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Introduction

History

The first edition

In 1953, the Population Commission of the United Nations requested the preparation of a Multilingual Demographic Dictionary, a task in which the International Union for the Scientific Study of Population (IUSSP) offered to collaborate. In 1955, an ad hoc Committee under the chairmanship of P. Vincent of France was established to prepare the English, French and Spanish versions of the Dictionary. The Committee included as members: C.E. Dieulefais (Argentina), H.F. Dorn (United States), E. Grebenik (United Kingdom), P. Luzzato-Fegiz (Italy), M. Pascua (Switzerland) and J. Ros Jimeno (Spain). The French and English versions of the Dictionary were published in 1958 and the Spanish version in 1959. Versions in ten other languages appeared between that date and 1971.

The second edition

Because of the rapid development of demography and population studies during the 1960s, in 1969 the Population Commission recommended the updating of the Multilingual Demographic Dictionary, a task that was pursued once more in collaboration with IUSSP. A new Committee on International Demographic Terminology was set up under the chairmanship of P. Paillat (France) and started work in 1972 with financial support from the U.S. Bureau of the Census. Other members of the Committee were: A. Boyarski (USSR), E. Grebenik (United Kingdom), K. Mayer (Switzerland), J. Nadal (Spain) and S. Kono (Japan). The Committee submitted a revised draft to the consideration of a hundred or so demographic centres that provided comments. In 1976, Prof. Louis Henry was commissioned by IUSSP to edit the work and produce the second edition of the Dictionary in French. IUSSP then requested Prof. Etienne van de Walle to adapt and translate the French second edition into English.
The second edition in English was published in 1982. Eventually, the second edition would be issued in all official languages of the United Nations.

**From the second edition to Demopædia**

The series of Multilingual Demographic Dictionaries is one of the most enduring products in the history of demography and one of the most fruitful thanks to the work and engagement of scholars who have translated the original French or English versions into their own languages. As a result of those efforts, the international community can benefit today from access to 14 language versions of the second edition of the Demographic Dictionary, mainly thanks to the initiative undertaken by Nicolas Brouard in compiling the out-of-print versions of the Dictionaries in different languages and developing a Wiki-based presentation of all of them as a web-accessible Multilingual Demographic Dictionary. The United Nations Population Division, IUSSP and the Comité national français of the IUSSP have all supported this work in order to facilitate access to these valuable reference texts.

**Why on-line?**

Because the Demographic Dictionaries in various languages were conceived as tools to serve people in many countries, making them accessible via the Internet was thought mandatory. Today, thanks to the project led by Nicolas Brouard, standard demographic terminology and its meaning is only two clicks away for students, teachers, professors, researchers, government officials, journalists, non-governmental organizations and the public at large, all working in their own languages.

**Functionality**

Visitors to Demopædia can consult the different language modules, read them, or download and print them. All copyright owners have made this possible. Users can search for a demographic term, surf between linked terms and expressions, or switch to another language or edition. Because each Dictionary consists of thematic chapters, terms are located in context, providing not only a definition of each term but also an understanding of the subject matter for which a term is relevant. Each language module has a built-in index that facilitates navigation and cross-referencing. In addition, the Wiki platform provides powerful tools for further development. It is envisaged that the next stage of the project will allow specialists to post additions, revisions or corrections to the second edition.
What is next?

Demographic knowledge made huge advances since the last editions of the Dictionary have been published. There is a clear sense that the structure and texts need updating. Doing it in a traditional format of ‘live’ panels and working groups would be hardly feasible. Developing on-line a renewed edition of multilingual encyclopedic demographic dictionary should be efficient and will unleash the potential of wide cooperation of professionals. Demopædia will host this project.

Demopædia also has the potential to become a platform for sharing and building a wider knowledge base in demography and population studies. Our vision is an extensive and constantly evolving encyclopedia on population, serving the world community and benefiting from influxes of ideas and texts.

For an unified second edition of the dictionaries as an intermediate step

Since the training in Marrakech, a lot of work has been done to improve the quality of the scanned texts. Specific computer programs using parsers have cross check the texts of the first and second editions in about 12 to 13 languages in order to detect the missing text terms in one or another language.

The first analysis of this work reveals that the second edition is not as rigorous as the first was. The first edition was the result of the Commission on terminology during the mid 50’s, but the second was first revised in French in 1981 and translated and adapted to English in 1982 and in Spanish in 1985, German in 1987 etc. up to Czech in 2005.

Some terms, expressions and even complete paragraphs have not been translated into English, but in Spanish, Arabic, German etc.. And a few sentences and paragraphs have been added into the English second edition but never translated into the French second edition which was already published. Also the Spanish second edition added a few new text terms which are not translated into any other language but Arabic.

The German second edition (1987) defined a lot of more modern text terms which haven’t been translated in any other language.

Editions, published after 1987, did not add any new term and thus a natural limit is 1987 (German) but harmonization between the three languages of the IUSSP could be an important step.

In many language specific editions, the numbering of the text terms differed (even between French and English) most of times due to errors but sometimes because a text term was not translated. The advantage of the technical work is
to highlight the missing text terms in order to decide if the word is not used in this language or if it is an omission.
Preface

Preface of the first edition (1958)

At its fourth session the Population Commission of the United Nations requested the Secretary-General to include the preparation of a multilingual demographic dictionary in the Secretariat’s work programme. Several months later the International Union for the Scientific Study of Population, at its General Assembly in Geneva, offered to collaborate with the United Nations in this project and set up a sub-committee to prepare a plan of work. At the fifth session of the Population Commission the Secretary-General was asked to accept the Union’s offer, and the Dictionary Committee was given the task of drafting versions of the dictionary in English, French and Spanish.

The primary purpose of the dictionary is to serve as a useful tool for technical translation. It consists of separate sections, each of which presents in one language the technical terms used in demography; the text is followed by an alphabetical index of terms. The texts in, the various languages correspond to one another, and equivalent terms in different languages have the same reference number so that it is possible to identify them in the different volumes. The Committee entrusted with the task of preparing the three initial volumes consisted of:

- Paul E. Vincent (France) (Chairman and Rapporteur);
- Carlos E. Dieulefait (Argentina);
- Harold F. Dorn (U.S.A.);
- Eugene Grebenik (United Kingdom);
- Pierpaolo Luzzatto-Fegiz (Italy);
- Marcelino Pascua (Switzerland);
- Jose Ros Jimeno (Spain).

The first draft consisted of a basic French text which was prepared in the Institut national d’études demographiques in France under the general super-
vision of M. Vincent. This text was translated into English and Spanish by Messrs. Grebenik and Ros Jimeno respectively. The draft had to be completed somewhat hurriedly in view of the approach of the World Population Conference, at which participants received a provisional edition, dated June 1954, published by the United Nations. The dissemination of this provisional edition made it possible for a number of experts to comment critically on the draft and gave the Committee an opportunity to take account of the comments received. Some of the imperfections of the first draft were due to the fact that the basic text had been prepared in a single language only—French. It was clear that considerable differences existed between the terminologies in English and in the Romance languages, and that a compromise between different conceptions was essential. It was further realized that a mere list of equivalences was not sufficient but that definitions of terms would have to be included in the text, so that translators might have the opportunity of noting differences in usage between different languages. The Committee recommended accordingly and, the recommendation having been approved by the Union, Mr. Grebenik was requested to prepare a new text in English, making use of the basic French text. Mr. Grebenik’s new text was then revised in collaboration with M. Vincent, and a second draft produced in English and French, which was used by Sr. Ros Jimeno in preparing the Spanish version. The three drafts were then submitted for approval to the Dictionary Committee, the Council of the Union and a number of experts, with a view to producing a final edition.

In publishing the English, French and Spanish sections of the *Multilingual Demographic Dictionary* it is necessary to emphasize certain points. Firstly, the dictionary is the result of collaboration, not only between the three principal editors, but also on the part of all members of the Committee. The final version owes much to the recommendations made by a number of demographers who read various versions of the draft and commented on them, frequently in great detail. Most of their comments were accepted either in whole or in part. Some other comments the editors—perhaps mistakenly—felt unable to accept.

The editors were frequently faced with difficult problems of choice between a number of possible formulations. The nature of the dictionary, however, makes it impossible to give a detailed justification for using one version, rather than another. Final responsibility for choice rests on each of the principal editors, in this English section, Mr. Eugene Grebenik. At the same time the editors were not free to prepare a text entirely according to their own wishes. The necessity to produce parallel texts in different languages and the desire to take into consideration the comments that were made, have frequently led them to include certain expressions or definitions which they would have preferred to formulate differently had they been entirely free agents. Nevertheless, they agreed to accept responsibility for the text as it stands.

It must also be stressed that this dictionary does not pretend to be a treatise on demography. In preparing the text the fundamental aim has always been that it should serve as an aid to technical translation, and it was therefore necessary
to consider the terminology of various languages in order to make the dictionary truly multilingual. Languages differ in their structure, and demographic terminology depends, moreover, not only on the language but on the development of demographic research in various countries, so that it is sometimes illogical and at variance with the requirements of science. Occasionally, terms in different languages are not wholly equivalent. In one language there may exist a profusion of terms referring to a particular subject which in another is practically neglected. In the text, notes to the different paragraphs have been used in an attempt to reduce as far as possible the inconveniences arising from these difficulties. Had the aim been to produce a set of definitions in one language, without taking account of the others, the result would have been very different. This preoccupation also accounts for a certain imbalance in the contents. It has seemed useful in certain cases to include in the dictionary terms which are not properly demographic but are frequently encountered in demographic literature and do not always appear in general dictionaries, thus causing difficulties to translators who are not expert in the subject. In considering the needs of translators the Committee has been led to adopt the principle that no opinions should be expressed on particular usages, and no recommendations made unless there was a general consensus of opinion that a particular nomenclature was undesirable. The dictionary is therefore not normative. It does not lay down new definitions. Where definitions are included, their main purpose is to establish terminological equivalences and to make them more accurate. The necessity for extreme conciseness in these definitions has occasionally led to a certain lack of precision. Standardization of definitions requires studies of a different kind. In order to avoid any misunderstanding, a list of recent documents published by various international organizations concerned with the definition of various demographic concepts is given at the end of the alphabetical index. The reader will have to consult these studies when he has to solve a problem connected with definition rather than translation.

The purpose of the dictionary will be better served if it is extended to other languages. Some sections in other languages have already been planned, or are in draft. Moreover, the Population Commission at its ninth session requested the Secretariat to study the possibility of preparing a Russian section of the dictionary. Experience will show whether the compromise that has been reached between the English and Romance languages can be extended to other Germanic and Slavonic languages as well as to those outside the Indo-European group.


The Population Commission of the United Nations in its fourth session requested the UN Secretariat to include the preparation of a multilingual demographic dictionary in its work programme. The Union offered to collaborate in this project, and at the end of the fifth session of the Population Commission
an ad hoc Committee was given the task of drafting a multilingual demographic dictionary in English, French and Spanish.


At its fifteenth session, held in Geneva in November 1969, the Population Commission of the United Nations adopted a recommendation suggesting that the U.N. Secretary-General should collaborate closely with the Union in carrying out projects of mutual interest, such as the preparation of a multilingual dictionary of demographic terms.

At a previous meeting in Liege in April 1969, the Council of the Union noted with great satisfaction that the dictionary had, in every respect, come up to the expectations of demographers all over the world; the Council felt, however, that the time had come to bring the dictionary up to date, in view of the profound changes which had affected the science of demography during the decade following its publication.

A new Committee was therefore set up, and thanks to the generous financial aid granted by the U.S. Bureau of the Census, work on the project was started in 1972 and completed in 1974.

The Committee’s field of action was not limited to its members, since a hundred or so demographic centres responded to its appeal by giving their comments on the drafts submitted to them. In this way, an immense documentation was collected which dealt not only with the definitions of demographic terms and concepts, but also with the arrangement of the book. All this was placed at the disposal of Professor Louis Henry, to whom in 1976 the Union entrusted the task of editing the final version of the second French edition of the demographic multilingual dictionary. Thus the new text prepared by Louis Henry is a synthesis of the one edited by the late regretted Paul Vincent for the first edition of the French version, and the texts prepared by the Committee on International Demographic Terminology.

The Union subsequently requested Professor Etienne van de Walle to adapt and translate the French version of the dictionary into English. I would like to take this opportunity of thanking him warmly for having successfully carried out such a very exacting task.

I also wish to express my deep gratitude to my predecessor, Professor Massimo Livi Bacci who, during his mandate, was one of the principal promoters of this new series of dictionaries.
This English edition, following on the French one, is thus the second in a collection which will continue to increase as time goes on and provide support to the international community of demographers.

Georges Tapinos Secretary-General

Multilingual Demographic Dictionary Committee: Chairman: P. Vincent (France), Members: C.E. Dieulefait (Argentina), H.F. Dorn (U.S.A.), E. Grebenik (Great Britain), P. Luzzatto-Fegiz (Italy), M. Pascua (Switzerland), J. Ros Jimeno (Spain).

Committee on International Demographic Terminology: Chairman: P. Paillat (France); Members: A. Boyarski (U.S.S.R.), E. Grebenik (Great Britain), K. Mayer (Switzerland), J. Nadal (Spain), S. Kono (United Nations-Japan); Observers: S. Baum and J. Siegel (U.S. Bureau of the Census — U.S.A.); Research Assistants: A. Hill (Great Britain), A. Lifshitz (France) and A. Saez (Spain).

Acknowledgements

Although many persons have contributed to various stages of the preparation of this dictionary, Etienne van de Walle would like to acknowledge the assistance of Alex Mogielnicki in translating the French version, and the advice of his colleagues, Ann R. Miller, Samuel H. Preston, Norman Ryder and Christopher Tietze who were kind enough to comment on initial versions of the English text. It owes of course a great deal to comment on initial versions of the English text. It owes of course a great deal to the First Edition, and to the preliminary texts prepared by the committee of the Union.

Preface of the unified second edition

The unification of the second edition of the dictionary seemed necessary when computerization of all scanned paper volumes has been performed. The Demopædia databases showed significant omissions from each of the major releases published during the 1980s (French 1981, English 1982, Spanish in 1985 and Germany in 1987). In 1988, the Arabic edition and the tri-lingual English-French-Arabic edition, had already but partially filled the gaps by comparing the French and English translations, but had failed to translate 92 new concepts introduced in the German edition. The Chinese editions (1994), Japanese (1994), Czech (2005) derived from the English version only like the Web only editions in Russian (2008), Portuguese (2008) and Polish (2010). On the other hand, the Italian edition, published on Web in 2010, drifted mainly from the French edition. Let us describe by the following example, the consequences of untranslated terms and the importance of a unified edition: a French term like “Nourrisson” which was retained, by the Commission of United Nations terminology in the 50s, and which appeared in any language of the first editions of the multilingual dictionary disappeared in the second English edition.
As an example, the forthcoming *unified dictionary* will be enriched by the term: *nourrisson* in French, *lactante* in Spanish, *Brustkind* in German, *kojenec* in Czech, *lattante* in Italian etc. or, if a common noun doesn’t exist like in English, an expression like *child at the breast* was used in the first English edition of 1958 and is reinserted in the unified English edition, permitting to new modules, derived from English only, to keep this lovely word, even if babies were not so appreciated before the demographic transition!

New translations into several Asian languages being under consideration due to the demographical importance of this continent, it became mandatory to achieve this unification before engaging new translations. It is still an ongoing process, concerning all languages previously published; and the first *unified* French language edition was published at the 46th Annual Conference of the Italian Statistical Society in June 2012 in Rome. The French edition fills a gap because the last copies of the second edition of 1981 were distributed at the symbolic price of € 1 at the IUSSP conference in Tours (2005). An Italian edition was also very necessary because the first edition was published in 1959 and had never been updated.

Harmonized editions should be available soon or later in the twelve languages already published on paper volumes and on-line in their original edition as well as in four to six new Asian languages.

Although it is regrettable that this harmonized edition is not a *new* edition, which could be enriched with new concepts of contemporary demography, such as reproductive health, disability and dependency, international migrations, demographic windows, decreasing population, retirement etc... But the comparisons of the first two editions demonstrated to us that the important concepts of the population sciences resided mainly in the first edition: terminological elements have been selected carefully by the Commission on Terminology of the United Nations during the ’50s in order to define our discipline and are mostly still valid.

We may also regret not having removed obsolete or even inappropriate words. Etienne van de Walle, lead author of the second English edition of 1982, told me at the Conference of Tours in 2005, that is to say, shortly before his premature death, his desire to participate in the new edition especially at removing terms on eugenics, a term or theory which already in 1981 had only an historical interest. Changes to the original editions have been done *a minima*, preserving the original spirit of the 1980s.

These changes justify the paper publication of this unified edition. New volume will also be available on paper once the unification in the specific language is complete. This unification is a mandatory prerequisite for a third edition.

Publishing digital books allow indeed a paper publication at low cost even if at demand. Thus the work of Joseph Larmarange, a demographer at the French
“Research and Development Institute” (IRD) working at the mixed research unit CEPED, permits to download from the multilingual demographic dictionary website (http://demopaedia.org/tools) any unified edition in various electronic formats (HTML, PDF or EPUB). It is also possible to order a hard copy from a publishing company on demand. The web site is also a place for generating a “current” version of the dictionary or even multilingual indexes.

If a publication with broad distribution does not seem justified for languages that have already been published in the past, an impression "on demand" seems to meet certain needs, especially when it will be available in several languages in the same format. In addition, a print "on demand" includes the corrections of the inevitable errors and shells.

It seems to us that the main authorship of the multilingual dictionary returns to the first work of the Population Commission of the United Nations chaired by Paul Vincent. Himself is partly in debt of the revolutionary indexing system of numbered paragraph which appeared in the work of John Edwin Holmstrom. He proved in his "Report on Interlingual Scientific and Technical Dictionaries" written in 1949 that unique entries in a dictionary were inadequate when the dictionary included more than two or three languages.

Therefore, authorships are multiple and multilingual too; the detailed names are mentioned in each of the prefaces of the two possible editions which we reproduced before this current generic preface of all unified versions. If we had to mention explicit authors we should gratify, Paul Vincent for the first French edition of 1958, Eugene Grebenik for the first English edition of 1958, Louis Henry for the second French edition of 1981, Etienne van de Walle for the second English edition of 1982 and Guillermo A. Macció for the second Spanish edition. The second German edition was coordinated by Charlotte Höhn in 1987.

This multiple paternity has led us to move the status of all the different editions of the multilingual demographic Dictionary under the Creative Commons Share Alike license (CCSA). Thus, since the computerization of old paper editions, any additional work to the dictionary which is published on-line requires the acceptance of this license. It permits to consider the exact contribution of each author involved. Note also that the MediaWiki software which is used by Demopaedia for both, browsing the dictionary and editing, is also under the same open-source license.

Once we know a little handling of Demopaedia which is identical to Wikipedia, you can easily compare the text of the first edition with that of the unified edition. The digitized text uses the same paragraph numbering (101, 102 etc.), each being bundled within the same page (eg page 10 http://ko-ii.wikipedia/wiki/10). If the reader wants to know the reasons that led a writer to adopt a particular reformulation, the discussion page lists the problems that have arisen and the decisions that have been taken (eg http://ko-ii.wikipedia/wiki/Talk:10). All members of professional associations of population studies
in partnership with the Demopaedia project are allowed and encouraged to contribute to the discussion pages. This is already the case for members of the IUSSP and soon for members of the Population Association of America. Rights to edit the dictionary itself, that is, not only the related discussion page, are given to a limited number of authors.

It is also the goal of the project Demopaedia to invite professional demographers to update the multilingual demographic Dictionary by providing this wiki platform. But as it is a first step to create new pages and even new chapters such as “reproductive health” already mentioned, we believe that it is easier to adopt a more open structure similar to that of Wikipedia, where consistency between languages is not essential. The site of this free encyclopedia is the URL http://fr.demopaedia.org for French and http://en.demopaedia.org for the English version as well as http://ko.demopaedia.org for Korean, etc.

