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CARILLONS OF THE WORLD

Privately published on behalf of the
World Carillon Federation and its member societies

by

Carl Scott Zimmerman
Chairman of the former
Special Committee on Tower and Carillon Statistics,
The Guild of Carillonneurs in North America

Online Edition (a set of Portable Document Format files)

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CONTENTS

The main purpose of this publication is to identify and describe all of the traditional carillons in the world. But it also covers electrified carillons, chimes, rings, zvons & other instruments or collections of 8 or more conventional or tubular tower bells (even if not in a tower), and other significant tower bells.

The complete publication (online version) consists of, and the Terms of Use apply to, the following PDF files:

Title & Contents (this page, reproduced in each file)

Introduction - a complete guide to the display and interpretation of site, summary and other information.

North America (carillons, traditional and non-traditional)

North America (chimes, chimolas, rings and zvons)

(North America = The U.S.A., Canada and Mexico)

Central and South America

Africa and the Middle East

Asia and the Pacific Rim

Belgium

British Isles (including Eire)

Denmark and its dependencies

France

Germany (East and West united)

Italy

The Netherlands

Europe and the North Atlantic (remaining countries)

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Survey forms for carillons, chimes and towers

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INTRODUCTION

This publication contains three types of information about tower bell sites. (See Glossary on next page.) The first type is plain text, which identifies the location of each site, people associated with it, etc. The second type is technical data about the bells and the installation at each standard site. The third type is summaries which reflect the overall characteristics of the standard sites in an area. Every major geographic areas contains one section of each type.

Plain text information is arranged under headings beginning with "MASTER INFORMATION LISTING" (referenced as "MIL"). Where it pertains to a standard site, it is laid out according to the Site Text Pattern described on the second following page. Each MIL entry, of whatever type, is set off with blank lines before and after it, and has no blank lines within it.

Technical data for every standard site is presented in a very compact tabular form under headings beginning with "CONDENSED INFORMATION LISTING" (referenced as "CIL") according to the Code Interpretation section which follows the Site Text Pattern page. There is no "incidental" material in the CIL. However, two blank lines around a row of dashes are inserted to provide a visual break wherever there is a break in alphabetic order that is due to subdivision of the geographic area. (This does NOT appear if consecutive subdivisions happen to form a continuous alphabetic sequence.)

Most geographic areas are further subdivided based on major classes of instruments; a few are also subdivided geographically. Such subdivision is always described at the beginning of the MIL for the area. All the standard sites in a geographic area appear in exactly the same order in the MIL and CIL sections for that area.

At the very end of each MIL section there is usually a sub-section headed "Other sites of interest". These include museums, rings of 5 or 6 bells, large or historic bells, and other such places not otherwise qualified for entry in the main sections. "Great bells" are listed with the heaviest first, and include bells over about 4 tons in weight, or of pitch G# or below. Heavy bells contained in standard sites appear here also.

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NOTE: Data for standard sites in the Americas appear essentially as published in the series of articles in the "Bulletin" of the G.C.N.A. However, those articles do not include the non-standard sites, the lists of great bells and the summaries which appear here.

DISCLAIMER:

The information presented in this book has been compiled from many sources. While some sites have been personally visited by the author, this has not been possible for all sites. There are obvious gaps in many data entries worldwide, and the validity of others is questionable. This publication can be no more accurate than the sources on which it is based. Therefore consider carefully the year of the source in determining the validity of any entry.

If you find any errors or omissions in this publication, please notify the author, so that they can be corrected in future editions. In return, you will receive a custom extract from the database, showing how your information has been entered, and also reflecting changes received from other contributors for the same area, section or sub-section.

Suggestions for enhancements to the display format or for new types of summaries are also welcome.

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U. S. A.

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 The definitions presented here are intended to clarify the usages and classifications found in this book. Other definitions and usages may be found elsewhere in the world of tower bells.

NOUNS

Tower bell - a cup-shaped cast bronze bell, of a size suitable for hanging in a tower; normally thicker at the "sound bow" where the clapper strikes. All bells listed in this book are presumed to fit this definition unless otherwise stated. (Some listed instruments are made of other kinds of bells, or of cup-shaped bells cast from a different material, but used in the same manner as tower bells.) The exception is great Oriental bells, which have a different profile and no sound bow.

All tower bells in listed instruments are presumed to be hung "dead" (i.e., non-swinging) unless otherwise stated. The exception is rings (see below).

Carillon bell - a tower bell which has been tuned so that its various partial tones (hum tone and "overtones") are in harmony with its strike tone according to widely accepted principles of tuning. This book does not attempt to indicate the degree to which any of the listed bells attain or fail such harmony.

Great bell - a tower bell of 4 tonnes or more.
 (See Supplementary Information on Weights.)

Strike tone - the apparent initial pitch of a bell when struck. It is this pitch which is used throughout this book to describe bell notes.

Site - a single musical instrument made of tower bells, or a collection of such bells in one place.

A "standard" site, which appears in both MIL and CIL in this book, contains at least 8 bells. A "non-standard" site, which can appear only in a MIL section, has less than 8 bells. If a new instrument replaced an older one in the same tower, both are included in the same site rather than being counted separately.

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 Carillon -

- (1) "a musical instrument consisting of at least two octaves of carillon bells arranged in chromatic series and played from a keyboard permitting control of expression through variation of touch." [G.C.N.A.] This implies the use of a baton keyboard as defined below. In this book, the term "traditional carillon" is used when this definition is intended.
- (2) a site having at least 23 tower bells in at least two octaves of mostly chromatic series, but falling short of the "traditional" carillon either in the lack of tuning of the bells or in the type of mechanism (e.g., electric keyboard or automatic-only operation). In this book, all such instruments are listed in "carillon" subsections.
- (3) an automatic mechanical tune-playing mechanism, usually found as auxiliary equipment on a ring (see below) in England; this peculiarly British usage of the word is not employed in this book.
- (4) a chime (see below) played by a traditional (i.e., baton) keyboard; this distinctively French usage of the word is not employed in this book. In this book, all such instruments are listed in "chime" subsections.

Chime -

- (1) a musical instrument consisting of at least 8 bells arranged in a diatonic (or partially chromatic) series, and upon which tunes can be played by some means.
- (2) any collection of at least 8 bells which is not a carillon by either definition (1) or definition (2) above. (But note that carillon-sized sites will be summarized as carillons even when listed in "chime" subsections.)

Ring - a set of at least 3 tower bells hung for full-circle ringing in either British ("change-ringing") or Veronese style, normally in diatonic series starting from the tonic note of the major scale. In the few cases of an added semitone, it is used to provide for a lighter (and smaller) diatonic range for ringing. In this book, rings are listed either with chimes or in a separate sub-section, but are always summarized as chimes.

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Peal -

- (1) a group of tower bells hung for swinging, each at its own natural pendulum frequency, and therefore at random with respect to each other; swung either by ropes or by individual electric motors.
- (2) the performance, by a band of change-ringers, of at least 5000 changes, non-stop; on a ring of 7 or more bells, no two changes can be the same. This definition is not used in this book.
- (3) a ring. This definition is fiercely held by some ringers, while being strongly deprecated by others; it is not used in this book.

Zvon - a set of tower bells hung dead with clapper ropes rigged for Russian-style rhythmic sounding; normally few (if any) of the bells fit into any musical scale, and there are large gaps between some adjacent bells, particularly the heaviest.

Keyboard - any of several different devices which permit one person to play all the bells in an instrument by hand, with one key per bell. The key size and arrangement varies according to the mechanism used:

- "baton" keyboards, found in traditional carillons and some chimes, have keys shaped somewhat like batons, with direct mechanical linkage to the clappers of the bells;
- "pumphandle" (American) or "barrow-handle" (French) keyboards are found in chimes with direct mechanical actions much heavier than those of carillons;
- electric keyboards are similar to those of an organ, and typically use relays to control hammer solenoids, which may strike the bell on the inside or the outside.
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Baton keyboards are played by striking with the fist; pumphandle keyboards are played by grasping a handle and pushing down with a full arm stroke; and electric keyboards are played with the fingers.

Console (or clavier) - the case or framework which holds a keyboard; sometimes it also contains a pedal keyboard (pedalboard) by which the heaviest bells can be played with the feet.

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Chimestand -

- (1) the console of a chime;
- (2) a wall-mounted rack to which are tied ropes leading to the clappers of a chime; sometimes called a taut-rope clavier. One variety, commonly called an "Ellacombe" stand, is used with rings; it is connected to externally mounted hammers so that it can easily lower them out of the way to permit the bells to swing without interference.

VERBS

Chime - to swing a bell just enough for the clapper to strike, often on only one side of the bell.

Peal - to sound the bells of a peal (n.) by swinging.

Ring -

- (1) to participate in a team of change-ringers.
- (2) to sound a bell by any method.

