix I of Restatement, where the contracting would be different from that obtaining at present.

Suffixes

When we examine the rules governing the use of contractions where suffixes are joined to root words, an interesting and puzzling contrast of attitudes is revealed between British and American usage. On the one hand, the Restatement allows British users to contract when suffixes are joined to root words, with the exception of the *ness* contraction in words with a feminine ending such as *governess*. On the other hand, the American Edition permits *ness* in *governess* but does not permit, for example, *ea* in such words as *peaceable*; *ed* in *freedom*; nor *er* in *imagery*.

Again, I would strongly suggest that pronunciation should be the prime consideration, and that all the contractions mentioned above (including *ness* in *governess*) should be permitted: for the use of these contractions in these circumstances would in no way hinder recognition and pronunciation.

Non-Use of Bridging Contractions:

There are occasions, I feel, when bridging contractions should not be used.

a) Where the letter *h* forms part of a contraction and the *h* is aspirated: for example: *sweetheart*, *mishap*, *Shanghai*, *rawhide*.

b) Where the letter *e* forms part of a diphthong and is followed by the letter *a*. In this case the *ea* contraction could present perceptual difficulties; for example: *Judaean* and *Paean*.

3) Where the letters of a contraction bridge two components of an unhyphenated compound word; for example: *twofold*, *storeroom*, *toenail* (the list becomes endless, especially through the ever-increasing tendency of typographers not to use hyphens in printing compound words).

In all three of these situations, the use of a contraction could, however, temporarily, lead to hesitency in recognition and pronunciation.

Conclusion:

It is just fifty years since the adoption of Standard English Braille by both Britain and America. In that half-century there has been no major revision of Grade II — even though nearly thirty years ago Lockheed and Lorimer, in their survey for the British National Uniform Type Committee, strongly recommended changes to make more efficient use of contractions.

A thorough revision of the Code is even more necessary today, to achieve the following aims:

1) Greater facility in learning and practising the Code by both writers and readers.

2) The greatest possible saving of space over Grade I, without sacrificing facility in usage.

3) Reduction in the anomolies and exceptions in the Code, which would

in turn contribute significantly to a uniform standard of braille, whether produced entirely manually or with the assistance of computers.

The achievement of these aims would be enhanced by:

a) Removing many of the least efficient contractions from the Code (see Appendix I).

b) Making changes in the rules governing the use and non-use of many contractions (see Appendix II).

c) Introducing new contractions to replace some of the deleted ones (see Appendix III).

There are, of course, many aspects of the Standard English Braille Code which should be internationally investigated — the Code's ability to reflect ever-changing print practises; the unspacing of sequences, to name but two — but the purpose of this paper has been to highlight the fundamental problem of securing for the future a form of Grade II contracted braille, which would be more rational, more saving in space, and easier to learn, than the present one.

APPENDIX I

Suggested List of Contractions To Be Deleted from Grade II

Contraction	*Mean frequency per million words*	*Contraction*	*Mean frequency per million words*
Himself	725	Rejoicing	6
Herself	249	Word	692
Themselves	241	Upon	664
Itself	221	Whose	222
Myself	214	Today	199
Yourself	119	Tomorrow	114
Ourselves	60	Tonight	70
Thyself	14	Either	257
Yourselves	10	Neither	136
Oneself	6	Children	411
Declare	80	Child	261
Declaring	7	Above	310
Receive	268	According	118
Receiving	24	Across	354
Deceive	16	Afternoon	148
Deceiving	3	Afterward	62
Perceive	31	Again	929
Perceiving	4	Against	567
Conceive	27	Also	693
Conceiving	1	Almost	368
Rejoice	19	Already	276

APPENDIX (Continued)

Suggested List of Contractions To Be Deleted from Grade II

Contraction	*Mean frequency per million words*	*Contraction*	*Mean frequency per million words*
Altogether	33	Although	234
Because	746	Always	558
Between	579	Immediate	167
Behind	339	Necessary	184
Beside	227	O'clock	75
Beyond	169	Paid	151
Below	149	Perhaps	321
Beneath	71	Quick	292
Before	1128	Together	353
These	1179	Quite	419
Those	715	Rather	353
		Knowledge	115

APPENDIX II

Some Alterations Proposed for "Guide To The Contracting of Words" Restatement II

aEDile	antEDate	antENatal	antERoom
bANDog	bARoNESS	BEnign	
CHieftaiNESS	CHimaERa	citizeNESS	
dEAcoNESS	dEN/ATIONalise	dENumERaBLE	diaEResis
ENcyclopaEDia			
govER/NESS			
HADji	hyaENa		
lioNESS			
maENad	mahARajah	mAR/CHioNESS	miST/ERmED
miSTranslATION	miSTruST		
oEDema			
paEDiatric	patroNESS	phoENix	prEDecEAsED
prEDeST/IN	prEDetERmINe	prEDispose	prEDomINate
prENatal	prERelEAse	prERequisite	pyTHoNESS
rEDirect	rEDiSTribuTION	rED/OU/BLEd	rEDuplicate
rENumbER	rER/OUtED		

APPENDIX III

Some Proposed New Contractions for Grade II

Word	*Contraction*	*Occurrences per million words*
IS	GH	10196
ON	ING	6755
BEEN	BLE	2472
ONLY	Dots 4-5-6 followed by O	1747
ALL	Dot 4 L	3052
OTHER	Dots 4-5 O	2993
OVER	Dot 4 0	2253
PRESENT	Dot 4 P	884
PLACE	Dots 4-5-6 P	981
TURN	Dots 4-5 T	1077

In addition, considerable use could be made of outlines of frequently occurring words, such as:

WL for WELL; NW for NEW; HS for HAS; WHT for WHAT

Conference Observers

Every exception is a rule to be learned. (Bogart). Pronunciation should not govern contractions (Bogart, Brown) since braille is not a spoken language. (Brown). Cargill listed examples of the inconsistencies in the American Code and Ledermann responded with examples from the British Code. Maxwell's contention that language trends cannot be legislated, that even if there were no rules in braille there are rules in language itself, was countered by Small's argument that braille is *not* a language but a code to convey the language; and as such, must have some law and order, removing as much ambiguity as possible.

WORD SEQUENCES IN CONTRACTED ENGLISH BRAILLE

by J. R. Hughes and C. M. Low
James Hughes, Secretary of the Braille Authority of the United Kingdom, represents the National Federation of the Blind of the U.K. on BAUK. Colin Low, Past-President of the National Federation of the Blind, has for several years represented the organization on the Braille Authority of the United Kingdom.

I. Introduction

A. *A Basic Definition.*

1. In this paper, "sequence" means two or more words written without intervening blank cells. We are not concerned with any other kinds of sequence, e.g. sequences of unit abbreviations or numbers, sequences of lower signs in a word, etc.

B. *General*

2. Contracted English braille has made use of sequences since the earliest years of this century, if not before. This is hardly surprising. Space saving has always been a primary concern of the framers of contracted braille codes, and blank spaces between words occupy a considerable part of the space taken up by uncontracted braille — one cell in every 5.65 or just over 17.5% on average according to Lorimer (1982) (Table 1). Grade 2's modest use of sequences by the side of the comparatively sophisticated system of contractions employed means that the proportion of interword blank spaces actually rises in Grade 2 to 1 in 4.5 cells or just over 22% (945 in 4250, the total Grade 2 space taken up by a thousand words on average — Lorimer (1982), Table 1).

3. Lorimer (1978, 1982) has explored the effect in terms of space saving over Grade 1 of adding new contractions to the Grade 2 code. He considered that the space-saving value of adding new contractions diminished fairly rapidly, but recognised that further gains could probably be made by contracting more groups of letters within words and by the more extended use of unspaced sequences of words. His study was limited by its acceptance of the no-substitution rule, i.e. the rule that no existing Grade 2 sign should be given a new meaning in any revised code. However that may be, there would, we believe, be fairly general agreement with Poole (1981) that the economic value of additional contractions decreases fairly rapidly, and that it becomes progressively more difficult to devise sensible signs for them even in a basic grade of contracted braille. Poole (1981) goes on: 'Sequences such as pronoun plus common verb, or preposition plus definite article, or "and" plus the next word, would all be of frequent occurrence, and create relatively few opportunities for the types of problem to which all sequences tend to give rise'; and both Milligan (1979) and Poole (1979) made considerably extended use

of sequences in the proposals for a basic, as well as the sketches for an advanced, contracted braille code which they submitted for consideration by the Research Sub-Committee of the British National Uniform Type Committee (now the Braille Authority of the United Kingdom) on 18 May, 1979.

4. Milligan's and Poole's proposals were impressionistically, though no doubt soundly, inspired. There would therefore seem to be value in a systematic investigation of the potential contribution which the more extended use of sequences could make to the improvement of contracted literary braille. This paper represents a preliminary essay upon this task. After defining some further terms, we briefly state the case for the greater use of sequences in contracted English braille and note some areas where caution needs to be observed. We review the sequences and the rules that govern them in contemporary English braille Grade 2, and advance a classification of sequences which we hope provides a helpful approach to the problem of selecting suitable sequences. We go on to explore the possibilities for extending the use of sequences in a revised braille code by pointing to ways in which further sequences may be formed and regulated. Finally, we attempt to make some estimate of the space-saving potential of using more sequences in contracted English braille. If we focus on space saving, it is not because we are unmindful of other factors affecting code efficiency and so the ultimate goal of readability. But for a variety of reasons, space saving will always be one of the main preoccupations of readers, writers and transcribers of braille, even if paperless braillers do become generally available to braille users (cf. Milligan (1982), paras. 10-14 and 19). Moreover as Lorimer (1982, para. 3.2) has stated, space saving, unlike the other components of code efficiency, is something which can be measured relatively precisely and in terms that are easily understood. In any case, whatever refinements are made in the interests of readability, the basic work on space-saving potential still needs to be undertaken.

5. Our own position is that we would favour some extension in the use of sequences in any new basic contracted braille code that was devised along the sort of lines suggested by Milligan (1979) or Poole (1979), i.e. that had some hundred fewer contractions than present-day Grade 2 while saving at least the same amount of space. We would favour a considerable extension in the use of sequences in any new advanced contracted braille that was built on such a basic contracted code, and indeed believe that such an extension would probably be essential if the ambitious space-saving targets (40-50% over Grade 1) which are usually set for such a code are to be met. We also believe that there is room for some extension in the use of sequences even if present-day Grade 2 continues to be the basis of contracted braille, if only to bring the proportion of inter-word blank spaces back to something more like the 17.5% level of Grade 1. However, it has not been our aim in this paper to make specific proposals for change. Our concern has rather been to assemble in accessible form the data on the basis of which designers of

new braille codes can take rationally based decisions regarding the extension of sequences while maintaining an optimum balance between space-saving efficiency and readability.

6. We should like to acknowledge our indebtedness to Martin Milligan, currently Assistant Secretary of the Braille Authority of the United Kingdom, who commissioned from Warwick University the data on word sequences in the Gill Corpus on which an important part of our work is based.

II. Some Further Definitions.

An *Upper Sign* is one which contains dot 1 or dot 4 or dots 1 and 4.

A *Lower Sign* is one which contains neither dot 1 nor dot 4.

Natural Pause (usually written in inverted commas) refers to the hiatus in speech which occurs in such sentences as: "There was nobody to talk to// or to play with// for the whole of the day".

III. The Case for Sequences.

1. *Space Saving.* The blank spaces between words account for a considerable amount of the space taken up by any text. As already stated, in a text of 1,000 words of Grade 2 braille, there will be approximately 945 blank cells on average — Lorimer (1982), Table 1. Although only one cell is saved with the addition of each component to a sequence, if commonly occurring wordstrings were sequenced, substantial space saving could be achieved.

2. *Reading Speed.* Reduction of bulk is not the only consideration when talking of saving space. The less distance the fingers have to cover to collect complete elements of tactile information — in the present case, one or two words — the sooner will the complete picture be assembled — the sentence or paragraph. The careful choice of sequences which are readily recognisable and/or logically predictable would seem to hold out some hope of facilitating accelerated reading speeds. As one observer has put it: "Greater signal density should increase input rate".

3. *Coding Considerations.* An increase in the number of sequences may be preferred as an alternative or welcomed as a complement to an increased number of contractions. Such an increase could more than compensate for the loss of many of the contractions at present used in Grade 2 for infrequently occurring words.

IV. Some Notes of Caution.

1. *Redundancy.* Lorimer (1982, para. 3.2) has remarked a number of other features of the braille code which have no less an important bearing on readibility than saving of space and which merit further research. Among these he includes the effect of varying density of contracting on level of redundancy. Clearly a certain amount of inter-word blank space is essential to intelligibility and achieving the necessary degree of differentiation between

distinct informational units, each of which needs to be of a manageable size. There may well be an interaction between signal density and level of redundancy such that the latter cannot be reduced beyond a certain point without having a deleterious effect on speed and fluency of reading, especially as the level of contraction rises. In reading a word, even one containing many letters, it is rarely necessary to examine each sign or letter individually. But in reading a sequence or a highly contracted code, each component will require individual attention to a greater extent. So far as the sequence side of this equation is concerned, care will ned to be taken to ensure that sequences do not contain too many components, otherwise reading speeds could be reduced.

2. *Dot Density.* Lorimer (1982, para. 7.7) cites Nolan and Kederis in support of the view that word recognition times increase (hence reading speeds will tend to decline) not only as words become longer but also as the dot content of cells increases. No doubt this again reflects the interaction between signal density and redundancy, but it also suggests that high dot density within cells may as such contribute to some of the possible negative effects of increased signal density. In combination with increased length of informational units, making for greater masses of difficult-to-differentiate dots and cells, this could have a particularly deleterious effect, and carries a particular warning for the designers of sequences. In this connection, it is noteworthy that Milligan, an advocate of the greater use of sequences, now apparently favours writing the signs for "the" and "and" in sequence after the words which they follow as opposed to before the words they precede, even though this saves slightly less space, on the ground that in the initial position they tend to mask or overshadow the word that follows.

3. *Miscellaneous.* When providing for sequences in any new code, care will be needed to avoid:

a. Discrimination difficulties such as might be caused by lower signs in sequence, some single-column signs in sequence, etc.

b. The formation of characterstrings which represent single words in their own right. (Alternatively, wherever this was deemed acceptable because of the usefulness of a particular sequence, some distinguishing mark such as the letter sign would need to be employed to show that the word itself was intended.)

c. The use of some single-cell wordsigns which are apt for sequencing as letter-groups within words, especially in the initial and terminal positions.

V. Sequences in English Braille Grade 2.

A. *Sequence Rules.*

1. According to the *Restatement of the Layout, Definitions and Rules of Standard English Braille*, Part I, Rule 26, the wordsigns for "and", "for", "of", "the", "with" and "a" are generally written unspaced from one

another, except when a "natural pause" occurs, e.g. "Organisations of// and*for t*he Blind"; "The book I was looking for//the other day". Further, if the second or subsequent component of a sequence formed in this way is italicised, it must be preceded by a blank cell.

2. According to the *Restatement*, Rule 30, the signs for "to", "into" and "by" should be written unspaced from the following word. They may be used after open quotes, open brackets and the dash; before the numeral, letter and accent signs; and before and after the capital and italic signs. They may not be used before a "natural pause", as parts of words, before or after the apostrophe or hyphen, or in such phrases as "to and fro", "by and by", "by and large", "into or out of the room", etc. The words "be", "enough" and "his" may not be represented by their lower-sign contractions when preceded by the contractions for "to", "into" or "by".

B. *Classification of Sequences.*

We propose below a classification of sequences by reference to the parts of speech involved. It may seem needlessly elaborate in relation to the rudimentary system of sequencing permitted in Grade 2, but we believe it offers a useful way of approaching the question of sequences generally. The complete classification is to be found in Appendix VIII. Those classes which apply to Grade 2 are as follows (classes 1-4 involve the words "and", "for", "of", "the", "with" and "a" only; class 5 involves the words "to", "into" and "by" only): —

(1) Conjunction plus article, e.g. "an*d t*he man an*d a* dog".

(2) Conjunction plus preposition, e.g. "an*d o*f freedom he spoke, an*d w*ith high hopes, an*d f*or nothing".

(3) Conjunction plus preposition plus article, e.g. "an*d for th*e whole day an*d with a* sad heart he wandered".

(4) Preposition plus article, e.g. "He always looked fo*r th*e end o*f a* book".

(5) Preposition plus following word, e.g. "They came b*y ca*r t*o tak*e her in*to cus*tody".

N.B. The sequence preposition plus preposition will almost invariably be precluded by the "natural pause" rule.

VI. Sequences in a Revised Contracted English Braille Code.

A. *General*

1. In this part are listed new classes of sequence involving pronouns, verbs, negatives and common phrases, together with extensions of the classes already noted. The lists do not exhaust the possibilities of sequencing, but are a clear indication of them.

2. Little seems to be known about the tactopsychological problems of braille reading — how much of what is read is clearly identified and how much is anticipated or taken for granted. This must vary even with expert readers. In the case of sequences, it seems likely that less could be taken for granted than with a word written on its own. Thus "an*d for th*e" may be slower

to read than "foreigner" although only half its length, yet three words are read as against one. From this admittedly intuitive judgment may come some sense of the maximum acceptable length for sequences, that is, a mean in which the advantage of containing several words in a smaller space outweighs the disadvantage of the impedance in reading speed. Even without such nice considerations, it is not difficult to imagine that four or five components in a sequence is a reasonable limit for most purposes, although there may be exceptions.

3. Before listing the classes of sequences, we must draw attention to a major source of frustration in the formation of sequences, namely, the lack of contractions for many words which have a very high frequency of occurrence in literary texts. The most important of these are: he, she, we, they; what, who; is, are, been; has; at, on, up; or, if; an. If single-cell contractions were allocated for these words, they would be high on the list of candidates for sequencing.

4. The words "could", "should" and "would" could be useful sequence components, but would need to be contracted differently. Having said that, we do not favour what may be called the "artificial" sequences of the kind used in Grade 3 where contractions were created wholesale solely that words could be used in sequences. In our view, the extent to which a word is contracted will depend principally on factors other than its suitability for sequencing, most notably its frequency of occurrence. Thereafter, its suitability for sequencing becomes an added bonus.

5. Finally — another lesson which flows from the unfortunate experience of Grade 3 — care needs to be taken when choosing sequences to ensure that their use is not dependent on a complicated system of rules.

B. *Extension of Grade 2 Sequences.*

(1) Classes 1-4 could include other conjunctions and prepositions and "an", e.g. "bu*t the* man i*n the* moon"; "ou*t with the* old, i*n with the* new"; "ou*t from the* night"; "i*n for a* penny", etc.

(2) Class 5 could include "and" and "the", and perhaps some prepositions, e.g. "The *men* an*d wo*men came wi*th the an*imals"; "She sat wi*th me* fo*r the* journey" (this class we call "sequences of initial attachment").

(3) "and" and "the" could be attached at the ends of words e.g. "We pas*sed the* hig*h and the* low hills" ("sequences of terminal attachment").

C. *Possible Further Classes of Sequence.*

(6) Pronoun plus verb, e.g. "*I hav*e", "Yo*u wi*ll".

(7) Verb plus verb, e.g. "Wil*l ha*ve".

(8) Verb plus negative, e.g. "hav*e no*t", "wi*ll no*t".

(9) Interlocking or dovetailing of classes 6-8, e.g. "Y*ou wi*ll-wi*ll ha*ve-wi*ll no*t" gives "Yo*u will hav*e", "wi*ll have n*ot", "wi*ll not ha*ve", "Yo*u will not hav*e", etc.

(10) Common phrases, e.g. "of course", "at least", "in order to".

It might be thought that the above classifications should have included

interrogative and negative interrogative forms with verbs, but these are too rare to be considered.

D. *Guidelines for the Formation of Sequences.*

1. Probably the main justification for a sequence is the high frequency of its occurrence in literary texts. If it is readily recognisable, this should be further commendation.

2. Some sequences which may or may not have a high frequency of occurrence themselves will suggest "families" of sequences which, taken together, could save a great deal of space and help to rationalise learning. Possible "families" of this kind could be formed with pronouns and parts of the verbs "to be", "to have" and "to do", as well as with other pronouns and auxiliary verbs. The biggest space saver of all would be the attaching of "the" to the word that follows it or, though slightly less space saving since "the" often begins a sentence, to the word that precedes it.

3. It may be thought desirable that components of sequences should be restricted to single-letter words and single-cell wordsigns — an acceptable exception to this restriction would surely be the word "into".

4. If double-cell contractions are acceptable as components of sequences, only those formed with dot 5, dots 4-5 and dots 4-5-6 should be used. Exceptions for deserving cases like "could", "should" and "would" would be very difficult to support.

5. At least one component of a sequence should be an upper sign.

6. The following symbols could not be used as the first component of a sequence: lower g, lower h, numeral sign, apostrophe, italic sign, letter sign, double capital sign and dot 4.

7. The following symbols could not be used as the final component of a sequence: dot 2, lower b, middle c, lower d, lower f, lower g, lower h, lower j, dot 3 and lower c.

8. Sequences should not be formed which would result in the formation of words unless the sequence was judged so indispensable that it was preferred that the word should be represented in some other way. To take a possible example, if "ar" were to represent the word "are", then the sequence "that are" would result in the formation of the word "tar". The word "tar" would then have to be written in some other way, say, preceded by the letter sign.

E. *Some Rules.*

Many rules governing the use of sequences will be derived from the previous section, but the following should perhaps be added: —

1. The use of permitted sequences should be obligatory in the transcription of braille books and periodicals, but permissive elsewhere. Clearly, one needs a less precise knowledge of the rules governing a code when it merely has to be read. The permissiveness of sequence rules would mean that the majority of braille readers would never need to become experts in their application.

2. It seems probable that no more than four single-cell contractions should make up a sequence. If double-cell contractions are permitted, the sequence should probably occupy no more than six cells altogether.

3. It will be obvious, but should nevertheless perhaps be mentioned here, that the indefinite article "a" cannot be used in sequences of initial attachment, but it would be possible to use it in sequences of terminal attachment.

4. Wordsigns directly attaching to a word in sequences of initial or terminal attachment cannot be used to represent letter-groups in these positions. Misgivings have been expressed to us about the effect of attaching "the" and "and" to the beginnings of words. It is felt that these signs, having four and five dots respectively, will tend to overshadow the beginning of the associated word. We submit the following samples for the reader's own judgment: "The *Ac*acia Tree"; "The *pop*ular boy"; "The *en*emy"; "The *Ili*ad"; "The *Pli*ades". For our part, we feel that if the American braille forms listed below are acceptable, no great difficulty will be experienced as a result of the initial attachment of "the" and "and" to words: "A Still Child"; *"Know One Another"*; *"a knockabout comedy"*.

VII. The Space-Saving Potential of Sequences.

1. It is impossible precisely to quantify the space-saving efficacy of the greater use of sequences in the abstract. This depends on which particular sequences it is decided to use and how it is decided to use them (e.g. whether to attach words like "a", "the", "and" and "of" to the words which they precede or follow). Indeed some advocates of the greater use of sequences (such as the framers of the 1919 Grade 3 revision) have even suggested that some words might be attached to both those which they follow and those which they precede. Again, the possible cross-sequencing of words which each seem good candidates for sequencing in their own right further vitiates the reliability of estimates of space saving based on the aggregation of frequency counts of words which might potentially be used in sequences.