The new pages created gradually should allow us to better measure both, the extent of our discipline and its new terminology. A third edition of the multilingual dictionary could come someday.

The goal of science is to share results with colleagues around the world but also to fellow countrymen and thus, it seems necessary that the scientific vocabulary can be well translated and understood so that the media as well as students can use it safely. We also note that in some countries such as Sweden, there is no second edition of the dictionary, giving the impression that the scientific vocabulary doesn’t need to be renewed in Swedish, but English only. By contrast, a clear need has been felt at the IUSSP Conference in Marrakesh by Asian academics who, under pressure from many local students who do practice English, are struggling with rough translation of English demographical terms (even old terms) to be adopted by the entire community. Today, in India, there are several languages spoken by a number of users exceeding 70 million which is the total number of humans whose mother tongue is French. Malayalam is spoken, in Kerala at least, by as many speakers as Thai-speaking Thais. Hopefully this wiki platform is a multilingual opportunity to discuss the understanding of new concepts conveyed in the English scientific journals but also in international conferences still in French or Spanish and national conferences in many different languages.

This project could not have been completed without the ongoing support of the Population Division of the United Nations in the person of Hania Zlotnik who was her director from 2005 to 2012. This support took the form of the organization of Demopaedia workshops, including Paris (2007) and Marrakesh (2009). Special thanks to Sergey Ivanov (UNPD), co-organizer of two workshops and author of the first draft of the Russian edition. Giudici Cristina and Elena Ambrosetti, authors of this Italian translation which has been published concurrently, have established a partnership between the University La Sapienza and the French Committee of the IUSSP, to organize a workshop on the Wiki technology in Rome in 2011. Some materials due to Laurent Toulemon’s tutorial at INED in Paris having been reused, we are extremely hap-
with the Franco-Italian collaboration which is driving the development of the Demopædia project, particularly in Chiang Mai at the end of August 2012. The last Chiang Mai workshop, funded by INED, co-organized by Géraldine Duthé (INED) and locally organized by Sophie Le Coeur (IRD/INED), Joseph Larmarange and Elena Ambrosetti was an opportunity to train 13 senior demographers in the Demopædia/Wiki technology in order to produce a unified edition in six Asian new languages (Korean, Indonesian, Malaysian, Nepalese, Thai and Vietnamese). They should be completed by the next IUSSP conference of Busan in August 2013.

Also thank to Christine Gandrille, secretary of the French National Committee of the IUSSP, who scanned and corrected many of the issues due to her exceptional knowledge of several languages, Françoise Gubry and Martine Deville, librarians respectively at CEPED and INED for their obstinacy to find the old dictionaries such as the Arabic or Estonian editions. Their advices in thesaurus and index technology were also very helpful.

Finally, I would like to thank the French National Committee that I had the honor to preside until January 2012 and all members of the three successive bureaus for their help in starting and conducting the Demopædia project since 2005. Websites are requesting light but continuous supports which are provided by INED in hosting the server. In 20012, IUSSP created a group of interest so that the Demopædia project could take an international dimension.

Nicolas Brouard

Director of research at INED

Coordinator of the IUSSP Demopædia project

July 2013
Notice

Notes on the use of the dictionary

The dictionary consists of a text supplemented by notes in small type and an alphabetical index. All terms which are printed in bold face in the text and the notes are listed in the index. Where an expression consisting of several words is printed in bold face it will appear in the index under each of the principal constituent words, e.g., "density of population" is indexed under $D$ as "Density population", and under $P$ as "Population density".

Each term has a reference number which is composed of the number of the paragraph in which it appears and an identification number. For terms appearing in the body of the text the identification number is printed immediately after the term, and for those in the notes it is the number of the note; the latter also relates the note to the corresponding term in the text. Terms occurring in the notes which are not in the text are followed by an asterisk (*) in the index and reference numbers.

Due to the harmonization of all second editions of the dictionary, new terms have been introduced in this unified second edition of the English volume compared with the original second edition of 1982. These new terms are starred (★).

Text terms with the same reference numbers in the various sections of the dictionary correspond to one another. For instance, the translator who wishes to find the equivalent French term for a given expression in English should look up the English expression in the alphabetical index of the English section and find the correspondingly numbered paragraph in the French section. It is strongly recommended that the whole paragraph in which the expression occurs in both sections should be read in order to guard against faulty translation due to slight differences in usage; this will also be useful if, in one of the languages, no term exists to express a particular concept.
Only terms in the text itself are comparable from one volume to one other using their number. Terms in the notes are specific to each volume and don’t correspond between volumes.

Different terms which are used to express the same concept have the same reference number. Any term which is susceptible of different interpretations may have two or more reference numbers which refer to the appropriate contexts.

Terms printed in bold face in notes do not necessarily correspond to one another in the different sections. Moreover, in paragraphs 303 and 344, which deal with the administrative structures of different countries and with their educational systems, there is no correspondence between the different language sections. Terms introduced in these paragraphs have no identification numbers; the paragraphs themselves are subdivided into lettered sections, A and B in the English section referring to Great Britain and the United States of America respectively.

Exploring the dictionary on demopaedia.org

Comparing the dictionary between several languages will be easier online on the web site http://en-ii.demopaedia.org where hypertext links allow you to switch between the different volumes of the dictionary.

The dictionary is divided into sections or sub-chapters, each of them having its own page on the wiki. Each section is identified by a two-figures number. Usually, the section number of a paragraph corresponds to the two first figures of the paragraph number (the paragraph 104 is therefore located in the section 10). There are few exceptions: paragraphs 360, 361 and 362 are in section 35, paragraph 640 in section 63 and paragraphs 810 and 811 in section 80. Section breaks are indicated in the text by an asterism (⁂).

The URL of a section is obtained by adding the section number to http://en-ii.demopaedia.org/wiki/. Therefore, paragraph 357 could be seen online at http://en-ii.demopaedia.org/wiki/35. For more details, please read online http://en-ii.demopaedia.org/wiki/Instructions.

Tools to search a term in all indexes or to generate a multilingual index are available at http://www.demopaedia.org/tools.

Citation

Since the dictionary has been digitized, it is now available in different formats (online, printed books, electronic books...). Although this unified second edition will not change significantly, some minor corrections could be apply to
the text. Therefore, the copy you are currently reading, generated at a specific date, could differ slightly from the online version.

To cite the multilingual demographic dictionary, it is recommended to consult first the last version online, the website being the reference. You can cite the dictionary as follow:


If you need to cite a specific paragraph of the dictionary, indicate the number of the paragraph (as any page number will differ between the different formats). For example, to cite paragraph 211:


**List of abbreviations**

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Chapter 1
General concepts

101

Demography\(^1\) is the scientific study of human populations primarily with respect to their size, their structure\(^2\) and their development; it takes into account the quantitative aspects of their general characteristics. It is the core of the population sciences\(^5\), which in the broadest sense include interdisciplinary fields such as economic demography (104-1), social demography (104-2), population genetics (104-4), historical demography (102-1), mathematical demography (102-6) as well as contributions from the law, medicine, epidemiology (423-6), sociology, psychology, geography and philosophy. In statistical terminology any collection of distinct elements may be called a population\(^3\), a word that is synonymous with universe\(^3\). However, in demographic usage, the term population\(^4\) refers to all of the inhabitants\(^5\) of a given area, though on occasion it may be used for part of the inhabitants only [e.g., the school-age population (cf. 346-7), the marriageable population (cf. 514-2)]. Such groups are properly called sub-populations\(^6\). The term population is often used to denote more specifically the size\(^7\), i.e., the total number\(^7\) of the aggregate referred to in no. 101-4.


4. Population, n. - Note that this term may also be used adjectivally as a synonym for demographic, e.g., in population problems, population analysis, population studies.

5. Inhabitant, n. - inhabit, v.: to occupy as a place of settled residence.
Certain sub-disciplines within demography have received special names reflecting their objectives or their methodology. **Historical demography**¹ deals with populations of the past for which written records are available. In the absence of such sources, the study of ancient populations takes the name of **paleo-demography**². In **descriptive demography**³ the numbers, geographical distribution, structure and change of human populations are described by means of **population statistics**⁴ or **demographic statistics**⁴. The treatment of quantitative relations among demographic phenomena in abstraction from their association with other phenomena, is called **theoretical demography**⁵ or **pure demography**⁵; because of its resort to various mathematical methods, in practice it is identified with **mathematical demography**⁶. A piece of research that applies the tools of **demographic analysis** (103-1) to an actual population is often called a **demographic study**⁷. This study can focus on the **current demographic situation**⁸ or **current demographic conditions**⁸, i.e. the population change and its indicators during a short and recent period. All the preceding disciplines place a great emphasis on the numerical aspects of the phenomena, and are sometimes referred to as **formal demography**⁹, when they apply only to the size and structure of the population. In contrast the broader term **population studies**¹⁰ also includes the treatment of relations between demographic events and social, economic or other phenomena.

**Demographic analysis**¹ is that branch of formal demography which controls for the effect of population size and structure on **demographic phenomena**² by isolating the effects of each demographic variable from the others, the latter of which are called **disturbing phenomena**³. It also studies the relations between demographic variables and how they interact to form population structures. A distinction is made between **cohort analysis**⁴ or **generational analysis**⁴ which focuses on a well defined cohort (cf. 117-2) followed through time, and **cross-sectional analysis**⁵ or **period analysis**⁵ which focuses on the demographic phenomena that occur during a precise time interval (such as a calendar year) among several cohorts.

4. Cohort analysis is a form of **longitudinal analysis** which deals with aggregates of persons possessing the same characteristic. Panel analysis follows the same individuals case by case.
The study of relations between demographic phenomena on one hand and economic and social phenomena on the other forms another branch of the subject. The terms economic demography¹ and social demography² have been used by some writers. Demography also deals with the study of population quality³. This phrase may be used with reference to all sorts of social and personal characteristics. In a slightly different sense the term primarily refers to the distribution and transmission of hereditary characteristics (910-3) which are the subject of population genetics⁴. Human ecology⁵ is the study of the distribution and organization of communities with attention to the operation of competitive and cooperative processes and has part of its subject matter in common with demography. Fields of research and methodology are even more intertwined in the case of demography and human geography⁷. It is also the case for biometry⁶ or biometrics⁶ and epidemiology⁸, which deal with the application of statistical methods to all forms of biological and medical research.

4. Population genetics is distinct from human genetics, which deals with the transmission of inheritable characteristics in man: population genetics includes the study of the distribution and transmission of hereditary traits in plant, animal and human populations.


6. Biometry, n. - biometrics, n. - biometric, adj. - biometrician, n.: a specialist in biometry. The terms biostatistics, n. - biostatistical, adj. - and biostatistician, n. are frequently encountered and are synonymous with the terms given for biometry.

Finally, there is the study of population theories¹. This term should not be confused with theoretical demography (102-5). Population theories are designed to explain or predict the interaction between changes in population and economic, social, psychological or other factors; they include purely conceptual treatments. Population theories occasionally form the basis of population policy² (cf. §930), which deals with measures designed to influence population changes.

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A fundamental statistical unit\(^1\) used in demography is the individual\(^2\) or person\(^3\). The term head\(^4\) has also been employed but this usage is now largely out of date. The household\(^5\), a socio-economic unit, consists of individuals who live together. Statistical definitions of the household vary. According to the definition which has been recommended as an international standard a household consists of a group of individuals who share living quarters (120-1) and their principal meals. The term hearth\(^6\) has been used in the past, showing that in the past members of the household used to share the same fire. Classifications of households also vary between different countries and different enquiries. Most classifications involve the distinction of two types: private households\(^7\) and collective households\(^8\). An individual living by himself is considered to be a one-person household\(^9\). A boarder\(^7\) is a person other than a domestic servant, who is unrelated to other members of the household and who habitually takes his meals with the household. A lodger\(^8\) or roomer\(^8\), on the other hand, does not habitually take his meals with the household. These two categories may or may not be included in the household for statistical purposes.

4. Private households are called family households when their members are related.

5. Collective households may include institutional households composed of persons who reside in specifically designated institutions (e.g. hospitals, prisons, etc.). They may also include unrelated persons who reside in group quarters (120-1) other than institutions. However, recent internationally recommended definitions restrict the terms household and household population to private households, and refer otherwise to persons not living in households.

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When a private household (110-4) contains several persons they are called members of the household\(^1\) and one of them will be the head of the household\(^2\). There is no universally accepted rule as to who is considered the head of the household; in some cases it may be the principal earner\(^3\). On most census schedules there appears a question dealing with the relationship\(^4\) (114-3) of members of the household to its head. This enables a distinction to be made between different groups in composite households\(^5\) or complex households\(^5\) which contain members of more than one biological family or nuclear family (113-1). A composite or complex household can be disaggregated into several nuclei\(^6\), including a primary nucleus\(^7\) and secondary nuclei\(^8\). The nuclei are more commonly called families (112-1). The primary family\(^9\) is that of the household head when it is defined, the others are called...
secondary families\textsuperscript{10}. Household size\textsuperscript{11} denotes the number of persons included in the household.

2. The term householder is sometimes used to refer to the head of the household. The term headship is frequently encountered, as in headship ratio, the ratio of the number of heads of households by age, sex or other characteristics to the corresponding categories of population.

6. The nucleus is also called a conjugal family unit.

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The family\textsuperscript{1} (cf. § 113 and § 115) is a different unit which must be carefully distinguished from the household (110-3). It is defined primarily by reference to relationships which pertain to or arise from marriage, reproduction or adoption, all of which are regulated by law or custom. The fundamental relationships are those established between a couple by marriage — and that existing between a couple as parents\textsuperscript{2}, i.e., father\textsuperscript{3} and mother\textsuperscript{4}, and their children\textsuperscript{5}, i.e., sons\textsuperscript{6} and daughters\textsuperscript{7}.

2. Parent, n. - parental, adj. - parenthood, n.: the state of being or becoming a parent.

3. Father, n. - paternal, adj.


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Parents and their children are sometimes referred to as the biological family\textsuperscript{1}, or nuclear family\textsuperscript{1}. Brothers\textsuperscript{2} and sisters\textsuperscript{3}, without distinction of sex are called sibs\textsuperscript{4} or siblings\textsuperscript{4}. Siblings with only one parent in common are called half-brothers\textsuperscript{5} or half-sisters\textsuperscript{6}. Extended families\textsuperscript{7} are larger family units generally composed of combinations of nuclear families. The vertically extended family\textsuperscript{8} consists of three or more generations living in the same household or very close to each other. The horizontally extended family\textsuperscript{9} involves siblings with their spouses and their children living together. The vertically extended family can generate special types such as the stem family\textsuperscript{10} in which only the heir and his family may continue to reside with their parents.
1. The term **simple family** and **elementary family** are frequent synonyms for the terms biological or nuclear family. In a restricted sense, such as in fertility analyses, the term biological family may refer to parents and their own children, excluding adopted children.

7. The terms **composite family** and **joint family** are frequent synonyms for the term extended family. In the most general sense of the term, an extended family may refer to all members of a kinship group.

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Persons related through common **descent**\(^1\) from the same **progenitor**\(^2\) or **ancestor**\(^2\) are called **blood relatives**\(^3\) or **genetic relatives**\(^4\). The terms **kin**\(^3\) and in an aggregate sense **kinship group**\(^3\) are also used. The **degree of relationship**\(^4\) is generally computed by reference to the number of steps which are necessary before a common ancestor is reached, but there are many different methods of computation. The fundamental relation in each of these steps is the **filial relation**\(^5\) (cf. 112-6\(^*\) and 112-7\(^*\)) of child to parent, which is the reciprocal of **parenthood**\(^6\) (112-2\(^*\)) i.e. the relation of a couple or of a father or a mother to **offspring**\(^7\) or **progeny**\(^7\). Blood relationship must be distinguished from **relationship by marriage**\(^8\), which marriage establishes between one spouse and the kin of the other.

1. **Descent**, n. - **descendant**, n.: one linked through descent
3. **Relative**, n. - **related**, adj. - **relationship**, n.: the state of being related. The term relative is used for persons related by blood or marriage. **Kin**, n. and adj. - **kinship**, n.: the state of being kin. **Relatives** is sometimes also used for the collection of all kin.
7. **Progeny**, n.: this term may also be used for all of the descendants of a common ancestor.
8. In certain countries persons related by marriage may be referred to as **in-laws**.

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The **family**\(^1\) (cf. 112-1) as a unit in demographic studies representing all or part of a **household** (110-3) needs to be specifically defined, and definitions for different purposes may vary. A **statistical family**\(^1\) or **census family**\(^1\) generally consists of all members of a household who are related through blood, adoption or marriage. A household may, or may not include a family. A statistical family cannot comprise more than one household, although a household
may include more than one family. In some countries the definition of a statistical family may approximate to the biological family (113-1); in others the definition may be based on the family nucleus consisting of either a married couple without children, a married couple with one or more never-married children or one parent with one or more never-married children. These may either form the census family itself or be the core of such a family. Married couples living with their children are called traditional families. A broken family is one in which one of the parents has been lost by death, divorce or desertion. Families where one parent, separated or widowed, lives with her children may be also be named single parent families. Married couples, widowed or separated people who, at the time of the declaration, have no more children living in the household, may have special name, like in Germany, residual family (“Restfamilie”). When these types of families are living within a household, they are called family household.

1. In the United States of America, a sub-family is a married couple with or without children, or a parent with one or more never-married children, under 18 years of age, living as members of a household and related to but not including the head of the household and his wife. In Great Britain, the primary family unit consists of parents and their children, the parents’ sibs and ancestors.

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In demographic literature, the term generation has been given a precise meaning and refers to a group of persons born within a specified period of time, generally taken as a calendar year. The term cohort denotes a group of persons who experience a certain event in a specified period of time: thus birth cohort is a synonym for generation in the sense of 116-1, a marriage cohort is a group of persons married within a defined period, etc. In demography as in genealogy the term generation may also be used to denote the descendants of a group of persons who are themselves a generation in the sense of 116-1. Thus the children of a group of migrants are often referred to as the second generation. Occasionally we also use the expression third or fourth generation. Generations can be qualified according to their current age and, for example, the young and rising generation, the middle-aged generation or the generation in the prime of life and the older generation while the age limits are often vague and therefore require clarification. Cohorts of people born during historical periods related to low birth rates (respectively high) can be referred as low-birth-rate cohorts (respectively high-birth-rate cohorts). Occasionally consideration is restricted to lines of descent through one sex only, thus a male generation or paternal generation are the sons of a generation of males, a female generation or maternal generation the daughters of a generation of females. These distinctions are normally used when the length of a generation or mean interval between successive
generations is calculated. (cf. 713-1). (Note|11|Because of the depletion of births during the first World war, particularly in France, the French term "

2. **Cohort**, n.: the term cohort analysis is used to denote a method of analyzing data, in which the experience of individual cohorts is studied throughout their lives, or other specified periods.

   For purposes of military service the number of men who become liable to conscription in a given year is sometimes called the class of that year. In the United States the same term is used for a group of students who complete their studies at a particular school or university in a particular year.

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A **dwelling**\(^1\), a **dwelling unit**\(^1\), or **living quarters**\(^1\) are statistical abstractions denoting housing accommodations appropriate for occupation by one household (110-3). The size of a dwelling is measured by the number of its **rooms**\(^2\) or by its **surface area**\(^3\). The **degree of crowding**\(^4\) is a function of the size of the dwelling and the number of its inhabitants. Crowding standards are applied to distinguish **overcrowded dwellings**\(^5\) and **insufficiently occupied dwellings**\(^6\). An **unoccupied dwelling**\(^7\) is a dwelling which is not used for residence either permanently or occasionally.