ADJECTIVES

Dead - refers to bells which are hung in a fixed (i.e., non-swinging) position. This is typical of carillons, chimes and zvons.

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On pages headed "MASTER INFORMATION LISTING" (referenced as MIL) appears plain text descriptive material for all sites.

STANDARD SITES

For standard sites, text appears in six categories. Any or all of these categories may be present for any individual site, and will normally appear in the same order that they are listed here.

A. City and country where the instrument is located, in capital letters, on one line. This site identification is always present, and provides the link between the MIL and the CIL (described on the following pages).

Where a city has more than one tower bell site, the city name is followed by a letter code to distinguish between the sites. This letter code is usually based on the initials of the site name. Sites with more than one instrument will have a number to distinguish between them. It is possible for a site to have both a letter code and a number.

Some country names include an abbreviation of the geographic section, state or province, to facilitate sorting.

Within each geographic area or subdivision, sites are listed in order by city name. Multiple sites in the same city are listed in order by the letter code.

Cross-references are provided for variant city names, and sometimes between subdivisions for multi-site cities.

B. Name of the instrument, if specifically named. (There is no starred keyword associated with this, as there is for the remaining four categories.)

C. Location of the instrument. This is the complete physical, civil or geographic location of the tower or other installation, and is always present, even if the exact location is unknown. This is not a postal address, although street numbers may be used when cross-street names or similar geographic references are not available. Tower name is included when one exists. If the instrument is not hung in a conventional tower, a descriptive word or phrase may be shown. If the name of the institution has changed during the lifetime of the instrument, any former name(s) of the institution will be shown in parentheses. If the location of the bells is not the same as their original site, then "Former Location" will be shown after the (present) "Location", using the same style.

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D. Names of persons who play the instrument and/or who may be contacted about it, if known. Players are listed under the keyword "Carillonist" or "Chimer", depending on the size of the instrument; their formal titles (assigned by the employing institution) are included when known. Other persons or offices are listed under the keyword "Contact".

For both individuals and institutions, categories of membership in the G.C.N.A. (as of 1 November 1994) are indicated by letters in parentheses, as follows:

- (A) Associate
- (C) Carillonneur
- (H) Honorary
- (Su) Sustaining

Postal addresses and telephone numbers are included, and for G.C.N.A. members are current as of the above date. (Country names are not included in postal addresses, since they would not be used within that country.) Telephone numbers for individuals are designated "H:" for home and "W:" for work when known; in all other cases they are marked "Ph." or "Tel." Facsimile machine numbers are marked "Fax:". Area codes within the country are shown where known, using either parentheses or "/" according to the custom of the country. Country codes are not shown within the site entries, but are listed at the beginning of each MIL section. E-mail addresses are included where known, designated "E:".

E. Schedule of concerts or other regular playing for the public (and practice times for rings), if known.

F. Remarks, if appropriate. This includes the explanation for items belonging in the CIL (see next page) but which do not fit the code tables. If the bells are not standard tower bells, their type is shown here.

OTHER SITES

In addition to standard site data (described above, and always matched to corresponding site data in the CIL), the MIL may contain plain-language information about other sites or points of interest. For example, rings of 5 or 6 bells outside of Great Britain are mentioned, as are bell museums or notable bells which cannot be covered in "Remarks" for a standard site. The text pattern given above for standard sites may be used to the extent convenient, but only a comma (without site code) will be used to separate city and country.

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SUMMARY DESCRIPTIONS

On pages headed "SUMMARIES" appear various displays of summary information for the sites in the geographic area listed. The standard summaries are described here.

The simplest summary, which can also appear at the end of a MIL or CIL section, is a "count of sites". It shows the numbers of carillon-sized and chime-sized sites which exist now (active) or formerly existed (defunct) in the area being summarized, regardless of the manner of operation.

A "summary by maker" consists of a table showing the number of distinct installations by each maker (named down the left side of the table) for each type of contribution (abbreviated across the top of the table). The bottom row of the table gives the totals for each type of contribution regardless of maker, while the right-most column of the table gives the total number of site contributions for each maker regardless of type. The bottom right figure in the table is the total number of contributions by all makers, which is the same as the number of CIL lines being summarized.

A "plot of site counts" is a scatter diagram showing the numbers of sites having each possible combination of bourdon (or treble) weight code and number of bells (instrument size). Weight codes increase from left to right and are displayed along the top edge of the plot; sizes decrease from top to bottom and are displayed along the right edge of the plot. For areas containing very large instruments, the diagram may be broken into two parts, with the carillon portion on the first page and the chime portion on the second page. The starting weight code may vary between areas, depending on the range of instruments which exist therein. The maximum carillon size and maximum chime size shown also vary as appropriate to each area.

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A great variety of other summaries are available from the author on a custom basis at relatively low cost. These include selective and/or sorted listings (MIL and/or CIL) based on any parameter(s) in the CIL, as well as standard summaries applied to any selected set of standard sites. (Non-standard sites cannot be summarized, since they do not appear in the CIL.)

Examples:

1. CIL of all sites in the southern hemisphere, sorted by year of installation.
2. MIL (Location, player and Contact only) for all sites in Europe having a traditional keyboard, at least four octaves, where either a player or a contact is known.
3. CIL of all sites for which the maker is known, sorted by maker and year of installation, with bourdon scatter-plot for each maker.
4. MIL (Location only), CIL and site count for all sites with a traditional keyboard in which all notes appear on the manual, the lowest key is B-flat (A#), and the pedal C# is present.
5. CIL for all sites which have a bourdon heavier than middle-C and which transpose downward.
6. MIL &/or CIL for all sites for which there has been a significant change to the information recorded in the database since any specified date. (This methodology is used to prepare the articles which appear in the Bulletin of the G.C.N.A. from time to time.)

Within the limits of available data, the possibilities are very wide-ranging. Unfortunately no selection is possible based on the content of MIL data--only on the existence or non-existence of the various categories of information.

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INTRODUCTION

This publication contains three types of information about tower bell sites. (See Glossary on next page.) The first type is plain text, which identifies the location of each site, people associated with it, etc. The second type is technical data about the bells and the installation at each standard site. The third type is summaries which reflect the overall characteristics of the standard sites in an area. Every major geographic area or separately listed country has one section of each type.

Plain text information is arranged under headings beginning with "MASTER INFORMATION LISTING" (referenced as "MIL"). Where it pertains to a standard site, it is laid out according to the Site Text Pattern described on the third following page. Cross references and other non-standard material may appear in various places. Each MIL entry, of whatever type, is set off with blank lines before and after it, and has no blank lines within it.

At the very end of each MIL section there is usually a subsection headed "Other sites of interest". These include museums, rings of 5 or 6 bells, large or historic bells, and other such places not otherwise qualified for entry in the main sections. "Great bells" are listed with the heaviest first, and include bells over about 4 tons in weight, or of pitch G# or below. Heavy bells contained in standard sites appear here also.

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Most geographic areas are further subdivided based on major classes of instruments; a few are also subdivided geographically. Such subdivision is always described at the beginning of the MIL for the area. All of the standard sites in a geographic area appear in exactly the same order in the MIL and CIL sections for that area.

Summaries always follow the CIL for the geographic area over which they apply, except that consolidated summaries which apply to the entire world are located at the very end of the book.

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NOTE: Data for standard sites in the Americas appear essentially as published in a series of six articles in the "Bulletin" of the G.C.N.A. with subsequent changes which could have been published in another such article and actually have been published on the G.C.N.A. Website. However, those articles and that Website do not include the non-standard sites and the summaries which appear here. (The Website does contain the lists of great bells, as well as other summaries, both in different formats.)

DISCLAIMER:

The information presented in this book has been compiled from many sources. While some sites have been personally visited by the author, this has not been possible for all sites. There are obvious gaps in many data entries worldwide, and the validity of others is questionable. This publication can be no more accurate than the sources on which it is based. Therefore consider carefully the year of the source in determining the validity of any entry.

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Suggestions for enhancements to the display format or for new types of summaries are also welcome.

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 The definitions presented here are intended to clarify the usages and classifications found in this book. Other definitions and usages may be found elsewhere in the world of tower bells.

NOUNS

Tower bell - a cup-shaped cast bronze bell, of a size suitable for hanging in a tower; normally thicker at the "sound bow" where the clapper strikes. All bells listed in this book are presumed to fit this definition unless otherwise stated. (Some listed instruments are made of other kinds of bells, or of cup-shaped bells cast from a different material, but used in the same manner as tower bells.) The exception is great Oriental bells, which have a different profile and no sound bow.

All tower bells in listed instruments are presumed to be hung "dead" (i.e., non-swinging) unless otherwise stated. The exception is rings (see below).

Carillon bell - a tower bell which has been tuned so that its various partial tones (hum tone and "overtones") are in harmony with its strike tone according to widely accepted principles of tuning. This book does not attempt to indicate the degree to which any of the listed bells attain or fail such harmony.