2. However, the following very rough-and-ready estimate of the maximum number of spaces which might reasonably be saved by the greater use of sequences does seem possible:—

a. From Appendix I, it emerges that some 2338 spaces in 10,000 words might on average be saved by the general use in sequences of the words listed there. This estimate is based on the very crude assumption that one space might be saved every time each word in the table occurred if it was used in sequence. This is certainly an over-estimate, since allowance must be made for the distinct possibilities of cross-sequencing afforded by the words in Appendix I; and if it is decided to use "the" in sequence after the preceding word rather than before the following one, that will further reduce the space-saving possibilities, since it is assumed that "the" will not be used in sequences of terminal attach-

ment after punctuation. However, it is submitted that the "one space saved per occurrence" rule will serve as a basis for the very rough estimate which is all that is being attempted here. It is assumed that 2338 spaces per 10,000 words is not an underestimate, as it is assumed that the Grade 3 framers' idea of attaching words to the words which they both follow and precede will not in general commend itself.

b. From the figure of 2338 spaces per 10,000 words, it is necessary to deduct the 510 spaces per 10,000 words already saved on average by Grade 2 (Appendix II).

c. Appendix IV shows the 136 sequences in the Gill Corpus, not already provided for in Grade 2, which each save at least 1 space in 10,000 words on average. As will be seen, these save between them on average some 467 spaces in 10,000 words. But from this figure must be deducted the 183 spaces which are potentially saved in common with Appendix I (see Appendix V).

d. A very rough maximum estimate of the spaces which might be saved over Grade 2 by the sequences considered in this paper is therefore given by the following: — 2338 − 510 + 467 − 183 = 2112 per 10,000 words, i.e. approximately 22% of blank cells in current Grade 2 braille, or 5% of total Grade 2 space. (Space saving is reckoned in terms of Grade 2 rather than Grade 1 space, since it is assumed that sequences would only be used in a contracted code of some kind, and Grade 2 is the only contracted code we presently have to measure against.) At just over 18%, this would barely restore the redundancy level (as measured by blank spaces) to that of Grade 1. Since, for the reasons given, sequencing is unlikely to be able to save as much as this maximum estimate, any saving effected ought easily to be tolerable from the point of view of the redundant space it leaves. Even so, at 3-4% of total Grade 2 space, though possibly less than might have been anticipated, the saving which can be effected by sequencing should nevertheless prove a useful weapon in the space-saving and speed-promoting armoury of any new advanced contracted braille. Indeed it will probably prove a necessary one if the level of redundancy is not to rise well above that of Grade 2 as more contractions are introduced.

3. From Appendix IV, it emerges that, very much as with the present Grade 2 contractions, a comparatively small proportion of the new sequences studied in this paper do a disproportionate amount of the space-saving work. Of the commonest new sequences each saving at least 1 space in 10,000 words on average in the Gill Corpus, 5 account for a quarter of the occurrences. 9 account for a third, 22 for 50%, 41 for two-thirds and 57 for three-quarters.

4. Appendices VI and VII indicate the space-saving potential of some promising pronoun-verb and verb-verb sequences. As will be seen, the pronoun-verb sequences identified, if fully used, could save some 216 spaces per 10,000 words on average, while the verb-verb sequences could save some 75. It should

be stressed that these figures substantially overlap those disclosed by Appendix IV, and should not be cumulated with them. Furthermore, as with the estimates derived at 2d above from Appendices I, II, IV, and V, it is most unlikely that all the identified sequences would ever be utilised — a further reason for regarding the estimates contained in this section as considerably on the top side. Having said that, the verb-verb sequences in Appendix VII appear particularly powerful space savers, especially those involving the verb-parts "be", "been" and "have".

5. Finally, Appendix III shows the space-saving value of the most powerful sequences permitted in present Grade 2 braille in order that designers of new codes may have ready access to information about what they presently have before proceeding to supersede it by something else.

Appendices

Appendix I

Some frequently occurring words which have been or might be considered for "general" use in sequence, i.e. for writing close up to most of the words which they either immediately precede or follow.

The words are listed in descending order of mean frequency of occurrence per thousand words in the Brown and Gill Corpora (for full details of these Corpora, see 'A Study of Braille Contractions', Universities of Birmingham and Warwick, Book Two, Section (d)). Since the two Corpora are thought not to be wholly comparable, the means have not been weighted according to the size of the individual samples contributing to them.

The inclusion of "an" and "at" presupposes the creation of single-cell signs for these words if it is desired to use them in sequences.

N.B. The Gill values for "a" are a slight under-estimate, based on a preliminary analysis carried out in December, 1978, evidently before the Corpus was complete. It has been used as this is the only source from which this information is available. The effect of any inaccuracy will be partially offset by the inclusion of the Brown values.

Brown Corpus (1,014,232 words) — number of occurrences and mean frequency per thousand words.

Gill Corpus (2,255,326 words) — number of occurrences and mean frequency per thousand words.

Mean Frequency (M.F.) per thousand words for the two Corpora.

Word	Brown Corpus		Gill Corpus		M.F. for the two Corpora
the	69971	68.99	142881	63.35	66.17
of	36411	35.90	71401	31.66	33.78
and	28852	28.45	67749	30.04	29.25
to	26149	25.78	60047	26.62	26.20
a	23237	22.91	45848	20.33	21.62
in	21341	21.04	41191	18.26	19.65
for	9489	9.36	23089	10.24	9.80
with	7289	7.19	15271	6.77	6.98
at	5378	5.30	13416	5.95	5.63
by	5305	5.23	11075	4.91	5.07
not	4609	4.54	10440	4.63	4.59
an	3747	3.69	6776	3.00	3.35
into	1791	1.77	3838	1.70	1.74
Total	243569	240.15	513022	227.46	233.83

Appendix II

Space saved by Grade 2 sequences.

Source: 'A Study of Braille Contractions', Universities of Birmingham and Warwick, Appendices 2 and 3 (J. M. Gill, unpublished, 1979).

Brown Corpus (1,014,323 words) — number of occurrences and mean spaces saved per thousand words.

Gill Corpus (2,255,326 words) — number of occurrences and mean spaces saved per thousand words.

Mean Spaces (M.S.) saved per thousand words for the two Corpora (space-saving is reckoned in terms of spaces saved by Grade 2 sequences over Grade 1).

Sequence	Brown Corpus		Gill Corpus		M.S. for the two Corpora
to	25974	25.61	59173	26.24	25.93
and for)					
of the)	19424	19.15	40151	17.80	18.48
with a)					
by	5167	5.09	10695	4.74	4.92
into	1771	1.75	3785	1.68	1.72
Total	52336	51.60	113804	50.46	51.03

Appendix III

The most powerful Grade 2 sequences in descending order of frequency of occurrence in the Gill Corpus.

Source: J. M. Gill, 'A Statistical Study on the Braille Code proposed by M. Milligan', Warwick Research Unit for the Blind, December, 1978 (unpublished). N.B. This study suffers from the disadvantage that its values appear to be under-estimates throughout (see note to Appendix I). But where it has been possible to cross-check with the completed Corpus, this suggests that the under-estimations are not serious enough to matter.

Number of Occurrences in the Gill study (2,255,326 words assumed).
Mean Frequency per 10,000 words.

Sequence	Number of Occurrences	Mean Frequency
of the	18103	80.27
to the	7728	34.27
for the	5410	23.99
and the	5068	22.47
by the	2986	13.24
with the	2806	12.44
of a	2797	12.40
with a	1970	8.73
for a	1685	7.47
and a	1309	5.80
to a	1175	5.21
by a	721	3.20
and of	253	1.12
and for	241	1.07
Total	52252	231.68

Appendix IV

The commonest sequences in the Gill Corpus (2,255,326 words), not already provided for in Grade 2, in descending order of frequency of occurrence.

*Denotes figures obtained from the imperfect December, 1978 analysis.			
Sequence	Number of Occurrences	Mean Frequency per 10,000 Words	Cumulative Percentage of the Total of Occurrences
in the*	10881	48.25	10.41
on the*	5395	23.92	15.57
at the*	3831	16.99	19.23
it was	3457	15.33	22.54
from the*	2854	12.65	25.27
it is	2735	12.13	27.88
in a*	2493	11.05	30.27
will be	1810	8.03	32.00
should be	1710	7.58	33.64
he was	1691	7.50	35.25
had been	1519	6.74	36.71
as a	1475	6.54	38.12
would be	1458	6.46	39.51
have been	1454	6.45	40.90
I was	1314	5.83	42.16
is the*	1303	5.78	43.41
there was	1288	5.71	44.64
out of	1262	5.60	45.84
may be	1261	5.59	47.05
he had	1258	5.58	48.25
has been	1140	5.05	49.34
on a*	1112	4.93	50.41
there is	1075	4.77	51.44
I am	1073	4.76	52.46
can be	1033	4.58	53.45
shall be	982	4.35	54.39
this is	954	4.23	55.30
you are	949	4.21	56.21
do you	946	4.19	57.11
I have	933	4.14	58.01
she was	912	4.04	58.88

Appendix IV - Cont'd

Sequence	Number of Occurrences	Mean Frequency per 10,000 Words	Cumulative Percentage of the Total of Occurrences
she had	882	3.91	59.72
in this	871	3.86	60.56
must be	800	3.55	61.32
of course	791	3.51	62.08
they were	768	3.41	62.81
you have	750	3.33	63.53
there are	733	3.25	64.23
they are	732	3.25	64.93
you can	708	3.14	65.61
I can	704	3.12	66.28
more than	703	3.12	66.96
do not	695	3.08	67.62
but the	693	3.07	68.28
I had	670	2.97	68.92
as if	667	2.96	69.56
is to*	618	2.74	70.15
at a	595	2.64	70.72
did not	565	2.51	71.26
would have	565	2.51	71.80
which is	564	2.50	72.34
he is	562	2.49	72.88
not be	558	2.47	73.41
I could	546	2.42	73.93
we are	528	2.34	74.44
that is	520	2.31	74.94
at least	518	2.30	75.43
it would	514	2.28	75.93
could be	509	2.26	76.41
of an*	503	2.23	76.89
was not	500	2.22	77.37
we have	494	2.19	77.84
that was	490	2.17	78.31
what is	487	2.16	78.78
you will	487	2.16	79.24
at all	479	2.12	79.70
are not	472	2.09	80.15
he would	431	1.91	80.57
from a*	428	1.90	80.97

Appendix IV - Cont'd

Sequence	Number of Occurrences	Mean Frequency per 10,000 Words	Cumulative Percentage of the Total of Occurrences
of any	423	1.88	81.38
or the*	418	1.85	81.78
could not	406	1.80	82.17
does not	397	1.76	82.55
they had	388	1.72	82.92
there were	379	1.68	83.28
are you	377	1.67	83.64
on to*	364	1.61	83.99
it to*	361	1.60	84.33
is that	359	1.59	84.68
be able	347	1.54	85.01
he could	347	1.54	85.34
who had	344	1.53	85.67
this was	342	1.52	86.00
I should	341	1.51	86.33
must have	335	1.49	86.65
as to	330	1.46	86.96
it will	330	1.46	87.28
as it	329	1.46	87.59
he has	329	1.46	87.91
we can	325	1.44	88.22
you were	325	1.44	88.53
might be	317	1.41	88.83
is in*	315	1.40	89.13
I would	313	1.39	89.43
in an*	313	1.39	89.73
in order to	310	1.37	90.03
as follows	306	1.36	90.32
they have	306	1.36	90.61
I do	301	1.33	90.90
which are	298	1.32	91.19
will not	295	1.31	91.47
I shall	289	1.28	91.74
as well as	287	1.27	92.02
is an*	287	1.27	92.29
is it	286	1.27	92.57
or a*	283	1.25	92.84
at this	282	1.25	93.11

Appendix IV - Cont'd

Sequence	Number of Occurrences	Mean Frequency per 10,000 Words	Cumulative Percentage of the Total of Occurrences
who are	277	1.23	93.37
you must	276	1.22	93.64
you would	276	1.22	93.90
it had	270	1.20	94.16
had not	265	1.17	94.41
would you	265	1.17	94.66
I must	263	1.17	94.92
what do	260	1.15	95.16
we were	257	1.14	95.41
you may	257	1.14	95.66
in that	255	1.13	95.90
you should	255	1.13	96.14
as though	252	1.12	96.39
at the end	245	1.09	96.62
who was	244	1.08	96.85
with an*	243	1.08	97.09
would not	242	1.07	97.32
it has	239	1.06	97.55
did you	238	1.06	97.77
she could	238	1.06	98.00
what was	238	1.06	98.23
should have	237	1.05	98.46
on this	234	1.04	98.68
who is	234	1.04	98.90
at any	232	1.03	99.12
she would	232	1.03	99.35
for example	230	1.02	99.57
all that	227	1.01	99.78
she is	226	1.00	100.00
Total	104549	463.56	100.00

N.B. Allowance should be made for the fact that the sequences "in order to" (1.37 occurrences per 10,000 words), "as well as" (1.27 occurrences) and "at the end" (1.09 occurrences) save two spaces over Grade 2 per occurrence.

Appendix V

Sequences listed in Appendix IV which also potentially result from the "general" sequencing of words in Appendix I.

Number of Occurrences in the Gill Corpus (2,255,326 words).
Mean Frequency per 10,000 words.

*Denotes figures obtained from the imperfect December, 1978 analysis.

Sequence	Number of Occurrences	Mean Frequency
in the*	10881	48.25
on the*	5395	23.92
at the*	3831	16.99
from the*	2854	12.65
in a*	2493	11.05
as a	1475	6.54
is the*	1303	5.78
on a*	1112	4.93
of course	791	3.51
do not	695	3.08
but the	693	3.07
at a	595	2.64
did not	565	2.51
not be	558	2.47
at least	518	2.30
of an*	503	2.23
was not	500	2.22
at all	479	2.12
are not	472	2.09
from a*	428	1.90
of any	423	1.88
or the*	418	1.85
could not	406	1.80
does not	397	1.76
is in*	315	1.40
in an*	313	1.39
in order to	310	1.37
will not	295	1.31
is an*	287	1.27
or a*	283	1.25
at this	282	1.25
had not	265	1.17
in that	255	1.13
at the end	245	1.09
with an*	243	1.08
would not	242	1.07
at any	232	1.03
Total	41352	183.35

Appendix VI

Pronoun-verb sequences in the Gill Corpus arranged in "families" by part of verb.

N.B. Values for these and those, are not given on account of their comparative infrequency of occurrence. Sequences which occur on average less than ten times in 10,000 words have also not been included.

Number of Occurrences in the Gill Corpus (2,255,326 words).
Mean Frequency per 10,000 words.

*Denotes figures obtained from the imperfect December, 1978 analysis.

Sequence	Number of Occurrences	Mean Frequency
AM		
I am	1073	4.76
IS		
he is	562	2.49
she is	226	1.00
it is	2735	12.13
that is	520	2.31
this is	955	4.23
there is	1075	4.77
what is	487	2.16
which is	564	2.50
where is	65	0.29
who is	234	1.04
Total	7423	32.91
ARE		
we are	528	2.34
you are	949	4.21
they are	632	2.80
there are	733	3.25
what are	144	0.64
which are	398	1.76
where are	38	0.17
who are	277	1.23
Total	3699	16.40

Appendix VI - Cont'd

Sequence	Number of Occurrences	Mean Frequency
WAS		
I was	1314	5.83
he was	1691	7.50
she was	912	4.04
it was	3457	15.33
that was	490	2.17
this was	342	1.52
there was	1288	5.71
what was	238	1.06
which was	221	0.98
where was	24	0.11
who was	242	1.07
Total	10219	45.31
WERE		
we were	257	1.14
you were	325	1.44
they were	768	3.41
there were	379	1.68
what were	35	0.16
which were	73	0.32
who were	130	0.58
Total	1967	8.72
HAVE		
I have	933	4.14
we have	494	2.19
you have	750	3.33
they have	306	1.36
what have	41	0.18
which have	97	0.43
who have	185	0.82
Total	2806	12.44

Appendix VI - Cont'd

Sequence	Number of Occurrences	Mean Frequency
HAS		
he has	329	1.46
she has*	—	—
it has	239	1.06
that has	62	0.27
this has	62	0.27
there has*	—	—
what has	68	0.30
which has	102	0.45
who has	165	0.73
Total	1027	4.55
*Denotes figures not available.		
HAD		
I had	670	2.97
he had	1258	5.58
she had	882	3.91
it had	270	1.20
we had	205	0.91
you had	128	0.57
they had	388	1.72
that had	129	0.57
this had	33	0.15
which had	190	0.84
where had	11	0.05
who had	344	1.53
Total	4508	19.99
DO		
I do	301	1.33
we do	107	0.47
you do	214	0.95
they do	98	0.43
what do	260	1.15
where do	25	0.11
which do	13	0.06
who do	30	0.13
Total	1048	4.65

Appendix VI - Cont'd

Sequence	Number of Occurrences	Mean Frequency
DOES		
he does	66	0.30
she does	23	0.10
it does	93	0.41
this does	13	0.06
that does	11	0.05
what does	85	0.38
where does	19	0.08
which does	11	0.05
who does	18	0.08
Total	339	1.50
DID		
I did	216	0.96
he did	184	0.82
she did	136	0.60
it did	42	0.19
we did	40	0.18
you did	60	0.27
they did	62	0.27
that did	10	0.04
what did	134	0.59
where did	37	0.16
which did	10	0.04
who did	18	0.08
Total	949	4.21
SHALL		
I shall	289	1.28
we shall	109	0.48
Total	398	1.76

Appendix VI - Cont'd

Sequence	Number of Occurrences	Mean Frequency
WILL		
I will	195	0.86
he will	163	0.72
she will	49	0.22
it will	330	1.46
we will	111	0.49
you will	487	2.16
they will	166	0.74
that will	63	0.28
this will	119	0.53
there will	136	0.60
what will	37	0.16
which will	137	0.61
who will	92	0.41
Total	2085	9.24
SHOULD		
I should	341	1.51
he should	99	0.44
she should	33	0.15
it should	155	0.69
we should	111	0.49
you should	255	1.13
they should	106	0.47
that should	24	0.11
this should	66	0.29
there should	74	0.33
what should	24	0.11
which should	51	0.23
who should	28	0.12
Total	1367	6.06

Sequence	Number of Occurrences	Mean Frequency
WOULD		
I would	313	1.39
he would	431	1.91
she would	232	1.03
it would	514	2.28
we would	96	0.43
you would	276	1.22
they would	203	0.90
that would	143	0.63
this would	155	0.69
there would	76	0.34
what would	110	0.49
which would	147	0.65
where would	12	0.05
who would	90	0.40
Total	2798	12.41
CAN		
I can	604	2.68
he can	130	0.58
she can	58	0.26
it can	137	0.61
we can	325	1.44
you can	708	3.14
they can	163	0.72
that can	57	0.25
this can	43	0.19
there can	29	0.13
what can	53	0.23
which can	89	0.39
who can	47	0.21
Total	2443	10.83

Appendix VI - Cont'd

Sequence	Number of Occurrences	Mean Frequency
COULD		
I could	546	2.42
he could	347	1.54
she could	238	1.06
it could	108	0.48
we could	118	0.52
you could	215	0.95
they could	133	0.59
that could	54	0.24
this could	43	0.19
there could	21	0.09
what could	41	0.18
which could	68	0.30
who could	66	0.29
Total	1998	8.86
MAY		
I may	68	0.30
he may	79	0.35
she may	27	0.12
it may	210	0.93
we may	65	0.29
you may	257	1.14
they may	134	0.59
that may	32	0.14
this may	61	0.27
there may	64	0.28
which may	131	0.58
who may	85	0.38
Total	1213	5.38

Appendix VI - Cont'd

Sequence	Number of Occurrences	Mean Frequency
MIGHT		
I might	129	0.57
he might	82	0.36
she might	51	0.23
it might	133	0.59
we might	41	0.18
you might	135	0.60
they might	56	0.25
that might	34	0.15
this might	19	0.08
there might	22	0.10
what might	21	0.09
which might	41	0.18
who might	33	0.15
Total	797	3.53
MUST		
I must	263	1.17
he must	119	0.53
she must	66	0.29
it must	163	0.72
we must	159	0.70
you must	276	1.22
they must	55	0.24
that must	18	0.08
this must	28	0.12
there must	52	0.23
what must	11	0.05
which must	41	0.18
Total	1251	5.55
Grand Total	49408	219.07

Appendix VII

Verb-verb sequences in the Gill Corpus arranged in "families" by part of verb.

Sequence	Number of Occurrences	Mean Frequency Per 10,000 words
BE		
shall be	582	4.35
will be	1810	8.03
should be	1710	7.58
would be	1458	6.46
can be	1033	4.58
could be	509	2.26
may be	1261	5.59
might be	317	1.41
must be	800	3.55
cannot be	168	0.74
Total	10048	44.52
BEING		
is being	122	0.54
are being	72	0.32
was being	81	0.36
were being	48	0.21
Total	323	1.43
BEEN		
has been	1140	5.05
have been	1454	6.45
had been	1519	6.74
Total	4113	18.24
HAVE		
shall have	199	0.88
will have	198	0.88
should have	237	1.05
would have	565	2.51
can have	48	0.21
could have	212	0.94
may have	204	0.90
might have	216	0.96
must have	335	1.49
Total	2214	9.82

Appendix VII - Cont'd

Sequence	Number of Occurrences	Mean Frequency Per 10,000 words
HAD		
has had	43	0.19
have had	146	0.65
had had	83	0.37
Total	272	1.21
Grand Total	16970	75.24

Appendix VIII

Complete List of Classes of Sequence Mentioned in the Text.

A. *Unattached Sequences.*

1. Conjunction plus article.
2. Conjunction plus preposition.
3. Conjunction plus preposition plus article.
4. Preposition plus article.
5. Pronoun plus verb.
6. Verb plus verb.
7. Verb plus negative.

B. *Interlocking or Dovetailed Sequences.*

8. Pronoun plus verb plus verb.
9. Verb plus negative plus verb.
10. Pronoun plus verb plus negative plus verb.
11. Common phrases.

C. *Attached Sequences.*

12. Initial attachment of preposition or article to following word.
13. Terminal attachment of preposition or article to preceding word.

Biographical Notes.

Jim Hughes has been blind from birth and is a fluent and extensive user of braille. He works as a piano tuner and is an active member of the National Federation of the Blind of the United Kingdom, which he represented on the Executive Council of the Royal National Institute for the Blind from 1975-9, and which he has represented on the British National Uniform Type Committee (now the Braille Authority of the United Kindgom) since 1979. He was Assistant Secretary of the BNUTC from 1979-81, since when he has been its Secretary.

Colin Low has been blind virtually since birth, and is also a fluent and extensive user of braille. Educated at schools for the blind and Oxford and Cambridge Universities, he now works as a lecturer in Law and Sociology at the University of Leeds. He has been active in a wide range of organisations concerned with handicap, notably the National Federation of the Blind, of which he was President from 1979 to 1982. He has represented the Federation on the BNUTC/BAUK since 1970.

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Conference Discussion

Evensen: There is an urgent need to investigate the effect of reading components contextually rather than character by character. An increase in sequencing might keep us in the business of "scrubbing" which is one of the major causes of slow reading in braille.

Churcher: There is a place for more sequencing in standard braille. It would be particularly valuable to slower readers because they do not skim.

Small: Braille experts can amuse themselves for hours playing with the code, but must always remember the majority of people who must be able to read braille. Positioning in the cell is important; it creates a perceptual problem for some, a problem which is exacerbated in sequencing.

Lorimer: I would urge caution over the extension of sequencing. Space-saving is only useful if it enables us to gather information speedily and easily. Eliminating the space between does not reduce the number of embossed cells that the finger has to read and the mind absorb. Removing the spaces between words removes the clear boundaries of the words. With regard to Table 4 in the paper, of the 136 two-word sequences only the first seven each saved one or more braille spaces in 1,000. (NOTE: Because delegates had not had the opportunity of studying this paper in advance of its presentation, Poole read aloud the first seven in Grade 2 braille and the first seven outside Grade 2 braille — 14 sequences which represent 45% of the use of the word "the" in combination with another word.) Is the perceptual and cognitive difficulty justified when the gain is so small?

Milligan: The perception of cell position is important. Some of the sequencing in the Birmingham/Warwick study was predicted to be bad before it was tried. Sequences must not be introduced unless they could be said to increase perception.