1. A dwelling may consist of a **private house**, or part thereof, or a **flat** or an apartment which forms part of a **block of flats** or **tenement house**.

   In the United States of America a distinction is made between a **one-household structure** and a **multiple-household structure**, and all persons who are not members of households are regarded as living in **group quarters**. Statistics of houses by the number of **floors** or stories are sometimes provided. It should be noted that in Europe, the **ground floor** is not generally counted, whereas in the United States of America it is called the **first floor**.

2. There is no general rule as to whether or not the **kitchen** is included in the number of rooms.

The occupier of a dwelling may be its owner or a tenant who rents it from an owner, who is then called landlord. A tenant who rents a dwelling to a sub-tenant is called the principal tenant. A sub-tenant is a person who rents from a tenant. A person occupying a dwelling to which he or she has no legal title is called a squatter.

2. A dwelling or apartment may be rented with or without furniture in which case it is respectively called a furnished dwelling or an unfurnished dwelling.


Data are usually referred to as raw data or crude data prior to their processing and tabulation and basic data or primary data after processing and tabulation. Basic data usually consist of series of absolute numbers which are put together in the form of statistical tables. In such tables the data are generally classified with respect to certain variables or variates such as age, number of children, etc., or with respect to certain attributes or characteristics (i.e. sex, marital status, etc.). Where data are classified with respect to several variables or attributes simultaneously the tables are called cross-tabu-
lations\(^7\) or contingency tables\(^7\). Summary tables\(^8\) give information in less detail than do individual tables\(^9\).

1. When the data relate to individuals\((110-2)\) as their unit of analysis they may be referred to as micro-data. Aggregate data or macro-data relate to a unit of analysis other than an individual, for example, a nation or an administrative unit within a nation. Micro-data can be derived from several sources such as a field survey\((203-5)\) or a sample of vital registration records. A new source of micro-data is the census public use sample, which is a systematic or a random sample of census returns that is made available for analytical purposes to interested individuals.

7. A table which presents the distribution of a single variable or attribute within a population is generally called a frequency table.

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Using the basic data generally involves two phases. Analysis\(^1\) aims at isolating the components of the observed numbers (size, structure, extraneous factors and the phenomenon under investigation); synthesis\(^2\) is the process of recombining the disaggregated components in various ways. Either phase involves the calculation\(^3\) or computation\(^3\) of indices\(^4\) which may be denoted by various names (cf. § 133). In contrast to the basic data, these indices are referred to as results\(^6\) or synthetic indices\(^5\). In a more restricted sense an index\(^7\) (pl. indexes or indices) or index number\(^7\) is a ratio showing the value of a given quantity relative to a base\(^8\), which is usually taken as 100. Some indices are good indicators\(^9\) of a complex situation; thus the infant mortality rate is sometimes used as an indicator of the health status of a population.


3. Calculate, b. - calculation, n. - calculator, n.: a machine with minimal to modest data storage capabilities designed to facilitate a modest amount of arithmetic and statistical calculating. Compute, v. - computation, n. - computer, n.: a machine system designed to effect the transmission, storage and calculations of large data sets; it permits arithmetic and statistical calculations as well as logical processing of data. In a dated sense, the terms calculator and computer were used to designate the person(s) engaged in the computations.

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One of the first stages of analysis\((132-1)\) consists of relating the population totals or number of events to other totals or numbers. The resulting indices are
given various names. A **ratio**\(^6\), also used for various purposes, is the quotient obtained by dividing quantities of the same kind. When the dividend and divisor belong to the same kind but different categories (men and women, children and women, different age-groups, for example) an other terminology might be used in non English languages, relating both quantities with a **specific ratio**\(^1\) (like a sex ratio). A **proportion**\(^2\) is a ratio which indicates the relation in magnitude of a part to the whole. A **percentage**\(^3\) is a proportion expressed per hundred. A **rate**\(^4\) is a special type of ratio used to indicate the relative frequency\(^5\) of the occurrence of a particular event within a population or a sub-population in a specified period of time, usually one year. Although this usage is recommended, the term has steadily acquired a wider meaning and is often incorrectly used as a synonym for ratio (e.g. labor force participation rate, which is actually a proportion).


4. Rates are generally given per thousand, and where the term “rate” is used without additional qualification "per thousand" is generally understood. Some rates, however, are given per ten thousand, per one hundred thousand, or per million e.g. cause-specific death rates (421-10). On other occasions rates may be given per person or per hundred. The word "rate" is sometimes omitted, thus one may find the expression “a mortality of ten per thousand,” but this is not recommended.

6. The **total fertility rate** (cf 639-4) is the sum of **age-specific fertility rates** (cf 633-9) over the age reproductive period and thus lost its inverse temporal dimension (per year). The difference is as important as between length and surface or velocity and acceleration. The term **synthetic index** (cf 132-5) is preferred in some languages to avoid the confusion with the inverse temporal dimension (per year) of a rate: number of demographic events divided by the time exposure or person-years. If used, the term **rate** in the expression “total fertility rate” refers to the implicit ”per woman”, which is not enough to qualify as a rate but enough for a dimensionless ratio.

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The **relative frequency** (133-5) of a non-renewable event is often regarded as an empirical measure of the **probability**\(^1\) of occurrence of that event. This presumes that all the individuals who appear in the denominator have been **exposed to risk**\(^3\) in some way, i.e. there must have been a **chance**\(^2\) or **risk**\(^2\) that the event in question could happen to them. The use of the term "risk" does not imply that the event in question is in any way unwanted; thus the term "risk of marriage" is used. The population is often divided into different sub-groups, in which the risk of the event in question is less variable between individuals than in the population as a whole; the subgroup is more **homogeneous**\(^4\)
with respect to the risk than the relatively heterogeneous whole population. Rates calculated for such subgroups are called specific rates as opposed to crude rates (136-8) which apply to the population as a whole. General rates sometimes involve an age restriction, as in the instance of general fertility rates (633-7).

5. Heterogeneous, adj. - heterogeneity, n.

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Age-specific rates are computed for single years of age or for age groups (age-group specific rate or age group-specific rate). Duration-specific rates take into account the time elapsed since a baseline event or event-origin such as marriage or a previous birth. Central rates are obtained by dividing the number of events during a year, or some other period (often five years) either by the average population or mid-year population or by the number of person-years of exposure to the event in question during that year or period; the number of person-years is the sum, expressed in years, of the exposure time for all individuals in the observed group, over the year or period. The term rate is often used also for another type of measure, obtained by dividing the number of non-renewable events in a year or a period of years by the size of the cohort considered at the beginning of the year or period; this measure is sometimes called an attrition probability, and contrasted with the central rate, defined earlier. In this paragraph, the word "period" has referred to a length of time. In the expression period rates, however, the word is used in its chronological meaning and refers to a specific calendar year or group of years; it is opposed to cohort rate or generation rate.

5. The word quotient, used in French for this type of rate, has sometimes been used in English.

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Data are called provisional if they are based on incomplete or insufficiently controlled observations. They are replaced by final data when the observations are complete. Rates based on such data are called provisional rates and final rates respectively. Where information becomes available after figures have already been published, revised rates may be issued. The expression corrected rate usually implies that defective data or inappropriate methods have yielded results which are either misleading or of limited value for the
purpose in hand and that an effort has been made to correct this, e.g., correction for underenumeration, correction for migration, correction for seasonal movement. Standardized rates\(^7\) or adjusted rates\(^7\) are designed to make it possible to compare different populations with respect to a variable, e.g. fertility or mortality, where the influence of another variable e.g. age, is held constant. The term corrected rate\(^7\) has been used by some demographers as a synonym for standardized rate. When the data do not permit direct estimation of the rates (small population, for example), the use of standard rates\(^9\) (cf. 403-6 for example) computed from data of good quality and applied to the real population, provides an indirect estimation of the expected number of events which can be compared with the observed number of events. Unstandardized rates are called crude rates\(^8\). Although they may be used to measure actual trends, false inferences may result from their uncritical use when populations with different structures (144-4) are compared.

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Demographic indices (132-7) will in most cases relate to a particular period of observation\(^1\); this is true in particular of most rates (cf. 133-4). An annual rate\(^2\) will relate to a period of twelve months. Where observations are collected for a number of years and then averaged, the term mean annual rate\(^3\) or average annual rate\(^3\) is often used for the result. Where rates are calculated for periods different from a year they are converted to an annual basis\(^4\) through multiplication by an appropriate factor. Instantaneous rates\(^5\) are sometimes computed; they relate to an infinitesimal period of time, cf. for instance the instantaneous death rate (431-4) or the instantaneous rate of population growth (702-5).

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The primary objective of cohort analysis (103-4) is the study of the intensity\(^1\) and tempo\(^2\) or timing\(^2\) of demographic phenomena. The intensity of a phenomenon initiated by one non-renewable event (201-4) may be measured by either the ultimate frequency\(^3\) of occurrence for the given event or by its complement. The ultimate frequency reflects the proportion of persons who would have experienced the event, in the absence of extraneous influences, during the existence of the cohort (116-2). The intensity of a phenomenon initiated by a renewable event (201-5) such as births or migratory moves, can be measured by the mean number of events\(^4\) per person in the cohort, also in the absence of extraneous influences. Tempo or timing may be defined as the distribution over time within the cohort of the demographic events corresponding to the investigated phenomenon. The results of cross-sectional analysis or period analysis (103-5) are summarized by period measures\(^5\) — as opposed to cohort measures\(^6\) — which can be constructed in various fashions. A com-
monly used technique consists in attributing the observed rates pertaining to various ages or durations to a hypothetical cohort or synthetic cohort.

3. This ultimate frequency or its complement has received various names according to the phenomenon studied: parity progression ratio (637-7), frequency of definitive celibacy (521-1) ... It is best not to use the word proportion as part of these names, and to reserve it for observed proportions. For instance, the frequency of definitive celibacy must be kept distinct from the proportion single at a given age, as recorded in a census.

4. It is not unusual to give the same name to the observed mean number of events per person, and to the number that would have been observed in the absence of extraneous influences such as mortality. Distinct phrases should be used; for instance, the number of children ever born (637-2) can be distinguished from cumulative fertility (636-2).

5. Because cross-sectional analysis and hypothetical cohorts were used before genuine cohort analysis, the names of period indices often seem to imply that they refer to a cohort. This usage may lead to apparent contradictions. For example, parity-specific birth probabilities may exceed one for certain years when many postponed births are made up.

1. Average, n., can be used as an adjective. Mean, n., can be used as an adjective.

5. Weight, n. - weigh, v.

6. Median, n., can be used as an adjective.
8. **Mode, n., modal, adj.**

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The **dispersion**, **scatter**, **variation** or **variability** of a set of observations depends on the **differences** or **deviations** between its elements. Here the most common **measures of dispersion** only are mentioned. The **range** is the difference between the largest and the smallest values of a set of elements. The **interquartile range** is the difference between the first and the third **quartiles** and contains half the observations in the set. The **semi-interquartile range**, also called the **quartile deviation**, which is half the interquartile range, is often taken as a measure of dispersion. The **mean deviation** or **average deviation** is the arithmetic mean of the positive values of the deviations of the individual items from the average, the **variance** is the arithmetic mean of the squares of these deviations and the **standard deviation** is the square root of the variance.

9. The common notation for the standard deviation is \( \sigma \).

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If a series of observations is arranged in ascending order, values which have below them a certain proportion of the observations are referred to as **quartiles** or **order statistics**. The **median** has been previously mentioned. Other important order statistics are the **quartiles**, the **deciles**, and the **percentiles** or **centiles**, which divide the observations into four, ten and a hundred equal parts respectively.

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A variable is **continuous** in a given interval when it can take on an infinite number of values between any two points contained in the interval. In the opposite case it is said to be **discontinuous**. Where a variable can take only certain isolated values it is called a **discrete** variable.

1. **Continuous, adj. - continuity, n.**

2. **Discontinuous, adj. - discontinuity, n.**
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The arrangement of members of a population in various categories or classes of a specified attribute or variable produces a frequency distribution\(^1\), often called a distribution\(^1\) for short. The ratio of the number in the individual group or cell — the absolute frequency\(^2\) or class frequency\(^2\) — to the total number in all groups is called the relative frequency\(^3\) in that group. In demography the terms structure\(^4\) and composition\(^4\) are often used interchangeably to describe the distribution of characteristics such as age, sex, marital status, occupation, etc. Structure is sometimes used in a more restricted sense to describe the distribution of the population according to age and sex only.

4. The term population distribution usually refers to its spatial distribution. However, when used with the name of the characteristic or attribute that is analyzed, the word distribution is a synonym for structure or composition. Thus one finds references to age distribution, age and sex composition, and age and sex structure.

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When the movement of a demographic variable in time is considered, a demographic time series\(^1\) is obtained. It is sometimes possible to decompose a time series into a trend\(^2\) around which there are fluctuations\(^3\), variations\(^3\), or deviations\(^3\)\(\text{(141-2)}\). Where such fluctuations tend to recur after certain periods, usually several years, they are called cyclical fluctuations\(^4\) or, more generally, period fluctuations\(^4\). In demography the most common period for compiling data is a year, and the fluctuations in sub-periods of a year are called seasonal fluctuations\(^5\). The fluctuations that remain after trend, cyclical, and seasonal fluctuations have been eliminated are called irregular fluctuations\(^6\). They may be due to exceptional factors such as wartime mobilization, or sometimes they are chance fluctuations\(^7\) or random fluctuations\(^7\).

3. In a general sense the term variation may be used to describe change in any value or set of values for a variable.


7. Random, adj.: under the influence of chance (cf. 161-1).
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It is occasionally desirable to replace a series of figures by another series that shows greater regularity. This process is known as graduation\(^1\) or smoothing\(^1\), and it generally consists of passing a smooth curve through a number of points in the time series or other series, such as the number of persons distributed by reported age. If a free-hand curve is drawn the process is called graphic graduation\(^2\). When analytical mathematical methods are used, this is called curve fitting\(^3\). A mathematical curve is fitted to the data, possibly by the method of least squares\(^4\), which minimizes the sum of the squares of the differences between the original and the graduated series. Other methods include moving averages\(^5\) or involve the use of the calculus of finite differences\(^6\). Some of these procedures may be used for interpolation\(^7\), the estimation of values of the series at points intermediate between given values, or for extrapolation\(^8\), the estimation of values outside of the range for which it was given.


152

It is often necessary to graduate distributions to correct the tendency of people to give their replies in round numbers\(^1\). Heaping\(^2\) or digit preference\(^5\) is particularly frequent in age distributions and reflects a tendency for people to state their ages in numbers ending with 0, 5, or other preferred digits. Age heaping\(^3\) is sometimes measured with indices of age preference\(^4\). Age data must often be corrected for other forms of age misreporting\(^3\) or age reporting bias\(^5\).

153

The numerical values of demographic functions are generally listed in tables\(^1\), such as life tables (431-1), fertility tables (634-1), or nuptiality tables (522-1). A distinction is usually made between calendar-year tables\(^2\) or period tables\(^2\) which are based upon observations collected during a limited period of time, and cohort tables\(^3\) or generation tables\(^3\) which deal with the experience of a cohort throughout its lifetime. A multiple decrement table\(^4\) illustrates the simultaneous effects of several non-renewable events, such as the effects of first marriage and death on the single population. The most used are dou-
ble decrement tables. Forecast tables provide numerical values of demographic functions, like survival functions (431-6) for example, which can be used directly for population forecast (cf. 720-2). When a population is classified in two or more categories according to age, like economic status (women in the labor force or out of the labor force, for example), marital statuses, regions etc. and when continuous flows between categories are possible over time even if the individual state can usually be measured only at discrete times (waves of a longitudinal study, queries to population registers etc.), increment-decrement methods or multi-state methods are more and more developed and used.

154

Where insufficient data exist to establish the value of a given variable accurately, attempts may be made to estimate this value. The process is called estimation and the resulting value an estimate. Where data are practically non-existent a conjecture may sometimes be made to establish the variable’s order of magnitude.

155

Methods of graphic representation or diagrammatic representation may be used to illustrate an argument. The data are represented in a figure, graph, statistical chart or map. A schematic representation of the relationships between variables is often called a diagram, for example the Lexis Diagram (cf. 437). A graph in which one co-ordinate axis is graduated logarithmically and the other arithmetically is called a semi-logarithmic graph, though such graphs are often inaccurately referred to as logarithmic graphs. A true logarithmic graph has both axes graduated logarithmically and is sometimes referred to as a double logarithmic graph. A frequency distribution may be represented graphically by frequency polygons obtained by joining points representing class frequencies with straight lines, by a histogram, where class frequencies are represented by the area of a rectangle with the class interval as its base, by bar charts, in which the class frequencies are proportionate to the length of a bar or by an ogive representing the cumulative frequency distribution.
Sampling procedures are used to obtain information about a population from part of the population only, instead of having to study every person (110-2). The part of the population studied is called a sample. A population is a collection of elements which are the object of the investigation. A sampling unit may be an element or a group of elements of the population and is used for selecting samples. In demographic samples the elements are usually individuals (110-2), families (115-1), or households (110-3) and sampling units may be individuals, households, blocks of houses, municipalities or areas. The sample will consist of a number of sampling units selected in accordance with a sampling scheme or sampling plan.

A sample whose elements are selected by a chance process is referred to as a random sample or probability sample. If a complete list of sampling units is available, this is called a sampling frame. In simple random sampling, a proportion of sampling units is selected from the frame at random. This proportion is called the sampling fraction or sampling ratio. Systematic samples are drawn systematically from a frame in which the sampling units are consecutively numbered. The sample is selected by taking the \(n\), \((n + s)\), \((n + 2s)\), etc. unit, where \(n\) is not larger than \(s\) and is selected at random. In cluster sampling, population elements are not drawn individually, but in groups which are called clusters.

In stratified random sampling, the population is divided into a number of strata which are in some sense more homogeneous than the population as a whole with respect to the characteristics studied, and a simple random sample is drawn in each stratum. Variable sampling fractions may be used in the different strata. Multi-stage sampling is a method where the selection of the sample is carried out in several stages. A sample of primary units is first selected and each of these units is then regarded as a population from which a sub-sample of secondary units is selected, and the process may be repeated. When there is no good sampling frame, a sample of areas delimited on a map may be selected: this procedure is called area sampling.

1. Stratify, v.: divide into strata (plural of stratum) - stratification, n.

2. Random, adj. - randomness, n. - randomize, v,
In probability sampling (161-1), chance methods are used to obtain a representative sample\(^1\) i.e., a sample which is a faithful reflection of the population with respect to all the characteristics under investigation except for random fluctuation. In quota sampling\(^2\), on the other hand, the sample is purposely selected so as to reflect the population in certain characteristics, and each interviewer (204-2) is given a quota\(^3\) of different types of sampling units which are to be included in his sample. Within the limits of the quota the interviewer is free to select the sampling units.