Great bell - a tower bell which weighs 4 tonnes or more. (See Supplementary Information on Weights.)

Strike tone - the apparent initial pitch of a bell when struck. It is this pitch which is used throughout this book to describe bell notes.

Site - a single musical instrument made of tower bells, or a collection of such bells in one place.

A "standard" site, which appears in both MIL and CIL in this book, contains at least 8 bells. A "non-standard" site, which can appear only in a MIL section, has less than 8 bells. If a new instrument replaced an older one in the same tower, both are included in the same site rather than being counted separately, even if there was a gap of many years between removal and replacement.

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 Carillon -

- (1) "a musical instrument consisting of at least two octaves of carillon bells arranged in chromatic series and played from a keyboard permitting control of expression through variation of touch." [G.C.N.A.] This implies the use of a baton keyboard as defined below. In this book, the term "traditional carillon" is used when this definition is intended.
- (2) a site having at least 23 tower bells in at least two octaves of mostly chromatic series, but falling short of the "traditional" carillon either in the lack of tuning of the bells or in the type of mechanism (e.g., electric keyboard or automatic-only operation). In this book, all such "non-traditional" instruments are listed in "carillon" subsections.
- (3) an automatic mechanical tune-playing mechanism, usually found as auxiliary equipment on a ring (see below) in England; this distinctively British usage of the word is not employed in this book.
- (4) a chime (see below) played by a mechanical keyboard; this distinctively French usage of the word is not employed in this book. In this book, all such instruments are listed in "chime" subsections.

Chime -

- (1) a musical instrument consisting of at least 8 tower bells arranged in a diatonic (or partially chromatic) series, but with too few bells to be called a carillon, and upon which tunes can be played by some means.
- (2) any collection of at least 8 bells which is not a carillon by either definition (1) or definition (2) above. (But note that carillon-sized sites will be summarized as carillons even when listed in "chime" subsections.)

Ring - a set of at least 3 tower bells hung for full-circle ringing in either British ("change-ringing") or Veronese style, normally in diatonic series starting from the tonic note of the major scale in the bass. In the few instances of an added semitone, it is used to provide for a lighter (and smaller) diatonic range for ringing. In this book, rings are listed either with chimes or in a separate sub-section, but are always summarized as chimes; only rings of at least 8 bells are treated as standard sites.

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Peal -

- (1) a group of tower bells hung for swinging, each at its own natural pendulum frequency, and therefore at random with respect to each other; swung either by ropes or by individual electric motors.
- (2) the performance, by a band of change-ringers, of at least 5000 changes, non-stop; on a ring of 7 or more bells, no two changes can be the same. This definition is not used in this book.
- (3) a ring. This definition is fiercely held by some ringers, while being strongly deprecated by others; it is not used in this book.

Zvon - a set of tower bells hung dead with clapper ropes rigged for Russian-style rhythmic ringing; normally few (if any) of the bells fit into any musical scale, and there are large gaps between the pitches of some adjacent bells, particularly the heaviest.

Keyboard - any of several different devices which permit one person to play all the bells in an instrument by hand, with one key per bell. The key size and arrangement vary according to the mechanism used:

- "baton" keyboards, found in all traditional carillons and some chimes, have keys shaped somewhat like batons, have direct mechanical linkages to the clappers of the bells, and are arranged in two rows like the black and white keys of a piano;
- "pumphandle" (American) or "barrow-handle" (French) keyboards are found in chimes with direct mechanical actions much heavier than those of carillons, and the handles are usually in a single straight line;
- electric keyboards are similar to those of an organ, and typically use relays to control hammer solenoids, which may strike the bells on the inside or the outside.

Baton keyboards are played by striking a key gently or with the partially-closed fist; pumphandle keyboards are played by grasping a handle and pushing down with a full arm stroke; and electric keyboards are played with the fingers.

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Console (or clavier) - the case or framework which holds a keyboard; sometimes it also contains a pedal keyboard (pedalboard) by which the heaviest bells can be played with the feet as well as (or instead of) the hands. A pedalboard is always present for traditional carillons, sometimes for chimes, and never for non-traditional carillons.

Chimestand -

- (1) the console of a mechanical-keyboard chime (either baton or pumphandle);
- (2) a wall-mounted rack to which are tied ropes leading to the clappers of a chime; sometimes called a taut-rope clavier. One variety, commonly called an "Ellacombe" stand, is used with rings; it is connected to externally mounted under-hammers so that it can easily lower them all out of the way simultaneously to permit the bells to swing without interference.

VERBS

Chime -

- (1) to swing a bell just enough for the clapper to strike, often on only one side of the bell rather than on alternating sides;
- (2) to sound one or more bells by any method (coll.);
- (3) to emit the sound of a bell (colloquial).

Peal -

- (1) to sound the bells of a peal (n.) by swinging;
- (2) to sound a bell by any method.

Ring -

- (1) to participate in a team of change-ringers;
- (2) to sound a bell by any method.

ADJECTIVES

Carillon-sized - having 23 or more tower bells, regardless of any other characteristics.

Chime-sized - having 8 to 22 tower bells, regardless of any other characteristics.

Dead - refers to tower bells which are hung in a fixed (i.e., non-swinging) position. This is typical of carillons, chimes and zvons.

(END.)

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On pages headed "MASTER INFORMATION LISTING" (referenced as MIL) appears plain text descriptive material for all sites.

STANDARD SITES

For standard sites, text is organized in seven categories. Two of these categories will be present for every individual site, while the others are may or may not be; all will normally appear in the same order that they are listed here. Two categories are indicated by position, the rest by keyword.

A. City and country where the instrument is located, in capital letters, on one line (the first line). This site identification is always present, and connects the MIL and the CIL (described on the following pages).

Where a city has more than one tower bell site, the city name is followed by a letter code to distinguish between the sites. This letter code is usually based on the initials of the site name. Institutions with more than one instrument will have a number to distinguish between them. It is possible for a site to have both a letter code and a number.

Some country names include an abbreviation of the geographic section, state or province, to facilitate sorting.

Within each geographic area or subdivision, sites are listed in order by city name. Multiple sites in the same city are listed in order by the letter code and/or numeric code.

Cross-references are provided for variant city names, and sometimes between subdivisions for multi-site cities.

B. Name of the instrument, if specifically named. (There is no keyword associated with this, as there is for the remaining categories.)

C. "Location" of the instrument. This is the complete physical, civil or geographic location of the tower or other installation, and is always present, even if the exact location is unknown. This is not a postal address, although street numbers may be used when cross-street names or similar geographic references are not available. Tower name is included when one exists. If the instrument is not hung in a conventional tower, a descriptive word or phrase may be shown. If the name of the institution has changed during the lifetime of the instrument, any former name(s) of the institution will be shown in parentheses. If the location of the bells is not the same as their original site, then "Former Location" will be shown after the (present) "Location", using the same style.

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D. Names of persons who play the instrument and/or who may be contacted about it, if known. Players are listed under the keyword "Carillonist" or "Chimer", depending on the size of the instrument; their formal titles (assigned by the employing institution) are included when known. Other persons or offices are listed under the keyword "Contact".

For both individuals and institutions, categories of membership in the G.C.N.A. (as of Oct. 2006) are indicated by letters in parentheses, as follows:

- (A) Associate
- (C) Carillonneur
- (H) Honorary
- (Su) Sustaining

Postal addresses and telephone numbers are included, and for G.C.N.A. members are current as of the above date. (Country names are not included in postal addresses, since they would not be used within that country.) Telephone numbers for individuals are designated "H:" for home and "W:" for work when known, or "C:" for cell; in all other cases they are marked "Ph." or "T:". Facsimile machine numbers are marked "F:". Area codes within the country are shown where known, using either parentheses or "/" according to the custom of the country. Country codes are not shown within the site entries, but are listed at the beginning of each MIL section. E-mail addresses are included where known, designated "E:".

E. "Schedule" of concerts or other regular playing for the public (and practice times for rings), if known.

F. "Remarks" provide additional useful information, especially any explanation for items which belong in the CIL (see next page) but which do not fit the code tables. If the bells are not standard tower bells, their type is shown here.

OTHER SITES

In addition to standard site data (described above, and always matched to corresponding technical site data in the CIL), the MIL may contain plain-language information about other sites or points of interest. For example, rings of 5 or 6 bells outside of Great Britain are mentioned, as are bell museums or notable bells which cannot be covered in "Remarks" for a standard site. The text pattern given above for standard sites may be used to the extent convenient, but only a comma (without site code) will be used to separate city and country, and the keywords cited above are not used.

(END.)

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SUMMARY DESCRIPTIONS

On pages headed "SUMMARIES" appear various displays of summary information for the sites in the geographic area covered. The standard summaries are described here.