THE INFLUENCE OF CHANGES TO ENGLISH BRAILLE ON SIBLING CODES

by Connie Aucamp, M.A. Connie Aucamp, herself a braille user, is a braille and language teacher at the Pioneer School, Worcester, South Africa.

Sibling Codes

An aspect of English Braille which may easily be overlooked in countries that are predominantly English speaking is the influence that the English Braille code has on, what may be called *sibling codes*. For the purpose of this paper the term is used to mean a Braille code which, generally speaking, conforms to the English usage (British or American) in Braille Grade I, which designs its code of contractions and rules applying to their use according to the practices current in English Braille and which is used by blind people who also use English Braille extensively.

The situation in a country where sibling codes are used, differs fundamentally from that which exists where some individuals learn a foreign language for academic, cultural or similar reasons, such as a British student learning French or an American student learning Spanish as a second language. This difference and its relevance to possible changes in the English code can be made clear by describing an existing situation. However, if such a situation existed in one region only, there may be some justification for giving it little thought. I am convinced that parallel situations may exist or may be emerging elsewhere. In this paper I shall confine myself to what is known to me through personal experience.

The History of English in South Africa

During the previous century British influence penetrated deep into Southern Africa. Even in those regions that were not under British rule, British culture had a profound though sometimes subtle influence so that the emerging nations almost unquestioningly followed British examples in many educational and cultural undertakings. When the first school for the blind was founded in Worcester in the then Cape Colony (1881), the principal, although he was an immigrant from The Netherlands, patterned the Braille code on that which was currently used in Britain. This was so successful that when the Afrikaans Braille code was standardised in 1938 it followed the British code in most even minor details. Even customs in format (lay-out) were closely patterned on those of the Royal National Institute for the Blind in England. Afrikaans was thus the first sibling code which was developed in South Africa.

Other Sibling Codes

Other indigenous languages followed the same pattern when the need arose. After World War II, systematic attention was given to languages such as Zulu, Xhosa, Sotho and Tswana. Editing of these codes is still in progress but they

have been used in schools and books have been printed for a number of years. All these codes share the basic elements that I referred to as those characterising sibling systems.

The latest code is Venda, and there are other languages in Southern African territories and countries which may require codes of their own and which will probably qualify under the definition of a sibling code.

It must be pointed out that the English Braille Code has a widespread influence in Southern Africa and that it is important to many blind people whose first language is not English.

Practical Applications

All school-children in South Africa learn English Braille, but English is the first language (mother tongue or home language) of a minority only. English is the educational and cultural medium by means of which children and adults of all languages make contact with our common cultural heritage and it is the language that gives access to many kinds of employment. Though the children learn their mother tongue because of its inherent educational and emotional advantages, they also learn English as a second language from the very early grades in school. In many schools instruction in the first language is supplanted by English as a study medium at a very early age, though the children may also continue to have instruction in the mother tongue. Children in these schools, therefore, learn at least two Braille codes at an early age.

A few other examples of the close connection between English and the sibling code or codes may be mentioned:

1. Teachers preparing class material for Thermoforming must be able to use the mother tongue and English.
2. Several bilingual Braille magazines in which one of the languages may be English, are published.
3. The South African National Library for the Blind carries titles in English, Afrikaans, Zulu, Xhosa, Tswana, North and South Sotho.
4. Stereotypers and proofreaders in the two Braille printing houses in South Africa usually have to know at least two Braille codes so thoroughly that they can produce Braille texts in those languages.
5. Students and adults who are adventitiously blinded and whose first language is not English may find themselves at a serious disadvantage if they do not know two Braille codes.
6. To qualify for university (college) entrance a South African student has to be at least bilingual.
7. Braille code books and primers for learning Braille in some languages (e.g. Sotho/Tswana) sometimes state that when the particular code does not make provision for a given situation, current British or American publications should be consulted.

What Changes to the English Code Entail

When any change, however insignificant, is officially made to the Braille code of the English-speaking world, it entails that all code books and primers in the sibling codes have to be revised. Supplements have to be issued or new editions published. Within a reasonable time school textbooks, particularly readers and grammars, have to be reprinted. Adults have to readjust to the alterations. This happened in 1967 when British Braille adopted a new way of writing fractions, introduced dot 3 as the *mathematical comma* and the new *operation signs* in mathematics. In South Africa a national conference had to be held to deliberate on these alterations but there was much reluctance to adopt the changes that affected such a minor part of the code. The fact that South Africa subsequently changed to the Metric System made it possible to introduce all these alterations at the same time in 1971.

Fewer Firm Rules

The facts and circumstances which have been enumerated must lead to the conclusion that in some parts of the world English Braille Grades I and II are vital to the cultural, educational and vocational needs of many blind people whose first language is not English. It may also be added that funds are not always so abundant and that production time is limited. An undue proportion of time and money should not be spent on one aspect only of work for the blind.

Authorities who make decisions on Braille rules and usage are doing so not on behalf of the English-speaking world only but on behalf of many others to whom English is a second or third language.

To conclude at this theoretical point would, however, serve little purpose. Certain suggestions are therefore made but it must be pointed out that they are those of the author and that they have not been debated elsewhere.

The first recommendation to accommodate sibling codes that I wish to make is that there should be *fewer firm rules* governing Braille codes, more particularly, but not exclusively, Braille Grade I. It would, it seems, be advisable to follow the precedent of the capital sign in this respect. The British code states that the capital sign is not generally used but that it may be used. The Sotho/Tswana code states that the capital sign should be used throughout. The two Braille printing presses in South Africa also follow different policies with regard to the use of the capital sign — one preferring its use while the other limits it to certain publications. None of these practices is contrary to the rules. When rules are too rigid, the situation may arise where they do not allow for local circumstances. The Braille conference of 1971 referred to previously, resolved that the South African currency, the rand, should be indicated by the letter R. This, according to one interpretation, is an infringement because in Standard English Braille the letter R indicates rupees. Surely, we cannot devise a Braille code for the blind which makes it impossible to print a Braille text according to the customs of the

country for which it is intended. Another example is that of the way the metric symbols are represented in Braille in South Africa. This is done to conform to inkprint usage in South Africa but it does not happen to coincide with the rules of Standard English Braille.

A further example is the rules governing the use of the capital sign and the italic sign when they occur in hyphenated words. American rules state that the double capital sign should not be repeated after the hyphen. This seems reasonable practice in English where hyphenation is infrequent and inconsistent. In Afrikaans, on the other hand, it happens that many words are written as unspaced compounds. In some hyphenated compounds the second half of the word is written with lower-case letters, e.g. "TV-man". If the American rule is applied, the reader will not know that "man" is not capitalized.

It would be possible to overcome these difficulties by making a distinction between common usage on the one hand and firm rules on the other. A set of guidelines that could facilitate decision making and ensure reasonable uniformity would be a possible solution. In the same way that a good publishing company has its usages, the Braille authorities could provide guidelines. If they have firm rules, as is the case at present, the situation arises where Braille cannot adapt to changes in inkprint usage without incurring costs and having other implications as was previously pointed out.

Experience in South Africa has shown that Braille readers adjust readily to minor variations in these matters, provided that they are not brought up to believe that in the world of the blind there is only one correct way of doing things which are done in various ways in the world of the sighted. The South African Library circulates British as well as American books and magazines. This indicates that uniform and rigid world-wide usage is not essential.

Avoid Unnecessary Rules

Though it is sometimes easier for the Braille reader when inkprint is not followed too closely in matters such as the use of the italics for a change of type-style, it seems unnecessary to make firm rules about the inverted commas, brackets and the apostrophe after numbers. There seems little justification for having rules which make it impossible to produce a text that conforms to inkprint usage, unless the interests of the Braille reader are indeed served by such rules. The same holds good for lay-out (format). Why, for example, should rules for writing poetry be framed in such a way that it becomes difficult to keep up with changing inkprint customs? If it were permissible to conform to inkprint usage when this is possible, the interests of certain groups of readers such as students may be better served and the computer can be accommodated as well.

Make Fundamental Changes Now

When it was pointed out above that changes to the English Braille code entail numerous adjustments in sibling codes, one could have come to the conclusion that no changes should be made at all. There is also another possibility which seems preferable in the light of the knowledge that recent research has provided. If after careful deliberation it is found that changes are advisable because they would make Braille easier to learn and use, those changes should be made immediately and thoroughly. These changes should be scientifically justified and it is essential that the prime reasons for introducing them are that they would make Braille easier to read and easier to learn. If this course is followed the sibling codes can make the necessary adjustments to their own codes which do not have such a long tradition as English Braille. In most of these languages the number of books that are at present available in braille is still very small. This also makes it advisable to change now. These emerging codes would then have the advantage of a scientific model which will simplify the task of those who have to develop or standardize sibling codes.

Make Braille Easier to Learn

South African codes, especially those that have been developed after World War II have fewer contractions than English. If a generally accepted English code that has fewer contractions which have been scientifically determined, is introduced internationally it would mean that students and adventitiously blind people could master Braille skills more easily. The time needed to teach the contractions would be shorter. Teaching time could then be used for developing the motor, perceptual and cognitive skills which are necessary for learning Braille.

One of the most important ways of making English Braille Grade II more accessible to readers whose first language is not English would be to eliminate contractions that do not have a high frequency. The beginner whose first language is not English finds contractions such as CONCEIVE, SPIRIT and CHARACTER difficult to remember. Other contractions that are difficult to remember are those which only differ from one another by the dots that precede them, such as WILL, WORK, WORD, WORLD and THE, THERE, THESE and THEIR. It may be difficult to eliminate these contractions because most of these words have higher frequencies.

Conclusion

Commencing from a local situation in South Africa, I have tried to point out that decisions concerning English Braille Grades I and II affect many people whose first language is not English. English Braille should be made as accessible as possible to these readers provided that changes are not detrimental to the interests of English-speaking Braille readers. It is more likely that Braille would then be easier to master by English-speaking Braille

readers as well.

What makes Braille difficult or inaccessible, however, is not of necessity the minor differences in usage between Britain and America but the initial problems in learning the code.

With the advent of computer-produced Braille we now have an opportunity of simplifying the code. We can envisage that Braille will be produced at a faster rate. This will offset the loss of titles that have already been accumulated.

Finally, if the authorities do not see their way open to making radical changes now, they should not be made at all. The English-speaking world of today has inherited a responsibility that encompasses large parts of the world. Whatever this conference decides — it must be borne in mind — has a bearing not only on nations with a longer tradition such as Britain and the United States: the decisions affect many young and emerging cultures and Braille codes.

Conference Discussion

Cargill: I strongly support this down-to-earth paper. Too much has gone into this conference not to follow it up with some action.

Troughton: In our school, there are 30 students for whom English is a second language.

Small: A similar problem exists in the South Pacific where many countries will have to rely for literacy on their second language, English Braille. It is important to remember that if there is no agreement, neither the British nor the Americans are going to suffer very much, but others will.

Evensen: If you get entangled in the needs of every country, the problems, of course, increase.

Maxwell: There is a connection between the codes.

Poole: In what way do the rules make it difficult to produce poetry?

Aucamp: We make rigid rules which restrict other languages, but not just other languages. The strict rules for poetry, for example, make it difficult to keep abreast of changing print practice. The results of rules cannot always be foreseen. Let the Americans and the British who pride themselves on freedom, leave some in braille.

BRAILLE AS AN AUTONOMOUS SCRIPT

by William Poole
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1. The purpose of this paper is to provide a framework within which certain aspects of braille code change can be rationally considered. The primary question which it examines is: to what extent should braille copy print? But this raises other questions of almost equal importance: what exactly does it mean to say that braille should or need not do this? How far does current SEB actually do so? Should the requirements of computer produced braille be different in this respect from manual braille? What implications do our answers to these questions have not only for the future of braille, but also for the view we take of the status of the blind person in a predominantly sighted world? These matters received a considerable amount of attention at the Workshop on Compliance of Computer Programs with English Braille, American Edition, held in New York in June 1976, and I have studied carefully the opinions expressed there by the various contributors. Nevertheless it is clear to me that a number of relevant points were not made adequately, if at all. There can be no doubt that the attitude we adopt on these questions has a crucial bearing on matters of formatting as well as coding, and on non-literary as well as literary braille. But the devising of a satisfactory literary code must to some extent take account of non-literary needs, because of the necessity of using different codes in close proximity, so I have not hesitated to touch on all aspects of my topic, while concentrating mainly on those which are of most direct concern to this Conference.

2. Braille is a tactile script by means of which people with little or no sight are enabled to read and write. The script is segmented into homogeneous cells, each in the form of a three-row, two-column matrix, so that within any cell there are six positions each of which can be occupied by a dot or by no dot. This means that, including the blank cell, there is a total of only 64 possible dot combinations, or distinct characters, which must be used to represent the entire range of languages, notations and codes to which the blind person may desire access. Other tactile scripts have been invented, but braille is by far the most versatile, as well as being the most widely used.

3. The situation confronting the sighted person is utterly different. There are many visual scripts. For the writing of natural languages alone there is Roman, Arabic, Cyrillic, Devanagari, and a host of others. But the student of the ancient world may wish to become acquainted with linear b, or cuneiform, or Egyptian hieroglyphs, or runes, none of which is in current everyday use, though there is no theoretical bar to their representation in

braille. In addition there are distinct visual notations used in all the branches of mathematics and science, for the writing of music and phonetic utterance, and for the recording of games and other purposes. Many of these scripts have characters in common, though they do not necessarily perform a similar function in each; and the total number of characters available to the sighted writer must run into many thousands, though hardly any individual is required to know more than a tiny proportion. Moreover this number is constantly increasing: if a writer on, say, linguistics feels that the script he is using is inadquate to express his needs, he can simply modify some of the existing characters by turning them upside down or in some other way; or he can write them above or below the line; or he can add diacritical marks to them; or he can create entirely new ones — assigning in all these cases whatever meanings he chooses. He can also systematically distort his primary character set so as to generate fresh ones — capitals, italics, boldface, sans serif and other type founts. There is no visual script authority to legislate for him what new characters or usages are permissible, though in science and mathematics attempts are made to establish some conventions on an international basis. But for the most part he is free to make changes which may be idiosyncratic or even inconsistent, regardless of whether his innovations will eventually gain general acceptance or not. Fortunately the scripts in which natural languages are written are much more static, but new punctuation and formatting habits can, as we shall see, give rise to brailling problems.

4. How can this diversity of visual scripts, with their almost indefinitely large number of characters, be adequately represented in braille, which has only 64 characters? This is a task of transliteration. We must focus our attention now on the English language, and for the time being I will pose the problem in terms of rendering into braille a printed English text. The English alphabet consists of 26 letters; there are upwards of a dozen punctuation signs in regular use; there are ten digits; there are a few signs used in connection with numbers in normal literary text, such as the principal arithmetical operation signs and the signs used to indicate denominations of coinage; there are some special symbols, such as the asterisk and dagger, which occur with sufficient frequency to need to be catered for; there is finally the problem of different type founts. But it looks as though we might get by with only 64 characters for a literary English braille code, and this suggests the possibility of establishing an exact correspondence between print and braille signs which would seem to have a number of advantages. To what extent have the designers of Standard English Braille in fact achieved this? I now propose to examine several suggested criteria of print/braille equivalence, see how far current British and American braille practice accords with each of these, and consider what if any modifications to the braille system are desirable in consequence. I shall be writing primarily from the standpoint of a British braillist, but salient differences in American usage will be taken into account.

5. I must begin by disposing of a red herring. I am not here concerned with mere formal similarities between braille and print, such as whether we should write poetry in a block with end-of-line indicators, or line by line as print normally does, though there are situations where failure or inability to imitate print formats does raise substantive issues. Still less am I interested in those designed resemblances between print and braille symbols in some technical codes, which may have mnemonic value for the learner, but which have nothing to do with my conception of equivalence.

6. Let us begin with a quite rigorous definition of equivalence, which can be relaxed gradually as we proceed. *Each print character must be represented by one and only one braille character, and each braille character must represent one and only one print character.* I shall call this the corresponding characters criterion of equivalence, or ccc. No-one has yet, I think, seriously suggested that this is the principle of transliteration which should be applied to English braille, and certainly it could not be applied to braille universally, since, quite apart from science and mathematics, there are several scripts for natural languages, such as Amharic and Vietnamese, which employ more than 64 characters.

7. However, our main concern is with Standard English Braille, and we need to see in what ways current SEB violates this particular test of conformity with print. First of all, contractions constitute a major class of cases where one braille character, or a character string, represents a larger number of print characters, and it has been seriously suggested that, in order to produce a closer approximation to some form of print equivalence, English and other languages should abolish their contraction systems completely. This would have the effect of reducing braille reading speed by about 40%, augmenting manual writing time considerably, and increasing the bulk of conventionally produced braille books by about one volume in four. I therefore hope and expect that it would remain unacceptable to the vast majority of thinking braillists.

8. There are also situations where two or more braille characters represent one print character. Punctuation signs such as square brackets and dashes, asterisks and daggers, and signs used in connection with numbers are examples of this. In a language like English with a comparatively small alphabet, especially if there were no contractions, it would in principle be possible to substitute single braille characters for character strings in these cases. But this has not been seriously advocated, doubtless because it is recognized that the number of special print symbols that may need to be represented even in a literary code can be extended almost indefinitely. There are other features of SEB which violate ccc, but these will be dealt with later, as they do not violate it uniquely.

9. Let us now reformulate our criterion of equivalence in terms of signs instead of characters. A sign is the smallest unit of significance in a code, and if it consists of more than one braille character, it cannot at this level

of textual analysis be meaningfully split up into its constituent characters. We can then say: *each print character or specified character string must be represented by one and only one braille sign, and each braille sign must represent one and only one print character or specified character string*. Braille contractions thus become a particular class of signs whose definition specifies which print character strings are to be treated as print signs for the purpose of transliteration into braille. I shall call this the corresponding signs criterion of equivalence, or csc. This is, I would say, the most widely supported criterion, since the limited resources of braille give greater flexibility for one to one correspondence between signs than between characters. The features of SEB which violate csc can be divided into several categories, and I shall now list the major violations together, lettering the categories and numbering the items within them for convenience of reference in the discussion which follows. Further violations will appear when I come to consider other criteria of equivalence.

10. (a) *Different print signs which are represented by the same braille sign*:

(1) Both opening and closing round brackets are represented by dots 2356;

(2) Both opening double inverted commas and the question mark are represented by dots 236;

(3) Both the oblique stroke and the letters st are represented by dots 34;

(4) Both the poetry sign (which is not an actual sign in print) and the letters are represented by dots 345;

(5) In braille the general accent sign, dot 4, represents a considerable variety of print signs in contexts where braille signs taken from foreign codes are not used;

(6) The braille sign which represents the asterisk can also represent other print reference symbols;

(7) The braille sign which represents the word "and" also normally (but not always) represents the ampersand sign.

11. (b) *Different braille signs which represent the same print sign*:

(1) Closing single inverted commas are identical with the apostrophe in print but not braille;

(2) The dots composing an ellipsis are identical with full stops in print but not braille;

(3) The decimal point is identical with the full stop in print but not braille;

(4) The sign used to group the digits of large numbers in threes is normally identical with the comma in print but not in UK braille;

(5) The minus sign may be indistinguishable from the hyphen in print, but this is not the case in braille;

(6) There are some signs, notably round and square brackets, which have the same form in print regardless of context, but which differ in braille according to whether they occur in the literary or mathematical code;

(7) It is perhaps worth recording that the abbreviation point and full

stop, which are identical in print, used to be differentiated in braille as regards sign or spacing, and that this is still the case in some foreign braille codes.

12. (c) *Substitution, insertion and suppression of punctuation and other diacritical signs in braille*:

(1) The oblique stroke is replaced by the hyphen or some other substitute when it is thought that its retention might cause confusion to the braille reader — see (a) (3) (UK only);

(2) Broadly speaking, the two pairs of quotation signs are used functionally to mark outer and inner quotes, and do not correspond to the use of double and single inverted commas in print (now UK only);

(3) The apostrophe is inserted in braille in the plurals of letters, numbers and abbreviations when not present in print;

(4) A short dash is substituted for a print hyphen in writing sports scores, votes, odds, etc (now UK only);

(5) A hyphen is substituted for a print short dash in writing compound dates and similar numerical ranges (UK);

(6) A long dash is substituted for a print short dash to indicate an omitted word (NA);

(7) A full stop is inserted in braille to mark off a roman or foreign ordinal termination (UK);

(8) The signs for brackets, quotes and italics are omitted in braille with letters of the alphabet because of the use of the letter sign which has no print equivalent;

(9) The signs for brackets, quotes and italics are inserted at the beginning of new paragraphs where appropriate, even when there is nothing to correspond in print;

(10) Matching opening brackets are added in braille when only a closing bracket appears in print (UK);

(11) Quotation marks reopened for each line of a quoted document in print are omitted in braille;

(12) A full stop is inserted before the hyphen in compound initials in braille (UK);

(13) The accent sign is added in braille when not shown in print on a capital letter (UK).

13. (d) *Standardization of print signs and spacing (in addition to items already listed under (c)*:

(1) The spacing of personal initials and of the components of abbreviations is not always in accordance with print;

(2) A spaced hyphen in print is treated as an unspaced short dash in braille;

(3) A braille hyphen is used between stammered syllables when print has a short dash;

(4) The signs used to mark omitted letters can vary from print, and so can their number, which corresponds to the number of letters omitted;

(5) Three asterisks are centered in braille to mark a break in text, regardless of what is done in print;

(6) There is a standard procedure for punctuating and formatting speech headings and stage directions in plays, which is not necessarily in accordance with print;

(7) The ellipsis is always spaced as a word in braille though not in print. In this and the next section the process of standardization has gone much further in UK than in NA braille.

14. (e) *Standardization of print words (including abbreviations and other entities containing alphabetic characters)*:

(1) The braille wordsigns td, tm, tn represent print forms both with and without the hyphen;

(2) The ordinal numbers 2nd and 3rd, when printed without the n and r respectively, are restored to their standard form in braille (NA);

(3) Ordinal terminations, when appended to fractions in print, are dropped as superfluous in braille;

(4) Print abbreviations are not copied in braille if they would occupy more space as a result;

(5) Print words or abbreviations which would be identical with braille wordsigns are modified or annotated in various ways to make clear the exact print reading!

15. (f) *Contraction anomalies*:

Contractions are braille signs which represent letter groups or whole words in print, but they cannot be used wherever the character strings they represent occur, being restricted by one or more of the following factors:

(1) They may only be used in specified positions (initial, medial, terminal or unattached);

(2) They may be prohibited when adjoining specified punctuation or composition signs;

(3) Alternative possible contractions may be given preference;

(4) Their avoidance may be necessary to remove braille ambiguities;

(5) Perceptual problems could be caused by writing too many lower signs in sequence, or

(6) By distorting the braille form of a basic word when letters are added to it;

(7) Word recognition could be obscured for phonetic, or

(8) morphological, or

(9) etymological, or

(10) semantic reasons;

(11) Words already unfamiliar could be made harder to read if they are foreign, or

(12) proper names, or

(13) abbreviations, or

(14) unusually or wrongly spelt, or

(15) newly coined, or
(16) made up, or
(17) colloquial, or
(18) dialectal.

It can scarcely be denied, I think, that there is an element of caprice as well as of sound sense in the detailed application of these considerations.

16. (g) *Sequences*:

A sequence is two or more words which are written without an intervening blank cell. But such sequences, even though theoretically possible, may be excluded on syntactical grounds when there is held to be a natural break between the words constituting them. Where a contraction can only be used as part of a sequence, this will result in the prohibition of that contraction (now only UK). I have assigned a separate category to this phenomenon, in view of the importance it would assume if the number of permissible sequences in braille were to be increased.