A population parameter\(^1\) is a numerical value that characterizes a population. Statistical estimation\(^2\) is the name given to the procedure by which the values of such parameters are estimated from the sample. Such estimates are subject to sampling errors\(^3\) and a measure of the magnitude of the sampling error is generally given by the standard error\(^4\). Sometimes a confidence interval\(^5\) is associated with an estimate to show the limits within which the estimated quantity may be expected to lie with a pre-determined probability. A difference between two values is referred to as a significant difference\(^6\) when the probability that it is due to chance is less than a given value which is called the level of significance\(^7\). Thus a difference would be significant at the 5 percent level if the probability that it could have arisen by chance is less than 0.05. In addition to sampling errors, observation errors\(^8\) or response errors\(^8\) also affect estimates. These errors usually include interviewer biases\(^9\) which are systematic errors introduced by the interviewers when the basic data are collected.
Chapter 2
The treatment and processing of population statistics

201

Current population statistics\(^1\) may be distinguished from statistics of population change\(^2\). They deal with the static aspects of the subject and give an instantaneous picture of the population at a given moment of time: the statistical units (110-1) used are generally households (110-3), individuals (110-2), etc. Statistics of population change are concerned with the continuous processes of change which affect a population, and deal largely with vital events\(^3\), such as births, marriages, deaths, and with migration (801-1). Nonrenewable events\(^4\) (e.g. deaths) may be distinguished from renewable events\(^5\) such as pregnancies, births or migratory moves; renewable events are assigned an order\(^6\) based on the number of previous events of the same nature for the same person. Statistics of population change are a principal source for the study of population processes\(^7\), sometimes called population dynamics\(^7\). Censuses (cf. 202) are the main source of information on the state of the population\(^8\). Vital Statistics (212-1) are the primary source of data for the study of population growth\(^9\) (cf. 701). Occasionally they deal with natural increase\(^10\) only, i.e. they do not take into account movement between the population studied and other populations, but logically migration statistics (812-1) are a part of the statistics of population change. The term population movement\(^11\) is used to refer to the geographical movement of a population.

202

Population censuses\(^1\) are taken to obtain information about the state of the population (201-8) at a given time. Most commonly all inhabitants of a particular country are counted simultaneously:. the census is then called a general census\(^2\). Occasionally, however, only a section of the population is counted,
e.g. the inhabitants of a given area, in which case the census is called a partial census. The term "Census", however, denotes that an attempt was made to enumerate every member of the population concerned and to achieve complete coverage of the population. A micro census is limited to a sample of the population, usually large in size, and belongs in the category of sample surveys. Censuses or surveys are sometimes preceded by pre-tests or pilot surveys. To verify the accuracy and completeness of enumeration, a post-enumeration check is performed using a post-enumeration survey.

1. Census, n. - censal, adj. The intercensal period is the time elapsing between two successive censuses. Modern censuses correspond to what used to be called head counts. Population counts included any estimation procedure, however imprecise, based for example on the counting of baptisms (214-2) registered for a number of years, or of hearths (110-3) or even parishes (214-1).

203

An enumeration is any operation which is designed to yield a population total. It differs from a simple count in that a list is generally prepared. An inquiry or survey on the other hand, is generally an operation which is designed to furnish information on a special subject (e.g. the labor force) and which has limited aims. A field inquiry or field survey is an inquiry in which information is obtained by personal interview. In postal inquiries or mailback surveys questionnaires (206-3) are sent out by post with a request to return them completed. A retrospective survey focuses on past demographic events; in a multiround survey those events that occurred since the previous survey are noted from the second round on. This type of survey should not be confused with a call back, a term used to describe the instance where the interviewer is obliged to make several attempts to reach a respondent. In censuses, information may be obtained by either direct interview, or by self-enumeration. In the first method, also called canvasser method the enumerator (204-2) notes the information provided by or about the respondents; in the second method, also called householder method, the questionnaire is completed by the respondents (204-1) themselves. Self-enumeration may take the form of a mail census.

Persons who answer questions in a census (202-1) or a survey (203-4) are called respondents\(^1\) or informants\(^1\). Persons who collect (130-4) the information are called interviewers\(^2\), field workers\(^2\) or enumerators\(^2\), the last term being usually reserved for persons collecting information in a census. Enumerators usually work under the control of supervisors\(^3\) or inspectors\(^3\). General censuses (202-2) are usually taken by the statistical departments\(^4\) of individual countries. In England and Wales it is the [*NoteTerm!!General Register Office*], in Scotland the [*NoteTerm!!General Registry Office*]; both are headed by a [*NoteTerm!!Registrar General*].}

1. The term interviewee is sometimes used.

4. In the United States of America the office responsible for the census is called the Bureau of the Census;

Censuses are usually compulsory\(^1\), i.e. respondents (204-1) are under a legal obligation to provide the required information; in this respect they are different from voluntary inquiries\(^2\) (cf. 203-4), where the problem of non-response\(^9\) may become important. This is particularly the case in postal inquiries (203-7), where it is often necessary to follow-up\(^4\) the first questionnaire by a second, or sometimes by a visit. Non-respondents\(^5\) are frequently divided into those who refuse\(^6\), i.e. who are unwilling to cooperate in the inquiry, and those who could not be found by the interviewer (204-2). The latter are counted as absentees\(^7\) or no contacts\(^7\). The proportion of refusals\(^8\) in response to a given question is an useful index of the reactions of the respondents. The replacement of an unusable sample unit with another unit is referred to as substitution\(^9\).


The forms\(^1\) used for the collection of information have a number of different names. The term schedule\(^2\) is frequently used, especially the term census schedule\(^7\). Most of the forms are questionnaires\(^3\), particularly when they are designed for completion\(^4\) by the respondents themselves. At other times, officials obtain statements\(^5\), or particulars\(^6\) which they extract\(^7\) from documents primarily used for non-statistical purposes. The questions are usually of
two basic types: closed ended questions in which a respondent replies by selecting one out of a limited number of responses listed on the questionnaire or open ended questions to which the respondent may give a spontaneous answer.

207

A census schedule (206-2) may be an individual schedule containing information relating only to a single individual, a household schedule containing information relating to each of the members of the household (110-3), or a collective schedule, nominal list or enumerator’s schedule on which the enumerator enters successively data for all the persons he enumerates. There may be special schedules for the institutional population, which are called institutional schedules.

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210

Census operations usually begin with the delimitation of census areas and enumeration districts. Enumeration districts in towns and cities may consist of one or several blocks, a block being defined as a group of buildings around which it is possible to walk without crossing a street, or which are bounded by some obstacle, such as a railway line or a river. Most of the larger cities of several countries have been subdivided into statistical areas called census tracts which may contain one or several enumeration districts.

211

Vital events may be defined as births, deaths, stillbirths, foetal deaths, marriages, adoptions, legitimations, recognitions, annulments, divorces and separations; in short all the events which have to do with an individual’s entrance into or departure from life together with changes in civil status. Records of these events are generally called vital records, or registration records. For legal reasons vital events have, in many countries, long been the object of vital registration or civil registration. Birth registration, marriage registration and death registration use special forms as birth records, marriage records and death records; these are the most common types of registration documents. The person responsible for maintaining these registers is called the registrar.
4. **Register, n.** - register, **v.** - registration, **n.**

Civil registration systems are the descendents of parish registers (214-1) kept by the Church. A register was originally a bound book in which one or several lines were devoted to an event. Today individual records often take the form of certificates. They are separate documents for each recorded vital event.

212

Vital statistics\(^1\) or registration statistics\(^1\) are obtained by processing the registration record or a statistical report\(^2\) established at the time of registration. Tabulations by place of residence\(^3\) of the mother or of the decedent are often regarded as more useful for demographic purposes than tabulations by place of occurrence.

3. In many countries, the time of registration of a birth may be markedly later than the time of occurrence.

213

The registers mentioned in a preceding paragraph (cf. 211-4) are distinct from the population registers\(^1\) of those countries which possess a system of continuous registration\(^2\). In these registers every member of the population or every family may be represented by a card\(^3\), and the register is maintained\(^4\) or updated\(^1\) through information which reaches it through the local registration offices and through registration of any changes of residence\(^5\) (cf. 310-6). It is usually matched\(^6\) with the census results and brought up to date at regular intervals by special checks\(^7\).

3. A card file is a collection of cards. In general, a file is a collection of records arranged in convenient order.

214

Historical demography (102-1) often uses documents which precede or anticipate the development of civil registration (211-4) and nominal lists (207-3) from censuses. Parish registers\(^1\) or parochial registers\(^1\) contain information on the religious equivalents of vital events such as baptisms\(^2\), religious marriages (503-2), and burials\(^3\). For chrismos\(^5\), privately baptized infants\(^4\*) who die at home prior to a formal church ceremony, only the burial record is available. Nominal lists contain information either on a portion of the population or more rarely on the whole population. They include the a status ani-
marum which are nominal lists of all parishioners, lists of communicants and confirmation lists, as well as administrative and fiscal documents such as hearth tax lists, taxation rolls and military conscription lists.

215

Data are extracted from parish registers with the help of several types of forms or slips. These include the baptism slip, marriage slip and burial slip. The names of the subjects of record (i.e. the persons being baptized, buried or getting married) are inscribed on these slips, and information is recorded about the parents and other persons such as the godfather, the godmother and the witnesses. Other anonymous statements, nominal rolls and transcription forms are also used for summary extraction of the data, either with or without the names of the subjects. Family reconstitution makes use of family reconstitution forms. When genealogies reconstitute the descendence of an individual or a family, they are under certain conditions a valuable source of information on the demographic characteristics of the upper classes.

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220

The process of obtaining statistical data from documents not primarily designed for this purpose is called extraction. In general, whatever its source, statistical information is subjected to processing which may be manual, mechanical, electronic or a combination of these modes. Manual processing involves no equipment more complex than the desk calculator. Mechanical processing uses tabulating machines or punch card machines; electronic processing uses computers. Regardless of the mode of processing, certain types of operations must be performed including editing of the data, tabulation and calculation and table preparation. These operations are made more or less complex depending on the mode of processing which is selected.


2. Processing, n. - process, v. The terms to process information, data processing, are used widely.

8. Editing, n. - edit, v. In English, the term refers to an operation performed either on the basic document or on the machine - readable
To correct inconsistencies or eliminate omissions. In French, edition refers to the stage of table preparation.

221

Editing the data usually requires the prior coding\(^1\) of a certain number of entries on the basic document\(^2\). The coding scheme\(^3\) establishes a correspondence between an entry and its translation into numeric or alphabetic codes. The code book collects and describes the coding schemes used with a particular set of basic documents. A coding scheme is usually designed to facilitate later groupings of the data. In contrast, a classification\(^4\) is a mere list of individual codes where each heading\(^5\) is given one or several numbers. After the data have been coded, they constitute a file\((213-3^*)\) which can be converted to machine readable form. The second stage in the editing consists in the cleaning\(^6\) of the file, through elimination of errors by validity checks\(^7\) and consistency checks\(^7\); these can be internal checks within each statistical unit (cf. 110-1) or may result from the comparison of different units. After errors have been identified, they may be corrected in the original document or the file by some automatic procedure.


222

The edited data are rarely used directly; they are subjected to grouping\((130-7)\) and tabulation\((130-6^*)\), and this normally leads to a presentation in the form of statistical tables\((131-4)\). These may be the outcome of sorting\(^1\), either manual or mechanical, resulting in the reorganization of the elements in a set according to predetermined rules, or more simply of a systematic count of the elements presenting a selected characteristic. The choice of elements or of characteristics may be based on the values of one or several quantitative attributes, or on the modalities\(^2\) of one or several qualitative attributes. Few studies can do without computation, simple or complex, isolated or repetitive, and the computer\((225-2)\) now allows calculation that would have been too lengthy by hand. These capabilities have led to the development of techniques of data analysis\(^3\). Deterministic and stochastic models (cf. 730) often require considerable computations, and so do simulations\((730-6)\).

The stage of table preparation (220-9) aims at making the results of processing conveniently available in the form of listings\(^1\), numerical tables (131-4) or charts (155-2), all of which are commonly used in descriptive statistics\(^2\). The use of computer graphing\(^3\) and computer cartography\(^3\) permits the mass production of graphical presentation at a preliminary stage.

Purely mechanical processing (220-4) did not involve the use of electronic equipment\(^1\) which has come to replace the earlier tabulating machines\(^2\) or unit record machines\(^2\) and is much more versatile. In most instances the information is coded (221-1\(^*\)) first, and then transcribed onto punch cards\(^3\) by using a keypunch\(^4\). A card verifier\(^5\) is a device used to check the accuracy of the punching. These two types of unit record machines remain in common use since the punch cards are still a frequent way of entering data into the computer. The use of other types of unit record equipment such as the card sorter\(^6\) and the tabulator\(^7\) has declined. Increasingly, the data are entered directly on magnetic tapes (cf. 226-4) or disks (cf. 226-5) without resorting to punch cards.

3. Punch cards or punched cards.
4. Keypunch or card punch.

Demographic research depends heavily on electronic data processing\(^1\) using the computer\(^2\). The term hardware\(^3\) refers to the physical component, whereas software\(^4\) supplies the user\(^5\) with ways to have access to the computer. Computer specialists\(^6\) include programmers\(^7\) who write programs\(^8\) conceived by system analysts\(^9\).

The hardware (225-3) components of a computer (225-2) include one or several central processing units\(^1\), a central memory\(^2\), one or more mass storage devices\(^3\) which use magnetic tapes\(^4\) or disks\(^5\) and a set of input-output devices\(^6\). The software (225-4) components include the operating system\(^7\), which has the task of efficiently managing the available facilities\(^8\) for the users (225-5) running the users’ programs\(^9\) and the processing programs\(^10\) which are preestablished programs (225-8) designed for the solution of standard problems.
A user can process his problem by writing a program in a general programming language such as Fortran, Cobol, Basic or Algol, or a specific language, designed to use the processing programs stored in the central memory of the computer such as a data base management system used to create and maintain a data bank, a survey processing program or a statistical package. The devices which are used to enter and receive information from the computer can differ according to the mode of processing. In batch processing, the normal input and output units are the card reader and the line printer. A console is the normal input and output unit for processing in a timesharing mode. In either instance the entry units may be spatially separated from the computer and processing under these conditions is accomplished by remote terminal.

1. In addition to programming languages as defined above, other types of languages can be used to manipulate the operating system; these are usually referred to as job control language.

Any information processed in a computer undergoes three main phases. First, data entry or input which may be done by using punched cards or by using an on line device such as a keyboard console. Data which is already stored in the computer may be accessed from either central memory or from one of the mass storage devices and used as input data. This is part of the data collection which goes from extraction to the transcription on an electronic medium, through validity checks and consistency checks that can be made during data entry when working on line. The second phase, processing, is divided into two main types: numerical processing and non-numerical processing. Statistical or arithmetic computations are normally the operations contained in the former while data manipulation operations are the focus in the latter. In a third phase, occasionally referred to as output phase, the processed results or output may be printed out on the line printer or saved as a file on a mass storage device for further processing. Results may also be diverted to a plotter to obtain processed results in the form of a graph or a figure.
The accuracy of population statistics will depend among other factors on the completeness of the count of individuals, groups or events on which they are based. Omissions and undercount tend to generate underestimation while multiple counting leads to over-estimation. Additional sources of error include misreporting of a characteristic such as age and classification errors. Such inaccuracies are sometimes detected by post-enumeration tests or quality checks. Occasionally certain questions are not answered or insufficiently answered and this may lead to considerable inaccuracy, the incidence of which is indicated by the frequency of the class designated as non-response, not stated, unknown, undeclared, not specified, poorly defined or misspecified etc...

1. **Accuracy**, n. - accurate, adj.

2. **Completeness**, n. - complete, adj. The terms "complete" and "completeness" are used here to express the absence of omissions. The same terms may also be used to refer to coverage, as in 202-4.

3. The omission of some events from vital registration is called underregistration, and from a census or survey, underenumeration.

4. The expression double counts is often used in this sense.
Chapter 3
Distribution and classification of the population

301

Population statistics are generally presented in terms of the geographical distribution of the population\(^1\) or the spatial distribution of the population\(^1\), and also by structure (144-4). Each population lives in a given area\(^2\) or territory\(^3\) (305-6), and the study of the geographical distribution\(^3\) or spatial distribution\(^3\) deals with the way in which they are distributed over the territory.

2. **Territory, n.** - *territorial, adj.*

302

The territory (301-2) in which a population lives will generally be divided into sub-areas\(^1\). For administrative purposes it may be divided into administrative areas\(^2\), administrative units\(^2\) or administrative districts\(^2\) sometimes known as legal divisions\(^2\) or political divisions\(^2\). Geographers on the other hand, may divide the area into regions\(^3\) or zones\(^4\) which may or may not correspond to administrative units. The term "region" or "zone" may be used in a number of different senses and the areas referred to may be of very different sizes. Thus one speaks of the polar regions, of climatic zones or of metropolitan regions. The terms natural region\(^5\) and economic region\(^6\) are used by geographers. The term natural area\(^7\) is used in human ecology (104-5) to define an area occupied by a population with distinct characteristics.
Administrative units differ from country to country and over time in the same country, so that the same word may cover different situations. Minor civil divisions include townships and parishes; major civil divisions receive names such as states or provinces, and intermediary units are often called counties and districts. In Canada, for example the main administrative divisions, by increasing order of size, are the township, the county and the province. As an other example, the main administrative division in France are now the regions which correspond to the province and the départements which correspond to the cantons in Switzerland where districts and circles are minor civil divisions. In the United States, parishes are equivalent to counties.

1. Villages, boroughs and cities are other names sometimes given to the smaller administrative units. Municipality is a general descriptive term for minor civil division.

A population may be settled, sedentary, or nomadic, i.e., migrating back and forth within a given area and without fixed abode. Nomads who are in the process of becoming settled are called semi-nomadic. Occasionally primitive peoples may have a territory allocated exclusively to themselves called a native reserve or reservation.


A country is usually the territory of a people (cf. 333-3) or a nation. Persons belonging to a nation share, in general, a common culture. A state is a political body. The term may be used in two different senses: most commonly a state is a body possessing full sovereignty in its territory and over its inhabitants. However, a number of federations of federal states are divided into smaller units which are also called states and whose sovereignty is not absolute (e.g. in the United States of America and Australia). The term territory (301-2) is generally used for a geographical area, but it is occasionally used to denote a political unit which has been settled relatively recently. A distinction is sometimes made between self-governing territories and non-self-governing territories.

Within a territory (301-2), certain terms are used to describe different kinds of conglomerations ¹ or aggregations ² of population, sometimes known as population aggregates ¹, population clusters ¹ or more generally as localities ¹. In rural areas, the smallest unit is referred to as a hamlet ², which generally consists of a very small collection of houses. A slightly larger conglomerate is the village ³ which is generally a small community and which may have a mainly agricultural population. A town ⁴ or city ⁴ is a larger conglomerate in which there are in general few people engaged in agriculture, but the point at which the transition from village to town or city occurs is difficult to specify and varies in different countries. The seat of government of a territory (in the sense of 305-1), is called its capital ⁵. In a county, the place where the local government is situated is called the county town ⁶ or county seat ⁶. Towns and cities may be further divided into districts ⁷ or quarters ⁷ and for electoral purposes into wards ⁷.

1. The term agglomeration is also used in this sense. See however 307-1.

4. A very large town or city is sometimes called a metropolis, n. - metropolitan, adj.
   Town, n. - urban, adj.

Continuously built-up areas may arise through the coalescence of neighboring localities which, while retaining their administrative independence, may constitute one agglomeration ¹, containing a central city ² and suburbs ³ with specialized functions. The terms conurbation ⁴ or metropolitan area ⁴ are generally employed to designate a number of different agglomerations which, though geographically contiguous, have retained their own individuality. In many cases, however, the term conurbation is used as a synonym for agglomeration. The fusion of conurbations and large cities leads to the megalopolis ⁵ or metropolitan belt ⁵ which may extend over a large area. Metropolitan regions ⁶• may refer to agglomerations which include the commuter belt.

2. Another term used as synonym is urban nucleus.

3. Other terms used as frequent synonyms are satellite communities and suburban zone.

Suburb, n. - suburban, adj. - suburbanization, n.: the process of rapid population growth in the suburban zones adjacent to a large city. Densely populated areas contiguous to large cities are occasionally referred to as the urban fringe, and the zone marking the transition
between urban and rural settlement, as the rural-urban fringe or exurbia.

4. Urban populations are often regrouped in statistical areas such as the standard metropolitan statistical area (United States), the densely inhabited district (Japan) or the conurbation (England).