The simplest summary, which can appear at the end of a MIL or CIL section, is a "count of sites". It shows the numbers of carillon-sized and chime-sized sites which exist now (active) or formerly existed (defunct) in the area being summarized, regardless of the manner of operation.

A "summary by maker" consists of a table showing the number of distinct installations by each maker (named down the left side of the table) for each type of contribution (abbreviated across the top of the table). The bottom row of the table gives the totals for each type of contribution regardless of maker, while the right-most column of the table gives the total number of site contributions for each maker regardless of type. The bottom right figure in the table is the total number of contributions by all makers, which is the same as the number of CIL lines being summarized.

A "plot of site counts" is a scatter diagram showing the numbers of sites having each possible combination of bourdon (or treble) weight code and number of bells (instrument size). Weight codes increase from left to right and are displayed along the top edge of the plot; sizes decrease from top to bottom and are displayed along the right edge of the plot. For areas containing very large instruments, the diagram may be broken into two parts, with the carillon portion on the first page and the chime portion on the second page. The starting weight code may vary between areas, depending on the range of instruments which exist therein. The maximum carillon size and maximum chime size shown also vary as appropriate to each area.

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A great variety of other summaries are available from the author on a custom basis at relatively low cost. These include selective and/or sorted listings (MIL and/or CIL) based on any parameter(s) in the CIL, as well as standard summaries applied to any selected set of standard sites. (Non-standard sites cannot be summarized, since they do not appear in the CIL.)

Examples:

1. CIL of all sites in the southern hemisphere, sorted by year of installation.
2. MIL (Location, Player and Contact only) for all sites in Europe having a traditional keyboard, at least four octaves, where either a player or a contact is known.
3. CIL of all sites for which the maker is known, sorted by maker and year of installation, with bourdon scatter-plot for each maker.
4. MIL (Location only), CIL and site count for all sites with a traditional keyboard in which all notes appear on the manual, the lowest key is B-flat (A#), and the pedal C# is present.
5. CIL for all sites which have a bourdon heavier than middle-C and which transpose downward.
6. MIL &/or CIL for all sites for which there has been a significant change to the information recorded in the database since any specified date. (This methodology was used to prepare the articles which formerly appeared in the Bulletin of the G.C.N.A. from time to time.)

Within the limits of available data, the possibilities are very wide-ranging. Unfortunately no selection is possible based on the content of MIL data--only on the existence or non-existence of the various categories of information.

=====

* This section describes (a) the format of the tabular data shown on pages headed "CONDENSED INFORMATION LISTING" (referred to as CIL), column by column, starting from the left side of the CIL, and (b) how to interpret the codes used there.

* Location (city & country) of each site is shown exactly as in the first line of the corresponding entry in the MASTER INFORMATION LISTING (or MIL). For each site, there is one line of print for every distinct contribution to the history of the instrument (such as recasting or expansion), with the newest shown first. On lines after the first, dittos ("") are used for the location.

* The bells are specified by a bourdon code number, a chromatics letter, and the total number of bells.

* Bourdon code number, pitch and approximate weight:

1=C	18500kg	13=C	2300kg	25=C	270kg	37=C	54kg
2=C#	16500kg	14=C#	1900kg	26=C#	230kg	38=C#	50kg
3=D	14000kg	15=D	1600kg	27=D	190kg	39=D	46kg
4=D#	12000kg	16=D#	1300kg	28=D#	160kg	40=D#	41kg
5=E	9500kg	17=E	1100kg	29=E	135kg	41=E	36kg
6=F	7700kg	18=F	900kg	30=F	110kg	etc.	
7=F#	6400kg	19=F#	770kg	31=F#	100kg		
8=G	5500kg	20=G	640kg	32=G	90kg		
9=G#	4600kg	21=G#	540kg	33=G#	80kg		
10=A	3850kg	22=A	450kg	34=A	70kg		
11=A#	3200kg	23=A#	385kg	35=A#	64kg	99=unknown	
12=B	2700kg	24=B	320kg	36=B	59kg		

* (For other interpretations, see section on weights.)

* NOTE: If the bourdon code number is followed by +, then there is another bell which is heavier (by more than a whole tone) than that identified as the bourdon. This bell (the sub-bourdon) is included in the total number of bells. It is possible to have more than one sub-bourdon.

* Chromatics letter:

* Z-W for carillons (and some chimes):

- * Z = completely chromatic
- * Y = lowest semitone omitted
- * X = lowest 2 semitones omitted
- * W = lowest 3 semitones omitted

* H-M for chimes:

- * H = diatonic scale only
- * I = diatonic scale plus one semitone
- * J = diatonic scale plus two semitones (et cetera; see Note on page 3 of this section)

* *,- for both carillons and chimes:

- * * = other arrangement (see Remarks for site in MIL)
- * - = unknown arrangement

* Number of bells is self-explanatory.

* 99 = unknown, but reportedly a carillon.
(Chimes of unknown size are listed as 8 bells, with "*" chromatics letter and a Remark in the MIL for the site.)

* The console description section is divided by the virgule (/) into manual and pedal subsections. In each subsection is shown the lowest and highest note of the respective keyboard. This does not include any extra bass bells (as above), whose keyboard note is shown in parentheses at the left of the appropriate subsection. If the manual keyboard does not include all bells, then the number of notes on the keyboard is shown to the right of the keyboard range. The pedal range is assumed to be at least one octave but not two or more octaves, unless the number of pedal notes is given to the right of the range. All semitones are indicated as sharps (#), as in the table at left, because there is no "flat" character on standard computer printers. The word "NONE" appears where there is no keyboard (manual and/or pedal, as appropriate). On rings of bells hung primarily for change-ringing, the word "ROPE" appears in place of NONE in the manual subsection.

* Examples:

* 20X23:CC/CC describes a carillon having

- * - 23 bells, two octaves without the lowest two semitones;
- * - manual = 2 octaves (23 notes) C to C without low C# & D#;
- * - pedal = one octave (11 notes) C to C without low C# & D#;
- * - bourdon note G (code 20), approximately 640 kilograms (about 1400 pounds) weight, connected to keyboard C.
- * - Thus the instrument transposes a fifth up from concert pitch (7 semitones).

* 10+Y51:CC49/(G)A#A24 describes a carillon having

- * - 51 bells, covering over four octaves, missing one semitone above the bourdon but having also a sub-bourdon;
- * - manual keyboard of 4 octaves (49 notes), ranging from C to C and fully chromatic;
- * - pedal keyboard of over 2 octaves (24 notes), covering G-A#-C-chromatic-to-A;
- * - specified bourdon note A (code 10), approximately 3850 kilograms (about 8500 pounds) weight, connected to pedal A# key but not to the manual.
- * - Thus this carillon transposes one half-tone down from concert pitch (-1 semitone).
- * - Since the sub-bourdon is connected to pedal note G, it must therefore sound note F# and weigh about 6400 kilograms (about 14000 pounds).

* continued...

*
* In the following paragraphs, the "COLUMN" numbers listed
* in the code group headings refer to the numbers in the
* sub-heading line on each CIL page. In those columns,
* blanks usually represent "unknown" but may indicate
* "not applicable"; this is usually obvious from context.
*
* Principal playing mechanism (COLUMN 1):
* B = mechanical (baton) keyboard (and pedalboard)
* C = chimestand (pump-handle keyboard; usually no pedals)
* c = none (a collection, not an instrument)
* E = electric automatic
* I = independent electric keyboard (piano style)
* L = Ellacombe stand, or other taut-rope claviers
* M = mechanical automatic (drum)
* n = no current workable playing mechanism (bells remain)
* N = none (instrument no longer exists)
* O = electric operation from organ keyboard
* R = rope and wheel (full-circle, for change-ringing)
* S = swung individually by electric motor
* V = rope and wheel (full-circle, Veronese system)
* W = rope and wheel (swing-chiming only)
* * = other (see Remarks for site in MIL)
* - = not applicable (e.g., partial phase of installation)
* (See also COLUMN 10.)
*
* Bellfounders (COLUMN 2):
* A = van Aerschodt
* B = Bollée b = Bigelow
* C = Schilling (Apolda & Heidelberg)
* c = Causard
* D = van den Gheyn d = Deagan (tubular)
* E = Eijsbouts e = Meeks, Watson & Co.
* F = Petit and Fritsen
* G = Gillett and Johnston
* H = Hemony h = Hooper/Blake
* I = Michiels
* j = Jones
* M = Meneely (West Troy/Watervliet)
* m = Meneely (Troy)
*
* N = McShane
* O = Olsen (Nauen)
* P = Paccard p = Perner
* R = Rincker r = Rüttschi
* S = Sergeys
* T = Taylor
*
* u = U.S.Tubular
* V = van Bergen (Heiligerlee & Greenwood)
* W = Whitechapel (& its predecessors)
* w = Warner
* X = Michaux Y = Wauthy
* Z = Bergholtz z = Vanduzen
* \$ = Bochumer Stahlverein (steel bells)
* + = multiple makers, no one of which predominates
* (most often used for collections)
*
* COLUMN 2 continues ...