17. (h) *Type Fount Indicators*:

It is possible in print to write letters of the alphabet in upper or lower case, and with different type faces or sizes. Braille cannot imitate this, so it employs what are rather misleadingly called composition signs to function as fount indicators. UK and NA usage diverge particularly widely in this area, and there is surely scope for reducing the differences considerably and simplifying the rules in the process. The principal irregularities which can be interpreted as violations of csc are as follows:

(1) there are not enough braille indicators to cover the range of typographical distinctions in literary use, so they are largely disregarded, though the italic sign is also used as a general purpose indicator which can mark change of margin as well;

(2) in UK literary braille capitals are not normally differentiated from small letters;

(3) the letter sign is used not only as the lower case indicator, but also to resolve braille ambiguities between letters of the alphabet and the contractions for which these letters can stand; this is a source of formal confusion, especially in the UK;

(4) when a single letter is followed by a full stop there is a formal ambiguity as to whether it is to be read as a contraction or, eg, a personal initial, which the letter sign is not used to resolve;

(5) there is a general lack of clarity over the marking of fount changes in the middle of a word, and hyphens or apostrophes which have no print equivalent are sometimes inserted for this purpose (the NA termination sign being of restricted use);

(6) quotation marks are sometimes added in braille to indicate a change of type or margin (especially UK);

(7) the order of braille symbols of enclosure (which include the italic sign) does not strictly correspond with print (eg, opening brackets and quotes

always precede italics);

(8) print italics which are held to be merely pictorial are not retained;

(9) braille italics are sometimes added;

(10) there is no print equivalent of the separate italicizing of consecutive words or groups of words in braille;

(11) where the printing of numbers in italics is excluded by convention, braille inserts italic signs as the context requires. (See also (c), (8)-(9).)

18. (i) *Irregularities associated with numbers*:

(1) numbers are represented differently in literary braille from how they are in American mathematical braille;

(2) mathematical operation signs are replaced by words in literary braille (NA);

(3) there is no braille sign corresponding to the fraction line, denominators being written in the lower part of the cell (UK);

(4) roman numerals are often replaced by arabic ones in references;

(5) the numeral sign operates in much the same way as a fount indicator, but there is a general lack of clarity as to which signs terminate its effect and under what conditions;

(6) unspaced sequences of arabic numerals are written in braille with repeated numeral signs, and without the full stops, colons or hyphens which serve in print as separators (especially UK);

(7) a full stop is added in braille after roman numerals which form parts of sequences (UK);

(8) because braille punctuation signs are also used in writing the denominators of fractions (UK), there is a special punctuation indicator (dot 6), but the conditions for its use in literary braille are not precisely specified. (See also (c) (3)-(5), (e) (2)-(3), (h) (11).)

19. (j) *Denominational abbreviations*:

The treatment in braille of units of length, weight, coinage, etc, and of abbreviations used in references, diverges (though less so in NA) from print practice in the following respects:

(1) an abbreviation may appear in braille when there is none in print (UK);

(2) the symbols constituting an abbreviation may differ from those used in print;

(3) the abbreviation normally precedes instead of following the number;

(4) when a quantity or reference is expressed in terms of a series of successively smaller units, only the first abbreviation is written in braille, though all will normally appear in print, and the numbers are brailled in an unspaced sequence;

(5) the spacing, abbreviation points, and pluralizing ss used in print with such units are disregarded in braille.

20. (k) *Formatting Problems*:

These relate less to csc than to other criteria of equivalence to be men-

tioned later, but it will avoid interrupting the subsequent discussion if I list them here.

(1) Because print and braille lineation do not correspond, it is necessary to decide whether an end-of-line print hyphen is an integral part of the word and therefore to be copied in braille, or whether it is merely there because of word division;

(2) word division in braille has to be made without reference to the print original;

(3) the braille representation of some strings of signs varies according to whether they are split at the braille line (eg, some contractions cannot begin or end a line, and the numeral sign has to be repeated after a hyphen at the beginning of a line but not generally otherwise);

(4) some strings of signs cannot be split at the braille line;

(5) because print and braille pagination do not correspond, it is necessary to decide whether, and if so where, to indicate print page numbers in braille;

(6) references to print page or note numbers may have to be changed to or supplemented by their braille equivalents;

(7) the layout of headings has to take account of braille length of line and turn of page;

(8) blank lines in print are not normally copied in braille (especially UK);

(9) paragraphs which start at the margin in print are indented in braille;

(10) there are standard braille formats for such things as title pages, footnotes, tables, indexes, etc, which may not correspond at all closely with the print formats;

(11) some diagrammatic and pictorial material cannot be reproduced in braille at all, or not without drastic modification, and it may therefore have to be ignored or merely referred to, unless a verbal substitute can be constructed. Here we reach the outermost fringe of literary braille.

21. The above inventory of disparities between braille and print shows clearly that current SEB, especially in the UK, falls far short of exhibiting complete one to one correspondence between print and braille signs. Before considering the extent to which it would be desirable to remedy this, I want to expose a more general deficiency of the braille code by looking at the question of print equivalence from a slightly different angle. *The assignment of characters in the literary braille code must be such as to enable any string of print characters in any order to be represented, and to allow the addition of technical codes without changing any of the literary assignments.* I shall call this the comprehensive representability criterion of equivalence, or crc. I am now ready to consider arguments for and against print/braille equivalence, citing the most relevant item numbers from my inventory of disparities as I proceed.

22. That braille should in some sense accurately mirror print is to many people axiomatic, the starting point from which their detailed views on coding and formatting derive. But several types of argument have been developed

in support of this position, and one of the most fundamental is this: blind people need to be able to communicate with sighted people in a world where sight confers so many advantages; it is therefore essential that in situations where blind and sighted people use books in common, whether for work or leisure, the blind person should have before him exactly what the sighted person has. In particular braille should not be artificially simplified for the supposed benefit of the blind person: to do this is to patronize him and to derogate from his status as an equal member of the community, since he has the right to be as confused or misled by his script as his sighted counterpart. Any distortion of print, however seemingly trivial, exposes the blind person to the possibility of showing himself to be ignorant of something known to the sighted: this is at best embarrassing for him, and at worst renders him illiterate.

23. Closely allied to this argument is an educational one. Blind people need to learn sighted writing: this is made much more difficult if some of its features are not represented accurately in braille ((h) (2), (j)). Alternatively, since most blind people, including many if not most braillists, have previously been familiar with sighted writing, they will have extra problems in coming to terms with variant braille conventions. Where blind people work together with sighted people, eg, as teachers or students, or where they have to reproduce print material with some exactitude, their braille version of a text may put them at a disadvantage, eg, in dealing with references ((i) (4), (6), (k) (5)-(6)).

24. A new criterion of equivalence can most naturally be brought in here. *The assignment of characters in the literary braille code must be such as to enable the reader of any text to reconstruct totally the print from which it was transcribed in respect of words, numbers, punctuation and other special symbols, the manner of writing unit and other abbreviations, and formats.* I shall call this the total reconstructibility criterion of equivalence, or trc. Advocates of this criterion are prepared to show some flexibility as regards formats.

25. Finally it is urged that copying print exactly would facilitate greatly the task of producing braille with the aid of computers, and would also simplify some of the decisions which manual transcribers have to take. Some of the gains which should flow from a properly designed computer production system I need not elaborate on: faster turnround time, increased output, greater variety of material brailled, and, with the development of microprocessors, reduced costs and transcription on site. But there are other aspects of computer production which are more directly relevant to the question of print/braille equivalence. Methods of automatic inputting, such as the use of optical character readers or compositors' tapes, make it desirable to reduce, if not eliminate, the amount of pre-editing needed: it is especially unwelcome if human intervention has to take the form of searching the text for trivial and infrequently occurring features. This brings me to what some

people see as the main benefit of computer production: that it is not dependent, in the way that conventional production methods are, on skilled operators, ie, on people with a knowledge of braille. Given that it is increasingly difficult to find sighted people who are able and willing to become and remain transcribers, and that it takes a long time to train them, this is surely an asset.

26. And so I reach my last test of conformity between braille and print: *the assignment of braille characters and the rules governing their use, including formatting conventions, must be such that a computer translation program is 100% implementable.* I shall call this the computer implementability criterion of equivalence, or cic. Its fulfilment would remove the need to proofread the output of computer produced braille. Infringements of the second part of crc ((a) (5), (b) (6), (i) (1)) are also of particular importance here, since they obstruct the extension of computer translation programs to cover technical codes. In other words, the literary code should be, but is not, a strict subset of the totality of braille codes in use in any country.

27. Not all infringements of csc are also infringements of cic, but it is necessary for exceptions to rules to be capable of being expressed in precise conditional terms. These exceptions can then be stored in tables which can be modified if additions or alterations are made to the code. This is how contraction anomalies (f) are dealt with, but the tables are in practice not exhaustive, and not always accurate. However, more serious problems arise with regard to foreign words, abbreviations, word and number sequences, the functional use of signs in braille, and certain aspects of formatting ((b) (1), (c) (1)-(4), (8), (d) (1), (f) (11)-(13), (g), (h) (3)-(4), (8)-(11), (i) (4)-(6), (8), (j), (k) (1)-(3), (6)-(9)).

28. I have now presented the essence of the case for a rigorous adherence to some form of print/braille equivalence; what is there to be said on the other side? In my opening paragraphs I indicated that the resources of the braille system are limited, and it must be frankly recognized that important consequences flow from this. Because braille needs more than 64 signs, some of them have to be compound signs, ie, consisting of two or more characters. The ideal arrangement for facilitating print/braille equivalence would have been for all characters except the last in a compound sign to be modifiers, ie, incapable of having any value as a sign separately, but only of modifying the value of a following character. If only four characters were assigned as modifiers, this would ensure 5015 possible distinct signs (excluding the blank cell) of up to four characters each, which would be more than enough for most purposes. However, SEB is clearly not designed in this way, particularly with regard to contractions, where mnemonic considerations play a part in the choice of signs. It therefore happens that there are compound signs whose constituent characters can each be a sign in its own right, and herein lies a potential source of ambiguity. For if existing contractions were allowed to be used wherever the letters they represent occur, as some people would like,

only contextual clues would enable the reader to distinguish between such words as "blest" and "blindest", "bell" and "belittle" ((f) (1), (4), (7)).

29. Moreover, braille signs are partly defined by their position within a string ((f) (1)), and this applies not only to contractions. Otherwise category (a) of my inventory, instead of being confined to cases where the identity of signs in braille has been made a plausible ground for change, would have had to be enlarged to excess. This positional element in many braille signs, though alien to print, enables braille characters to be used more economically, especially in the case of punctuation signs, since most of these rarely occur except terminally (or in the case of opening brackets and quotes initially), so that the characters which represent them are free to be assigned other meanings in different positions. But it also violates the first part of crc, by not allowing the random mixture of letters from different founts, numbers and punctuation signs which can occur in print in slipshod, experimental, idiosyncratic, specialized or abbreviated writing ((e), (5), (h) (5)).

30. If we were at liberty to redesign the braille code from first principles, we might well eliminate some of the features under discussion. Round brackets can occur medially, eg, in the reproduction of defective text, so that the opening and closing signs may not be immediately distinguishable ((a) (1)); the question mark sometimes appears initially or unattached, eg, with dates ((a) (2)); and a general punctuation indicator, as with numbers ((i) (8)), might be needed to resolve unusual sequences of signs. However, a major assault on positionally defined signs would involve a radical departure from current SEB, which would render existing stocks of books unusable by new learners; and in any case, is it not better to make special arrangements to deal with very exceptional situations rather than provide for their coding on a routine basis in ways which would be bound to have restrictive repercussions on the system as a whole? That is a question which readers of this paper will constantly have to be asking themselves. It is perhaps worth pointing out here, too, that the suggestion tentatively made by some American writers that the use of Nemeth code numbers should be extended to the literary code would involve the abrogation of a generally accepted international braille convention, and would be unlikely to find favour in the UK ((i) (1)). (Strict compliance with csc would then require that the punctuation indicator should be used with *all* fifth line punctuation signs.)

31. Let me now turn to an altogether separate matter, the differences between tactile and visual perception in reading. Words, or even single letters, printed in upper case or different type are immediately conspicuous to the eye, whereas all braille dots are homogeneous, and characters only stand out by their position on the page, especially with reference to the left margin. This explains some of the distinctive features of braille formatting ((k) (7), (9)-(10)). Blank lines can be helpful, but not in such profusion as in print, especially where space is at a premium or at the turn of a braille page ((d) (5), (k) (8)). Or again, an italic (or capital) sign signals to the braille reader

that there is a change of type, but does not give prominence to what follows; indeed, after reading a few words he may cease to be aware of whether he is still in italics or not ((c) (9)). Why be overscrupulous about preserving distinctions which cannot have the same purpose that they do for a sighted person ((h) (1-2), (8))?

32. In addition the eye can assimilate a given amount of text more quickly than the finger can. There is therefore a case for representing things more succinctly in braille than in print, provided that this compression in coding does not itself generate obscurity; hence the system of contractions, which is in breach of ccc. Hence too some of the braille conventions with regard to abbreviations and references ((c) (5), (e) (4), (i) (4), (6), (j)); and should we necessarily follow print in the retention of full stops in abbreviations when the letter sign method (UK) would almost always save cells?

33. Finally braille, unlike print, is a one-dimensional script whose characters have to be perceived and interpreted successively. So the need for the braille reader to know about correct capitalization and accentuation, as well as other typographical conventions, has to be balanced against the undesirability of proliferating braille characters with little or no information content, which have no precise analogue in print, and which are a particular distraction to the less skilled braille reader ((a) (5), (c) (8), (h) (2), (8)).

34. This brings me naturally to the question of braille readability. I have no doubt that the use of contractions in braille creates a psychological bond between the letters contracted which has no parallel in print, so that the avoidance of contractions can become desirable to cancel this bonding effect ((f) (6)-(18)). Similarly, expectations with regard to syntactic structures are set up by the writing of words in sequence, and it is to obviate these expectations that we have a natural pause rule ((g)). The absence of these restrictive provisions would slightly impede reading, especially reading aloud, though the most fluent readers would be least affected. Print does not employ contractions or sequences, and it is therefore deceptive to maintain that restrictions on these features constitute a deviation from print in some way that the features themselves do not.

35. It is also clear to me that advocates of trc make unexamined assumptions about the way in which people read and their purpose in doing so. How many people, when reading, say, the report of a questionnaire survey into some topic that interests them, are concerned to know in what form the per cent sign appeared in print ((j) (1)-(2)), what kind of print quotation marks enclosed the respondents' comments ((c) (2)), or whether the abbreviations used in print had full stops or not? The truth is that most people read most of what they read at the semantic level only, i.e., for the information content, and they would find the obstrusive indication of lower level minutiae a distraction. They would feel that to clutter up the text with a lot of extra braille characters merely in order to make clear certain features of the typography would be tantamount to interposing something between the

author's meaning and their appreciation of it. Of course there are people whose needs are different. Students, scholars, writers who have to be able to quote accurately, proofreaders and no doubt others may all have to operate at lower levels: there is the syntactic level, concerned with grammatical structures; the lexical, concerned with the words used; the orthographic, concerned with spelling; and finally the level at which we are concerned with the precise use of print signs. Very few people operate at this lowest level, even when making verbatim quotations. The groups of readers I have mentioned are doubtless a minority, but their requirements are certainly not unimportant; and the situation is complicated by the fact that it is not easy to identify a text as one which would never need to be examined minutely by anyone.

36. Blind people themselves, when not actually engaged in the defence of csc or trc, readily recognize that some print features are expendable in certain reading situations. Tape recordings of books are very far from conforming to any of my tests of print equivalence, yet it is not commonly asserted — perhaps not commonly enough — that their exclusive use encourages illiteracy among the blind. Or again, there is increasing pressure, especially from fluent readers within the UK, for braille books to be less rigorously proofread, and in some cases not proofread at all, in the interests of making a greater amount of braille more quickly and cheaply available. Clearly complete fidelity is an aim which has to be balanced against other aims.

37. It is also worth pointing out here, I think, that not all braille is a transcription from print; and in devising braille conventions some account needs to be taken of the convenience of the person writing originally in braille ((c) (2), (h) (2), (j)). Moreover, a blind author who chose to write his manuscript in braille would be fully entitled to make use of script dependent characteristics, such as braille jokes, and we should then have to solve the problem of how to reproduce these most effectively in visual script. Such problems can also occur in writing about braille itself.

38. The notion that different degrees of fidelity are appropriate in different circumstances is not something I am seeking to foist upon the blind as an inferior substitute for the best print practice. In the sighted publishing world it is taken for granted. Let us suppose we wish to print an edition of Shakespeare's plays. The punctuation and even the spelling would not be authorial, nor, if we were merely providing an ordinary reading text, would they reproduce those of the earliest printed sources. Elizabethan practice with regard to capitals, italics and the use of the apostrophe was very different from ours, and it would be a matter of editorial decision to what extent they were followed. Even in a scholarly edition which approached facsimile conditions we might well choose not to bother about such things as long ss, mislineations, contemporary print abbreviations and trivial typographical errors. Much the same would, where applicable, be true about the reprinting of a more modern writer. What type of quotation marks to use, and whether to add an e after the g in *judgment*, or to write *realize* with an s instead of

a z, would be determined by house rules rather than by reference to the original sources. And so I could go on.

39. Two general conclusions can be drawn from all this: the first is that there is not just one print standard of correctness; and we must distinguish carefully between those braille conventions which accurately reproduce the ones in the source text, and those which correspond to some different but equally valid print convention, before deciding how much is being added to the blind person's task of learning sighted writing. Even sighted people themselves seldom know or make use of the full range of available print conventions; it is sufficient if their writing conforms to some set that is acceptable.

40. The second conclusion is that some print features are recognized to be less significant than others. It might be difficult to draw up a list of features that would be universally agreed to be of no significance from the point of view of braille transcription, but I would certainly want to include the following: the direction in which the script is to be read (now by international convention always from left to right in braille); the nature of the type employed; the use of right justified margins (widely used in the UK before 1914); the exact point at which print lines end; the starting of a chapter on a new page; and the wording of print headlines. More controversial would be: the copying of all material from the dust jacket, however transient its value; the reproduction of full details from the title page ((k) (10)); the absence of a braille contents page when there is none in print (gratuitously unhelpful); and the question of whether or not to show in all books the exact point at which each print page begins simply because this would be valuable sometimes ((k) (5)).

41. Early printers had to liberate themselves from the tyranny of manuscript conventions and develop their own with regard to punctuation, letter forms, etc; otherwise we should still be employing ligatures and scribal abbreviations which actually do resemble braille contractions, but which would give rise to many problems if we had to indicate in braille their presence or absence. Similarly braille should not follow print in everything, but should feel free to adopt conventions which are more logical ((c) (10), (12-13), (d) (4), (e) (4), (h) (11)), or more convenient ((c) (2), (5), (8), (e) (3), (h) (2), (8), (i) (6), (j)). Of course there has to be a minimum degree of fidelity to print which any braille transcription should seek to achieve, and I would certainly favour braille code changes designed to secure fidelity at the orthographic level ((e) (1)).

42. But I can see no virtue in imitating print conventions which are unhelpful to the braille reader or writer in the false belief that a preexisting parity between print and braille is being conserved by so doing. As to the argument in paragraph 22 that, unless print is slavishly followed, the status of a blind person is damaged vis-a-vis his sighted colleague, I can only say that it is a pity to see a noble principle degraded to serve such a stultifying purpose. Presumably, in the same spirit, the rectification of casual print er-

rors should also be deplored. But why, it might be asked, should blind people be penalized through a decision to transcribe from an unsatisfactorily printed text, when sighted people would have a choice of text, or would not be inconvenienced in the same way? Surely the appeal to equality of treatment can and should be used for levelling up rather than down. Why should sighted people not benefit from the eradication of errors in the course of braille transcription? It is my experience that most print publishers warmly welcome errors being drawn to their attention, so that they can be removed in subsequent impressions; and they are not infrequently willing to pay for the information supplied.

43. If I had been writing this paper 25 years ago, I would here rest my case for the treatment of braille as an autonomous script, free to develop its own conventions in a pragmatic way that took full account of the limited resources of the code, the differences between visual and tactile perception in reading, and the convenience of the writer, while remaining faithful to print at the orthographic level. But with rapid advances in computerized braille production the arguments deployed in paragraph 25 have acquired great weight. Intervention in an automatic process is now increasingly required to deviate from print, irrespective of the desirability of such deviation on other grounds. Moreover, if it became necessary to write a translation program for converting braille to print, something which has not yet so far as I know been done, then the case for adopting some strict form of print/braille equivalence would be still further strengthened. Must this lead to an endorsement of cic? I think not.

44. In the first place cic is a somewhat elastic conception, since the extent to which a braille code is implementable depends partly on the size of the computer and the storage space available for the translation program. But the considerations I have been advancing against strict conformity with print in the second half of this paper, though they do not invalidate the last paragraph, are equally not invalidated by it. I have therefore become increasingly convinced that the best solution is to adopt a dual braille standard, whereby certain specified provisions of the braille code could be suspended in computerized production; the code books would of course make clear within what limits divergence from the manual standard was permissible. It follows from what I have already said that there would be differences in coding and formatting between the braille outputs of different centres of computerized production; but many of these would only be apparent to a professional braillist, and the situation would not be so very different from what obtains in print, except that braille would have the advantage, as I see it, of defining a desirable standard of correctness to which computer output would strive to approximate.

45. Computer output already has some specific features: it is free from erasures, which is a definite asset; it does not normally employ word division ((k) (2)), so that blind people are deprived of a potential source for

familiarizing themselves with print practice in this respect; and it has distinctive types of error which, if left uncorrected, can be impossible for the reader to decipher. A time may come when most braille is produced by computer, but for the foreseeable future there will be a need for people to read braille which has been written manually by other people, so separate categories of braille produced to different standards of correctness will continue to be recognizable by braille readers.

46. The merits of adopting a dual standard are in my view as follows:

(a) it does not assume, as a single standard geared to current computer capabilities would do, that technology is static;

(b) it facilitates the extension of translation programs to technical codes, by not requiring that all problems should have been solved in accordance with manual standards prior to implementation;

(c) it allows experimentation in computerized braille production without interrupting production by traditional means;

(d) it permits any necessary retraining of staff or change in production methods to proceed with maximum smoothness;

(e) it allows for the most flexible adjustment between manual and computerized braille standards, rather than a series of sharp changes;

(f) it recognizes that braille correctness, while in itself desirable, has to be balanced against cheapness, speed, variety and quantity of braille, which are also desirable.

But though people will tolerate coding inaccuracies for the sake of getting braille which they otherwise would not have quickly or even at all, producers should not for this reason acquiesce in a general deterioration in the quality of the braille they produce; and this justifies the retention of a manual standard against which their output can be measured.

47. In conclusion I want to make two things clear: because I favour the maintenance of what must be regarded as deviations from, or less sympathetically distortions of print, it should not be imagined that I am essentially arguing for the status quo, and that I am willing to defend every existing deviation — or indeed that I would be unwilling to advocate new ones. Secondly, as I have already made explicit, I recognize definite limits to the amount of deviation that should be tolerated. But I would urge strongly that scrupulous adherence to every jot and tittle of the print source text is achieved at the price of ignoring some fundamental aspects of human perception and of print book production which can only be to the detriment of the braille reader.

Conference Discussion

Nilsson: Does autonomous script mean that it would be independent of print? The figure of 40% for the reduction in reading speed using Grade 1 braille seems very high. If the tests made in the Birmingham/Warwick study

had used people accustomed to reading Grade 1 braille and given them Grade 2 for two weeks, there would have been different results.

Evensen: There is a dual standard depending on how braille is produced. In reality, most mass-produced braille is computer-produced. If the paper is allowing for a greater divergence, we'd be against it. If we have Milligan's two-tiered braille, Nilsson's Grade 1 braille and Maxwell's "anything goes", we'd have a "mish-mash".

Brown: There are not just differences in approaches to braille here, but two different philosophies. One philosophy regards braille as a means to allow blind people to participate in the same world as the sighted; the second looks at braille as a tactile thing that blind people use any way they want to. A major task of this Conference is to understand these two philosophies since they both have validity.