* * *

310

In census practice a distinction is made between the resident population\(^1\) or de jure population\(^1\) of a given area, which consists of the people who habitually live in that area, and the actual population\(^2\), or de facto population\(^2\), which is made up of the persons in the area on census day. In the resident population, temporary absentees\(^4\) are included with those permanent residents\(^3\) who are present in the area on census day; the actual population consists of residents together with visitors\(^5\) or transients\(^5\). The two methods of enumeration will give different results even for the country as a whole. The place where a person lives is called the place of residence\(^6\). For administrative reasons, certain persons who live together in large communities (i.e. boarding schools, military persons in barracks, prisoners, etc. (cf. 110-5\(^*\)) are often separately enumerated. These persons form the institutional population\(^7\). Special rules are used to enumerate vagrants\(^8\) or persons of no fixed abode\(^8\).

6. The term domicile is a technical legal term for legal residence and denotes the place where a person is legally deemed to reside. This may differ from his actual residence. In the United States of America, the de jure population is the population of usual residence.

7. In the United States of America the term institutional inmates is reserved for persons living under care or custody in correctional institutions, hospitals for mental disease and tuberculosis, homes for the aged, handicapped and dependent or neglected persons; other residents of group quarters include such persons as students in college dormitories, or soldiers in military barracks.

311

In many countries a rural area\(^1\) is defined as an administrative district in which the population size is below a certain level (often taken as 2,000). Other areas are called urban areas\(^2\). The rural population\(^3\) is the population liv-
ing in rural areas, the urban population⁴ that living in urban areas. Criteria for allocating the population of particular areas to the rural or urban sector respectively differ in different countries. Certain definitions of rural and urban population may lead to distinguish an intermediate category referred to as the semi-urban population⁵.

3. Rural, adj. - realization, n.: growth in the proportion of persons living in rural areas. Rural population should not be confused with agricultural population or farm population (359-2).

4. Urban, adj. - urbanization, n.: growth in the proportion of persons living in urban areas.

312

The density of population¹ or population density¹ is an index showing the relation between a population and the area in which it lives. The simplest density index² is obtained by dividing the total population by the area of the territory and is generally expressed as the number of persons per acre, square kilometre or square mile. The scatter of the population³ depends on the type of settlement⁴, grouped settlement⁵ or dispersed settlement⁶. Some writers have computed the population center⁷ of a given area by the methods used to find the center of gravity in applied mathematics; each individual in the population is given an equal weight.


313

Where the pattern of settlement of different populations is to be compared and other factors besides surface area are taken into account, comparative density indices¹ are sometimes computed. There are various such indices, among which we may mention the density of population per unit of cultivable area² and the density of the agricultural population per unit of cultivable area³. Occasionally these indices are based on the cultivated area⁴ rather than the cultivable area⁵. The density may also be expressed as a relation between population and total economic resources; the maximum potential density⁶ or population carrying capacity⁶, showing the relationship between resources and the maximum population that can be supported with these resources, may be considered. The concept of optimum density⁷, i.e., the density which will give the maximum real income per head with given resources, is used in population theory.
The sex structure\(^1\) or sex distribution\(^1\) of the population is measured by the ratio of the total number of one sex\(^2\) to the total number of the population or, more frequently, to the total number of the other sex. By convention, the male sex is usually considered in the numerator and we speak of the masculinity\(^3\) of the population. The masculinity proportion\(^4\) is the proportion of males in the total population. The sex ratio\(^5\) is the ratio of the number of males to the number of females; it is usually expressed as an index value (132-7) i.e. the number of males per 100 females.

3. Occasionally, the numerator of this ratio relates to the female population, and the feminity of the population is measured.

The terms males\(^1\) and females\(^2\) are commonly used in demography in place of men\(^1\) and women\(^2\) to refer to persons of each sex at all ages including children (323-3). In a similar fashion the terms male child\(^3\) and female child\(^4\) replace boy\(^3\) and girl\(^4\). The term man is also used in the general sense of human being\(^5\*\).

Age\(^1\) is another fundamental characteristic of population structure. Generally it is expressed in years, or years and months; in the case of very small children, it may be given in months and days, or in years and decimal fractions of years. Demographers usually truncate the age to the number of complete years\(^2\) lived, and this is called age at last birthday\(^3\). Occasionally demographic statistics refer to the age reached during the year\(^4\). Where the fraction of the last complete year lived is counted as a whole year, as in some actuarial applications, we speak of age at next birthday\(^5\). Stated age\(^6\) or reported age\(^6\), in a census or vital registration, is often rounded upward to the next integer especially when the next birthday is near. The term exact age\(^7\) is used, particularly in life table calculations, to denote the time when an individual reaches his birthday. Census questions include either the date of birth, age at last birthday, or even simply age without further precision. When the knowledge of ages is not widespread, a historical calendar\(^8\) may be used to estimate ages. This is a list of events with a known date that occurred during the lifetime of the respondents.
2. Thus, *age groups* (325-2) are usually expressed in completed years and the group aged 6-13 years includes the individuals whose *exact ages* (322-7) are comprised between 6 and 14 years.

### 323

In demography, certain terms which have been taken from everyday language are used to denote different *stages of life* ¹ or an approximate range of years. At the beginning of life comes *childhood* ². In general a *child* ³ is a person who has not yet attained puberty (620-2). In the very early days of life, the child is called *newborn* ⁴. A *child at the breast* ⁵ is a child who has not yet been weaned from its mother. The term *infant* ⁶ may be used to denote a child who has not reached its first birthday, though in colloquial language it may be applied to slightly older children. Children who have not yet reached the compulsory school age are called *pre-school children* ⁷, a *school-age child* ⁸ is a child at an age at which it is customary to attend school.


### 324

Childhood is followed by *adolescence* ¹ or *youth* ¹ which starts at *puberty* < 620-2). The terms *adolescents* ² or *young persons* ³ are employed for men and women between childhood and *adult age* ¹. Those who have reached *maturity* ⁴ are called *adults* ⁵. *Old age* ⁶ is frequently used to define the period of life during which most persons are retired. Persons above that *retirement age* ⁷ are called *old people* ⁸, *the aged* ⁸ or *the elderly* ⁸.

3. The term *youth* is also employed collectively. When used in the singular, it more frequently refers to a male. In the United States of America, *teenager* refers to persons in their teens, i.e., between 13 and 19 years.


### 325

The age distribution of a population is either given by *individual years of age* ¹ or by *age groups* ², which may be *five-year age groups* ³, also called *quinquennial age groups* ⁴, or *broad age groups* ⁴, such as 0-19 years, 20-59 years, 60 years and over. Occasionally a population’s *age distribution* ⁶ or *age
structure⁶ is given by classifying the population by year of birth⁵. Graphically an age distribution may be represented by a population pyramid⁷ which is a histogram (155-8) showing the population by age and sex and so named because of its pyramidal shape.

326

The mean age¹ of a population is the average age of all its members, the median age² is the age which divides the population into two numerically equal groups. When the proportion of old people in a population increases, we speak of the aging³ of the population. An increase in the proportion of young people involves a rejuvenation⁴ of the population. An old population⁵ has a high proportion of old people, a young population⁶ has a high proportion of young people or children. The term aging used above should not be confused with the technique used in population projection, which consists of aging⁷ a population by applying survival probabilities (431-6) by age to determine the number of survivors at a later date.

3. Also written ageing.

4. The word younging is used by American demographers.

327

Aging (326-3) of a population must also be distinguished from individual aging¹ or senescence⁵, and from an increase in the duration of human life or increased longevity² which is the result of improved standards of living and of medical progress. An individual’s physiological age³ will depend on the state of his tissues and organs. In the case of children we speak of mental age⁴, which is defined as the age at which the attainments of the individual child as measured by certain tests can be performed by the average child. In studies of mental and physiological age, a distinction is made between these ages and chronological age measured by the time elapsed since the individual’s date of birth⁵. The ratio of mental to chronological age is called the intelligence quotient⁶ (often abbreviated to I.Q.).


* *
Inhabitants of a nation or state may be subjects, citizens or nationals of that state, who enjoy certain political rights, or they may be aliens or foreigners who are citizens of another state, or citizens of no state at all and called stateless. The term “subject” used to have a servile connotation but has tended to lose it and is frequently taken as a synonym of citizen, though occasionally a distinction is made between a subject and a citizen. Citizens of a state generally possess the nationality of that state. This term is nowadays used as a synonym for citizenship, but in some multi-national states a distinction may be drawn between political nationality and ethnic nationality.

Aliens may acquire the nationality of their country of residence by naturalization and become naturalized citizens of naturalized persons. In some countries certificates of naturalization may be revoked and naturalized persons will then suffer loss of nationality. Persons may occasionally have more than one nationality, and will then be said to possess dual nationality. A distinction is sometimes drawn between resident aliens, who habitually live in a country other than their own, and alien visitors or visiting aliens, who are there only for relatively short periods.

Individuals born in the territory in which they live are called natives of that territory. If their ancestors were among the original inhabitants of that territory, they are called autochthonous, indigenous or aboriginal inhabitants; the last term is often reserved for primitive peoples. Statistics frequently distinguish between native and foreign-born individuals.

The term race is generally taken to mean a group of persons with certain common physical characteristics which are hereditarily transmitted. In some census practice, the term is sometimes used more loosely, sometimes for a group of people bound together by a common culture or national origin, or even for people inhabiting a given territory. Another term which is sometimes used is ethnic group and here again there is no uniformity in meaning. Eth-
nic group generally refers to a group of people with common culture, language, or religious traditions. An ethnic group may be a racial group. A people (cf. 305-2) is generally a collection of persons who are linked by a common past or a common culture. Persons living in a given territory who exhibit notable difference from the majority of the population are called minorities, e.g., ethnic minorities, national minorities, linguistic minorities, or religious minorities.

1. Race, n. - racial, adj.
   1.  Race, n.: theory that certain races are inherently superior to others; racist, adj.
   2. Tribe, and tribal group, still used in certain contexts, tend to be replaced by "ethnic group".

334

Individuals are sometimes distinguished by their color, which is used loosely to refer to the apparent pigmentation of the skin. In some countries a distinction is drawn between white persons and colored persons sometimes called non-whites. Mating between persons of different colors is sometimes referred to as miscegenation. A person who is the issue of such a union is said to be of mixed blood or mixed parentage.

4. Crossing is sometimes used in that sense. It also refers to the change in racial self-identification of an individual between one date and another.

5. The issue of a white and a negro is called mulatto. In Spanish America the issue of a person of European extraction and an American Indian is called a mestizo. The issue of a person of European extraction and an Asian is sometimes referred to as an eurasian.

340

The population may be classified by the language or dialect habitually spoken. A distinction is drawn between an individual’s mother language, which is the language spoken in his home in his earliest childhood, and his usual language, which is the language customarily used by him. The distinction between the two is not always very easy among people who are bilingual or multilingual. The statistics that present information on these topics are called statistics of language.
1. **Language**, n. - **linguistic**, adj.  
   *Linguistics*, n.: the study of the nature, structure, origin and meaning of language and human speech.

2. **Dialect**, n. - **dialectal**, adj. A dialect is a variety of language that is distinguished by its pattern of pronunciation, grammar or vocabulary.


### 341

**Religious statistics**¹ divide the population by religious affiliation. A distinction is generally drawn between the major **religions**² and their principal **denominations**³, **rites**⁴ or **sects**⁵. Persons who have no religion may describe themselves as **agnostics**⁶, **freethinkers**⁶ or **atheists**⁶.

4. **Rite**, n. may also be used in the sense of a religious ceremony.

### 342

The population is also often classified by **educational status**¹. Individuals who can read and write are called **literate**²; those who have reached a certain age and cannot are **illiterate**³. Often completion of a particular grade or level of schooling is assumed to confer literacy. **Educational attainment statistics**⁴ classify individuals by **grade attainment**⁵, **years of school completed**⁵ or, more rarely, by **age at leaving school**⁶. Another type of classification is based upon the **diploma**⁷, **degree**⁷ or **certificate**⁷ obtained, and depends on the organization of **instruction**⁸ in each country.

2. **Literate**, adj. - **literacy**, n. **Literacy statistics** are the part of **education statistics** that refer to the ability to read and write. The **literacy ratio** is the proportion of the population covered that is literate. Its complement is the **illiteracy ratio**.

3. **Illiterate**, adj. - **illiteracy**, n. A person who is able to read but not write may be called **semi-literate**, and such persons are sometimes classed with the literate and at other times with the illiterate population.

4. The **school-age population** (346-7) is often classified by grade or **level of enrollment**, and attainment is then presented only for the population beyond normal school age.
343

The education system includes all institutions, public and private providing instruction in a country. Where both types exist a distinction is made between public education and private education. After pre-school education, it is usual to distinguish between three levels of education, which are in ascending order: primary education, secondary education, and higher education. The latter includes, among others and at different levels, courses of study that lead to a university degree. Technical education or vocational education may be offered either at the secondary or higher education level.

344

Types of educational institutions and their names are a function of each country’s particular educational system. Pre-school education (343-4) is offered in nursery schools or kindergartens. The institutions that offer the three levels of education mentioned above (343-5) are usually called respectively: primary schools or elementary schools, secondary schools and colleges or universities; in addition to the latter, there may be various kinds of professional schools. Technical education (343-12) is given in learning centers, technical schools, technical colleges, technical institutes and educational institutes.

5. The term college is used in a variety of senses; a university college is either an institution of higher learning which has not full university status, or it may be a constituent college of a university.

345

A class (cf. 130-8) is a group of pupils with the same teacher who meet in the same class-room and are generally instructed simultaneously. A group of pupils who are at the same level of educational advancement are said to be in the same grade in the United States of America, or in the same class or form (cf. 206-1), in Great Britain. The term student is generally used for those receiving higher education, but is also interchangeable with “pupil” at the secondary level.

2. A scholar in Britain is generally a pupil or student who has been given a scholarship from public or private funds; the use of the term as a synonym for pupil is archaic. In the United States of America such a student would be called a scholarship holder or scholarship student.
6. A university student who has not yet taken his first degree is an **undergraduate**. A **graduate** (cf. 151-1*) in Great Britain is the holder of a university degree; in the United States of America the term may be used for anyone completing his studies at the university, high school, or even primary school. In the U.S., a **graduate student** is one who is pursuing a second degree, the equivalent of a **post-graduate student** in the British system.

346

Current school statistics\(^1\) may distinguish between the number of pupils **enrolled**\(^2\) and the number of pupils **in attendance**\(^3\). A comparison of these two figures gives an **attendance ratio**\(^4\). Compulsory education\(^5\) implies the existence of a range of ages where school attendance is obligatory by law. This makes it possible to specify the number of children of **school age**\(^6\) or the **school-age population**\(^7\) according to a legal criterion.

4. The **attendance ratio** is the ratio of pupils in attendance to pupils enrolled, whereas the **enrollment ratio** is that of pupils enrolled to the school-age population.

347

Other statistics concern educational progression. An individual progresses normally grade by grade, from the lowest class of elementary school, to the end of his studies. **Leaving school**\(^1\), where compulsory education is enforced, is exceptional during school age, barring illness or death. The **dropout rate**\(^2\) is the probability of leaving school before obtaining a degree, either during the year or at the end of a grade, and it is constructed in the same way as a probability of dying in a life table; its complement to one is the **retention rate**\(^3\). Such rates can be used to compute a **table of school life**\(^4\), from which it is possible to infer the **mean length of education**\(^5\). At the end of the school year, pupils or students who do not terminate their studies, may either repeat the grade or move on to the next grade, with or without **change of track**\(^6\). According to the fate of these pupils or students at the end of the academic year, **proportion repeating a school year**\(^7*) are established.
A distinction is generally made between the working population and the unoccupied population. Generally speaking, the working population consists of those individuals engaged in gainful activities. A gainful activity, or economic activity, is an activity which contributes to the production of income. Unpaid family workers are usually included in the economically active population. Homemakers or housewives engaged in unpaid domestic duties, students, retired workers, etc. are usually excluded. The members of the economically inactive population are sometimes referred to as dependents in the sense that they subsist on the product of the working population. (See, however, the different sense of this term stated in § 358). The ratio of the working population to the total population, usually computed with reference to a given sex-age group or other category, is called the activity ratio or labor force participation ratio.

1. The terms gainfully occupied population, gainful workers, labor force are used as synonyms for working population and economically active population. For statistical measurement of the working population, the gainful worker concept or the labor force concept may be used. According to the gainful worker concept, the working population is defined as being composed of those persons who have a gainful activity which they normally exercise. According to the labor force concept, it is defined as the group of persons who were working at a gainful occupation or wanting or seeking such work during a specified period preceding the inquiry.

Workers who make up the working population can be classified as employed or unemployed. Under the labor force concept, only persons who were actively seeking work or are on temporary layoff during the specified period are usually counted as unemployed. It is important to distinguish between persons who have never had a job and persons who are looking for their first job or first-time job seekers. The employed population consists of all those currently working for pay or profit. Among the economically active, a substantial portion of workers may be compelled by the economic conditions of the country or of the time, to perform less work than they would normally be able and willing to perform; in this instance, the terms underemployment or partial employment are used. Marginal workers who only very occasionally participate in economic activity, are most often classified as not in the labor force under the gainful worker concept.
cept (350-1 *). The employment to population ratio⁸ is the proportion of 
employed persons in the working age group (usually 15 to 64). Inactive per-
sons⁹ are those who do not accomplish any kind of professional activity nei-
ther are looking for any employment. Hidden unemployment¹⁰ or labor 
reserve¹⁰ includes people who, although not officially registered as unem-
ployed, are looking for a private work as well as those who do not exercise 
or are looking for a job but if some job opportunities arose to them, could re-
spond.

2. Employed, n. and adj. - employment, n.: situation of an individual 
exercising an economic activity. Employment status refers to the 
classification as either employed or unemployed.


6. One refers occasionally to underutilization of the labor force. Under-
employment and underutilization also sometimes refer to the situation 
of persons who perform below their level of qualification.

352

The occupational classification¹ of the working population (350-1) shows its 
members grouped by occupation². The similarity of the work done by work-
ers, including the similarity of skills and training required are the main criteria 
used for grouping occupations into occupational groups³ or occupational 
classes³.

1. For purposes of comparability, the International Labour Office has 
prepared an International Standard Classification of Occupations.

353

The working population (350-1) is also usually classified by work status¹. In 
this classification employers⁵ are distinguished from employees⁶ on the one 
hand and from workers on own account⁴ or independent workers⁴ on the 
other. The latter do not employ labor for pay, but they, as well as employers, 
may be assisted by unpaid family workers⁵ or family helpers⁵ who are usu-
ally distinguished as a separate group. A combination of occupational and sta-
tus classifications may be used to construct social status categories⁶.

1. The classification by status (as employer, employee, etc.) is 
designated by many different terms in the censuses of various countries, 
including “industrial status”, “states in employment”, “position in 
industry”, “class of worker”, etc.
2. **Managers** are sometimes counted with employers though they are themselves employed.

### 354

Various sub-groups of the category of employees (353-3) are sometimes distinguished. One such sub-group is **home workers**\(^1\) or **cottage workers**\(^1\), who work in their own homes, sometimes for several employers. Among the employees a distinction is sometimes made between **manual workers**\(^2\) and **non-manual workers**\(^3\) or **clerical and office workers**\(^3\). Manual workers may be further sub-divided according to their **skill**\(^4\), with **skilled workers**\(^5\), **semi-skilled workers**\(^6\), and **unskilled workers**\(^7\) being distinguished. **Apprentices**\(^8\) are sometimes shown as a sub-category of employees.

2. Another type of classification of employees is that which distinguishes between **wage earners** who are paid daily or weekly and salaried employees who are paid monthly or at even less frequent intervals. The statistics of the United States distinguish four broad occupational categories: **white collar workers**; **blue collar workers**, including **craftsmen, operatives** and **non-farm laborers**; **service workers**; and **farm workers** (cf. 356).