...COLUMN 2 continues:
* % = Porzelleinfabrik Meissen (porcelain bells)
* * = other conventional (see Remarks for site in MIL)
* | = other/unknown tubular (see Remarks for site in MIL)
*
NOTE: In the last section of this book may be found an
* expanded list of bellfounders giving full names, locations,
* periods of work, and other information.
*
Extent of founder's contribution (COLUMN 3):
* C = complete instrument (possibly in several installments)
* E = extended to present range
* F = foundation of later-extended instrument
* I = intermediate extension
* K = new keyboard of different range
* R = recast (or replaced) without extending range
* T = retuned (without recasting)
* x = removal of bells previously in use (after * in Column 2;
* used when an instrument is downgraded, not improved)
* * = a mixture of founders, no one of which made a complete
* instrument at this site; see Remarks for site in MIL.
*
NOTE: Codes E and I may include recasting of older bells.
* Then the total added and recast will be shown in
* Column 4 (see below), and will be greater than the
* increase in the size of the instrument.
*
*
Remainder (COLUMN 4):
* Number of bells by this maker remaining or included
* -U = unknown number removed or excluded
* #-# = number excluded (usually after C in Column 3)
*
*
Year installed (COLUMN 5): self-explanatory
* (NOTE: If the year the bells were cast is not the same as
* the year of installation, or the preceding year, then a
* Remark appears in the M.I.L.)
*
*
Practice console (COLUMN 6):
* D = different from carillon console
* I = identical to carillon console
* N = none
* S = simulator for one or more bells of a ring
* Y = yes, but type is unknown
*
*
Source and date of latest information (COLUMN 7):
* Last 2 digits of year, followed by a letter -
* b = British Carillon Society Newsletter
* B = "Bulletin of the G.C.N.A."
* C = personal communication to the author
* D = "Directory" of North American carillons, G.C.N.A.
* F = Frank Della Penna
* H = published lists of Leen 't Hart
*
*
*
COLUMN 7 continues ...

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*****
* ..COLUMN 7 continues:
* J = Rinus de Jong
* K = "Klok en Klepel" (magazine of the N.K.V.)
* k = Keating, "Bells in Australia", 1979
* L = Lefevere, "Bells over Belgium" (3d ed), 1953
* M = manufacturer (bellfounder or installer)
* N = "The Clapper" (NAGCR newsletter; also annual report)
* O = Peace Tower Summer Program booklet, Ottawa
* P = Price, "Campanology Europe, 1945-47"
* Q = questionnaire of the GCNA Committee on Tower and
*   Carillon Statistics
* R = newsletter of the GCNA
*   (originally "Randschriften", now "Carillon News")
* T = "De Zingende Toren van Nederland"
* V = Dove, "A Bellringer's Guide..."
*   (8th ed., 1994; 7th ed., 1988; 6th ed., 1982)
* W = "The Ringing World" (weekly news magazine)
* Z = personal visit by the author
*
* Heights above ground, in meters (COLUMNS 8):
* a...base of console (or ringing room);
*   * if not in tower--see REMARKS for site in MIL
* 0 indicates ground floor
* b...lowest level of bells
* c...highest level of bells
*
* Percent of bellchamber walls open (COLUMN 9):
* 99 = exposed frame, no walls
* * = variable sound control
*
* Additional playing mechanisms (COLUMN 10):
* Codes as for COLUMN 1, plus the following---
* F = flywheel (Spanish style) full-circle free swinging
* H = hour struck by clock
* Q = quarters and hour struck by clock
* T = tolling hammer with rope
* n (before another code) = that mechanism is or was
*   installed, but is not operable now (notice lower case)
* a number after a code = the number of bells thus sounded
*
* Transposition (COLUMN 11):
* nn = transpose upward "nn" halftones (light bells)
* 0 = in concert pitch
* -nn = transpose downward "nn" halftones (heavy bells)
* 12 = one octave above concert pitch
* 24 = two octaves above concert pitch
* 9x (or blank) = indeterminate for some reason
*
*****

```

```

*****
*
* Site type (COLUMN 12):
* B = business
* C = church or seminary
* E = estate or foundation
* M = monument or memorial structure
* P = public building
* U = university, college or school
*
* Denominational affiliation - original (COLUMN 13):
* (specific branches within a major denomination may be
*   indicated by initials in parentheses in the MIL)
* A = Anglican/Episcopal
* B = Baptist
*   ABC = American Baptist Churches
*   SBC = Southern Baptist Convention
* C = Roman Catholic (including national sections)
* L = Lutheran
*   ELCA = Evangelical Lutheran Church in America
*   ELCC = Evangelical Lutheran Church in Canada
*   LCMS = Lutheran Church/Missouri Synod
*   WELS = Wisconsin Evangelical Lutheran Synod
* M = Methodist (United Methodist)
* N = Non-denominational (general Protestant)
* O = Orthodox Catholic (all nationalities)
* P = Presbyterian/Reformed
*   PCUSA = Presbyterian Church USA [United Presbyterian]
* S = Christian Science
* U = United Church of Christ/Congregational/
*   United Church of Canada
* * = other (see Remarks under MIL)
* - = none
*
* Latitude (Lat) and longitude (Long) are given in degrees
* and minutes, east longitude and south latitude negative.
* These values often represent only the general location of
* the city and not the exact location of the instrument.
*
* -----
*
* NOTE: For chromatics letters indicating added semitones in
* chimes (I,J,K), the placement of such notes is indicated in
* the MIL Remarks block for the site when known. It may be
* shown as a specific note, or as an interval relative to the
* bass (for chimes) or treble (for rings). Thus an F# added to
* a C scale would be the sharp 4th of a chime (of any size) but
* the flat 4th of a ring of 8 or the flat 6th of a ring of 10.
*
*
* continued...
*****