Milligan: There *are* two positions here on braille — one is right and one is wrong. The first position is that braille should imitate print; this is wrong. The second position is that braille should communicate information as effectively as possible and this might best be done by *not* imitating print. The "imitation" view, after all, was the one that was taken by the 19th century opponents of braille. A belief in integration does not necessarily mean following what sighted people do. We need ways that are as good for the blind as other ways are for the sighted. While sometimes information is best gained by following the print, this is not always so. We may have to tell people what the print says.

Small: This was a masterly paper, presented in a masterly manner. The field of textbooks for students is the one with the most need to be the same as print. Brown says that both philosophies of braille are right. Unless there is a willingness to get together and compromise, both will be wrong.

Burling: We have the right to a script that serves us as well as print serves the sighted.

Ledermann: Textbook code does not provide all the answers. We must always allow ourselves to be flexible.

Poole: There is a tendency to cry down research with which we do not agree, asking not for more research but for something which we personally believe. On the matter of a dual standard, manually written braille should have a primacy over computer braille like that of the spoken word over print.

NOW OR NEVER?

A paper presented by Mrs. Marjorie Bolton, M.A. Educated at Chorleywood College for visually handicapped girls, St. Andrew's University and the Selly Oak Colleges, Birmingham. Gained the College of Teachers of the Blind Diploma in 1941. Recently retired after teaching blind children since 1940. Has represented the Association for the Education and Welfare of the Visually Handicapped on the Braille Authority of the United Kingdom since 1970. On the advisory panel to the Birmingham/Warwick Universities' Joint project, "A Study of Braille Contractions", 1977-1980.

(A plea for the revision of Braille contractions along the lines suggested by the joint project, undertaken recently by the Universities of Warwick and Birmingham, on, "A Study of Braille Contractions").

It is perhaps a good thing that we associate no particular person with our present system of contracting English Braille; surely his name would be much maligned if we knew it, for the laborious business of learning 189 contractions is rewarded by seldom coming across one third of them. In terms of frequency of occurrence, this weakest third of the contractions accounts for less than 5% of the total occurrences of all contractions.

Over the years there have been a number of attempts to assess the frequency of occurrence of contractions, and very slight changes have been made, but as more and more books are transcribed into braille, those who are acutely aware of the weaknesses of the present code have hesitated to urge for radical changes.

Proposals were made and accepted by the Anglo-American conference on braille in August 1956, that a number of infrequently occurring short-form words should be deleted from the code, and a number of new signs added, but when the Braille Authorities of the two countries put their proposals before their representative bodies, all proposals for change were rejected, except for the addition of a very few new contractions, (the signs for 'afternoon', 'first', 'friend' and 'question').

We now have very good reasons for again taking a look at Standard English Braille, and giving serious consideration to the desirability of revision. We now have statistical evidence of the need for change, and information which should enable us to produce a much more satisfactory Braille code than the present one.

In September 1980, the Universities of Birmingham and Warwick completed a three year joint project which they had undertaken on "A Study of Braille Contractions". To appreciate fully the value of this study the full report should be read. I shall only refer to those areas of investigation relevant to my theme, and then only briefly, but I hope to draw attention to the known facts about Braille and to suggest that this enlightening study should be used in the devising of the best possible braille code, not so dif-

ferent from the present code that they could not run concurrently till old stocks of books run out, but good enough to have an immediate appeal to the many braille readers who are very prejudiced against change.

The team of researchers at Birmingham combined the findings of four frequency counts, their own, and three previous ones, to produce fairly reliable statistical data about the frequency of occurrence of each of the contractions in Grade II Braille. The results of the different counts varied somewhat, because of the differing proportions of the material examined, which included fiction, articles and topics of general interest, magazines and children's books. However, the average of the four counts is reliable enough to show those working on a new code what to retain and what to reject of present contractions.

The governing rules of Grade I and II Braille were analysed to see how many need to be known by beginners in braille, and how many apply to each group of signs. It looks as if it would be difficult to reduce the rules much, without simplifying the system more than would be acceptable, but in some cases the consideration of groups of signs, or 'families', rather than single signs, might influence final decisions. It might be worth keeping or rejecting a whole family of signs, according, not only to their frequency of occurrence, but to how complicated the rules are which govern them.

Here are just a few figures taken from the project report: There are 22 signs representing words and groups of letters which occur more than once in every 100 words; but 31 contractions occur less than once in 5,000 words, and 20 of these occur less than once in 10,000 words (that is about 45 pages of interpoint braille). Each one of the 56 weakest signs saves less than one embossed space in 1,000 words. It is also revealed that there are some twenty words and groups of letters which are not contracted, but which, if represented by suitable contracted forms, would save at least twice the space saved by the sixty weakest of the present code.

The researchers at Birmingham were mainly occupied in using the statistics from the Warwick computers to devise and experiment with possible new codes. They were assisted by volunteer groups of braille readers who gave up a great deal of their spare time to learning, practising, and finally doing timed reading of new codes and comparable passages of Grade II Braille. They also did some timed reading of uncontracted braille for useful comparison with the reading times obtained on the experimental codes. In devising experimental codes the researchers had clearly in mind the kind of code they envisaged for the future, taking into consideration previous research findings and what would and would not be likely to be acceptable to braille users.

As some enthusiasts for the reform of braille are pressing for two new codes, a basic code for slow and average readers, and a highly contracted code for the very able, it is important to state here that this is not what the Birmingham/Warwick team have in mind. The aims of this particular team

are set out in the report, and I quote the exact words:

1. The seven-line structure of the braille code would remain unchanged, and there would be no substitution of present meanings, i.e., the characters representing the letters of the alphabet and the meanings of the contractions would remain unaltered.

2. Contractions would continue to be used in a manner which makes syllable boundaries clear, and aids word recognition.

3. There would continue to be only one contracted code. In addition it was considered that any alternative code should satisfy the following criteria:

1. Save at least as many embossed spaces as Grade II.

2. Cause no lowering of current reading speeds.

3. Reduce the number and complexity of governing rules.

4. Contain fewer of the types of contractions known to cause perceptual or cognitive difficulties.

5. Need the minimum of new contractions.

6. Enable readers of the new code to transfer with ease to books written in Grade II Braille. (Large quantities of these books would be in circulation for many years after the adoption of a new code).

Ten experimental codes were devised, and tried out by the volunteer readers. There was a final experiment, already mentioned, of reading uncontracted braille so that the speed of reading this, as well as Grade II, could be compared with the speed of reading the various experimental codes.

I propose to describe only very briefly here, the characteristics of each of these codes, as details of each, and the method of trying them out, are given very fully in the report of the project. I mention them to give some indication of the work already done; it was not claimed that any of these codes would be as satisfactory as it would be hoped the final agreed code would be. They were devised to obtain indications of the direction and extent of changes which might be made with advantage to braille users.

Code 1.

A reduction of Grade II to 57 signs. These were mainly single-cell upper-word and part-word signs. Although over two-thirds of the standard code was not used, the increase of embossed cells amounted to only 8.4%.

Code 2.

This consisted of the first 60 contractions in a frequency count of non-fiction made at Warwick. The 13 alphabet word-signs not appearing in this list were added to make a code of 73 signs. Here the omission of 116 contractions increased Grade II embossed cells by about 6.1%.

Code 3.

A reduced code of 81 contractions, selected on the basis of space-saving efficiency from the Lockhead and Lorimer (1954) and Warwick University counts. In this version, Grade II space was increased by 2.5%.

Code 4.

This code expanded Grade II by adding 37 new signs. It retained the whole

of the standard code. The additional signs were used for words which were among the most frequent of those at present not given contracted forms. In this, and other codes to which signs were added, it was difficult to find easily readable new signs. More experiments would be needed, and more time given for the participants to become familiar with new signs, before it could be demonstrated whether increasing the number of contractions considerably increases or slows down reading speed. This code reduced Grade II spaces by 4.8%.

Code 5.

This code was devised to test the suggestion that space and reading time would be saved if the signs for AND, FOR, OF, THE, and WITH were used only as whole word signs, and written close up to a following word. The omission of these between-word spaces reduced overall Grade II space by 2.7%, but this was at the expense of a 5% increase of embossed cells. The readers did not like these unspaced sequences.

Code 6.

80 signs: a sub-set of Grade II, intended to ease the learning task and minimise any resulting decrease in space saving and reading speed. This code did not include any initial or final signs or double letter signs. The only new sign was a single-cell substitute for the TION sign. This code significantly reduced the number of rules, but increased spaces by 4.7%.

Code 7.

128 contractions: 110 of present Grade II, and 18 new word signs. There was a slight simplification of rules here, and a space saving of 1.7%. There were 61 fewer contractions than in present Grade II.

Code 8.

120 Contractions: 108 existing, and 12 new signs. Space was saved by adding a sign for AT, and this was used as well as the signs for FROM, and IN in unspaced sequences. Most of the participants thought it unlikely that this would be acceptable.

Code 9.

This was devised with the object of easing learning and perceptual difficulties. Contractions and rules were reduced with a loss of only 1.7% of space.

Code 10.

126 signs: 114 existing, and 12 new signs. In this code emphasis was on space saving rather than rule reduction. Grade II space was reduced by 1.5%.

Among other facts emerging from the project, we now know that the removal of the 60 weakest of the present contractions would only very slightly increase total space, and would probably have no adverse effect on reading speed.

We hope that this three-year project was only the beginning of work to improve the braille contracted system. It has given us information which we can now use in producing a better code. It would be a pity to stop here and

make no use of the work that has so far been done.

Another experiment was undertaken to assess the difficulty of code recognition, and to discover the most frequent errors in reading contractions. A 'Braille Recognition Test' was administered to representative groups of adults and senior school pupils. It was hoped that the information obtained from this test would assist code revisers by indicating the contractions which are most and least often involved in making errors. Those who are to be concerned with the devising of new codes will have to decide how much notice to take of this particular investigation. It does not seem likely that a useful contraction such as SH will go because it is often confused with M; or that any change will be made in CH and ST which, as well as being confused with each other, may be mistaken for the letter K.

Doubtless some problems will remain, but all this valuable data must be very carefully considered, so that the resulting final code can be seen at once to be really attractive and worthwhile.

It is not possible, yet, of course, to be very clear about the exact form the new code will take. There will probably be somewhere in the region of 100-120 of the best of the present contractions, when space saving, readability, complexity of rules, and so on, have been considered. Our discussions so far indicate that the substitution of a new meaning for an old sign would not be acceptable, though one or two might be tried in experiments. (K for 'they' for example, has been suggested).

There will be a few new signs, perhaps 12-20. There are not, of course, many new signs available, so we must do the best we can with what we have. There could be some new short-form words, WHT for 'what' and LK for 'look' have been suggested as words which occur fairly frequently. Some space, and perhaps reading time, would be saved by these and other similar abbreviations. Some of the Birmingham experiments tried such things as ED sign, ING sign and GH sign standing alone for words like 'he', 'is' and 'been'. These met with a very mixed reception. Dots 4-5 and 4-5-6 might be used to make more two-space contractions.

As the signs which would be omitted occur only seldom, and there would be comparatively few new ones, the general impression when reading a book in new Braille should be quite pleasing and present no real difficulties. It is to be hoped that these budding ideas will be given a chance to blossom, and that people will be prepared to give them their unbiased consideration.

It is likely to be difficult to persuade people to accept change, and the chance of having a better code may be lost if revisers press for the introduction of two new codes at once — a basic and an advanced code. Those who are doubtful about the desirability of two levels of contracted braille are afraid that the basic code may suffer through needing to be a sub-set of the advanced code. It is quite clear that if there are to be two contracted codes, they must be related in this way, for the convenience of those learning the advanced code, and so that good braillists can turn easily to either code. But

with this restriction there is a danger of the basic code being inferior to one devised with no such restriction. Should we not first launch our one new code? Then, if experiments with a highly contracted code, based on the new standard code, prove that it is both desirable and practicable, those who feel the need for such a code could present it for those who would benefit. Once people have accepted the main change, they are not likely to object if some very able readers want to produce a more difficult code for their own use.

The first consideration of all would-be revisers should be to make the braille system easier to learn and easier to read, and to enable the majority of braille users to use the system more efficiently.

Conference Discussion

Small: The Birmingham/Warwick research is an impressive document which needs careful scrutiny. We need more information about the actual method of selecting the volunteers.

Poole: After this Conference, there should be more research, more field testing. To say one can *never* make a change — as in the no-substitution rule — is to put restrictions on code designers.

Cargill: If we are going to succeed, we must put a stop to research and make a definite change within the next two years. This change could be field tested and a committee could come back with a specific Grade 2 Code which we could recommend at the next conference.

Milligan: Two years is about the right time for field testing. A remarkable feature of the Birmingham/Warwick study was that the readers had only two or three weeks to learn new codes. A longer learning time and some teaching is necessary.

Lorimer: The Birmingham/Warwick study was composed of groups of readers with a wide range of abilities and interests.

The 64 readers were made up of three groups — one, a group of 16 working adults from Birmingham whose careers ranged from workshop employee to physiotherapist to lawyer; another, a group of school children; and a third group of mainly retired adults living in Oxford. The passages read varied from 600 words to 1,200 words and were carefully balanced with regard to kinds and frequency of contractions.

"BRAILLE USER ORIENTED"

BY REBECCA MAXWELL
AUSTRALIA
Rebecca Maxwell, member of the Australian Guild of Business and Professional Blind, has taught braille and other subjects to children and adults, both blind and sighted, and currently runs a braille transcription service.

Pertinent Biography of the Author

Rebecca Maxwell went to a blind primary schoool, sighted secondary school, university, and teacher training college. Taught blind primary school children, then taught in sighted secondary schools: French, English, Latin. She then returned to teaching primary school, this time at a Rudolf Steiner School, teaching French. Since 1976, her teaching activities have shifted from languages to braille teaching: to blind and sighted people.

Rebecca has been a member of the Australian Guild of Business and Professional Blind since the 1960s, and is currently President. For the past three or more years the Guild has been working on braille in various ways, with a team under the leadership of Rebecca Maxwell. At first we directed our attention to experimenting with new signs (some of which have remained to become the contractions in Appendix I). That work culminated in a paper we sent to the Braille Authority of the United Kingdom (and the then British Uniform Type Committee), since we have no such body in Australia. We had felt a regretable lack of easily accessible braille books in our various interest areas, and the great difficulty of getting books of our choice brailled on request. The Guild determined to form a transcription service to provide the transcribing (purely by individual request) of any book supplied by any blind person in ink print copy, and accompanied by the requisite paper. In 1981 we advertised for people wishing to learn braille and willing to devote a large amount of time per day (when the pressure is on) to transcribe books into braille on a voluntary basis. Rebecca undertook the teaching of the 53 applicants in April '81. Twenty-eight people finished the course and fifteen of them are now actually transcribing, or practicing transcribing, a variety of books which become the private property of the people who request them.

Last year we also ran a series of seminars under the heading of "Braille Literacy and a Bit More" (aimed at workers in the field and parents of blind children), in order to share brailley insights with others and awaken enthusiasm for the teaching of braille as more than a mere transliteration method for the scholarly. We are now very keen to come together with our fellow braille enthusiasts overseas.

Preamble

From the title you note that the concern of this paper is how braille can best be *used*; how it can be most fully exploited to provide the richest possi-

ble resource, or the best tool, for individual blind people. Careful thought over recent years suggests that the traditional shapes of grade 1 and grade 2 braille need rethinking, from the point of view of the users.

So here follows a discussion of braille grade 1; see p. 210 for the discussion of braille grade 2. Conclusions and recommendations begin on p. 217, followed by Appendix I, which is a list of new signs which might be added to grade 2, Appendix II (p. 221), which is an extract using them to see if you like them. And Appendix III, (p. 222).

We are grateful for articles such as W.B.L. Poole, "Should Standard English Braille Be Reformed?" (*New Beacon*, June 1981) which raised so many issues; such as Carlton Eldridge, "Braille Literacy and Higher Education", and to all other articles, etc., that have made us think very deeply about braille, and strengthened our resolve to make known how pivotal braille is in our self-esteem and capability, in education and in life.

Braille Grade 1

Traditionally we have seen the role of braille grade 2 as for the competent braillist containing as it does signs and symbols for the commonly-occurring letter combinations, small words, etc., and controlled by quite complex rules: whereas braille grade 1 is "simple braille", containing only letters, a very few signs, and the simplest form of numeracy, the arabic numbers (formed by preceding letters *a* to *j* with the numeral sign).

Braille grade 1 clearly requires less learning; merely transliteration of known print letters for the late beginner, and many fewer shapes for the person who is not a late beginner, but whose braille skills are limited. What purpose does braille grade 1 serve? Not a means of access to literature, since anyone with difficulty sufficient to limit her to the grade 1 system would hardly seek such a labourious way of reading in an era when audial material is plentiful. No, another function *altogether;* that of tactual communication, of replacing visual clues by tactile clues. We must realize that most objects have numerous pictorial and other clues on them in addition to actual words, and are often identified by these rather than by the printed information. The blind person who has been deprived of all these will need some tactile substitute to help bridge some of the gap between visual information (usually copious) and tactile information (usually scarce).

What makes the person opt for grade 1 braille rather than grade 2? Usually difficulties with discriminating cell shapes through the fingers. Often the mind is quite clear about what the shapes stand for, but the fingers have difficulty working out which dots are there. We can anticipate and forestall some of the difficulty by using as pre-braille, large symmetrical shapes and flowing movements with two hands — to build trust in the finger as a *knowing organ.* There must be no sense of a puzzle to be solved; rather, the comfortable familiarity of recognition of the expected. Then in braille itself, concentrating on shapes and making light-hearted associations with the shapes: also by using

colloquial expressions (Go, go, go, baby!) and well-known song words or titles (K-K-K-Katy; Blue, blue, my life is blue). A little profanity can sometimes relieve the tension of effort! The important thing is to keep something happening under the fingers, not get stuck on one cell until it is identified. Always the expected, what message is it logical to expect next? Faith in communication, enthusiasm, and continued support through the frustrations have been known to suceed against remarkable odds. So we can afford to have faith in people learning braille!

Any blind person, in order to function as efficiently as possible, needs to be able to label things: cassettes, discs, cans, clothes, personal papers, controls on equipment...even the transparent jar in the pantry that would need no identification if you could see. Any blind person also needs to be able to note down things: names, addresses, telephone numbers, dates, prices, directions and messages...of course, blind people carry a lot more of this sort of thing in their heads, but there are times when the head does not seem completely trustworthy! Fear of forgetting can be a strain. For the grade 1 braillist in particular, these labels and notes must be reasonably easy to make, and reasonably easy to decipher. Yet we have given them the least codified, most tactually cumbersome, system to use. There is almost never enough space to label things properly, and this is worse in grade 1 for lack of contractions. Equipment has generally been designed with the competent busy braillist in mind, so most of it is too bulky, expensive, and complicated to be useful for the purposes of the grade 1 braillist.

So it seems that the grade 1 braillist is disadvantaged in three significant ways: in not maximizing restricted aptitude (the need is for fewer symbols with more meaning), in space needed, and in suitable equipment. I am suggesting here that braille would be more used by the people who need simple braille if it were abbreviated. Labelling and note-taking are facilitated and more realistic when the space taken by the content of the label is possible of application! The label must convey its message in the space available; the note must require little writing effort and little reading skill. We must consider a suitable code to meet these needs, and we must teach a method of personal codifying, for greatest personal benefit. Most of our brailling is for ourselves, or those close enough to us to know what we mean; in any case, one can always do it the long way if it is for someone else. You can see that all this discussion is geared to *use*. I wonder if people who have only mastered grade 1 braille use it sufficiently to benefit from it, or does it lie fallow, a passive skill, outside the classroom or rehabilitation centre?

One item of equipment deserves special mention: the hand frame. Thorough familiarity with the compact hand frame is of greatest value to any blind person and certainly is of more use to the grade 1 braillist than a machine. First, not much writing is needed, so the greater speed of the machine is not an issue. Secondly, labelling is not so easily managed in the machine when one is trying to write on strips or small pieces of paper or

card. We must ensure that the grade 1 braillist is equipped to use braille actively, just as we would for the grade 2 person.

Active braille does more than provide cues and information: it enables the person to be in control, to feel self-reliant, and to look good among seeing friends. A small frame can always be carried in a bag or pocket and never ceases to interest and impress people. This is fine positive modelling, as well as stimulating the blind person to attempt more and more. Competent braillists may find it cheap or shabby to speak of impressing other people, but for the people who have just lost a huge range of skills, to have one which does impress other people is quite important.

We see blind people who have been taught simple braille (in order to minimize learning) and only the use of a braille machine (in order to facilitate production) find themselves too encumbered by a piece of equipment which cannot be kept on hand and used when and where it is needed: we see such a person lose the ability to use the braille they have been taught (for lack of application), and incidently, and very importantly, lose the motivation for self-reliance and the belief that that degree of autonomy is possible.

Now I want to share some thoughts from my experience of teaching the code and the use of the hand frame.

If braille is to be used, and not soon fade into the background of the education or rehabilitation experience, it must be easy to jot, and not laborious to decipher. I have found that students must learn to write and read *absolutely concurrently*. In the first exercise, producing rows of dots or *for* signs ⠿, students must immediately be shown how to check and enjoy what they produce. Immediately the paper is turned over and they locate their efforts at the other end of the line. If some such method as the grasping of the right hand margin is used, the student is told to take the page this way, turn it over, and peruse it from the starting point. No elaboration of the reversal process is necessary while the students beome familiar with their own "proofreading". I have adopted the habit of referring to the "beginning of the letter", saying something like "*r* begins solid then has a middle point", or "*y* has a middle hole at the beginning", "*g* is square", "*p* begins with a solid line then turns the corner at the top", "*o* is an arrowhead forwards"...anything that helps with the recognition of patterns: not in relation to the sheet, just in relation to more braille! Patterns of linked letters, like ⠏⠁, ⠗⠊, ⠍⠑, ⠺⠑, etc., can help to build tactual appreciation of shapes. I am here concentrating only on ideas which I have found helpful, that make the learning of the hand frame and braille easier, by avoiding the difficulties which stem from thinking in terms of reversing, "mirror", left and right, and so on. Obviously one must choose the letters which are most easily recognised as patterns, and whose shape is easily felt. I have also found that very frequent lessons are important: one must keep intervening in the learning process to avoid formation of incorrect habits,

or of doubts or confusion — this can happen between teaching sessions if the student has too much thinking time.

So active and passive braille, writing and reading, must go along concurrently, until familiarity with letters and numbers makes the whole thing straightforward: it is a matter of exposure, familiarity, then confidence. Then doubts don't arise. I feel that the proper, efficient, relaxed use of the hand frame is the only way to ensure that grade 1 braillists will benefit from braille at all. Even then, I say again, we must consider some abbreviation of the code, or a style of abbreviation; that is, not so much a body of signs to learn, as a way of compacting your own information, more meaning for the same effort, and space-saving to boot. And done with simple braille equipment. See a footnote to this section for a piece of equipment not yet designed which could have a place.

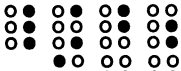
A final word on this subject is about the teaching. Braille encourages rigidity, you can't help it, it is a rigid format: does not have pictograms, nor allow flourishes or individual writing styles, as print does. So it would probably come less easily to the grade 1 braillist to devise personal abbreviations than to a sighted peer. Therefore I see it as a teacher's duty to show a reasonably flexible approach to writing personal notes, for example, how can these be made briefer, less tedious? How could that label fit more satisfactorily where it belongs? Some innovative thought must be given to this style of coding. Of course this must be a flexibility within boundaries, so as to make retrieval easy: but this should be the only criterion for the boundaries, ease of retrieval for that particular user. As long as it is non-confusing to that person, it need not satisfy any other more intricate system not actually needed by that user. I think we have handicapped ourselves by over-standardization, that is, in circumstances where it is not useful. For example if a person only buys C60 and C90 cassettes, an  on the C60 and a  on the C90 is quite sufficient identification: it can be put level with the centres, thus not interfering with the space where the content label will go, and can be read either way up. There is no point in using a complex code to cover all eventualities when they hardly ever happen, and if they do, it can be written in full that once. If three distinctions need to be made,  ,  , and  are useful in the same way. Personal braille, braille made usable, will ensure that more people benefit from simple braille, those who do not have the incentive of literacy to keep up their fluency.