7. A **laborer** is an unskilled worker, who does very heavy physical work.

### 355

Among the employees (353-3) a distinction is often made between the **managerial staff**\(^1\), who make policy decisions; the **executive staff**\(^2\) who apply the decisions; and **supervisors**\(^3\) or **foremen**\(^3\) who direct the operative. Officials () are divided into **simple or lower service**\(^4\), mainly for positions of menial work (eg, administrative assistants, technical assistants), **middle service**\(^5\), mainly for positions requiring roughly the equivalent of a completed apprenticeship (eg, editors, administrative secretaries), **upper service**\(^6\), mainly for positions requiring a Bachelor’s degree or its equivalent (administrative frameworks or technical) and **senior service**\(^7\), restricted to graduates holding a Master’s degree or its equivalent.

1. The term **executive** in the United States of America refers to a member of the managerial staff.
Special classifications apply in agriculture. Farmers\(^1\) or farm operators\(^1\) are those who farm the land for profit; among them we distinguish between farm-owners\(^2\), who own their land, tenant farmers\(^3\), who rent it from a landlord, and share-croppers\(^3\), who give a portion of the crop in return for the use of land and livestock. Agricultural laborers\(^4\) are persons working who are employed by farmers.

2. A farm manager who is salaried is generally classed as a farmer.

3. In Scotland a small farmer is sometimes called a crofter. A farmer with a very small farm is also known as a smallholder.

4. Agricultural laborers are of three general types: fulltime agricultural laborers, day agricultural laborers, and seasonal agricultural laborers. This last category often consists of migrant laborers.

The working population may also be classified by industry\(^1\) or branch of economic activity\(^1\). This classification depends on the nature of the firm\(^2\) or establishment\(^2\) that the individual works for. Generally importance is attached to the division of the population into agricultural workers\(^3\) and non-agricultural workers\(^4\). Government employees\(^5\) are sometimes, and military personnel\(^6\) or members of the armed forces\(^6\) are generally shown separately, but employees of public enterprises are counted as a rule with the rest of the industrial population. Industries are generally classified in three sectors, the primary sector\(^7\) (agriculture, hunting, fishing and mining), the secondary sector\(^8\) (manufacturing, construction and utilities), and the tertiary sector\(^9\) (commerce, finance, transport industries, and service industries). In developing countries the traditional sector\(^10\) is often listed separately and opposed to the modern sector of the economy.

1. For purposes of international comparability, the United Nations have prepared an International Standard Industrial Classification of All Economic Activities.

5. A civil servant is an employee (353-3) of the central government. An official is an employee of a public body but the term is occasionally used for salaried employees of large companies. A distinction is often drawn between government employees and private workers.
The economically inactive population may be divided into dependents\(^1\) (350-5) and self-supporting persons\(^2\). Dependents depend for their support on the efforts of earners\(^3\) or breadwinners\(^3\); this is for example the case of housewives (350-4) and dependent children\(^4\). Self-supporting persons have sufficient means for their subsistence. They may be rentiers\(^5\) or persons of independent means\(^5\), retired persons\(^6\) or pensioners\(^6\). A special category of dependents is that of persons receiving public assistance\(^7\) or public welfare recipients\(^7\). Persons incapable of work are called unemployable\(^8\). The ratio of the inactive to the active population is called the economic dependency ratio\(^9\).

1. Dependent or dependant, n. - dependent, adj. - dependency or dependancy, n.: the state of being dependent.

9. The ratio of the young and the elderly to the adult population is called the age dependency ratio.

It is possible to classify the population by the sector of economic activity from which they derive their livelihood, dependants being put into the same category as their breadwinners. We speak of the population dependent on\(^1\) a particular branch of activity and in particular of the population dependent on agriculture\(^2\). The term agricultural population\(^3\) is sometimes used as a synonym, but may also be employed in the sense of farm population\(^2\) which lives on farms or is dependent on agriculture and which is distinguished from the non-farm population\(^3\) or non-agricultural population\(^3\).

The infirm\(^1\) or handicapped\(^1\) are often separately shown in censuses. They are classified according to the nature of their infirmity\(^2\) or handicap\(^2\). Physical infirmities\(^3\) or physical handicaps\(^3\) such as blindness, or deaf-mutism are generally distinguished from mental infirmities\(^4\) or mental handicaps\(^4\), such as feeblemindedness or dementia.

The study of the working life\(^1\) of individuals includes the study of the accession to the labor force\(^2\) and of the separation from the labor force\(^3\). At accession it is possible to distinguish those who have never been active, from
those who belonged to the labor force at an earlier date; separations may be listed by cause, e.g. death, retirement, temporary withdrawal. The analysis may proceed by cohort or period, and it involves rates of accession to the labor force, or probabilities of accession to the labor force, rates of separation from the labor force or probabilities of separation from the labor force, eventually by cause; these indices are computed by age or age-group.

362

These indices serve to compute tables of working life, by period or cohort. In addition to the probabilities described in the previous paragraph, these tables contain the distributions by age at accession to the labor force and by age at separation from the labor force, (eventually by cause, before and after accounting for mortality), the mean age at accession to the labor force and the mean age at separation from the labor force. The expectation of working life, the gross expectation of working life (which excludes the effect of mortality) and the net expectation of working life (which includes it) all represent the mean number of years of working life that remain to be lived at each age by the active population. For those entering the labor force at that age, this expectation constitutes the mean duration of working life; a similar index can be computed for all ages at accession taken together.

1. Such tables are computed when temporary withdrawals from the labor force are a negligible proportion of the total, and this condition is approximately realized for males. For females, it is necessary to distinguish first accession to the labor force, or entry into the labor force, from re-entry into the labor force.
Chapter 4
Mortality and morbidity

401
The study of mortality\(^1\) deals with the effect of death on the population. The general terms mortality rate\(^2\) or death rate\(^2\) encompass all the rates (133-4) which measure the frequency of deaths\(^3\). Where the expression death rate is used without any qualifying adjective the crude death rate\(^4\) is usually meant (cf. 136-8 for a general discussion of crude rates). This is generally an annual rate and consists of the ratio of the annual number of deaths occurring during a calendar year to the number exposed to the risk of dying during the same period. This number is equivalent to the mean population\(^5\) or average population\(^5\) for the period, and the population at the mid-point of the period can usually be substituted for the average population without appreciable error, if the size of the population is changing fairly uniformly. If the mortality of a sub-population (101-6) only is studied, we speak of specific death rates (134-6) among which sex-age-specific death rates\(^6\) are the most common. Age specific death rates\(^7\) without distinction of sex are also used on occasion.

2. Occasionally the term mortality is used as a synonym for mortality rate or death rate.


5. When the observation period exceeds one year, the mean population is generally obtained as the average of several estimates of the size of the population for each year. The *average number of persons years* (135-6) is also used as denominator.

402
Specific death rates may be used to study differential mortality\(^1\) or mortality differences\(^1\) between groups, and reference is made to an excess mortal-
ity of one group as compared with another, or with the rest of the population. It is measured by an excess mortality index. The study of differences in the death rates of specific occupations is called the study of occupational mortality. In a rather different sense the term occupational mortality may refer to the mortality from hazards associated with a particular occupation. Among these, we may mention occupational diseases.

1. Differentials in mortality is also encountered.

2. The expression excess male mortality implies a comparison with the corresponding female mortality, e.g. at the same age.

403

Crude death rates (401-4) will depend upon the structure [particularly the age structure (325-6)] of the population as well as on the level of mortality. If the mortality of different populations is to be compared standardized mortality rates or adjusted mortality rates are sometimes computed to eliminate the effect of differences in population structure (144-4). Age is the characteristic for which mortality rates are adjusted most frequently by reference to a standard population with a given structure. If specific rates for the population studied are available, it is possible to use the direct method of standardization which consists of applying these rates to the corresponding groups of the standard population. If specific rates are not available, it is still possible to obtain standardized mortality rates by the indirect method of standardization. More frequently, comparative mortality indices are computed by applying standard mortality rates to the different groups of the population studied and summing these to obtain an expected number of deaths; the indices are then obtained by comparing the observed deaths in the population with the expected deaths which would have occurred had the standard rates applied.


5. If a crude death rate (401-4) is multiplied by a comparative mortality index, we obtain an indirectly standardized death rate. In British official terminology, when occupational mortality is studied, the figure obtained by direct standardization is called a comparative mortality figure and that obtained by indirect standardization a standardized mortality ratio.

*  
**
The mortality of live-born children who have not yet reached their first birthday is called infant mortality. The mortality of live-born children who die before reaching a certain age taken as four weeks or 28 days, the so-called neo-natal period, is called neo-natal mortality. The mortality during the first week of life and between the first week until before 28 days are called respectively early neo-natal mortality and late neo-natal mortality. The term post-neonatal mortality refers to deaths after the neo-natal period, but before reaching the age of one year.

3. In certain statistics the neo-natal period is defined as the first month of life. The term early infancy is occasionally used as an approximate equivalent to the neo-natal period, as, e.g., in “diseases of early infancy.”

The expression foetal mortality is used for deaths prior to the complete expulsion or extraction from its mother of a product of conception irrespective of the duration of pregnancy. The terms intra-uterine mortality or mortality in utero may also be used. The corresponding deaths are called foetal deaths or intra-uterine deaths. Early foetal mortality occurs before the twentieth week of gestational life, while intermediate foetal mortality occurs between the twentieth and the 28th week of gestation. After the twenty-eighth week, one refers to late foetal mortality and the product is called a late foetal death or, popularly, a stillbirth. Perinatal mortality includes late foetal mortality and a portion of infant mortality that may include either early neo-natal deaths, or all neo-natal deaths. The foeto-infant mortality includes stillbirths and deaths of children under one year.

1. Foetal - also spelled fetal.

2. Also designated as pregnancy wastage. These terms include abortions, miscarriages and stillbirths.

3. Early foetal deaths are also popularly known as miscarriages.

5. Stillbirth, n. - stillborn, adj. In certain countries, including France, children born alive who died before registration may be legally included among the stillborn, and are called false stillbirths.

6. The corresponding deaths are called perinatal deaths.
412

The ratios of deaths under one year of age\(^1\), of deaths of less than 28 days, and of deaths of less than one week, occurring in a year, to the number of live births of the same year give respectively the infant mortality rate\(^2\), the neonatal mortality rate\(^3\) and the early neo-natal mortality rate\(^4\). These rates are generally expressed per one thousand live births. When deaths are cross-classified by age and year of birth, it is possible to divide the deaths under one year by the births in the two cohorts to which they belong. The resulting index is an adjusted infant mortality rate\(^5\) equivalent to a probability of dying before age one\(^5\). In the absence of such information separation factors\(^6\) may be estimated, which divide infant deaths into those occurring to infants born in the current calendar year and to infants born in the previous calendar year.

413

The proportion of late foetal deaths (411-5) among all births is called a late foetal mortality rate\(^1\). The ratio of late foetal deaths to live births (601-4) is called a late foetal mortality ratio\(^2\). A foetal mortality rate\(^1\) represents the number of known intra-uterine deaths per one thousand births in the same year while the foetal mortality ratio\(^4\) is the ratio of intra-uterine deaths to live births in a given year. These indices greatly understate intra-uterine mortality since early intra-uterine deaths frequently remain unobserved or unknown. A better measurement of intra-uterine mortality is provided by intra-uterine mortality tables\(^5\), a specialized application of the life table (cf. 432) which takes into account the duration of gestation. The perinatal mortality rate\(^6\) relates perinatal deaths (411-6\(^*\)) to the sum of late foetal deaths and live births. The foeto-infant death rate\(^7\) represents the number of known stillbirths and deaths in the first year of life per one thousand live births and stillbirths of the same reporting period.

1. Also called stillbirth rate. This usage is not recommended.
2. Also called stillbirth ratio. This usage is not recommended.
6. The perinatal mortality ratio relates perinatal deaths to live births only.

414

In the study of age-specific mortality\(^1\), the terms infant mortality (410-2) and neo-natal mortality (410-3) refer to generally accepted time periods. The usage of such terms as child mortality\(^2\), youth mortality\(^3\), adult mortality\(^4\)
or mortality of old age is not uniform. Post-infantile child death rate sometimes refers to the death rate between one and 4 years of age.

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420  
The study of morbidity deals with the investigation of illness, sickness, ill-health or disease in a population. Two aspects are considered: the incidence of disease and the prevalence of disease according to whether the new cases of disease are considered or the number of cases existing at one point in time. The compilation of morbidity statistics is hampered by the lack of a sharp distinction between health and the morbid state. Nosology and nosography contribute respectively to the classification and description of diseases.

2. Disease, illness, or sickness are used as collective nouns in the singular, or both in the singular or plural to designate specific ailments.

421  
Health statistics encompass morbidity statistics, but also cover all aspects of the health of a population, and are generally taken to include statistics of cause-specific mortality. The classification of deaths by cause of death is made difficult because in many cases there may not be a single cause of death but multiple causes of death or joint causes of death. When this is the case we may distinguish between the immediate cause of death and the underlying cause of death or, looking at the problem from a different point of view, we may distinguish between the primary cause of death or principal cause of death and the secondary cause of death, contributory cause of death or associated cause of death. The cause-specific death rate is generally expressed per 100,000 population. The ratio of the number of deaths from a specific cause to the number of deaths from all causes is referred to as the cause-specific death ratio. Such ratios calculated for specific age groups or the general population provide information of the underlying structure of causes of death.
Death or disability (426-2) may be the consequence of disease (420-2) or of injury\(^1\) or poisoning\(^2\). Injuries may be due to accident\(^3\) or violence\(^4\). Among cases of violence it is normal to distinguish suicides\(^5\) and attempted suicides\(^5\), homicides\(^6\) and deaths or injuries due to operations of war\(^7\).

3. Accident, n. - accidental, adj.
6. Homicide, n.: May in law be murder or manslaughter.
7. Abbreviated to war deaths and war injuries.

An endemic disease\(^1\) is one that permanently affects substantial segments of a population, in contrast with an epidemic\(^2\), which spreads and then disappears within a fairly short time; when it appears in a large number of countries, it is called a pandemic\(^3\). Certain infectious diseases\(^4\) or communicable diseases\(^4\) have attracted particular attention, because they are capable of infecting large numbers of persons within relatively short time intervals. In such instances we speak of epidemic diseases\(^5\), and special epidemiological statistics\(^6\) are collected to show their incidence. It is possible to obtain information about these illnesses in various countries because legislation has made their reporting compulsory; they are therefore called notifiable diseases\(^7\). A distinction is sometimes made between chronic diseases\(^8\) and acute diseases\(^9\). These terms are not precisely defined, but acute diseases are generally understood to be those of abrupt onset and short duration while chronic diseases are those with slow onset and long duration, and often causing prolonged disability.

2. Epidemic, n., also used as adj.
4. Infectious, adj. - infect, v. - infection, n. The terms communicable diseases, contagious diseases and infectious diseases are not synonymous. A contagious disease can only be transmitted from person to person; thus, malaria, a communicable disease, is not contagious. Moreover, certain infectious diseases are not communicable.
6. Epidemiology, n.: the science dealing with epidemics - epidemiologist, n.: a specialist in epidemiology - epidemiological, adj.: pertaining to epidemiology. The meaning of these terms has expanded greatly, and epidemiology now covers the study of relations between a biological or medical phenomenon and various factors, such as tobacco for example in "the epidemiology of lung cancer," or
alternatively the statistical analysis of geographic variations in health phenomena.

424

Demographers devote particular attention to certain aspects of mortality: endogenous mortality\(^1\) which results from the genetic constitution of the individual, congenital malformations\(^2\), injuries connected with birth, or degenerative diseases associated with aging; exogenous mortality\(^3\), in contrast, results from external causes such as infectious or parasitic diseases and accidental injuries other than those incurred by the child during birth. Also of special interest are diseases connected with pregnancy, labor and the puerperium\(^4\). Mortality from these latter diseases is called maternal mortality\(^5\), and a maternal death rate\(^6\) may be computed as the ratio of maternal deaths in a year to the births of the same year. The proportion of deaths due to senility\(^7\) has mostly drawn interest as an index of poor reporting of causes of death.

1. Infant mortality (410-1) can thus be decomposed into endogenous infant mortality and exogenous infant mortality.

3. See note 1.

4. The puerperium is the lying-in period following a birth, and the mortality of mothers during the period is called puerperal mortality.

7. Senility n. - senile, adj.

425

Three aspects of morbidity (420-1) are commonly measured by morbidity rates\(^1\) or morbidity ratios\(^1\): frequency, duration and severity. These indices may be computed for specific diseases, or for all diseases. Two indices of the frequency of ill-health are the incidence rate\(^2\), the number of new cases of disease during the period related to the average population, and the prevalence rate\(^3\), the number of cases existing at a given moment of time expressed per unit of the average population. Either the average duration per case\(^4\), or the disability rate\(^5\), which is the mean number of days of illness\(^5\) per person in the population, may serve as a measure of the duration of illness. The case fatality rate\(^6\), which is the proportion of fatal cases among the reported cases of the specified diseases, may be used as an index of severity.

6. This is said to measure the lethality of the disease.
426
An impairment\textsuperscript{1} refers to any physical, functional or psychological defect, which results from illness, injury or congenital malformation. When an impairment inhibits an individual’s ability to work or participate in normal activities it is referred to as incapacity\textsuperscript{2} or disability\textsuperscript{2}. This may be total or partial; in either case, permanent disability\textsuperscript{3} or infirmity\textsuperscript{4} refer to an irreversible condition which gives rights to professional incapacity\textsuperscript{7} or work incapacity\textsuperscript{8} compensations. The probability that a healthy individual aged exactly \( x \) years will become disabled in the next year or over the course of some number of years starting with this exact age, is called the risk of disability\textsuperscript{5} or the probability of disability\textsuperscript{5}. A series of these probabilities can be combined into a disability table\textsuperscript{6}, which is a specialized extension of the life table (cf. §432). It gives rights to Professional incapacity or occupational disability

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430
Mortality statistics are generally compiled from death registration (cf. 211). When a death takes place a death certificate\textsuperscript{1} is generally issued; statistics are compiled from the information given on death certificates. In some countries a distinction is made between the medical certificate of death\textsuperscript{2} issued by a medical practitioner who has attended the deceased person during his or her last illness, and an ordinary death certificate issued by the registrar of deaths for legal purposes.

1. The first death statistics in England and Wales were compiled from bills of mortality which were generally drawn up on the basis of burial registers. In countries where vital registration is deficient, statistics can be gathered by the survey technique; questions may be asked on deaths during a reference period, generally the previous year; the indirect estimation of mortality relies on such questions as the number of children surviving among children ever born (637-2), orphanhood status or widowhood status.

431
Probabilities of dying\textsuperscript{1} or death probabilities\textsuperscript{1} are used to study in detail the mortality of a period or of a cohort. They are the probabilities that an individual of exact age \( x \) will die before exact age \( x + n \), and are represented by the symbol \( nq_x \). If \( n = 1 \), we talk about annual death probabilities\textsuperscript{2}; if \( n = 5 \),
about quinquennial death probabilities. The instantaneous death rate, or as it is occasionally called the force of mortality, is the limit of the \( nq_x \) value as \( n \) tends to zero. The projective mortality probability is the probability that individuals of the same cohort or group of cohorts died between two January 1st. The name of this probability comes from its use in the calculation of population projections. The complement to one of the probability of dying from exact age \( x \) to exact age \( x + n \) is the probability of survival over this interval. In the preparation of population projections, we use survival ratios; they represent the probability that individuals of the same birth cohort or group of cohorts will still be alive \( n \) years later.

1. The probability of death between age \( x \) and \( x + n \) is defined as the ratio of deaths between ages \( x \) and \( x + n \) to the number of survivors at exact age \( x \). It is not to be confused with the central death rate, the ratio of deaths between ages \( x \) and \( x + n \) to the mean population alive at that age. The central death rate is written \( nmx \).