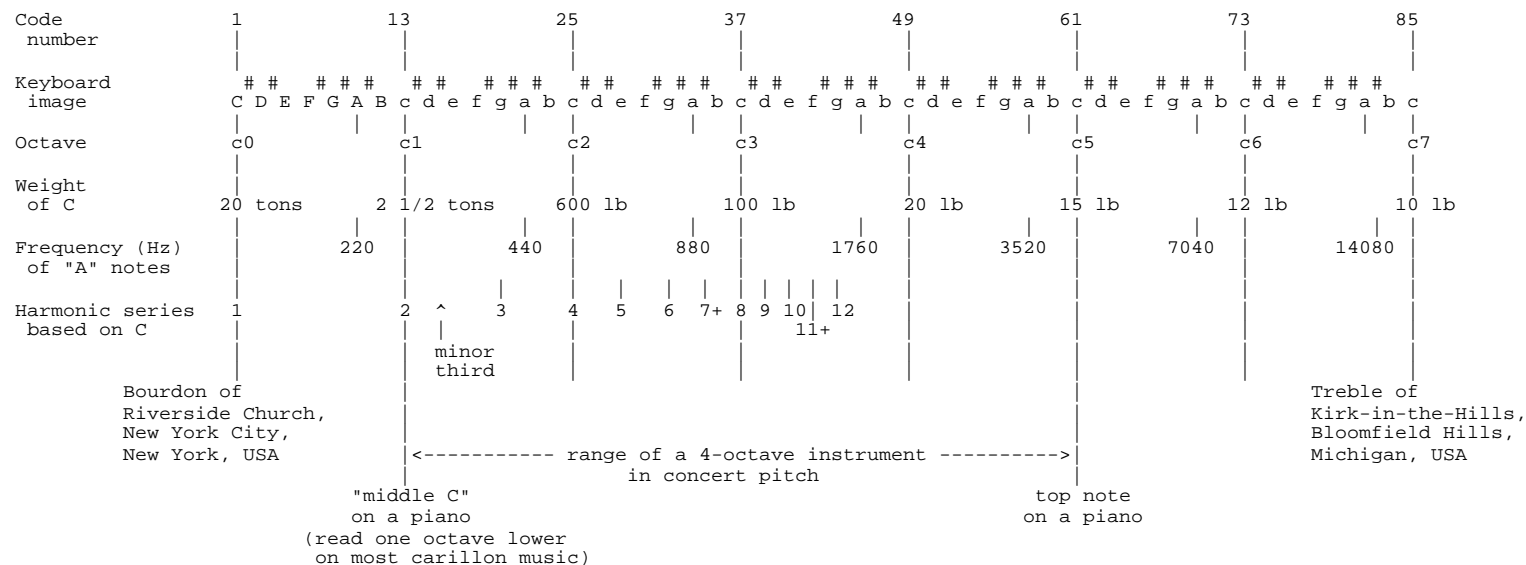
```



```
*****
*
*           EXPLANATION OF "BOURDON CODE NUMBER"
*
* A bourdon code number is used to give a general indication
* of the weight of a tower bell instrument by reflecting the
* approximate pitch or note of the heaviest bell in it.
*
* The code table in the left column of page 1 of the Code
* Interpretation section shows the relationship between code
* numbers and notes using approximate bell weights in kilo-
* grams. The following tables show other ways of looking at
* the bourdon code numbers.
*
* Bourdon code number versus international pitch notation:
* 1=c          13=c'          25=c"
* 2=c#/d-flat  14=c#'/d-flat'   26=c#"/d-flat"
* 3=d          15=d'          27=d"
* 4=d#/e-flat  16=d#'/e-flat'   28=d#"/e-flat"
* 5=e          17=e'          29=e"
* 6=f          18=f'          30=f"
* 7=f#/g-flat  19=f#'/g-flat'   31=f#"/g-flat"
* 8=g          20=g'          32=g"
* 9=g#/a-flat  21=g#'/a-flat'   33=g#"/a-flat"
* 10=a         22=a'          34=a"
* 11=a#/b-flat 23=a#'/b-flat'   ...
* 12=b         24=b'          etc.
*
* Bourdon code number versus European pitch notation:
* 1= c0        13= c1        25= c2
* 2= cis0/des0 14= cis1/des1 26= cis2/des2
* 3= d0         15= d1         27= d2
* 4= dis0/es0  16= dis1/es1  28= dis2/es2
* 5= e0         17= e1         29= e2
* 6= f0         18= f1         30= f2
* 7= fis0/ges0 19= fis1/ges1 31= fis2/ges2
* 8= g0         20= g1         32= g2
* 9= gis0/as0  21= gis1/as1  33= gis2/as2
* 10= a0        22= a1         34= a2
* 11= ais0/bes0 23= ais1/bes1  ...
* 12= b0        24= b1         etc.
*
* Bourdon code number versus approximate weight in pounds:
* 1=C 42000 lb  13=C 5000 lb  25=C 600 lb
* 2=C# 36000 lb 14=C# 4200 lb 26=C# 500 lb
* 3=D 31000 lb  15=D 3500 lb  27=D 420 lb
* 4=D# 26000 lb 16=D# 2900 lb  28=D# 350 lb
* 5=E 21000 lb  17=E 2400 lb  29=E 300 lb
* 6=F 17000 lb  18=F 2000 lb  30=F 250 lb
* 7=F# 14000 lb 19=F# 1700 lb 31=F# 225 lb
* 8=G 12000 lb  20=G 1400 lb  32=G 200 lb
* 9=G# 10000 lb 21=G# 1200 lb 33=G# 175 lb
* 10=A 8500 lb  22=A 1000 lb 34=A 155 lb
* 11=A# 7000 lb 23=A# 850 lb  ...
* 12=B 5900 lb  24=B 700 lb  etc.
*****
```

```
*****
*
* This method of numbering the bell notes permits a two-digit
* number to reflect the entire range of practical tower bell
* weights. Using any other method would take 3 to 5 digits or
* characters.
*
* A difference of 12 in code numbers always reflects a change
* of one octave in pitch. Code "13" is "middle C", so a tower
* bell instrument which has a C key connected to a bell of
* this pitch and weight is in concert pitch.
*
* Code number "1" corresponds to the bourdon of the carillon
* in Riverside Church, New York--the heaviest bell now in any
* carillon in the world, and unlikely to be surpassed. The
* few heavier tower bells which exist are either isolated
* (as in Asian temples) or are used in ways which do not
* correspond to the musical scale (as in Russian zvons).
* Isolated bells of more than a few tons are listed in plain
* language in the MIL under "Great Bells", and the enormous
* bells in a few zvons are handled by the "+" mark described
* on page 1 of the Code Interpretation section.
*
* On page 2 of this section is a diagram showing graphically
* some of the relationships which have been presented in
* tables and plain language above.
*
* The correspondence between weight and pitch is not exact.
* The weights of bass bells of the same pitch can vary by as
* much as 10%, and trebles by as much as 50%, depending on the
* profiles used by the bellfounder. In this book, pitch is
* more important than exact weight in determining the bourdon
* code number to use in the CIL.
*
* Weights given in the last table in the opposite column and
* in the similar table on page 1 of the Code Interpretation
* section are NOT equivalent, and should not be treated as
* such. They are simply round numbers chosen to show a general
* characteristic. For conversions among weight systems, see
* the tables and procedures on pages 3-7 of this section. They
* show the relationships among the metric (SI), American and
* British systems to varying degrees of accuracy.
*
* The difference between accuracy and precision often causes
* confusion in the reporting of bell weights. Accuracy refers
* to the number of significant digits in a number; precision
* refers to the value of the least digit used. If a weight is
* reported as 40,000 lbs, the precision is 1 pound (the unit of
* the rightmost zero), but the accuracy may be only 1 ton. If
* that is the case, then it is less misleading to report the
* weight as 20 short tons. When integer fractions are used
* (such as 1/2) there is often less confusion between accuracy
* and precision.
*
* For further information, see under "Weights and Measures" in
* the Encyclopedia Britannica.
*****
```

Diagram of the relationship among different methods of indicating bell size/weight/pitch



Ton weights in the lower octave are in short tons.

Frequencies shown represent the "strike tone" of the bell (see Glossary). A lower frequency, the "hum tone", develops later.

The octave numbering system used above corresponds to the range of tuned tower bells, and differs slightly from other commonly used systems. For example, piano tuners designate the top C of a piano as "c8". Some piano players and composers use a "small/great" system in which the top note of a piano is c5, middle C is c1, next lower is "small c", then "great C", then "contra C", down to "sub-contra A".

The code numbering scheme is a free adaptation of one originally developed by carillon architect Frederick C. Mayer. That may be found in "Carillon Music & Singing Towers of the Old World and the New," by William Gorham Rice, Revised edition, following page 278c. The principal difference lies in the separation of two items of information which Mayer combined into one, namely the bourdon pitch and the number of missing bass semitones.

* The three tables on the following page relate weights in kilograms (abbreviated "kg") and those in pounds (abbreviated "lb"). They are designed mainly to convert kilograms to pounds, but can be used for the opposite conversion also.

* o To convert from kilograms to pounds, first drop (or round) any fractional part. Then separate the value into thousands, hundreds, tens and units portions. (Example: 815 = 800 + 10 + 5)

* Next, read down the left column to find the row for the most significant value. This may be in the first, second or third table, depending on the magnitude. (Using the example above, 800 is the 8th row of the second table.)

* Then read across the top row of that table to find the column for the next lower value of kgs. (Using the same example, 10 heads the second column of the second table.)

* At the intersection of this column and row find the net lbs equivalent to the total number of kgs. (In the example, this is 1785.7 lb for 810 kg.)

* If you began in the first table, you are now done.

* If you began in the second table, and you had a non-zero units value, then use row 0 of the first table to find its equivalent. Add the two results together. (In the example, the leftover units are 5; in the first table, row 0 column 5 yields 11.0; adding the two values, 1785.7 + 11.0 = 1796.7 lb. You might wish to round this to 1797 pounds; for some purposes you might instead choose to use either 1795 or 1800 pounds.)

* If you began in the third table, you will have both tens and units values remaining. If either is non-zero, then use these two in the first table in a similar way. (Example: 2815 = 2000 + 800 + 10 + 5; from the third table, 2000 and 800 yield 6173; from the first table, 10 and 5 yield 33.1; then 6173 + 33 = 6206, so 2815 kg = 6206 lb.)

* o To convert kilograms to pounds mentally, multiply by 2 and add 10%. These two steps can be done in either order, and are easiest to do with round numbers. Accuracy is between two and three digits. (Example: for 300 kg, 2 x 300 = 600; 10% of 600 is 60; 600 + 60 = 660; so 300 kg = 660 lb.)

* o If using a calculator, use 2.20462 as the multiplier to preserve up to 6 digits of accuracy.

Abbreviation style: Here "s" is used with "kg" or "lb" only for plurals in plain text, not with numeric values.

* o To convert from pounds to kilograms, look in the table bodies for your starting number, or for a pair of numbers which bracket your starting number. Notice that numbers in the tables increase from left to right across each row, and that the right end of one row is less than the left end of the next one. (Example: 4700 pounds lies between 4630 and 4850 in the second row of the third table.)

If you are in the first table, pick the value which is closest to your starting value; if you are in the second or third table, pick the largest number which is below the starting value. (Example, continued: pick 4630)

Add together the kg values at the left end of the row and the top of the column for the number you found. (Example, continued: 2000 + 100 = 2100)

If you started in the first table, you are finished. If you started in the second or third table, then subtract the value you found in the table from your starting value, use the same process to look up the remainder in the first table, and add the results together. (Example, continued: 4700 - 4630 = 70, which lies between 68.3 and 70.5 in the fourth row of the first table. Since 70 is closer to 70.5 than to 68.3, pick 70.5; then the row and column values are 30 and 2. 30 + 2 = 32; 2100 + 32 = 2132; so 4700 lb = 2132 kg, which could be rounded to 2130 kg.)

NOTE: Tables are accurate and precise to the last digit shown. Accuracy of your result will be no greater than the accuracy of the figure with which you began.

* o To convert pounds to kilograms mentally, divide by 2, subtract 10%, and add back 1%. Accuracy is between two and three digits. (Example: given 1800 lb, 1800 ? 2 = 900; 900 - 90 + 9 = 819; so 1800 lbs = 819 kg, which could be rounded to 820 kg.)

* o If using a calculator, use 0.453592 as the multiplier to preserve up to 6 digits of accuracy.