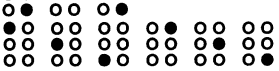
People who will really use their grade 1 braille will need imaginative teaching, perhaps far more so than those who will use grade 2. The teacher of grade 1 braille must teach from *within* the ambit of the student's interests and wishes, and after the basics, possibly no small part of the teaching will be on code-devising.

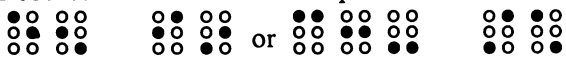
Footnote re a possible machine:

The present Braille Dymo Machine is rather limited and rather hard to feel, therefore not very useful. However, if with that type of mechanism there could be fourteen positions (instead of the alphabet) all signs in the braille code could be made with not more than two punches. The positions might go like this:

the first four for beginning of *letter:* 

the next four for end of letter: 

the last six for each individual dot: 

Of course there could be more positions if these were found easy to use, as: 

Such a machine might be worth a try.

Grade 2

What is the best homage we can pay to Louis Braille? Shall we not work our utmost for maximum utility of his wonderful system?

What demands are we making on braille now, in view of social changes? What are the implications for the code itself? Who needs the greater consideration, the consumers or the producers?

More grade 2 braille is needed than ever before. Blind people need to be informed, so they can respond appropriately to the demands of modern life. Social changes have allowed more people a longer stay at school and university, and among the general population, blind people too are enjoying this trend. So we have a large body of blind students needing braille books on a vast variety of subjects: law, economics, education, accounting, politics, history, social science, philosophy, music, literature, linguistics, mathematics, physics, metaphysics, religion...to mention just some, to remind us of the diversity of subject matter (and the concomitant diversity of vocabulary) needing to be transcribed. A major social change for us has been the integration of blind school children. At one time, with children centred in a blind school, the same books could be used by different students over many years. Even when students moved out to secondary school, there was a degree of commonality in the text books in general use: it was quite likely that a standard text brailled would be used by a number of students. In Australia at any rate, that circumstance can no longer be depended upon: the changes in standard text books are so rapid that it is much more likely that no other student will have that same book prescribed. The diversity of subjects and courses is a matter for rejoicing, but it does present some headaches for producers of braille. Even if things are not quite the same in America, I expect you will know what I mean. It seems more sense to face the probability of only one copy being needed, and turn the fact to advantage by doing things more personally for the actual student who has requested the book. Setting-

out that suits them and greatest care taken on the things for which they actually want the book. Some of this will come up later.

Our students are in the main peripatetic, they have to travel daily, carrying their books. They also have to store them at home and at school. Present bulk and weight of the necessary braille is a great burden and discourages the fullest use being made of books that have been brailled. (I can't help slipping in here that a hand frame is a great deal lighter than a machine and can be fully adequate for lecture notes.) We ought to take pity on our students, and use whatever means we can to make braille less cumbersome. Is it impossible to add a matching set of controls to the present Perkins Braille Machine to make two sided interpoint reliable? To reduce bulk by half at one stroke would be so magnificent. Paper copies can be bound by sewing, light and firm, good for carrying. Naturally it is a good thing to have access to many types of binding; I am not suggesting homing in on just one way.

Would it be possible to get large books computer-scanned before brailling to determine the hundred most common words? Then suitable abbreviations could be devised. These would appear in the front of the volume, and since they would be the very common words in that book, and probably in that subject area, there would be no learning difficulty. I think it is essential to *try* some of this type of coding: every discipline creates its own jargon, and there is no benefit in mixing jargons and trying to find one contraction that will suit everything: why not be specific?

Nor need we try to provide against every eventuality, or avoid every ambiguity: there is no need to. Look at the level of ambiguity that sighted people cope with all the time in newspaper headlines! Considered semantically, some of them are very odd; but the point is that because of context, there is no real ambiguity: even the expectation of the reader makes it clear, or an explanation will follow.

"Lions Miss Early Goals", "Demon Bats Under Fire", "Ton Up Greg Flays Kiwis", are quite plain to the sporting people who read them.

"Flies to Have Twins in Ireland" would not be interpreted biologically, etc. (For serious discussion, C.S. Lewis's *Studies in Words*, Cambridge University Press, Second Edition, 1967, p. 152). All I mean to illustrate by this is that *we can afford to be much freer without loss of comprehension.*

Indeed, comprehension will be aided by conciseness of signs. The blind student is disadvantaged by not being able to scan and quickly select what is wanted from a text; the search through material is more laborious and time-consuming than for print-users. The range of devices available in print to enhance clarity includes marginal summaries, many contrasting type-faces, columns, subtle spacing — the disposition on a page sometimes conveys a whole set of related meanings. In transcribing this into braille, it is not enough to just use the braille signs for the print equivalent, at least, many of the meanings which aid the sighted reader will be lost if this is all that is done. Rather, the intention the underlying logic must be made palpable in braille:

sometimes this requires quite a deal of insight and imagination — and flexibility! Transcribers can only become more effective at interpreting and setting out work by trying different things. Even better if collaboration is possible with the student using the book. And let us not forget that blind humans differ; there is no one solution which all will prefer. If there are several solutions to any problem, there seems no reason to insist that one of them is acceptable and none of the others are: if they are solutions, they are all acceptable, and provide thoughtful variety. A transcriber aware of different possibilities in setting out data is in a much better position to solve problems, that is, to produce effective braille, braille that offers the user real comprehension and pleasure. It is obvious that a blind adult somewhere in the resource system is a great advantage. If great variety of setting out is coped with in ink print by sighted people, why should variety of setting out in braille not be coped with by blind people? It would be a pity to limit ourselves unnecessarily.

The spur wheel makes an excellently feelable line, and I think sometimes could be used for delineating columns, or to put a box around a set of information whose space delineates it in print. Indents, and signals poking out into the margin, (braille or self-adhesive reinforcement rings) can help to set up the proportions of print — demonstrating its logic, and assisting scanning. In some types of publications in inkprint there is a system of pages folding out, to increase the area which is viewable at once. For example: maps and sheet music. With maps it is usually because the relationships can be better understood in the same continuum, with music more often for the practical reason that the player cannot get fingers off the instrument between those running semiquavers to turn the page! For the conceptual and the practical reasons, I think there is a place for this sort of thing in braille: as a deliberate strategy to assist scanning and review. It might be used as a summary, all the details to hand: or as a device to offer concentration of ideas which are in parallel. Two English translations of a German poem, for instance: normally the translations would be scattered, fragmented, too many sheets, no juxtaposition; we want to be able to cover as much information as possible in a fingerful! Text and commentary, poem and discussion; it is difficult to explain how disconcerting it is when you have such a point of study, of concentration, and it is dissipated over pages: on the print page the total concept can be presented, can be scanned, viewed, reviewed as a totality. In some cases it might be necessary to do the full thing, which will take pages, then a fierce contraction of it so it can be presented totally without page turns. We want to quickly traverse words in order to apprehend ideas compactly, as units. I have seen two interpoint volumes of a history of the First World War condensed into one volume by devising a code for the specialist words, the oft-occurring phrases of war strategy: I cannot now remember what they were, perhaps not sufficiently motivated by the topic. Scholarship itself demands the ability to both analyse and synthesize, coding

should be the least of our worries! French and German are more highly contracted than English, they are nonetheless acceptable to the folk concerned.

In the books of anthroposophy and theosophy which I have been reading over the past ten years I have made use of abbreviations now relegated to religious works only, plus some others of my own devising. The word "consciousness" recurs frequently: for four years we have used  , thus saving five cells. The adjective "supersensible" also needed abbreviating: we use  and save seven cells. For "body" we have written  , and for "anthroposophical",  , a saving of twelve cells. But we have been meticulous, using them strictly for the forms designated, not other forms of the same word. (Lately I have begun to wonder if there is any real wisdom in this strictness over forms of a word. The grammar and syntax probably makes it obvious which form would be used, and it *is* the same word, the same meaning-idea, merely subjected to a few rather randomly-applied rules or conventions of English to discriminate its part of speech. Not all words change for part of speech, and even if they do, I wonder if it is not more of an auditory than a written one. If the sense is unimpaired, why not use  for either "anthroposophy" or "anthroposophical"? If in doubt, write it out: otherwise, not.)

Anyone seriously considering the braille code must consider all the users, and some of them are children. When you are working with children, it becomes clear how clumsy the code is with normal speech patterns which have to be rendered into laborious braille. This is natural enough, since in dealing with modern spoken English we are working with a language shift — the Bible and the classics were the first candidates for being put into braille — and the words most common in them were chosen for encoding. So our children are presented with handy contractions for words which are generally not used by them, and quite few abbreviations for the language in which they wish to express themselves. Of course this is not such a difficulty for the more scholarly children, they get used to what they hear around them being quite different from what they read: but braille must be available to truly serve all blind children. If the speech is so different, when faced with written language, the student can't get the flow and can't guess. All humans learning to read learn to guess — that is why the print books are full of pictures — showing what the little dog is doing — so that the child will guess *right*, and begin to reinforce positively words that it doesn't know and couldn't guess without the picture. The need in our case is for more appropriate language. Clearly all children whose speech patterns are furthest away from written-syntactical-patterns are disadvantaged: only blind children are a little more so, since sighted children have seen words written on things for years, whereas our children come in cold to written words when starting to

learn to read: so they depend more heavily on speech patterns. Of course speech patterns are going to vary enormously across the English-speaking world, so there is no use trying to encode them widely, but it seems to me to be an argument for flexibility. In my community nobody actually says "I will not be there" — "I won't be there" is the sort of standard speech form: why not  for "won't"? (Just a telescoping of the braille ). I believe that "won't" is common enough over the English-speaking world. Similarly  for "don't",  for "does", and  for "doesn't",  for "shan't",  for "haven't" and  for "hadn't". Looking at it another way, just think how much longer "haven't" is than the braille form of  , and how incongruous when it is supposed to be an abridged form anyhow! Anyway, these few extra signs would go some way towards making braille reflect current usage, and since they occur often in children's language, they would be useful to them.

I have so far made a case for a grade 1 code containing contractions, and for subject codes to be used in addition to grade 2 code (with the list of extra signs in the front of the book, etc.). The Australian Guild of Business and Professional Blind has been reconsidering grade 2 braille for three years, and I would now like to reflect our thinking over that time in the suggestion of a few new signs and rules. Some of these signs and rules I have taught in addition to grade 2 code to about twenty sighted transcribers since April 1981. We had already been familiarising ourselves with the signs in our correspondence with each other for about two years, and in some cases much longer, before my introducing them to transcribers. (A much fuller reflection of the Guild's study is contained in a submission to the British Braille Authority.)

Here are some of the words we felt were common enough to benefit by contraction:

possible — psb	possibly — psbl	possibility — psbt
probable — prb	probably — prbl	probability — prbt

We built sequences for: different, decide, difficult, exist, follow, important, nature, result. I have appended a fuller list of the contractions in braille. The list is more or less alphabetical; read across each line so as not to miss any of the derivative words. Other words came up in the reading we each of us did between meetings: basic — 456b, language — 456l, organisation — 4560, rehabilitation — 456r. All these can be comfortably plugged into the normal five, and four-five and four-five-six preceding the initial letter. We debated whether to use something before *z* for organization, but since it is sometimes spelt with an *s* instead...

Maybe only whimsy explains these: once — 45o, person-  , sight-  , special-  , love-  . But I hope you can follow the tactile logic of it all! *S* is already so busy, we had nothing for "special", and it seemed to fit with the choice for "sight" which was made early in the discussions. We particularly like the look of    

Since it seems irksome to have "-ally" but not "-ality", we suggest "-ality" equal  , acceptable both as suffix in "practicality" and in "quality". We also found use for  as "-lessly", as in "carelessly". That sign was going begging anyhow!

I would like to think that when reading aloud from braille we could have enough signs and short forms to give our fingers time to travel over material more quickly than we can vocalise. *Reading ahead* is what makes inkprint easier to read aloud artistically (by those who can read inkprint!). This is an area where of course not only a more contracted grade 2 but also the additional specialist codes would help condense the script.

We have found that learning the braille code is made more difficult by complex rules, not by the number of signs. For this reason we have looked at some of the rules. What of the one prohibiting the use of more than one lower sign without an adjoining upper sign?        have grown on me since I have had to correct them so often in the past year! (in the work of my trainee transcribers). They do not lead to confusion, though I must say that when the sign for "his" comes straight after the opening quotation mark, it still looks awful to me, but I think that is something to do with the indefinite beginning of the quoted passage. Or else prejudice, for it is not different from the other combinations that we no longer find unacceptable, well, that we wish to accept. Another rule concerns spelling: it seems to us that one social change is that spelling is less unquestionably sacred than it was fifty or a hundred years ago: a minor change in spelling does not seem sufficient reason to write out a long word whose meaning is perfectly obvious. If I had written "  ", you would have understood me perfectly: perhaps I want a gold star for my work for writing "  "! The word "necessary" is a case in point: I would advocate the derivatives "necessarily"-  and perhaps even "necessity"-  . For a moment they look odd, but no worse than  or ! And they are so common and so long. We think there is a case for criteria other than spelling — i.e. that not only spelling — should be in the approach to coding.

We also see a case for extending the conjoining rule for "⠯⠿⠷⠮⠾"; we think ⠔⠮, ⠔⠁, ⠔⠱, ⠔⠘⠱, etc. could not be confusing — that is, contiguity of ⠔ with the articles and the interrogative and demonstrative pronouns — all the small words where you'd expect it! (As in speech!) and taking the same liberty as in "⠴⠐⠎⠹⠬" and "⠖⠐⠎⠹⠬".

Why not "stillness, likeness, childless" written as the sign plus suffix? No confusion. Same old rule: if in doubt, write it out: if there is no reasonable doubt for the reader of English, do it.

We do feel some of these things must be tried, and on the basis of what the users like, after they have used them — and not before! Decisions can be made, and where possible, flexibility allowed. There is certainly a degree of punctilliousness that is non-useful, perhaps counterproductive is the modern word for it. Words ending in "-ture" and "-tive" are almost always completely unconfusing if the vowels are left out — "literatr", "actv", "passv", "structr", etc.

We have had no mechanical way of checking the actual frequency of the words we have suggested abbreviating: it would be useful for a computer to do that — *but* only as information among other information upon which we may base a judgement — decisions should be human ones, based on users — whose primary concern may not be actual frequency but spanning, contiguity, juxtaposition, lay-out, review in a particular segment of a particular text.

A final word about mobility and storage: we travel more and greater distances to our places of education and employment, and need to be able to carry our books; we must also store them in modern, flimsier, less spacious accommodation, so we must consider space-saving. School desks, book shelves, bedside tables, they really are not designed for large, solid books any more.

Of course* (*"⠷⠉⠗⠎" is what my friends and I have used for years to mean "of course") condensing the script is not the only way to save space. We must urgently direct our attention to the producing of a good, tough, light, quality, braille paper. Incidentally, we rue the loss of the volume of solid dot which could hold 280-odd pages and stay slim! We also desperately need an efficient interpoint writer. If it writes upward, so much the better for the blind writer. If it does not, if it is merely a good interpoint writer on the same lines as the Stanisby-Wayne (but manufactured much better), it would be perfectly adequate, especially for the production of books by sighted transcribers. We are still using many voluntary sighted transcribers to produce single copies of books, and very happily! (We will always need this service unless blind people stop thinking altogether, and stop having individual interests.)

With the demands we make on our braille libraries, I am sure they would welcome halving their requirements for shelf space. We are tending to own more books since the advent of mass-produced books, and we too will feel the benefit of saving shelf space.

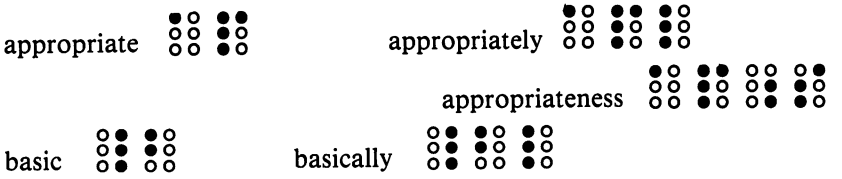
It remains for me to direct your attentions to the appended list of contractions for discussions (very difficult for me to produce in print) and to the second and third appendices: "Text using the proposed grade 2 contractions" (also very difficult for me to produce in print) and "The nine-dot cell", respectively. So now I wish to reiterate our recommendations.

Conclusions

1. That grade 1 braille should be more than an alphabet and numbers, since unless there is enough contracting to make reading easier, the user finds it too unwieldy for practical purposes.
2. That all braillists should be taught the use of a hand frame and stylus right from the beginning so that they can easily write with a portable tool.
3. That the complexities and diversities of our reading and study requirements would necessitate the addition of some specialist codes, or special sets of signs related to the subject matter and always affixed to the volume in which the signs appear.
4. That flexibility of coding and format are necessary to widen the scope of an already limited number of symbols and script-styles.
5. That grade 2 braille should be further contracted to enhance general literacy.
6. That research is needed into the production of very specialised braille paper. And that an inter point upward braille writer, or at least a precision-made interpoint braille writer is absolutely essential!
7. That the nine-dot cell should be considered, since it would increase the number of signs available for complex codes, like the braille music code, which are bursting at their well-tailored seams.

Braille—User-Oriented: Appendix I
List of Suggested Grade 2 Contractions

TABLE X



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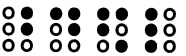
decidedly 

deciding 

decides 

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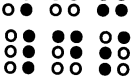
difference 

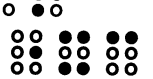
differently 

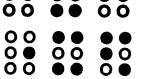
difficult 

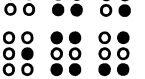
difficulty 

difficulties 

exist 

existence 

existed 

existing 

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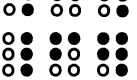
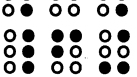
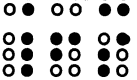
followed 

follower 

following 

follows 

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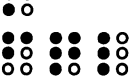
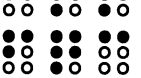
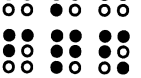
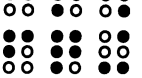
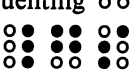
frequently 

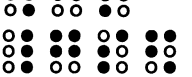
frequency 

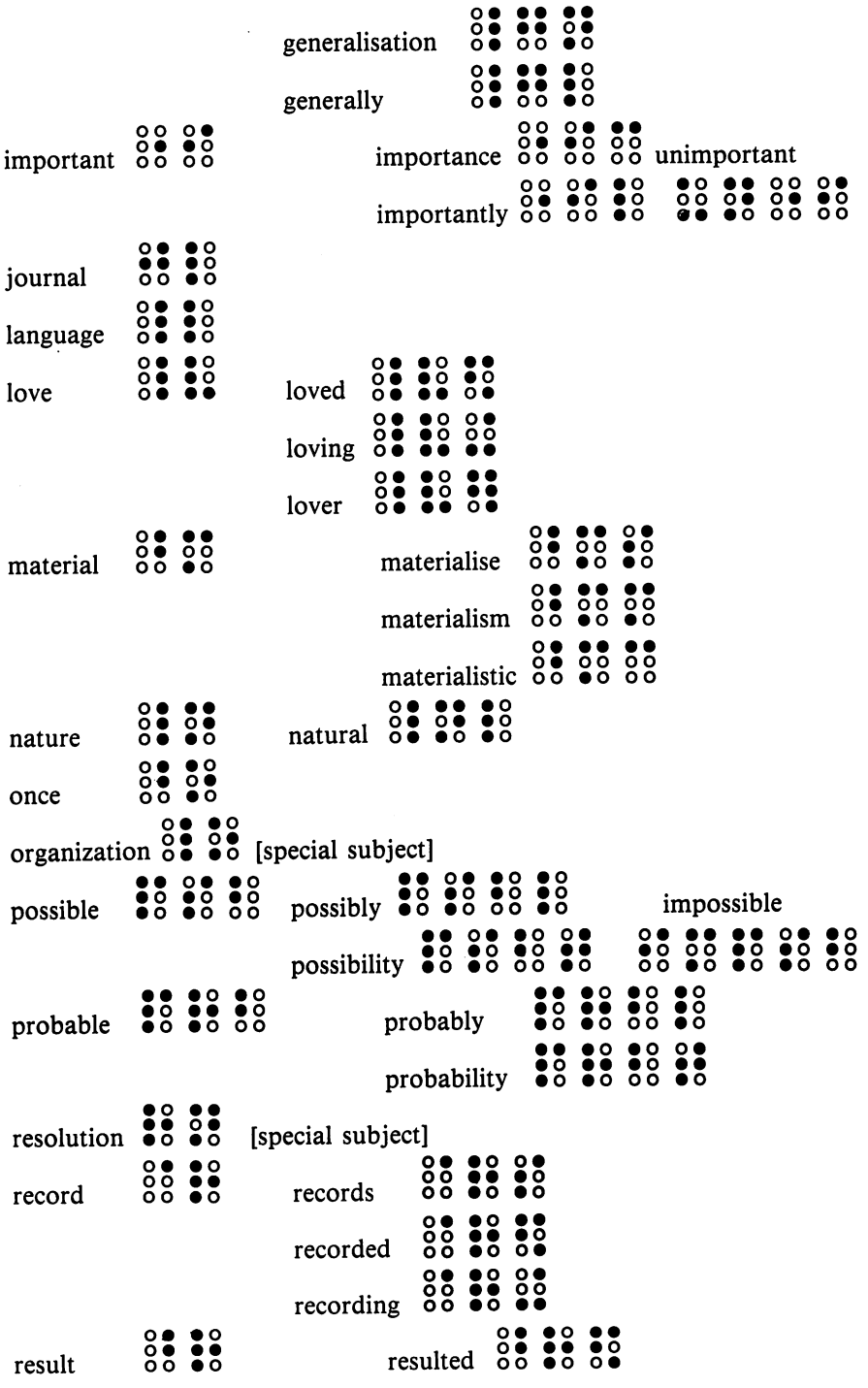
frequented 

frequenting 

general 

generalise 

generalised 


generalisation
generally
important
importance
unimportant
importantly
journal
language
love
loved
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travel 

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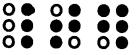
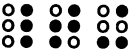
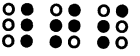
traveller 

travelling 

travels 

well 

fortunate 

fortunately 

unfortunate 

unfortunately 

change 

changing 

changed 

sight 

special 

education 

person 

whereas 

Suffixes

-ality 

-lessly 

don't 

does 

doesn't 

haven't 

hadn't 

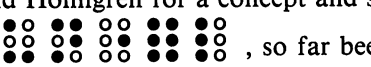
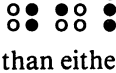
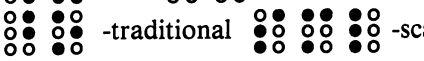
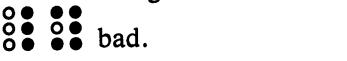
shan't 

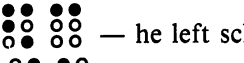
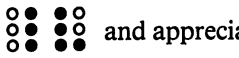
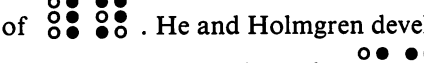
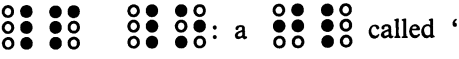
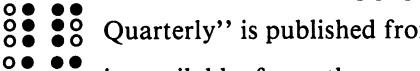
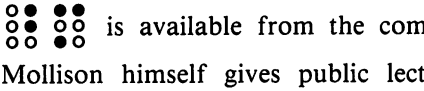
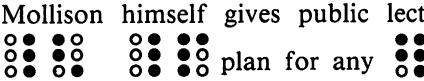
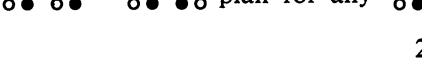
won't 

Appendix II

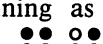
Reading passage using suggested contractions as listed in Appendix I.