6. The probability of survival from age \( x \) to age \( x + n \) is written \( np_x \).

432

The course of mortality throughout the life cycle may be described by a life table. A life table consists of several life table functions, all of which are mathematically related and may be generally derived when the value of one of them is known. The survivorship function shows the number of survivors of a cohort (116-2) of births to various exact ages (322-7) on the assumption that the cohort is subjected to the rates of mortality shown. The number of births in the original cohort is known as the radix of the life table and the process by which the original cohort is reduced is known as attrition.

4. The number of survivors to exact age \( x \) is denoted by \( l_x \).

5. The radix is usually a power of 10: 10,000 or 100,000 for example.

433

To the survivors function corresponds a death function which is calculated as the differences between the number of survivors (432-4) at different ages within the given age interval. It is named the distribution of life table deaths in order to be distinguished from the crude distribution of deaths. Life tables typically include the expectation of life or life expectancy at age \( x \); this is the mean number of years to be lived by those surviving to exact age \( x \), given the mortality conditions of the table. The expectation of life
at birth\(^4\) is a particular case of expectation of life, and represents the mean length of life\(^4\) of individuals who have been subjected since birth to the mortality of the table. The reciprocal of the expectation of life at birth is the life table death rate\(^5\) or death rate of the stationary population\(^5\).

3. By integrating the survivorship function (432-3) between two exact given ages we obtain the total number of years lived by the cohort between these ages; the notation for the total number of years lived between age \(x\) and \(x + n\) is \(nL_x\). This function is often called the stationary population in life table column headings. By summing it from a given age \(x\) to the end of life, we obtain the total number of years to be lived after attaining age \(x\) by those reaching that age; the conventional notation is \(T_x\).

4. The notation for the expectation of life at age \(x\) is \(e_x\)

434

The median length of life\(^1\) sometimes called the probable length of life\(^1\) is the age at which half the original cohort of births have died. After infancy the distribution of deaths by age in the life table will usually have a mode and the corresponding age is called the modal age at death\(^2\), or sometimes the normal age at death\(^2\). It may be of interest as an indicator of human longevity\(^3\) or the length of life\(^3\) corresponding more closely to the sense in which the term is used in everyday language than either the average (433-4) or the median length of life. The term life span\(^4\) is used to refer to the maximum possible length of human life.

435

A complete life table\(^1\) is usually one in which the values of the life table functions (432-2) are given in single years of age. An abridged life table\(^2\) is one in which most functions are given only for certain pivotal ages, frequently spaced at five or ten year intervals after infancy; intermediate values for the functions are usually obtained by some form of interpolation (151-7). The term life table for selected heads\(^3\) is used to refer to a life table relating to the experience of a number of specially selected individuals, such as the clients of a life insurance company, in opposition to general life tables\(^4\) which relate the experience of a whole population (101-4). Life tables are generally presented on a sex-specific basis although on occasion they are presented for both sexes. A life table which is based only upon the generalization of empirical relationships is called a model life table\(^5\).
A calendar-year life table\(^1\) or period life table\(^1\) (cf. 153-2; 432-1) is one in which the mortality rates used relate to a specified time interval and the cohort\(^2\) is therefore hypothetical. A generation life table\(^2\), or cohort life table\(^2\) on the other hand, traces the experience of an actual birth cohort and the mortality rates contained in the table are then spread over a prolonged period, usually about 100 years. A mortality surface\(^3\) is drawn when probabilities of dying\(^4\) are plotted against age and time period simultaneously in a three-dimensional diagram.

The Lexis diagram\(^1\) is commonly used to illustrate the usual method for computing death probabilities and other demographic measures. In this diagram, every individual is represented by a life line\(^2\) which begins at birth and ends in the point of death\(^3\). A method for the study of mortality at very advanced ages has been called the method of extinct generations\(^4\), because it uses observed deaths for cohorts which have been completely eliminated by mortality.
Chapter 5
Nuptiality

501

The study of nuptiality deals with the frequency of marriages i.e. of unions between persons of opposite sexes which involve rights and obligations fixed by law or custom; with the characteristics of persons united in marriage; and with the dissolution of such unions. By extension, it also includes the study of other conjugal unions (503-8) where their frequency makes their inclusion necessary. A marriage or wedding is the ceremony, prescribed by law or custom, which establishes such a union between a man and a woman as spouses, i.e. husband and wife. The spouses jointly are called a married couple.


6. A man at, or soon before or after his marriage, is a bridegroom (abbreviation: groom).

7. A woman at, or soon before or after her marriage, is a bride.

502

Marriage laws or marriage customs differ in different societies. A society in which a person may be married to only one person of the opposite sex at a time is called monogamous. Societies in which a person may be married to several persons simultaneously are called polygamous. A distinction is made between polyandrous societies, where a woman may have several husbands, and polygynous societies, where a man may have several wives. The term "polygamy" is frequently used in the sense of polygyny.


**503**

In some countries a legal union can be established only through a civil marriage\(^1\) performed by an official of the state; in other countries a religious marriage\(^2\) in accordance with the regulations of a church is recognized as having legal force. Social or legal recognition may be given under various conditions in different countries to stable unions which have not been solemnized by a legal or religious ceremony, for instance to customary marriages\(^3\) or to common law marriages\(^3\) conforming to local traditions. Different types of relationships and degrees of social acceptance are implied in terms applied to various unions but their significance varies widely in different countries. The term consensual union\(^4\) implies a socially recognized stable union, the term companionate marriage\(^4\) has a similar connotation. The terms free union\(^5\) and temporary union\(^6\) both imply a less stable union that may or may not include cohabitation\(^7\). Two persons of opposite sexes living in a stable union, whether legal or not, are called a couple\(^8\). The term conjugal union\(^8\) has been used by demographers to include both legal unions and more or less stable illegal unions.

3. **Concubinage**, n.: a type of illegal union. A concubine in the restricted sense is a woman with an accepted conjugal status inferior to that of a legally recognized wife, particularly in polygynous societies. In other societies, the word concubine is sometimes used loosely to denote any woman other than a wife living in conjugal union with a man. Today such terms as companion or mate are preferred.


**504**

In many countries a minimum age at marriage\(^1\) is laid down by law. The age differs from country to country and may be different for the two sexes. Marriages among persons closely related by blood are called consanguineous marriages\(^2\) and are generally prohibited by either law or custom. Persons who are forbidden to marry one another for these reasons are said to be within the prohibited degrees of consanguinity\(^3\).
505

In some countries the publication of banns\(^1\) or intent to marry\(^1\) is a necessary preliminary to a marriage (501-4), giving public notice to persons interested, who may then oppose the marriage if they have reason to do so. In many countries a marriage license\(^2\) must be obtained before the marriage ceremony can take place. A marriage certificate\(^3\) is usually delivered to the newly married couple\(^4\) after the ceremony. The consummation of marriage\(^5\) has occurred, or a marriage has been consummated\(^5\) when sexual relations have taken place between the spouses.

1. Before the celebration of the marriage the future spouses are said to be engaged or betrothed, words which come from the custom of engagement or betrothal which consists of a more or less formal exchange of promise to marry.

506

Endogamy\(^1\) exists where both spouses must belong to the same group (e.g. tribe, clan). The term is also used to denote a tendency for spouses to be members of the same social or geographical group or isolate\(^2\), which is generally of limited size. The opposite requirement or tendency is called exogamy\(^3\). Mixed marriages\(^4\) are marriages between persons of different nationalities, races, religions, etc. When marriage is contracted between persons with certain common characteristics, social, physical or mental, it is called homogamy\(^5\), the opposite is called heterogamy\(^6\).

2. Exogamy, n. - exogamous, adj.
3. Homogamy, n. - homogamous, adj.

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510

At the close of married life\(^1\) or conjugal life\(^1\), the end of union\(^2\) coincides with the dissolution of marriage\(^3\), i.e. the breaking of all legal obligations resulting from the status of spouse, including the removal of legal obstacles to a new marriage. If a marriage is dissolved by death the surviving spouse is
called a widower\(^4\) if male and a widow\(^5\) if female. Widowed persons\(^6\) live in a state of widowhood\(^7\).

**511**

Where *divorce*\(^1\) as an institution is recognized, the dissolution of *marriage* (510-2) may take place through the granting of a *decree of divorce*\(^2\) to one of the spouses. In some countries a spouse may be *repudiated*\(^3\) by the other. Persons whose marriages have been dissolved by divorce are called *divorced persons*\(^4\). The French words *divorcée (fr)*\(^6\) (woman) or *divorce*\(^5\) (man) are sometimes used in English, though the masculine form is rare.

1. Divorce, n. and v.

**512**

In some countries the principle of the *indissolubility of marriage*\(^1\) is upheld by law or custom and *divorce* (511-1) is not allowed; only the death of one of the spouses (501-5) may bring about *dissolution of the marriage* (510-3). Under any legal system, however, lack of harmony may lead to *separation*\(^2\) of the spouses. This may take the form of a *de facto separation*\(^3\), either through common consent or as the result of the *desertion*\(^4\) of one of the spouses by the other. Or it may take the form of a *legal separation*\(^5\) or *judicial separation*\(^5\). A judicial separation absolves the parties from certain obligations, including the duty of living together, or cohabitation, but does not enable either of them to contract a new marriage. Persons whose marriages have been broken by separation are called *separated persons*\(^6\). Marriages in which the spouses no longer cohabit but which have not been legally dissolved may be called *broken marriages*\(^7\).

**513**

A *decree of nullity*\(^1\) or an *annulment of marriage*\(^1\) is a declaration by a court of law that, although a marriage ceremony has taken place, there has been no *valid marriage*\(^2\). The expression *dissolved marriage*\(^3\) is frequently understood to include cases of annulments and of legal separation, although legally the marriage is not dissolved. The term *end of union* (510-2) is more appropriate than dissolution in such cases and may also refer to unions other than marriage.
From a legal point of view, any person who meets the conditions set by law or custom to contract a marriage is marriageable, and the marriageable population is made up of such persons; the non-marriageable population consists of those who are not free to do so by law or custom. The marriage market, the marriageable circle or group of persons among whom mate selection takes place however, does not include all marriageable persons; candidates to marriage include only those who are not excluded, at least temporarily, by reasons of health or other circumstances from the marriage market. Widowed or divorced persons may contract a new marriage; there is thus a distinction between a first marriage and a marriage of higher order, or remarriage. Because the order of marriage may differ for the two spouses, the term “first marriage” is ambiguous unless specified as referring to groom or to bride or to both parties; unless otherwise specified, it refers to a marriage between a bachelor and a spinster.

The population may be divided into different groups by conjugal status, marital status or marital condition. Single persons, bachelors (men) and spinsters (women), are those who have never been married; they are also sometimes called the never-married class. The class of married persons, married men and married women, consists of those who have been married and whose marriages have not been dissolved. All persons except single persons are ever-married persons.

Relative marriage frequency is measured by marriage rates or nuptiality rates, among which the crude marriage rate gives the ratio of the total number of marriages to the total population in a given period. Male nuptiality and female nuptiality are often different, and can be studied separately. The terms male nuptiality and female nuptiality are used for the marriage frequency of the different sexes. A sex-specific marriage rate can be computed...
with the appropriate population of each sex as a base. It is usual to distinguish between a **first marriage rate**\(^6\), which relates the number of *bachelors* or *spinsters* (515-3 and 4) marrying to the total number of bachelors and spinsters respectively and a **remarriage rate**\(^7\) which relates the number of remarriages to the total number of widowed and divorced persons. Similar rates can be computed by age or age-group of husband and wife whenever marriages are classified by **age at marriage**\(^8\) of each spouse; such rates are called **age-specific marriage rates**\(^9\). The tabulation of spouses by age at marriage permits the computation of the **mean age at marriage**\(^10\) or **average age at marriage**\(^10\) for the given year or period. **Age differences between spouses**\(^11\) can be analyzed from a classification of the **combined ages**\(^12\) of the spouses.

2. Sometimes the crude marriage rate is obtained by relating the number of newly married persons to the total population.

9. The terms **marriage frequencies** and **first marriage frequencies** have sometimes been used to refer to the ratio of the number of marriages or first marriages at a certain age, to the total number of persons of that age, irrespective of their marital status. **Cumulated marriage frequencies** and **cumulated first marriage frequencies** are used in cohort studies.

**521**

The prevalence of marriage in a generation of men or women is measured by the **proportion never married**\(^1\). This is usually equivalent to the **proportion remaining single**\(^2\) at an age such as 50 after which first marriages are rare. The proportion remaining single at each age in a cohort can be computed from **first marriage probabilities**\(^3\), i.e. the proportion of single persons at exact age \(x\) who will marry before exact age \(x + 1\), assuming that there is no mortality. For practical purposes, however, the proportion remaining single is usually obtained from census data as the **proportion single**\(^4\) at that age in the corresponding cohort. When a classification of first marriages by age of the spouses is available the **mean age at first marriage**\(^5\), the **median age at first marriage**\(^6\) and the **modal age at first marriage**\(^7\) can all be computed. In the absence of data on the timing of marriages, it is often possible to compute a **singulate mean age at marriage**\(^8\) from census data on the proportions single by age.

**522**

**Nuptiality tables**\(^1\) resemble life tables, and combine various nuptiality functions. The **gross nuptiality table**\(^1\) includes, by age, the **first marriage probabilities** (521-3) and **proportions remaining single** (521-2), as well as the **number**
of first marriages in a cohort of given size subjected to the prevailing nuptiality on the assumption that there is no mortality; it also gives the numbers remaining single at various ages. The net nuptiality table takes mortality as well as nuptiality into account, and is a particular case of double decrement tables (153-4). Such a table includes the single survivors, the ever-married survivors, the probability of single survival and the expectation of unmarried life.

523

A divorce rate can be calculated in different ways. The crude divorce rate gives the ratio of the number of divorces to the average population during a given period. The ratio of divorces to the number of married couples is sometimes computed and may be called the divorce rate for married persons. If divorces are tabulated by the age of the divorced person or by duration of marriage, age-specific divorce rates and duration-specific divorce rates can be computed. Another index of divorce frequency is obtained by computing the number of divorces per new marriage.

6. This is a period measure which relates the divorces of one year, either to the marriages of that year, or to a weighted average of the marriages of several years. In cohort analysis, it is possible to relate divorces in successive years to an initial marriage cohort to compute the cumulated proportion divorced.

524

When the requisite basic statistics are available, marriage dissolution probabilities may be computed, showing for each sex the probability of the marriage being dissolved by death or divorce according to duration of marriage; marriage dissolution tables are an application of double decrement life tables. Remarriage tables for widowed and divorced persons can also be computed, but the most common indices of remarriage are the relative frequency of remarriage, i.e. the proportion of widowed or divorced persons who remarry, often given by age at widowhood or divorce, and by the interval between widowhood or divorce and remarriage. The latter information enables one to compute the mean interval between widowhood and remarriage and the mean interval between divorce and remarriage.
Chapter 6
Fertility

601

Demographic studies of fertility\(^1\) deal with certain phenomena connected with human childbearing\(^2\) or reproduction\(^2\). The term natality\(^1\) is sometimes used instead of fertility. These terms refer to the frequency of occurrence of births\(^3\) or more specifically live births\(^4\) — within populations and sub-populations. A birth is the process of delivering a child. Live births or the births of live-born children\(^5\) are distinguished from late foetal deaths (cf. 411-5) by evidence of life, such as respiration, movement of voluntary muscles or heartbeat of the child after complete expulsion or extraction. The term effective fertility\(^6\), which was once used to indicate that late foetal deaths were not counted among the total number of births, should refer to the cases in which the deaths of infants or children are excluded from consideration. The term crude fertility\(^7\)** should refer to all births including stillbirths (411-5) or foetal deaths. The term differential fertility\(^8\) designates fertility differences between the subgroups of a population.

1. On the meaning of the term fertility in demography, see also § 623.

2. Reproduction, n. - reproduce, v. - reproductive, adj. Frequently, reproduction refers to the balance of births and deaths (as in § 711) rather than to the process of childbearing or procreation.

3. The word birth is now commonly used to mean live birth.

4. Live-born, adj. also used as noun to mean: infant born alive.

602

Conception\(^1\) results from the fertilization\(^2\) of an ovum\(^3\) by a spermatozoon\(^4\) or sperm cell\(^4\) and marks the beginning of pregnancy\(^5\) or gestation\(^5\)
for the impregnated woman. In the course of its development the product of conception is successively called an embryo and then a foetus — sometimes written as fetus. The moment at which the embryo becomes a foetus is not precisely determined: certain scientists set it at the end of 12 weeks or three months of intra-uterine life, although successive developmental stages after the eighth week are often termed foetal. Nidation refers to the implantation of the egg in the wall of the uterus or womb, a process which occurs a few days after fertilization.

1. **Conception**, n. - **conceive**, v.

2. **Fertilization**, n. - **fertilize**, v.
   *Artificial fertilization* : fertilization obtained by artificial insemination, i.e. by a process other than coitus (627-2).

3. A fertilized ovum is called an **egg** or **zygote**.

4. **Pregnancy**, n. - **pregnant**, adj.: gravid, expectant. Certain scientists consider that a pregnancy begins only at the time of nidation (602-8) of the egg.

5. **Embryo**, n. - **embryonic**, adj. - **embryology**, n.: the science dealing with the development of the embryo.
   **Foetus** or **fetus**, n. - **foetal** or **fetal**, adj. (cf. 41).


603

A foetus is said to be non-viable during the first part of a pregnancy and viable thereafter. The change occurs when the foetus becomes capable of independent existence outside its mother, which is commonly considered to take place when the period of gestation or duration of pregnancy has exceeded 28 weeks. If the pregnancy has lasted longer than this, the expulsion of the foetus (alive or dead) takes place during confinement; an earlier expulsion associated with an early foetal death is called an abortion (cf. § 604). The period of about six weeks after delivery (during which the uterus usually regains its normal size and in which the probability of conception is low) is called the puerperium.


2. The minimum period determining viability varies between 20 and 28 weeks among countries, but the World Health Organization has recommended that 28 weeks be the standard time period. Generally the duration of pregnancy is computed from the onset of the last menses. This constitutes the conventional duration of pregnancy,
as opposed to the true duration of pregnancy, computed from the time of conception.

4. The actual process of expulsion of the foetus is called delivery or parturition, which is the termination of labor. In addition to those, confinement includes expulsion or removal of the placenta or afterbirth.

5. Abortion, n. - abort, v.t or v.i. - abortifacient, adj. used as n.: capable of inducing abortion. - abortionist, n.: a person who performs abortions. In everyday language, the term abortion often takes the meaning of induced abortion (604-2), as opposed to spontaneous abortion (604-1).


604

Abortions following a non-induced infra-uterine death, which may have occurred some time before expulsion, are called spontaneous abortions or miscarriages, in contrast to intentional abortions, or induced abortions. A therapeutic abortion is one undertaken for medical reasons. The laws of certain countries permit abortions for health or other reasons; these are legal abortions. Abortions which are induced contrary to law are called illegal abortions or criminal abortions. According to the technique used, there are abortions by curettage, abortions by vacuum aspiration, abortions by dilatation and evacuation, hysterotomies (involving surgical cutting into the uterus), and abortions by medical induction procedures.

6. Also called abortions by dilatation and curettage, (abbreviated to D and C).

7. Also called abortions by suction. When the procedure is used very soon after a presumed conception, the terms menstrual regulation or menstrual extraction are used.

9. Such procedures involve amniotic fluid exchange as in the instance of an abortion by saline injection, or the use of prostaglandins.