```

*****
*
* Kilograms to pounds avoirdupois
*
*
*   \kg:      0      1      2      3      4      5      6      7      8      9
*   kg \      =====
*   0         0.0     2.2     4.4     6.6     8.8     11.0    13.2    15.4    17.6    19.8
*   10        22.0    24.3    26.5    28.7    30.9    33.1    35.3    37.5    39.7    41.9
*   20        44.1    46.3    48.5    50.7    52.9    55.1    57.3    59.5    61.7    63.9
*   30        66.1    68.3    70.5    72.8    75.0    77.2    79.4    81.6    83.8    86.0
*   40        88.2    90.4    92.6    94.8    97.0    99.2    101.4   103.6   105.8   108.0
*   50       110.2   112.4   114.6   116.8   119.0   121.3   123.5   125.7   127.9   130.1
*   60       132.3   134.5   136.7   138.9   141.1   143.3   145.5   147.7   149.9   152.1
*   70       154.3   156.5   158.7   160.9   163.1   165.3   167.6   169.8   172.0   174.2
*   80       176.4   178.6   180.8   183.0   185.2   187.4   189.6   191.8   194.0   196.2
*   90       198.4   200.6   202.8   205.0   207.2   209.4   211.6   213.8   216.1   218.3
*   100      220.5   222.7   224.9   227.1   229.3   231.5   233.7   235.9   238.1   240.3
*
*
*   \kg:      0      10     20     30     40     50     60     70     80     90
*   kg \      =====
*   100      220.5   242.5   264.6   286.6   308.6   330.7   352.7   374.8   396.8   418.9
*   200      440.9   463.0   485.0   507.1   529.1   551.2   573.2   595.2   617.3   639.3
*   300      661.4   683.4   705.5   727.5   749.6   771.6   793.7   815.7   837.8   859.8
*   400      881.8   903.9   925.9   948.0   970.0   992.1   1014.1  1036.2  1058.2  1080.3
*   500     1102.3   1124.4   1146.4   1168.4   1190.5   1212.5   1234.6   1256.6   1278.7   1300.7
*   600     1322.8   1344.8   1366.9   1388.9   1411.0   1433.0   1455.0   1477.1   1499.1   1521.2
*   700     1543.2   1565.3   1587.3   1609.4   1631.4   1653.5   1675.5   1697.6   1719.6   1741.6
*   800     1763.7   1785.7   1807.8   1829.8   1851.9   1873.9   1896.0   1918.0   1940.1   1962.1
*   900     1984.2   2006.2   2028.3   2050.3   2072.3   2094.4   2116.4   2138.5   2160.5   2182.6
*   1000    2204.6   2226.7   2248.7   2270.8   2292.8   2314.9   2336.9   2358.9   2381.0   2403.0
*
*
*   \kg:      0*     100     200     300     400     500     600     700     800     900
*   kg \      =====
*   1000      2205    2425    2646    2866    3086    3307    3527    3748    3968    4189
*   2000      4409    4630    4850    5071    5291    5512    5732    5952    6173    6393
*   3000      6614    6834    7055    7275    7496    7716    7937    8157    8378    8598
*   4000      8818    9039    9259    9480    9700    9921    10141   10362   10582   10803
*   5000     11023   11244   11464   11684   11905   12125   12346   12566   12787   13007
*   6000     13228   13448   13669   13889   14110   14330   14550   14771   14991   15212
*   7000     15432   15653   15873   16094   16314   16535   16755   16976   17196   17416
*   8000     17637   17857   18078   18298   18519   18739   18960   19180   19401   19621
*   9000     19842   20062   20283   20503   20723   20944   21164   21385   21605   21826
*   10000    22046   22267   22487   22708   22928   23149   23369   23589   23810   24030
*   11000    24251   24471   24692   24912   25133   25353   25574   25794   26015   26235
*   12000    26455   26676   26896   27117   27337   27558   27778   27999   28219   28440
*   13000    28660   28881   29101   29321   29542   29762   29983   30203   30424   30644
*   14000    30865   31085   31306   31526   31747   31967   32187   32408   32628   32849
*   15000    33069   33290   33510   33731   33951   34172   34392   34613   34833   35053
*   16000    35274   35494   35715   35935   36156   36376   36597   36817   37038   37258
*   17000    37479   37699   37919   38140   38360   38581   38801   39022   39242   39463
*   18000    39683   39904   40124   40345   40565   40785   41006   41226   41447   41667
*   19000    41888   42108   42329   42549   42770   42990   43211   43431   43651   43872
*   20000    44092   44313   44533   44754   44974   45195   45415   45636   45856   46077
*
*
*   (see
*   page 6)
*
*
*****

```

* The tables in the opposite column and on the following page relate British and American methods of counting weight. In both methods, the unit of weight is the avoirdupois pound, which is abbreviated "lb" (singular) or "lbs" (plural). The difference between the methods lies in the way that pounds are counted.

* The British method, which is the standard used for change-ringing bells, is based on the [long] hundredweight, which is 112 lbs. It is abbreviated "cwt" whether singular or plural.

- * o One fourth of a hundredweight is a quarter. It is abbreviated "qtr" or "qr" (singular) or "qrs" (plural).
- * o Twenty cwt is a ton (not abbreviated).

(Another British counter, the stone, is one-eighth cwt, or 14 lbs; it is commonly used for weighing people, but not bells.)

When any one of these counters is used by itself, its abbreviation is written with the number (for example, 7 cwt). When a weight is expressed to the nearest qtr, the standard fractions are used. (Examples: 2 1/2 cwt; 3 tons 7 1/2 cwt). However, when a weight is expressed to the nearest pound, no abbreviations are used; instead, the numbers are separated by dashes in the order cwt-qtr-lbs or tons-cwt-qtr-lbs. For example, 17-3-12 represents 2000 lbs.

Using the table at right:

- * o To convert from British to American, read down the left column to find the row for the number of cwt, then read across the top row to find the column for the number of qtrs. At the intersection of this column and row find the net pounds equivalent to cwt-qtr; then add the remaining lbs to find the total. For example, a British weight of 1-2-3 is equal to an American weight of 171 pounds. (In row 1, column 2 yields 168; add 3 to obtain 171.)
- * o To convert from American to British, search the body of the table for the largest number which does not exceed the American weight given. The number at the left end of that row is the cwts, and the number at the top of that column is the qtrs. The difference between the number given and the number found is the lbs.

For example, an American weight of 123 lbs is 1-0-11 in the British method of counting. (The closest number in the table body is 112, which is in row 1, column 0; then 123 minus 112 equals 11.)

British (cwt-qtr) to net pounds (up to 2 tons)

\qtr:	0	1	2	3	
cwt \	====	====	====	====	
0	0	28	56	84	
1	112	140	168	196	
2	224	252	280	308	
3	336	364	392	420	
4	448	476	504	532	
5	560	588	616	644	
6	672	700	728	756	
7	784	812	840	868	
8	896	924	952	980	
9	1008	1036	1064	1092	
10	1120	1148	1176	1204	
11	1232	1260	1288	1316	
12	1344	1372	1400	1428	
13	1456	1484	1512	1540	
14	1568	1596	1624	1652	
15	1680	1708	1736	1764	
16	1792	1820	1848	1876	
17	1904	1932	1960	1988	
18	2016	2044	2072	2100	
19	2128	2156	2184	2212	
20	2240*	2268	2296	2324	* 1 British
21	2352	2380	2408	2436	ton
22	2464	2492	2520	2548	
23	2576	2604	2632	2660	
24	2688	2716	2744	2772	
25	2800	2828	2856	2884	
26	2912	2940	2968	2996	
27	3024	3052	3080	3108	
28	3136	3164	3192	3220	
29	3248	3276	3304	3332	
30	3360	3388	3416	3444	
31	3472	3500	3528	3556	
32	3584	3612	3640	3668	
33	3696	3724	3752	3780	
34	3808	3836	3864	3892	
35	3920	3948	3976	4004	
36	4032	4060	4088	4116	
37	4144	4172	4200	4228	
38	4256	4284	4312	4340	
39	4368	4396	4424	4452	
40	4480*	4508	4536	4564	* 2 British

Imperial
tons

For weights exceeding this table, see next page.

British Imperial units:
 ton = 20 cwt (2240 lb)
 cwt = hundredweight (112 lb)
 qtr = quarter (28 lb)
 lbs = pounds