Permaculture ("Permanent Agriculture")

Permaculture (herinafter ) is a term coined by Bill Mollison and David Holmgren for a concept and system which the English  has not,  , so far been called on to express.  ,  is a way of getting  from land than either the  -traditional -scale labour-intens*v* method, or the huge modern technological monocul*t*rs whose pollution  is so hope  bad.

Mollison is a man with little so-called formal  — he left school at 15 — but who has  widely and has a  and appreciation of  . He and Holmgren developed the idea as individuals, but there is now also something of a  : a  called "The  Quarterly" is published from Maryborough; quite a lot of printed  is available from the community at Tagari in Tasmania; and Mollison himself gives public lectures and will, for a fee, design a  plan for any or group who have to

 their approach and   's  principles but who  the confidence or  to do it on their own.

 ,  is a matter of putting together  , intense,largely self-maintaining eco-systems, each containing as many  species of plants and animals useful to humans as  . They are selected so that their  attributes are complementary and helpful to each other.

One of Mollison's ideas is that by the  , so to speak, of  cleared land around the cities, — delinquent land, as he calls it —  these lines, our cities should be  able to feed themselves. This might  at first  to be wildly optimistic, but Mollison's figures are convincing. And if such a  is a  , then the  of  both to our  , and to the  of our  , is   to overestimate.

Space-saving count: Where in normal braille grade 2 contractions words from the list in appendix I would have taken 386 cells, they took 146 instead.

Appendix III—The Nine-Dot Cell

It is possibly outside the frame of reference of this conference, but we feel enthusiastic about the use of the nine-dot cell for special codes. The braille music code, for instance, is effective, though difficult, for music written from about 1700 to 1900. Either side of these dates, it is progressively unsuitable — there are just *not enough signs*! To realize notations which do not use bar lines, it is essential to have a sign for *each* metrical value: in the present code there are only four possibilities for expressing length and they have to do double duty; that is a nuisance when you are working out a Mozart slow movement, etc., but it does work. "Greater value" and "lesser value" signs do exist, but they are only for emergencies in normal location. However, they would have to be used *all the time* in contemporary notation, and it is just not suitable. So many other things are different, too, and need signs, that it seems a better idea to think the whole thing out in a nine-dot cell format then to drag at the existing braille music code.

Many contemporary codes are not yet fixed in print, people are trying all sorts of ways of expressing the sonorities, lengths, silences, and ambiguities

which they want — to actually express ambiguity in the present code is extremely hard — it was not felt to be the sort of thing anyone would want to express at the time when Louis Braille worked out the music code.

Users of other special codes are no doubt looking forward to having more signs too: the music code was only an example. The addition of a half-space mechanism on the present Perkins braille machine might be possible; in any case if something is really needed, it can usually be invented.

We must try some of these things and see how they work *in use* before fixing our attitudes. People interested and close to the subject matter must think which codes and circulate examples to others close to the subject matter; but of course it is difficult to do this until the scattered interested people have a way of writing. Is it possible to get 200 nine-dot cell hand frames made? Or do people want to go straight to the hexidecimal, sixteen-dot cell? Perhaps there ought to be 200 of those frames made too, the hexidecimal cell, that is, so that experimenting can go on in the two formats concurrently.

We will see what happens as we experiment with such codes: in a way, there is no accounting for what people will prefer. The strangest forms sometimes become standard from usage.

Conference Discussion

Burling opposed the suggesting of particular contractions for particular books. Poole agreed that there could be more sequencing but was against using the same contraction for variant spellings and felt we must be clear as to whether special contractions were to be for personal writing or more widespread publications.

Churcher and Gore were wary of relying on "the imaginative transcriber" rather than following the author's intent.

Declaring that we must not be "hell-bent" on making rules, Jolley complimented the imaginativeness and creativity of this paper. Maxwell responded that her intent was not to make braille unreadable, but to have a code which would suggest what can be done rather than dictate what must not be done.

THE FUTURE OF BRAILLE

By Bertil Nilsson, Hässleholm, Sweden, Coordinator of Braille Issues, Committee on Cultural Affairs, World Council for the Welfare of the Blind

1. Background

The invention of a script which could be read by blind people a little more than 150 years ago was a revolutionary event, a first step in making society accessible to this very substantial group of people. Frenchman Louis Braille's system, known as the braille code, was one of several put forward and became the one which attained general use.

There were no braille-writing machines, such as we have today, in the beginning. Braille was produced by use of slate and stylus, a cumbersome and time-consuming process.

The original braille code, which took in consideration production techniques of the day, is still with us today, with only a very few changes. The original production techniques, on the other hand, are in very limited use. Technological progress in this as in other areas concerning blind people has gone on at an ever increasing rate. It has become possible to produce braille to an almost unlimited extent on a small scale as well as on a large one. Blind people have achieved access to computerized media which enable them not only to produce braille faster but to simultaneously achieve an inkprint copy.

This tremendous technological development is making possible a totally new degree of integretation for blind people into society. Jobs and professions which were totally impossible for blind people before are or can become quite accessible to them today and in the near future. In addition, blind people in general have access to much larger amounts of printed material and possibilities for international communication among blind people and international distribution of material printed in braille are greatly increased.

Yet the 150 year-old braille code has not kept up with this technological advance. Many aspects of the code which made sense in the beginning and in the relatively isolated environment in which blind people existed before do not function well when adapted to new production techniques or international communication.

It is clear that changes in the code must and will be made. Individual manufacturers are already making adjustments in order to make the code compatible with their products. The absence of an international policy is gradually bringing about a chaotic situation in which there are no generally accepted rules for major aspects of the code — a situation which will greatly reduce the effectiveness of the code and all related technological aids for blind people.

2. The Construction of the Braille Code

If you look closely at the braille code, you will find that it has been

constructed with the French alphabet in mind. After the first 25 letters, common in most languages, the combinations that follow are used for representing French letters with diacritical signs. This made it impossible to give numerals a one-character representation, as is done in inkprint. The construction of the braille code shows that the inventor was not very familiar with the inkprint code. This is obvious from the fact that the beginning and the end of quotation are represented by two different characters in braille, whereas the open and close parentheses are represented by the same character, contrary to what is the case in inkprint.

The differences in character representation between braille and inkprint have not, apart from the last ten or fifteen years, led to any major practical difficulties, as braille production and braille reading have taken place in splendid isolation in a world of their own. But with the training of blind computer programmers, it became obvious that the lack of compatibility between braille and inkprint would lead to certain difficulties. This problem was emphasized by the development of devices with which people who do not know braille can produce braille. The appearance of techniques to produce braille from compositors' tapes for modern computerized inkprint production and the development of paperless braille have emphasized this problem still more strongly.

2.1 *Figures*

Louis Braille chose to have every figure represented by two braille characters, probably in order to be able to have a one-character representation for letters with a diacritical sign. This makes it difficult for people who do not know braille to produce braille when using devices such as IBM braillers. It also creates problems with automatic transfer from compositor's tapes and optical character recognition (OCR) devices, above all when letters and figures occur in the same context. This also makes communication via telephone by deaf-blind people and communication with modern computer media unnecessarily complicated.

Two different systems for the representation of figures have been developed among blind computer programmers, one used in the U.S.A. and the other in Europe. The U.S. system uses the dropped letters a to j to represent the figures one to zero, which means that other representations have to be found for composition signs than those used now. Another disadvantage is that it becomes extremely difficult to determine whether a character represents a letter or a figure, when found isolated.

The European system uses the letters a to i with dot six of the same cell added to represent the figures from one to nine, with zero represented by the number sign. This, of course, affects some letters with diacritical signs, above all in French, but also in German, Spanish and the Scandinavian languages, to mention only a few. This system makes it possible to tell a figure from a letter regardless of the position in relation to other characters. But this system affects many contraction systems (see section on contractions).

2.2 *Upper and Lower Case Letters*

So far it is mainly in North America that upper and lower case letters have been distinguished in braille. Very few practical problems have occurred up to now in the countries where this distinction has not been made. However, this has meant that congenitally blind people have been unfamiliar with the use of capital letters, which has shown in their inkprint communication. Due to reasons mentioned earlier this was not especially important in the past, but recently it has become more and more significant because of the growing integration of visually impaired persons into society. This group now more often occupies white-collar professions, making use of braille devices with word-processing facilities and an automatic hardcopy production in inkprint. This development has made it natural for the question to be raised, whether it would not be a good idea to adopt the usage of upper and lower case letters, as in inkprint, even in countries outside North America.

2.3 *Other Characters*

As mentioned earlier, there are differences between braille and inkprint regarding the representation of parentheses and quotation marks. Through a revision of the braille code aimed at using the same character at the beginning and end of a quotation and different characters to signify open and close parentheses, automatic transfers from OCR and compositors' tapes could be made much less complicated.

3. Contractions

Already at an early stage in the history of the braille code contractions were used. The reason for this nobody knows for sure, but one reason may have been to increase writing speed — a sensible goal in the days when braille was produced with slate and stylus. Another reason may have been to save space, in order to cut down on cost and bulk.

Contractions became, of necessity, systematized, but only on a national basis. These systems are not necessarily compatible from country to country or language to language. More intensified international contacts in general, in combination with improved linguistic skills, have increased the desire of braille readers to communicate with people in other countries and to read braille material that is produced abroad. Unfortunately, national contraction systems often make this impossible. The revision of contraction systems in some countries has revealed problems that nobody was conscious of until now.

In grade two braille (with contractions) each individual character brings more information than in uncontracted braille. Thus, when reading grade two, the reader must interpret each character. When reading grade one, however, the braille reader can apply a similar reading technique to that used by sighted people when reading inkprint — that is, he can use context and the redundancy of the language to read whole words and give less attention to each individual character. There is a considerable difference between these

techniques and for a braille reader who is used to reading grade two only it takes some time to acquire the new skill. But once the transition has been accomplished, there is no reason to suppose that there should be any significant difference in reading speed between reading grade one and grade two. There is no evidence that braille readers in countries where no contraction system exists read slower than their colleagues in countries with a contraction system.

There are questions involving the effectiveness and the accessibility of contracted braille to the population. Many studies have clearly indicated that the ability to learn and use contractions is closely related to the learners overall intellectual capacity, showing that while many people can master contractions very well, they become to a greater or lesser degree a barrier to many others. It is also a fact that learning contractions is extremely difficult for mentally retarded persons. It is evident that frequent use of contractions affects any persons spelling and that many people who are good grade two readers are not able to write it correctly.

There is another factor as well which substantially diminishes the accessibility of contracted braille. In order to make a contraction system effective, the words and letter groups that are contracted must occur frequently in the language. Since our languages change all the time, the effectiveness of contraction systems is gradually reduced, which means that they have to be revised from time to time. As a result, material that was produced before a revision becomes inaccessible to an ever increasing number of readers after the revision. It is a common experience at braille libraries in countries with a contraction system that the number of loans of pre-revision produced books rapidly decreases and some of them have to be reproduced with the revised system. This can be an unfortunate diversion of funds from production of more recently written books and there is a risk that braille readers will lose contact with literary development, in spite of the fact that the quantity of production may be acceptable.

New technology has introduced an entirely new element into the discussion concerning contractions. Whereas traditional methods of producing braille have used devices specially designed for just that purpose, newer computerized techniques combine braille production with other systems. It is now possible to produce braille by connecting a braille printer as an auxiliary to an ordinary electric typewriter. It is also possible for a blind person to produce inkprint by connecting an electric typewriter to a paperless braille device. With the appearance of these techniques and the possibilities for automatic transfer of printed material from computer-readable media, the braille reader will have almost unlimited access to printed material. However, these systems require the acceptance of uncontracted braille if they are to achieve widespread use. Of course, it is perfectly possible for a computer to handle contracted braille, but now without extra software, which makes production much more expensive and takes more time.

A research programme has just been finished in the U.K. dealing with possible changes in grade two English braille. As is the case with most other programmes of this kind, they seem to have gone on the assumption that grade two is desirable and that everybody who is used to reading grade two can, automatically, read grade one just as well. However, in my experience, this can not be taken for granted.

4. Conclusion

It is of the utmost importance to start an unbiased international discussion concerning the braille code and changes of this code that may be desirable or necessary, based upon the experience we have up to now, the developments that can be foreseen and the demands we have concerning the use of braille in the future. These questions must be answered soon or we will be faced with a fait accompli, since the manufacturers of equipment in this field will have developed their own standards, which would probably mean that we would not have any uniformity at all.

Many of the changes I have discussed may seem drastic, but we do have a choice. We must bear in mind that the braille code has remained unchanged for the last 150 years. Many people may think these objectives too optimistic, but I am fully convinced that if they are fulfilled, it will be a very important step towards giving braille readers access to almost any printed material.

Conference Discussion

Lorimer: There is no great demand for uncontracted braille and no research to back up the claim that contracted braille causes poor spelling among the blind. The one survey that has been done indicates that not contracted braille but braille itself is the cause. There is no doubt that the reading speed for uncontracted braille is slower.

Nilsson: The World Council for the Welfare of the Blind (W.C.W.B.) has now agreed on one commission for braille and we look forward to hearing from you — in whatever format. My views on Grade 1 braille are shared in both Holland and Finland. Braille is not an intellectual game — it should be for all blind people.

CONSTITUTION
WORLD ALLIANCE OF BRAILLE AUTHORITIES

By Floyd Cargill, Delegate

Floyd Cargill is President of the recently formed Braille Revival League; represents the American Council of the Blind on the Braille Authority of North America; and was BANA Chairman 1978-81.

ARTICLE I: NAME AND LOCATION

SECTION 1. NAME. Under the name World Alliance of Braille Authorities, hereinafter referred to as "WABA", an alliance of Braille Authorities of the sovereign nations of the world that use English Braille is hereby formed according to the law governing international not-for-profit corporations in the United States of America.

SECTION 2. LOCATION. The headquarters of WABA shall be located in Washington, D.C., U.S.A. It may be transferred to other places as may be decided by the membership.

SECTION 3. DURATION. Its duration shall be unlimited.

ARTICLE II: STRUCTURE

WABA shall be a membership, not-for-profit organization composed of a General Assembly, an executive Committee, a Secretary General serving in an honorary capacity, and such standing, technical, and ad hoc committees as this Constitution and the General Assembly may establish.

ARTICLE III: PURPOSE AND FUNCTION

SECTION 1. PURPOSE. The purpose of WABA is to provide a medium for international cooperation among National Authorities on English Braille.

SECTION 2. FUNCTION. WABA shall work toward:

A. the creation and development of Braille Authorities in nations where they can be effective;

B. the introduction of minimal standards for the production and teaching of braille throughout the world, and the steady improvement of such standards;

C. the provision of such material and technical aid as may be appropriate to be given to National Braille Authorities, upon their request, and after consultation with the governments concerned;

D. the provision for and the encouragement of an exchange of information and experiences among National Braille Authorities;

E. the encouragement and carrying-out of research studies related to the production, teaching and use of braille throughout the world;

F. collaboration with the United Nations and its specialized agencies, the World Council for the Welfare of the Blind, and other appropriate international organizations to improve the production, teaching and use of braille, and

G. taking any other measures necessary to achieve the purposes of WABA.

ARTICLE IV: MEMBERSHIP

SECTION 1. CLASSES OF MEMBERS. Membership in WABA shall be open to all sovereign nations which have a single identifiable English Braille Authority. The classes of members shall consist of National Members, International Members, Honorary Life Members, Associate Members, and Sponsoring Members.

SECTION 2. NATIONAL MEMBERS. National Members are persons nominated by a braille authority from a country participating in WABA and supported by a resolution from the nominating body. Each National Member should be thoroughly knowledgeable of the braille code and hold, or have held, a responsible position related to the production or teaching of braille. Any individual whose permanent residence and employment are located within a participating country shall be eligible to serve as a National Member regardless of the nationality of such individual, so long as the terms of this Article are met. Each participating country shall be entitled to nominate one (1), two (2), three (3), or four (4) National Members.

SECTION 3. INTERNATIONAL MEMBERS. WABA, by resolution adopted by no fewer than two-thirds of the National Members present and voting, may authorize any international organization or agency to appoint one (1) International Member to WABA. To qualify, the organization or agency must be one that is exclusively international in scope and promotes or coordinates a substantial program of literacy for blind people with braille as a major medium.

SECTION 4. HONORARY LIFE MEMBERS. Any person who has rendered outstanding service to the blind through extraordinary efforts to promote the production, teaching and use of braille may be elected an Honorary Life Member by a simple majority vote of the General Assembly. Each candidate must be nominated by a participating Braille Authority and satisfy such other requirements as may be established by the Executive Committee. The reason for such nomination and election shall be fully stated at the time of election. Honorary Life Members shall not be required to pay dues.

SECTION 5. ASSOCIATE MEMBERS. Any persons or organization directly involved in a substantial program of producing or teaching English braille or promoting its use may be admitted as a non-voting Associate Member by a simple majority vote of the Executive Committee, after consultation with the National Members from the countries concerned. They may serve on any committee except the Executive Committee and the Finance Committee as non-voting members. They may be nominated by their respective Braille Authorities and serve as National Members.

SECTION 6. SPONSORING MEMBERS. Any individual, organization or concern may be admitted by a simple majority vote of the Executive Com-

mittee as a non-voting Sponsoring Member. A sponsoring Member may be admitted only after consultation with the National Members from the countries concerned. Sponsoring Members may serve on any committees except the Executive Committee and the Finance Committee in a consultative capacity.

ARTICLE V: GENERAL ASSEMBLY

SECTION 1. DELEGATES. Delegates to the General Asssembly shall include those National Members, International Members and Honorary Life Members whose names have been certified to the Secretary General not less than ninety (90) days prior to the opening date of a regular meeting of the General Assembly. Associate Members and Sponsoring Members may attend meetings in a consultative capacity with the right to participate in discussions. The President may invite observers to attend meetings of the General Assembly without the right to vote.

SECTION 2. MEETINGS. Regular meetings of the General Assembly shall be held in 1985 and at intervals of five (5) years thereafter; but intervals may be greater or lesser if agreed upon by the General Assembly. Extraordinary meetings shall be convened by summons posted in Washington, D.C. not less than sixty (60) days prior to the opening date of the meeting.

SECTION 3. VOTING. Only National Members, International Members, and Honorary Life Members shall be eligible to vote at a meeting of the General Assembly. If a Braille Authority is unable to send a National Member it may give its proxy or proxies to another National Member. International Members may authorize another International Member from the same country to exercise their proxies. Notice of any proxy must be given in writing addressed to the Secretary General and posted not less than thirty (30) days prior to the opening date of the meeting at which it is to be exercised. All questions before the General Assembly shall be decided by a majority vote of those members voting, whether present or by proxy, except that amendments to this Constitution shall require a two-thirds (2/3) vote. Voting may be by viva voce, show of hands, or ballot which shall be secret at the elections when there are two (2) or more candidates. Between meetings of the General Assembly, questions which, in the judgement of the Executive Committee lie outside the powers committee to it, may be decided by letter-ballot mailed to all members of the General Assembly entitled to vote.

SECTION 4. DELEGATE EXPENSES. Delegates shall be responsible for their own travel and maintenance expenses while attending meetings of the General Assembly.

SECTION 5. POWERS AND DUTIES. The powers and duties of the General Assembly shall include, but not be limited to, the following:

A. determine the general policies to be adopted by WABA in order to achieve its purposes;

B. receive and consider recommendations made by the Executive Committee;

C. receive and consider reports from the Executive Committee on its work and the work of the Standing, Technical, and Ad Hoc Committees;

D. determine the rate of membership fees;

F. elect the Officers and Executive Committee;

G. adopt and amend the Constitution of WABA;

H. decide, if it is desired, on the dissolution of WABA.

ARTICLE VI: EXECUTIVE COMMITTEE

SECTION 1. COMPOSITION. The Executive Committee shall consist of:

A. two (2) National Members chosen from each of the following regional areas: European Countries, North America and Oceania, East and Southeast Asia, Latin America and the Caribbean, the Middle East, and Africa;

B. up to three (3) representatives chosen from among the combination of International Members and Honorary Life Members;

C. the chairperson of each of the Technical Committees; and

D. the President, Immediate Past President, Treasurer, and Secretary General

SECTION 2. SELECTION OF MEMBERS. The National Members from each of the regional areas shall be responsible for designating the individuals who will represent them on the Executive Committee. The representatives from the International Members and Honorary Life Members shall be elected by the General Assembly.

SECTION 3. TERM OF OFFICE. Members of the Executive Committee shall serve from the conclusion of a Regular Meeting of the General Assembly until the completion of the next Regular Meeting and shall be eligible for reelection subject to the restrictions for election of Officers.

SECTION 4. SUBSTITUTE MEMBERS. If a member of the Executive Committee who represents a regional area is prevented from attending a meeting of the Executive Committee, the National Members from that regional area shall be responsible for naming a substitute member who shall have full speaking and voting rights during that meeting.

SECTION 5. QUORUM. At any meeting of the Executive Committee a majority of its members shall constitute a quorum for the purpose of conducting business.

SECTION 6. VACANCIES. In the event of a vacancy among the members of the Executive Committee who represent a regional area, the National Members from the regional area concerned shall be requested to select a replacement who will serve until the completion of the next Regular Meeting of the General Assembly. A vacancy among other members of the Executive Committee shall be filled by the Executive Committee after consultation with the Braille Authority in the country from which the replacement will be selected.

SECTION 7. POWERS AND DUTIES. The Executive Committee shall have power of decision and shall be directly responsible to the General Assembly for interpreting and carrying out in detail the general policies established by the General Assembly for the administration, management and control of the property and affairs of WABA. It shall have the widest powers to do or authorize any action not specifically reserved to the General Assembly. It shall supervise the administration of the Officers of WABA and has the right, at all times, to ask for an account of their action.

SECTION 8. MEETINGS. A meeting of the Executive Committee shall be held concurrently with the Regular Meeting of the General Assembly. One (1) further meeting shall be held, at a time it shall select, between Regular Meetings of the General Assembly.

SECTION 9. EXPENSES. The Travel and maintenance expenses of members attending interim meetings of the Executive Committee shall be met in whole or in part for such members as may wish to apply.

SECTION 10. VOTING. All questions before the Executive Committee shall be decided by a majority vote of those voting. The President shall have the power, if he deems it necessary, to ask for a decision on specific matters by postal vote addressed to all members of the Executive Committee.

ARTICLE VII: OFFICERS

SECTION 1. ELECTION OF OFFICERS. The General Assembly shall elect, from among the National Members, International Members and Honorary Life Members, a President, three (3) Vice-Presidents, a Treasurer, and a Secretary General who, together with the Immediate Past President, shall be the Officers of WABA. When there are two (2) or more candidates for an office, the vote shall be by secret ballot. A majority vote shall be requisite for election.

SECTION 2. TERM OF OFFICE. The term of office shall be from the conclusion of one Regular Meeting of the General Assembly to the close of the next Regular Meeting. No Officer shall be reelected to the same office for more than two (2) consecutive terms. The President shall hold office for one (1) term and must, thereafter, be succeeded by a qualified member from another nation. Each Vice-President shall be from a different regional area and shall be succeeded by a qualified member from another regional area.

SECTION 3. TERRITORIAL STATUS. The President, Immediate Past-President, Treasurer, and Secretary General, during their term of office, shall not hold territorial status and, should they have held seats as National Members or International Members of the General Assembly, such seats shall be available to other persons to be selected by the Braille Authorities or organizations concerned.