```

*****
*
* British (cwt) to net pounds
*
*
*  \cwt:    0      1      2      3      4      5      6      7      8      9      British tons
*  cwt \  =====
*  40  4480  4592  4704  4816  4928  5040  5152  5264  5376  5488  2
*  50  5600  5712  5824  5936  6048  6160  6272  6384  6496  6608  2 1/2
*  60  6720  6832  6944  7056  7168  7280  7392  7504  7616  7728  3
*  70  7840  7952  8064  8176  8288  8400  8512  8624  8736  8848  3 1/2
*  80  8960  9072  9184  9296  9408  9520  9632  9744  9856  9968  4
*  90 10080 10192 10304 10416 10528 10640 10752 10864 10976 11088 4 1/2
* 100 11200 11312 11424 11536 11648 11760 11872 11984 12096 12208 5
* 110 12320 12432 12544 12656 12768 12880 12992 13104 13216 13328 5 1/2
* 120 13440 13552 13664 13776 13888 14000 14112 14224 14336 14448 6
* 130 14560 14672 14784 14896 15008 15120 15232 15344 15456 15568 6 1/2
* 140 15680 15792 15904 16016 16128 16240 16352 16464 16576 16688 7
* 150 16800 16912 17024 17136 17248 17360 17472 17584 17696 17808 7 1/2
* 160 17920 18032 18144 18256 18368 18480 18592 18704 18816 18928 8
* 170 19040 19152 19264 19376 19488 19600 19712 19824 19936 20048 8 1/2
* 180 20160 20272 20384 20496 20608 20720 20832 20944 21056 21168 9
* 190 21280 21392 21504 21616 21728 21840 21952 22064 22176 22288 9 1/2
* 200 22400* 22512 22624 22736 22848 22960 23072 23184 23296 23408 10
* 210 23520 23632 23744 23856 23968 24080 24192 24304 24416 24528 10 1/2
* 220 24640 24752 24864 24976 25088 25200 25312 25424 25536 25648 11
* 230 25760 25872 25984 26096 26208 26320 26432 26544 26656 26768 11 1/2
* 240 26880 26992 27104 27216 27328 27440 27552 27664 27776 27888 12
* 250 28000 28112 28224 28336 28448 28560 28672 28784 28896 29008 12 1/2
* 260 29120 29232 29344 29456 29568 29680 29792 29904 30016 30128 13
* 270 30240 30352 30464 30576 30688 30800 30912 31024 31136 31248 13 1/2
* 280 31360 31472 31584 31696 31808 31920 32032 32144 32256 32368 14
* 290 32480 32592 32704 32816 32928 33040 33152 33264 33376 33488 14 1/2
* 300 33600 33712 33824 33936 34048 34160 34272 34384 34496 34608 15
* 310 34720 34832 34944 35056 35168 35280 35392 35504 35616 35728 15 1/2
* 320 35840 35952 36064 36176 36288 36400 36512 36624 36736 36848 16
* 330 36960 37072 37184 37296 37408 37520 37632 37744 37856 37968 16 1/2
* 340 38080 38192 38304 38416 38528 38640 38752 38864 38976 39088 17
* 350 39200 39312 39424 39536 39648 39760 39872 39984 40096 40208 17 1/2
* 360 40320 40432 40544 40656 40768 40880 40992 41104 41216 41328 18
* 370 41440 41552 41664 41776 41888 42000 42112 42224 42336 42448 18 1/2
* 380 42560 42672 42784 42896 43008 43120 43232 43344 43456 43568 19
* 390 43680 43792 43904 44016 44128 44240 44352 44464 44576 44688 19 1/2
* 400 44800* 44912 45024 45136 45248 45360 45472 45584 45696 45808 20
*
* -----
*
* TONS & TONNES:
*
* 2000 lbs = 1 American [short] ton
*
* 2205 lbs = 1000 kg = 1 metric ton = 1 tonne
*
* 2240 lbs = 1 American long ton (shipping ton)
*
* 2240 lbs = 1 British Imperial ton
*
*
*
*
*
*

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- \
 --- > Note that these three kinds of "ton"
 - /
 differ by less than 2%.

* The tables in the opposite column relate British and metric methods of measuring weight, both of which have been introduced above in relationship to pounds avoirdupois.

*
 * o To convert from British to metric, first read down the left column of the large table to find the row for the number of cwts, then read across the top row of the same table to find the column for the number of qtrs. At the intersection of this row and column find the kgs equivalent to cwt-qtr. Next, use the small table to find the kgs equivalent to the lbs. Finally, add the two results together.

* Example: given a British weight of 1-2-3,
 * in row 1, column 2 of the large table find 76.2;
 * in the small table find 1.4 opposite 3 lb;
 * 76.2 + 1.4 = 77.6 kg total. This would probably be rounded to 78 kg.

*
 * o To convert from metric to British, search the body of the large table for the largest number which does not exceed the metric weight given. The number at the left end of that row is the cwts, and the number at the top of that column is the qtrs. Subtract the number found in the table from the starting number; then find this remainder (or nearest value) in the second column of the small table and read the lbs equivalent from the first column of that table.

* Example: given a metric weight of 255 kg,
 * in row 5 of the large table, 255 lies between 254.0 and 266.7; row 5 represents 5 cwt, and column 0 represents 0 qtr.
 * Subtracting 254.0 from 255 gives 1.0; in the small table, this is closer to 0.9 than to 1.4, so use 2 lb.
 * Then 255 kg = 5-0-2 (or 5 cwt 2 lbs) in British terminology.

British (cwt-qtr-lbs) to kilograms (kgs)

cwt \ qrs:					lb \ kg
	0	1	2	3	
0	0.0	12.7	25.4	38.1	0 0.0
1	50.8	63.5	76.2	88.9	1 0.5
2	101.6	114.3	127.0	139.7	2 0.9
3	152.4	165.1	177.8	190.5	3 1.4
4	203.2	215.9	228.6	241.3	4 1.8
5	254.0	266.7	279.4	292.1	5 2.3
6	304.8	317.5	330.2	342.9	6 2.7
7	355.6	368.3	381.0	393.7	7 3.2
8	406.4	419.1	431.8	444.5	8 3.6
9	457.2	469.9	482.6	495.3	9 4.1
10	508.0	520.7	533.4	546.1	10 4.5
11	558.8	571.5	584.2	596.9	11 5.0
12	609.6	622.3	635.0	647.7	12 5.5
13	660.4	673.1	685.8	698.5	13 5.9
14	711.2	723.9	736.6	749.3	14 6.4
15	762.0	774.7	787.4	800.1	15 6.8
16	812.8	825.5	838.2	850.9	16 7.3
17	863.6	876.3	889.0	901.7	17 7.7
18	914.4	927.1	939.8	952.5	18 8.2
19	965.2	977.9	990.6	1003.3	19 8.6
20	1016.0	1028.7	1041.4	1054.1	20 9.1
21	1066.8	1079.5	1092.2	1105.0	21 9.5
22	1117.7	1130.4	1143.1	1155.8	22 10.0
23	1168.5	1181.2	1193.9	1206.6	23 10.5
24	1219.3	1232.0	1244.7	1257.4	24 10.9
25	1270.1	1282.8	1295.5	1308.2	25 11.4
26	1320.9	1333.6	1346.3	1359.0	26 11.8
27	1371.7	1384.4	1397.1	1409.8	27 12.3
28	1422.5	1435.2	1447.9	1460.6	28 12.7
29	1473.3	1486.0	1498.7	1511.4	
30	1524.1	1536.8	1549.5	1562.2	
31	1574.9	1587.6	1600.3	1613.0	
32	1625.7	1638.4	1651.1	1663.8	
33	1676.5	1689.2	1701.9	1714.6	
34	1727.3	1740.0	1752.7	1765.4	
35	1778.1	1790.8	1803.5	1816.2	
36	1828.9	1841.6	1854.3	1867.0	
37	1879.7	1892.4	1905.1	1917.8	
38	1930.5	1943.2	1955.9	1968.6	
39	1981.3	1994.0	2006.7	2019.4	
40	2032.1	2044.8	2057.5	2070.2	

For weights exceeding this table, first convert to total pounds using the procedure on page 5 of this section; then convert pounds to kilograms using the procedure on page 3 of this section.

(END.)