SECTION 4. DUTIES. The Officers shall perform duties which are not the specific responsibility of either the General Assembly or the Executive Committee. During the period between meetings of the General Assembly

and the Executive Committee, the Officers shall have the power to decide on matters of internal administration and to take action to implement decisions made by those bodies. The President shall preside over meetings of the General Assembly and the Executive Committee, and shall represent WABA in all civil actions. In the absence of the President, one of the Vice-Presidents, in the order they were elected, shall preside. The Treasurer and the Secretary General shall, under the direction of the Executive Committee, perform the duties properly appertaining to those offices.

ARTICLE VIII: COMMITTEES

SECTION 1. APPOINTMENT. The President, with the approval of the Executive Committee, shall appoint chairpersons and members to, or remove them, with cause, from, all committees except the Executive Committee. The President shall be an ex officio member of each committee except the Nominating Committee.

SECTION 2. STANDING COMMITTEES. A Budget and Finance Committee, Bylaws Committee, and Nominating Committee shall be established as Standing Committees. The term of office for chairpersons and members shall be from the close of one regular meeting of the General Assembly to the close of the next regular meeting.

SECTION 3. TECHNICAL COMMITTEES. Technical Committees shall be established in such number as may be deemed necessary and desirable: to develop or review proposed changes and improvements in specific braille codes, formats, and techniques of producing and teaching braille; to conduct research and field tests; and to promote the production, teaching and use of braille. Each Technical Committee shall be governed by directions and guidelines developed by the Executive Committee. Members of Technical Committees need not be members of WABA or its Participating Braille Authorities and organizations. They shall be selected on the basis of their background and experience relevant to the subject matter assigned to the committee.

SECTION 4. ASSISTANCE. Committees, other than the Finance Committee, may, with the approval of the Executive Committee, enlist the assistance of any person who can help them discharge the assigned duties.

SECTION 5. ADDITIONAL COMMITTEES. The Executive Committee may establish such other standing and ad hoc committees as it deems necessary or desirable.

ARTICLE IX: FINANCES

SECTION 1. FISCAL YEAR. The fiscal year of WABA shall coincide with the calendar year.

SECTION 2. MEMBERSHIP FEES. Membership fees shall be at a rate to be determined, from time to time, by the General Assembly. They shall be payable on the first day of January of each year. The Treasurer shall notify

each member of the dues not less than thirty (30) days prior to the beginning of each fiscal year. A second notice shall be sent to members whose annual fees have not been received within ninety (90) days following the due date. Members whose annual fees have not been received within six (6) months after the beginning of the fiscal year may be declared by the Executive Committee to have forfeited their membership.

SECTION 3. SAVINGS. Savings made on the annual budget shall constitute a reserve fund which shall be deposited in a bank or invested.

SECTION 4. BALANCES BUDGET. It shall be the duty of the Executive Committee to keep the expenses of WABA strictly within its income at all times.

SECTION 5. FUNDRAISING. If the income is insufficient for the work in progress or contemplated, the Executive Committee shall have power to raise additional funds by any legitimate means, after consulting, and receiving approval from, the National Members of the country or countries in which the fundraising activities will take place.

SECTION 6. RECORDS. The Executive Committee shall cause proper accounts to be kept. The account books, and all WABA documents, shall be held at the office of WABA.

SECTION 7. AUDIT. The accounts of WABA shall be examined and audited each year by qualified auditors. A statement showing the fiscal position of WABA shall be published and a copy sent to each member within six (6) months after the close of the fiscal year.

ARTICLE X: AMENDMENTS

This Constitution may be amended at any meeting of the General Assembly. If urgent action is necessary, in the opinion of the Executive Committee, the vote may be by letter-ballot mailed to all members of the General Assembly eligible to vote thereon. The Executive Committee shall cause a vote to be taken on amendments which are proposed in writing and signed by five (5) or more members eligible to vote thereon. The exact text of the proposed amendment or amendments shall be presented when the vote is taken. A proposed amendment to be considered at a meeting of the General Assembly must be received by the Secretary General not less than ninety (90) days prior to the scheduled opening date of the meeting. No fewer than two-thirds (2/3) of the members voting must favor the amendment for it is to be adopted.

ARTICLE XI: RULES OF ORDER

All meetings and affairs of WABA shall be governed by this Constitution and *Robert's Rules of Order, Revised.*

ARTICLE XII. DISSOLUTION

SECTION 1. PROCEDURE. If a dissolution of WABA should be

necessary or desirable, as recommended by the Executive Committee, the same procedure shall be followed as provided for amending this constitution, except that a dissolution cannot be initiated by petition of five (5) or more members eligible to vote.

SECTION 2. DISBURSEMENT OF ASSETS. In the event of dissolution, the funds and assets owned by WABA shall be liquidated and disbursed in accordance with recognized legal procedures.

ARTICLE XIII: ENABLING CLAUSE

SECTION 1. TEMPORARY OFFICERS. Upon the adoption of this proposal by a majority vote of the delegates attending the International Conference on English Braille Grade Two, convened in Washington, D.C., September 13-17, 1982, temporary officers shall be elected and authorized to proceed to organize WABA. The temporary officers shall include a president, vice-president, secretary and treasurer. A majority vote of those voting shall be requisite for election. The temporary officers shall function as a committee of the whole.

SECTION 2. FUNDING. The temporary officers shall be authorized to solicit minimal funding from interested Braille Authorities, appropriate organizations and agencies of and for the blind, and individuals.

SECTION 3. FIRST MEETING. The organizational meeting of WABA shall be convened in 1985 at a time and place to be decided by the Temporary Officers.

Conference Discussion

Nilsson: The W.C.W.B. is involved in drawing up a very similar constitution. At a time when we are trying to reduce the number of organizations working in the field, we should not create a new one. Braille matters have not been well taken care of by the W.C.W.B. in the past, but we would hope for more cooperation in the future. From the W.C.W.B. point of view, the proposed braille organization is not desirable.

Milligan: Would the World Allliance of Braille Authorities (WABA) actually be making rules for braille?

Cargill: My concept is that a basic unified code would be adopted by this Alliance.

Milligan: BAUK considered the papers of Small and Cargill and agreed that while we must proceed to some system of sustained international cooperation, it is premature to discuss it in this much detail. The proposed Constitutions seem to have a top-heavy, elaborate membership. In order to be effective, such an authority would have to arise from an international consensus. It must be representative or there will be no "willing subordination" to the authority. There must be a fairly continuous international dialogue before we proceed to an international alliance. We're just at the beginning; we've only just met each other. We need another conference before we start an

authoritative body. Too many countries are not represented here — India, for one. We must create a more humble body to do research but have no power to change codes. It would be a pity, as Nilsson points out, to create a new body. Perhaps in a reorganized W.C.W.B. we would want to work towards a representation of braille authorities.

Evensen: At this time, I would prefer an independent braille authority. We need to be shown that braille *can* be handled by the W.C.W.B.

Aucamp: We need a formal alliance to continue the work which has been done here, since some of us may find it difficult to attend an informal meeting.

Small: It is encouraging to hear Nilsson's suggestion that the W.C.W.B. should be a vehicle to assist a world alliance, but we need some assurance that this would be possible. Unfortunately, communication will be mostly correspondence; we must take every opportunity to meet face to face. Whatever body is set up must be given a task and a time frame.

Cargill: The W.C.W.B. cannot be all things to all people. The complexity of braille merits its own authority. No organization will work unless the individual authorities agree to go into it. Any final decision would be made in a general assembly with no one braille authority able to make decisions. It would be a tragedy if it were limited to only those countries represented here. Calling it an alliance would allow some flexibility for individual decisions. The important thing is to get an international dialogue going now.

CONFERENCE OBSERVERS

Thursday, September 16, 1982

Tony Best: By learning braille at the same time as print reading, I was receiving messages with the fingers at the same time as with the eyes. While braille skills are separate from print reading skills, perhaps the psychology of reading can help us in research. Are braille readers using their fingers efficiently? Reading speeds are more likely to be increased by teaching methods than by code changes.

Pamela Lorimer: The Association for the Education and Welfare of the Visually Handicapped (AEWVH) decided a year ago to study: (1) pre-braille; (2) those who can read but need help; (3) newly-blinded school children; (4) methods for teaching blind adults; (5) the code from the teachers' point of view. This study is now being carried out through correspondence, meetings and workshops, with the aim of improving the standard of teaching and providing more reading materials.

Les Pye: Contractions should be approached as letter groups rather than from the point of view of pronunciation. All have learned from this Conference; there is an underlying movement for eventual unification. In the matter of two tiers, sequencing, and so on, we must get it right this time.

Hans Ledermann: As an illustration of how a new feature may have unexpected results, there is the use of the lower "d", "a" for the Australian dollar; four Australian dollars might also be read "disabled". There are further problems in the transcription of plays where verse lines are broken between two speakers.

Conchita Gilbertson: The purpose of braille is to convey the information given by the author in print and no one should act as editor. Because we must obtain copyright, we must therefore "copy right". Because of regional differences, pronunciation is not uniform across the U.S. Paperless braille is being used in the State of Virginia.

Norma Schecter: While absolute rigidity is not desirable, we should not have "creative" transcription. A creative publisher, after all, must submit a copy to the author. Each country should decide for itself on the use of the capital sign. We must not make changes in the code to accommodate computer braille, dependent on the current state of the art. Needs other than the code changes include a smaller, lighter braille writer which need not be restricted to six dots.

Judith Dixon: The needs of the average braille reader must always be considered, and no one here is an average reader. The number of borrowers from braille libraries in the past decade has increased only 3 per cent while the number for other libraries has increased 120 per cent. Why? The National Library Service for the Blind and Physically Handicapped is undertaking a

study of braille reading to help answer this question. It is our responsibility to reaffirm the value of braille.

Roberta Werth: As the elite, you carry a high responsibility for the average braille reader who doesn't care at all about the speed of reading but who reads for pleasure. We (the Lutheran Braille Workers), produce books in Grade 1-1/2, and Grade 2 braille. If a book is produced only in Grade 1-1/2, the demand is doubled. When, as Nilsson suggests, the Washington Post will be on the street in braille the same day as the print, it must be in a code that everyone can read.

Christopher Gray: Will any of the suggested changes to the code — three-tiered braille, contractions across prefixes, and so on — substantially increase readability? It is to be hoped that a committee of some substance will come out of this Conference. There has been no discussion of any of the technical codes. Although paperless braille may be expensive, can we really afford not to have it?

Bernard Krebs: The rules have been developed so that braille can be read easily. When the U.S. first adopted braille, it was thought that Grade 2 braille was too difficult and therefore Grade 1-1/2 braille was invented. It was meant to be more basic with a general rule of not overlapping the syllables, but exceptions soon crept in. Field testing of changes is important. We must not allow the subject of capitalization to obstruct agreement on other points.

Janiece Petersen: As a teacher of children from Grade II to Grade VI, I would hope for the development of new tools for hand-produced braille. I cannot imagine when I would not need to know what the print says. It has been my experience that slow learners work better in Grade 2 and that sequencing eliminates something that helps slow learners.

Joanna Cargill: The U.S. philosophy to follow print is the result of three decades of mainstreaming, culminating in the recent ruling that every child be given "the most appropriate education". Textbooks are becoming more exotic, with words in corners, coloured words, and so on. Braille producers are forced to follow the print.

Abraham Nemeth: Since I teach sighted mathematics students at the University of Detroit, I am not just a reader, but must also generate print for my students. It is most helpful to be able to present print from the textbook that the student is using. Reverse transcription is important and the ability of the code to exactly reproduce print has been invaluable. If we keep the mathematical vocabulary hidden in the transcription, we are doing the student a disservice.

Margaret Craig: As transcribers of textbooks, our volunteers at CNIB must follow the print since we are usually not working closely with the individual user who may be a student from anywhere across the country. Being members of the National Braille Association and affiliated with BANA, we follow the textbook code. Such a standard format is essential because often a large textbook will be divided among many transcribers so that it may be transcribed

as quickly as possible.

Harold Snider: The International Federation of the Blind (IFB) has not been doing a very good job in braille. The appointment of a good public relations person from this group is necessary to promote fund-raising for braille. Like the English language itself, braille is always changing, but the bases of the code must be those things that we can agree upon; many changes to computer braille code — if they are table changes — are not difficult. One of the noteworthy things about this Conference and something that does not exist in other international organizations is the perfect partnership between blind and sighted.

RESOLUTIONS

The procedure for the presentation of resolutions was outlined by Richard Evensen, Chairman of the Day. Following the reading of a resolution by a member of the Steering Committee and discussion by the delegates (limited to one contribution per delegate), the Chairman would determine whether or not there was consensus, any delegate having the right to make or amend a motion or to call for a vote.

Resolutions are expressions of the views of the Conference but are not binding on any member organizations.

Resolution 1. On Conference Papers

Whereas, it is recognized that the authors, singly and collectively, of papers submitted to and presented at the International Conference on English Braille Grade 2 have expanded a great deal of time, effort, research, analysis, creativity and high motivation; therefore,

Be it resolved, that this conference expresses its thanks to the authors of the Conference papers;

Be it further resolved, that this Conference commends to all delegates and observers, and to any and all who shall read the Proceedings of the Conference the substance, findings, conclusions and recommendations of the several Conference papers in deliberations of braille-code practice and change.

Resolution 2. To Support Braille

Whereas, the ultimate benefit of the braille system as the primary tool of literacy for blind people depends upon teaching programs, appropriate and affordable personal writing equipment, the production of sufficient material in braille, and a functional system of national and international distribution of braille reading and writing goods; and,

Whereas, these peripheral and adjunct supports are as necessary as the braille code itself, but require a different expertise from that used to construct the code; and,

Whereas, most of the delegates and observers attending this Conference are affiliated with one or more organizations which are dedicated to the promotion of the total welfare of blind people; and,

Whereas, those organizations are potentially more effective in generating the kind of social action needed to create and to carry out the support activities than a "braille authority"; therefore,

Be it resolved, that it is the consensus of the 1982 Conference on English Braille Grade 2, assembled at the National Library Service for the Blind and Physically Handicapped, Washington, D.C., U.S.A., this 17th day of September, 1982, that each and every person attending this Conference should work, and encourage others to work, through appropriate organizations of

and for the blind, civic organizations, legislative bodies, school boards, training programs for teachers of the blind, manufacturers of aids and appliances for the blind, producers of books and materials in braille, postal systems, and other resources to promote broad support for the teaching and use of braille; the production and distribution of material in braille; the manufacture of new and inexpensive personal braille writing equipment such as an 8- or 9-dot slate, an interpoint upward brailler, computer driven braille printer, paperless braille devices, etc.; the manufacture of "things" in braille such as stoves with brailled dials, appointment calendars, checking systems, etc.; reduced airmail rates for braille and related materials in countries where it does not now exist; the development of an inexpensive but usable page duplicator; the development of a durable and affordable rapid computer braille printer; improved standards for the training and certifying in braille of teachers preparing to teach blind children or adults; and any other activity that will strengthen the braille system as the primary tool of literacy for blind people.

Resolution 3. On International Cooperation

This International Conference on English Braille Grade 2, held in Washington, September 1982, resolves:

1. That it is imperative that arrangements be made to facilitate continuing international cooperation on English braille from the close of this Conference:
2. That a further conference, at which definitive recommendations in relation to the English literary braille code should be made, should be held no later than the end of 1987, hosted by the Braille Authority of the United Kingdom;
3. That immediately after the present Conference an International Coordinating Committee on English Literary Braille be established to consist of one member from each of the seven countries represented at this Conference, with the following functions:

(a) To assist in the exchange of ideas about English braille and to promote international cooperation in research in this field;
(b) To prepare proposals for the establishment of an international authority on English literary braille;
(c) To act as a steering committee for the planning and preparation of the conference to be held by 1987; and
(d) To investigate sources of finance and to solicit funds for its own work for research projects and for the proposed conference.

4. That all countries in which there is a substantial use of English braille should be invited to be represented at the full conference on English literary braille to be held by 1987;
5. That while much of the work of this committee will have to be carried on by correspondence and the exchange of material, the committee

should hold at least one interim meeting by not later than the end of 1985;

6. That an Interim Secretary for this International Coordinating Committee on English Braille should be appointed by the present Conference subject to confirmation;
7. That after the appointment of an Interim Secretary and before the dissolution of this Conference, one person from each country represented at the Conference shall be designated as an Interim Correspondent who shall receive information from the Interim Secretary and disseminate it to appropriate people within the country represented and act as liaison with the braille authority within that country. The braille authority within each country represented at this Conference shall be invited to name an official member of the International Coordinating Committee on English Literary Braille by December 1, 1982, at which time the tenure of the Interim Correspondent shall cease.

The Interim Secretary shall distribute the names of the official members of the International Coordinating Committee on English Literary Braille with a mail ballot to all members at the earliest possible date and shall proceed in the most expeditious manner to elect, from among the members, a Chairperson and a Secretary. A majority of the votes cast shall be requisite for election. Upon the official selection of the Chairperson and the Secretary, the tenure of the Interim Secretary shall cease and the Committee shall be authorized to proceed under the recognized practices governed by **ROBERT'S RULES OF ORDER REVISED** to carry out the intent of this resolution.

Resolution 4. Need To Postpone Changes

Be it resolved, that except with regard to any specific recommendations for change which this Conference may make, this Conference call upon all countries here represented to abstain from implementing any diversifying changes in the English Literary Braille Code until the conference proposed to be held in the United Kingdom has taken place, or until attempts to convene such a conference have clearly broken down.

Resolution 5. To Compare Braille Codes

Whereas, the spirit of international cooperation to work toward a unified braille code is present; therefore,

Be it resolved, that it is the consensus of the 1982 International Conference on English Braille Grade 2 that a small but knowledgeable and representative international committee should be named by this Conference to develop a detailed comparison of English braille codes and to make preliminary recommendations for unifying them.

Be it further resolved, that the work of the committee would be done by correspondence and reports made to the representative braille authorities as each logical unit of the project is completed.

Resolution 6. Regarding Accommodations For Computers

Whereas, the potential for computer-assisted production of braille is likely to fluctuate dramatically with the rapid growth and development of computer technology; therefore,

Be it resolved, that it is the consensus of the 1982 International Conference on English Braille Grade 2 that, between now and the next International Conference on English Braille Grade 2, or until such time as it appears that such a conference is not likely to occur within a foreseeable period of time, any deviation from currently recognized braille codes permitted by braille authorities to facilitate the development of computer-assisted production of braille shall be temporary, experimental guidelines rather than amendments to the braille code.

Resolution 7. On Research

This conference supports the following research proposals:

1. It is urged that action be taken to explore the possibility of achieving uniformity in the forms, placement and spacing of unit abbreviations for coinage, weights and measures.
2. It is proposed to develop and field-test a contracted literary code which is based on the experience of users and teachers as well as on theoretical considerations and research findings.
3. The selection of contractions for inclusion in contracted codes has in the past been done almost entirely on the basis of their frequency of occurrence in the reading material, little or no account having been taken of the contractions used by individual people in their personal writing. It is proposed that a survey of personal writing should be undertaken to discover what, if any, are the contracting devices being employed which might be usefully added to a formal code.
4. Immediate research attention should be given to the devising and trial of techniques for providing format cues for paperless braille.
5. Little appears to be known about the structure and functioning of the touch sense or about the psychophysical factors which affect tactile sensitivity in perceiving braille characters. Research on this topic is clearly beyond the competence of any braille authority to carry out. It is therefore proposed that efforts be made to persuade properly qualified specialists to undertake this task.

Resolution 8.

Be it resolved, that research be conducted into the use and non-use of contractions to bridge syllables and in relation to prefixes, suffixes, root and base words to determine how present rules affect word recognition.

Resolution 9. Against Restriction Of Research

Be it resolved, that any research into and field testing of possible changes

in the present English literary braille code should not be bound by the restriction that no alteration to the existing meanings of signs should be considered.

Resolution 10. Support For Further Investigation Of Two-Tier Contracted Code

This Conference expresses support for the continuance of investigation into the possibility of creating a simplified revision of Grade 2 English braille and into the development of an advanced grade of contracted braille which should be built upon it. It also recommends this as one of the matters to which the proposed coordinating committee should give its attention.

Resolution 11. On Transcription Procedures

This Conference recommends that early action be taken by authorities for English braille to achieve a greater degree of uniformity in transcription procedures which might provide, among other things, for the following as normal practices in the transcription of books of all kinds:

(a) The reproduction in the braille version of all dust-jacket material from the print;

(b) A clear indication on the outer cover of the braille volume, both in braille and (on the spine) in print, of the author, title and the braille volume of the work;

(c) A complete contents list in the first braille volume of each work giving print page references;

(d) A page-information line on every page, preferably on the bottom of the page, giving braille and print page numbers, number of chapter, section, etc., and section title;

(e) A concise indication of each print page turn-over;

(f) The location of notes of all kinds in separate pamphlets or in other ways which will maximize ease of reference combined with minimum interference with the reading of the text; and

(g) The inclusion on the cover of each volume of all reference or alphabetized multi-volume works of an abbreviated citation of the first and last entry words.

Resolution 12. Specific Code Changes

Whereas code changes which have been dealt with in Conference papers would promote uniform treatment of certain braille matters, or a proposal for adoption of a rule or practice from one code has elicited quick agreement from parties employing the other code; therefore,

Be it resolved, that this Conference recommends careful consideration by appropriate national rule-setting bodies and adoption of the following changes, or reaffirmation if already part of a country's code:

1. Whenever the "ear" letter grouping occurs in braille, the "ar" contraction will be used. This change is not meant to affect the use of the

"ea" contraction in other letter groupings where these letters appear.

2. The letter sign will be placed before a letter that follows a number, close up or after a hyphen whether or not that letter is capitalized or uncapitalized.
3. When braille contains a series of items such as the title of books, the individual items in the series will be italicized according to rules for 1-3 words and for 4 or more words, i.e., a single italic sign before each of 3 words in an item; and for 4 or more words a double italic sign before the first word, no italic sign before intervening words, and a single italic sign before the final word.
4. Normal braille contractions will be used in foreign words, phrases and names in English context if the print type face is not different from that for surrounding words; but contractions will not be used where the word, phrase or name is in a different type face.

Be it further resolved that the above recommended practices shall be compared against existing formulations in the American and British codes and precise wording shall be developed while remaining consonant with the four practices recommended here.

Resolution 13. Unit Abbreviations

Be it resolved, that where common usage of abbreviation of coinage, weights and measures deviates from those listed in the code, the common geographical usage should become practice.

Resolution 14. Word Division

Be it resolved, that the division of words be regarded as a matter of formatting on which each braille-producing agency will formulate its own policy in accordance with a standard dictionary.

Resolution 15. The Capital Sign

Whereas, the use of the capital sign in braille is deemed important in several countries, but not in other countries; and

Whereas, some data support the usefulness of the capital sign in promoting smooth and/or fast reading; and

Whereas, further investigation should aid in clarifying the usefulness of the capital sign; therefore,

Be it resolved, that this Conference supports the continued use of the capital sign in those countries where it is currently used and accepts its continued non-use at the present time in other countries;

Be it further resolved, that this Conference hopes that braille rule-setting bodies in countries not now using the capital sign will undertake their own or keep abreast of other countries' investigations into the usefulness of the capital sign, and will be open to adopting the capital sign if such investigations support the hypothesis of the capital sign's usefulness.

Interim Committee

A motion by William Poole (U.K.), seconded by Floyd Cargill (U.S.), that Darleen Bogart (Canada) be appointed Interim Secretary, was passed unanimously.

Each of the seven countries represented at the Conference appointed an Interim Correspondent to receive and disseminate information and act as a liaison with its braille authority. These representatives are:

Connie Aucamp	South Africa
Jo Churcher	Canada
Richard Evensen	United States
Joan Ledermann	Australia
Bobby Lee	Hong Kong
William Poole	United Kingdom
Terry Small	New Zealand