605

Full term deliveries occur when the pregnancy has lasted at least 37 weeks, measured in conventional duration of pregnancy (603-3*). A pregnancy ending before the normal period is termed a premature delivery or premature confinement or premature birth and the product of this delivery is called
a premature baby. Births which are not premature are called births at term or full-term births. The word prematurity is used to refer to phenomena connected with premature delivery. A classification of births by stage of development that does not depend upon an estimate of the period of gestation is used in many countries. In this classification a live-born infant with a birth weight of 2,500 grams (5 1/2 lbs.) or less is said to be immature. Immaturity is often combined with debility, an abnormal state of weakness.

606

At most confinements there is a single birth or single delivery but at some there are plural births, multiple births or multiple deliveries. Two children born during the same confinement are called twins and we may distinguish between monzygotic twins, uniovular twins or identical twins on the one hand, and dizygotic twins or biovular twins on the other. Monozygotic multiple births occur when one ovum splits after fertilization; the resulting children must always be of the same sex. Dizygotic multiple births are due to the simultaneous fertilization of two or more ova and the resulting children may be of different sexes.

2. In British official terminology the term maternity is used to denote a confinement resulting in the birth of one or more children; the number of births per maternity may be computed.

3. Where a multiple birth results in three children, these are-called triplets, four are quadruplets, and five quintuplets. The terms "twins", "triplets", etc. are generally used in accordance with the total number of deliveries during a confinement; occasionally, however, multiple births are classified only in accordance with the number of children born alive.

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610

Births are classified by legitimacy. Strictly speaking, a legitimate child may be defined as one whose father and mother were married to one another at the time of conception. But in practice, the classification depends upon the marital status of the mother at the time of the birth or, after the dissolution of marriage (510-3), at the time of conception. A legitimate birth is the delivery of such a child; other births are illegitimate births. It is general practice to consider as legitimate the children who result from pre-marital conceptions or pre-nuptial conceptions (i.e., conceptions occurring before mar-
riage) provided that the parents are married to each other at the time of the birth. An illegitimate child or child born out of wedlock may be legitimized or legitimated by the subsequent marriage of its parents. The process of legitimation, which varies in different countries, may confer on the illegitimate child some or all of the legal rights of legitimate children. In some legal systems it is possible for a father to grant recognition or acknowledge his illegitimate child, i.e., to admit in legal form that he is the child’s father.

5. Bridal pregnancies is also used in this connection.

6. The legal term bastard has acquired a derogatory meaning but is occasionally used by historical demographers. According to the law of some countries a child is illegitimate if it results from adulterous relations or extra-marital relations i.e., a connection between a married woman and a man other than her husband, but such a birth is not always registered as illegitimate.

611

Births are also classified by birth order, e.g. first births, second births, etc. Birth order is usually determined by considering all previous births to the mother, and sometimes only births of the present marriage. Birth order is generally based on live births only, but occasionally late foetal deaths are taken into account as well. A classification of women by confinement order is made in the same way as for births by counting all pregnancies which lasted at least 28 weeks, and reckoning multiple births as one confinement (cf. 603-4). Similarly a classification by pregnancy order is made by counting all known pregnancies. In medical parlance, a woman is called nulligravida if she has never been pregnant; the terms primigravida and multigravida respectively are used for a woman who is pregnant for the first time or who has been pregnant before. Women are also classified by parity, usually on the basis of the number of children born alive, although in biological literature the term refers to the number of confinements, and a woman who has had no confinement at all is said to be a nullipara or nulliparous. Similarly, a woman is termed a primipara and deemed to be primiparous at her first confinement and a multipara or multiparous at subsequent confinements.

1. Higher order births are births occurring after the last specified order, e.g. fifth and higher order births.

9. A woman who has not borne any live children is called a zero-parity woman, a one-parity woman has borne one child but no more, and so on.
612

Studies of birth timing\(^1\) deal with the length of birth intervals\(^2\). These include the interval between marriage and the first birth\(^3\) and intervals between successive births\(^4\). The interval between a birth and a fixed date, such as that of a census (202-1 \(^*)\) or survey (203-4), is called an open birth interval\(^5\); intervals that begin before and end after that date are called straddling intervals\(^6\). The interval between marriage and the \(N\)th birth\(^7\) is also used to study the timing of births.

1. Birth spacing, although sometimes found in the sense of birth timing as above, is commonly used to refer to the deliberate efforts of couples to postpone a birth.

3. Also called first birth intervals. The second birth interval is that between the first and the second birth; and so on.

4. As seen from the vantage of that census or survey, the intervals between the recorded successive births are called closed birth intervals.

613

In computing the period of exposure to the risk of conception\(^1\) it is necessary to consider pregnancy intervals\(^2\). The interval between marriage and the first pregnancy is the conception delay\(^3\) or first pregnancy interval\(^3\). The period between the end of one pregnancy and the beginning of the next is the inter-pregnancy interval\(^4\). If the time when the woman had no sexual activity is subtracted, a net inter-pregnancy interval\(^5\) is obtained. The period between the end of the last pregnancy and the date of a survey is called an open inter-pregnancy interval\(^6\).

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620

The reproductive period\(^1\) (or in women the childbearing period\(^1\)) begins at puberty\(^2\). Menstruation\(^3\) — the appearance of the periods\(^4\) or menses\(^4\) in women — also begins at puberty. The first period is called the menarche\(^5\) and menstruation ceases with the menopause\(^6\), which is also sometimes called the climacteric\(^6\). In practice, the reproductive period is often made to start, by convention, at 15 years or at the minimum age at marriage (504-1) and, for some, to end at 45 or 50 year. The temporary absence of menstruation, be it
normal or pathological, is called amenorrhea. Pregnancy amenorrhea occurs after a conception, and post-partum amenorrhea after a confinement.

1. The terms reproductive ages or fecund ages are also used.


6. Menopause, n. - menopausal, adj. The expression change of life is used as a synonym for menopause in colloquial language.

621

The capacity of a man, a woman or a couple to produce a live child is called fecundity. The lack of that capacity is called infecundity or sterility; inability to conceive and inability to procreate are the main, but not the single causes of sterility. Used alone, sterility usually carries the connotation of irreversibility, but occasionally temporary inability to conceive and temporary sterility are distinguished from permanent inability to conceive and permanent sterility. Among women we distinguish primary sterility where the woman has never been able to have children, and secondary sterility, which arises after one or more children have been born.

1. Fecundity, n. - fecund, adj. An alternative meaning of the term implies the ability to conceive, rather than to produce a live child. The terms sub-fecundity and sub-fecund mean either that the capacity to produce a live child is below normal, or that the probability of conception is low.


622

The term temporary sterility (621-5) is used even in instances where a woman’s inability to conceive is not the result of a pathological condition. Women are said to have sterile periods in each menstrual cycle, because generally conception can occur only during a few days around the time of ovulation. The period of sterility that extends from conception to the return of ovulation after a delivery, which includes pregnancy and is influenced by the duration of breastfeeding, is called the nonsusceptible period, particularly in mathematical models of reproduction. Temporary sterility is also used to refer to the occurrence of anovulatory cycles (i.e., menstrual cycles in which ovulation does not occur) or to abnormal periods of amenorrhea. The sub-fecundity of very young women is commonly called adolescent sterility; it would be better to talk about adolescent sub-fecundity.
5. The period between delivery and the return of ovulation is often called the period of post-partum sterility.

6. Also called anovular cycles.

623

Fertility and infertility refer to reproductive performance rather than capacity, and are used according to whether there was actual childbearing or not during the period under review. When it concerns the complete reproductive period, the term total infertility may be used while permanent infertility may extend from a certain age or marriage duration to the end of the childbearing years. Voluntary infertility is used when the absence of procreation corresponds to a decision of the couple (503-8). It should be noted that in many Latin languages, the cognates of fertility and fecundity are used in a sense diametrically opposite to that in English. Thus, the French fécondité and the Spanish fecundidad are properly translated by fertility, and fertilité and fertilidad by fecundity.

1. Fertility, n. - fertile, adj.
2. Infertility, n. - infertile, adj.
3. Childlessness, n. - childless, adj. : refer to the state of a women, man or couple who have been so far infertile.

624

The fertility (623-1) of couples will depend upon their reproductive behavior. A distinction is drawn between planners, couples who attempt to regulate the number and spacing of their births, and non-planners, couples who make no such attempt. Family planning has a broader meaning than family limitation which refers to efforts not to exceed the number of children wanted. The terms birth control or fertility regulation are not restricted to the activities of married persons.

4. A classification according to family planning status distinguishes couples who have not tried to regulate the number and spacing of their children from those who have tried to do so.

5. Unwanted births or unintended births are those that occur after the total family size desired by the couple has been reached. They are distinguished from unplanned births that may have occurred at a time that was not intended, and perhaps outside of wedlock.
Family planning implies a concern with planned parenthood\textsuperscript{1} or responsible parenthood\textsuperscript{1}, i.e., the desire to determine the number and spacing of births in conformity with the best interest of each couple, or of society. The number of children expected by a couple may differ from the desired number of children\textsuperscript{2} or intended number of children\textsuperscript{2} reported by the couple in a survey. Even if these goals are not revised, they may be exceeded as a result of contraceptive failures\textsuperscript{3}; the frequency of the latter depends on contraceptive effectiveness\textsuperscript{4} which has two aspects. Theoretical effectiveness\textsuperscript{5} or physiological effectiveness\textsuperscript{5} indicates how reliable a method is when used all the time according to directions. Use effectiveness\textsuperscript{6} measures its reliability when used in everyday situations by a given population. Reasoning in terms of residual fecundability (638-7), use effectiveness is usually measured by the contraceptive failure rate\textsuperscript{7} which relates the number of unintended conceptions to the length of exposure to the risk of conceiving.

2. In other terms, birth expectations differ from reproductive intentions. A distinction is made between desired family size, the number of children a woman, man or couple wants to have, and the ideal family size which they envision for their society. Intended family size may be lower than desired family size.

3. Unplanned births are often opposed to planned births.

4. 5. and 6. Efficacy is a synonym for effectiveness in these expressions.

4. Not to be confused with the demographic effectiveness of a family planning program (see 626-7), or of a method in a population.

A family planning program\textsuperscript{1} seeks to introduce and diffuse birth control in a group of potential users\textsuperscript{2} or in a target population\textsuperscript{2}. Teams of fieldworkers\textsuperscript{3}, including canvassers\textsuperscript{3}, motivators\textsuperscript{3} and distributors\textsuperscript{3}, attempt to reach and convince the population to use contraception or abortion. The success of the program can be measured by the proportion of new acceptors\textsuperscript{4} in the target population, or by the acceptance rate\textsuperscript{4}; for the acceptors of contraception, the continuation rate\textsuperscript{5} after a certain lapse of time and its complement, the termination rate\textsuperscript{6} or drop-out rate\textsuperscript{6} are also computed. Estimates of the numbers and proportions of births averted\textsuperscript{7} reflect the demographic effectiveness (625-4*) of the program. Contraceptive prevalence in a population is estimated by the proportion of current users\textsuperscript{8} of contraception from a relevant universe, such as married women of reproductive age.{

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99
8. Special surveys of knowledge, attitudes and practice of contraception have been called KAP surveys in abbreviation.

627

Contraception\(^1\) refers to measures which are taken in order to prevent sexual intercourse\(^2\) or coitus\(^2\) from resulting in conception; the term covers contraceptive sterilization (631-1). Birth control methods\(^3\) is used in a broader sense than contraceptive methods\(^3\) to include induced abortion (604-2). Abstinence\(^4\) from coitus, particularly periodic abstinence (628-4) is often included among contraceptive or birth control methods.


628

A distinction is frequently drawn between appliance methods\(^1\) of contraception and non-appliance methods\(^2\). One principal non-appliance method of contraception is coitus interruptus\(^3\) or withdrawal\(^3\). Another non-appliance method of contraception is periodic abstinence\(^4\) or the rhythm method\(^4\), in which coitus is avoided during the period when the woman is believed to be fecund and takes place only during the so-called safe period\(^5\) of the menstrual cycle. The basal body temperature method\(^6\) refers to the method in which the woman keeps track of her temperature to identify the safe period.

1. Appliance methods include not only barrier methods which are used to prevent the union of the sperm and ovum, but also methods using other contraceptive devices such as the intra-uterine device (629-10) and other types of contraceptives such as the pill (630-4).

4. The term natural family planning methods has been applied collectively to cover the rhythm method, the basal body temperature method, and other techniques which attempt to identify stages of the woman’s ovulatory cycle.

629

The barrier methods which are more commonly used alone or in combination include the condom\(^1\) or sheath\(^1\), used by men, and the cervical cap\(^2\) or pessary\(^2\), the diaphragm\(^3\), tampon\(^4\) or sponge\(^4\), contraceptive jelly\(^5\), suppos-
itory, foam tablets and douche with or without spermicide, used by women. There are various types of intra-uterine devices (abbreviated to IUD), including the loop, the coil, the copper T, etc.

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630

Oral contraceptives are a method of hormonal contraception or contraception by steroids. These inhibit ovulation by regular ingestion of the pill, or by injections or implants.

631

Sterilization results from various surgical procedures: on the male, vasectomy or occlusion involves tying and cutting the vas deferens; on the female tubal ligation and salpingectomy or tubectomy involve interventions on the fallopian tubes. Hysterectomy or excision of the uterus, also involves sterilization of the woman.

4. and 5. Various procedures are used to gain access to the Fallopian tubes, such as laparotomy, colpotomy or laparoscopy.

632

The general term birth rate refers to a rate calculated by relating the number of live births observed in a population or sub-population during a given period to the size of the population or sub-population during the period. The rate is usually stated per 1,000, and the most usual period is one year. Where the term birth rate is used without qualification, it is understood to be the crude birth rate, and all live births are related to the entire population. The total birth rate based on live births and late foetal deaths is sometimes calculated. Legitimate birth rates and illegitimate birth rates are also calculated with legitimate and illegitimate births in the numerator and the currently married and unmarried female population, respectively, in the denominator. The illegitimacy ratio, the number of illegitimate births per 1,000 total births, is more frequently used, however. To compare the fertility of different populations, standardized birth rates are often used to eliminate the effect on the birth rate of certain differences in structure of the population (most commonly the age and sex structure). The child-woman ratio, most commonly the number of children aged 0 to 4 per 1,000 women of childbearing age, e.g., 15
to 49, is used as an index of fertility when reliable birth statistics are not available.

4. The denominator of the legitimate and illegitimate birth rate is sometimes the total population.

5. See note 4.

633

The term fertility rate is often used when the denominator of the birth rate fraction is restricted to a group of individuals of the same sex in the reproductive ages (620-1). This denominator is commonly the mid-year population in the stated period, but it may also be the number of years lived by the group during the period, or the mean size of the group. Unless otherwise indicated, these rates are female fertility rates, and the rates are calculated for groups of women; the number of years lived by a given number of women in an interval is called the number of woman years. Male fertility rates are computed sometimes in an analogous manner. Fertility rates are generally expressed as births per thousand (implied: individuals of the same category — sex, age, marital status, etc. — cf. 133-4°). Marital fertility rates or legitimate fertility rates relate the total number of legitimate births (610-3) to the number of currently married women; non-marital fertility rates or illegitimate fertility rates relate the total number of illegitimate births (610-4) to the number of single, widowed and divorced women. Overall fertility rates make no distinction according to the legitimacy (610-1) of the births or the marital status of the parents. The general fertility rate relates the total number of births to all women of reproductive age regardless of marital status. Rates based on a narrower age range (usually one-year or five-year age groups) are called age-specific fertility rates or age-specific birth rates.

1. In many expressions used in this and following paragraphs, birth rate is used synonymously with fertility rate.

5. Marital fertility or legitimate fertility: the fertility of married persons (see 635-1).


634

Order-specific fertility rates relate births of a certain order to a number of women, to a number of marriages or to a number of births of the preceding order. Parity-specific fertility rates or parity-specific birth rates not only
restrict the numerator to births of a given order, but also restrict the denominator to the women of the parity (611-6) at risk (134-2), e.g., second order births to one-parity women. Such rates are usually age-specific or duration-specific. In parity-specific birth probabilities\(^3\), the numerator consists of the number of births of order \(x + 1\) occurring during a period, and the denominator consists of the number of women of parity \(x\) at the beginning of the same period.

635

When studying marital fertility\(^1\) it is possible to arrange the data by marriage cohorts (116-2) of the mothers, and marriage duration-specific fertility rates\(^2\) are often computed in preference to age-specific marital fertility rates\(^3\).

636

The term cohort fertility\(^1\) refers to the reproductive performance of particular birth or marriage cohorts (116-2). When the age-specific or marriage duration-specific fertility rates are summed from the cohort’s beginning of exposure to risk until some later date, we speak of cumulative fertility\(^2\): age-specific cumulative fertility\(^3\) or marriage duration-specific cumulative fertility\(^4\) when then ending date is that of a woman’s birthday or marriage (501-4), completed fertility\(^4\) or lifetime fertility\(^4\) is the cumulative fertility until the date when all members of the cohort have reached the end of the reproductive period. The sum of the products of the fertility rates of the cohort by the probability of survival of the women to successive ages could be called the cumulative net fertility\(^5\), age-specific net cumulative fertility\(^6\) or marriage duration-specific net cumulative fertility\(^6\) and net complete fertility\(^7\) or net lifetime fertility\(^7\) of the cohort.

4. Before the end of the reproductive period, the terms incomplete fertility or fertility to date are employed to show that the cohort’s cumulative fertility may be expected to increase.

637

Censuses and surveys may provide information on fertility when they include questions on the number of children born to enumerated women or couples, either during the current marriage\(^1\), or overall. The mean number of children ever born per woman\(^2\) or average parity\(^2\) can be computed. The number of children per couple is sometimes called average family size\(^3\). It is al-
so possible to calculate the mean number of births per marriage. Special attention is paid to marriages of completed fertility, those in which the wife had reached the end of the reproductive years before the marriage was dissolved. The final parity or completed parity, i.e., the mean number of children per woman past the childbearing age, is not very different from completed fertility. The tabulation of final parity or completed fertility by number of children serves to compute series of parity progression ratios; these are fractions whose denominator is the number of women with \( n \) children, and whose numerator is the number of women with \( n + 1 \) children. Special studies yield information on family formation and the family life cycle. Among those, frequency of premarital conceptions, birth intervals, and the age at the birth of the last child for women of completed fertility are of particular interest.

638

Fertility histories or reproductive histories are accounts obtained for individual women of the important events in their reproductive lives, such as marriages, pregnancies, births, infant deaths, etc., and their dates. Fertility histories are often obtained retrospectively from surveys. Family forms are used in historical demography, where they are established for a married couple and its children by family reconstitution on the basis of vital records. A woman’s pregnancy history or pregnancy record contains detailed information about her pregnancies including the date when each began and ended, and the outcome of the pregnancy. Such detailed records on the timing of fertility have been used for various purposes. For example, they can provide information on natural fertility, i.e., fertility in the absence of family limitation. They are also used to estimate fecundability, the probability of conceiving per menstrual cycle. A distinction is made between natural fecundability, in the absence of contraception, and residual fecundability in the opposite instance. The term effective fecundability designates a fecundability that is reckoned in terms of conceptions that result in live births only. The conception rate during the period of exposure to risk often estimated using the Pearl index is used to measure the effectiveness of contraception during periods of contraceptive use.

1. Birth histories are usually limited to live births.

6. When used alone, the word fecundability stands for natural fecundability.
A summary index of period fertility, i.e., the fertility of a particular year or period, computed by the summation of the series of age-specific fertility rates constituting the fertility schedule and representing a synthetic measure of fertility, is the total fertility rate or total fertility. Other summary period indices can be obtained, such as the total legitimate fertility rate, the summation of marriage duration-specific fertility rates, and the order-specific total fertility rate, the summation of age-specific fertility rates order by order. The ratio of births to marriages is computed by relating the number of births of a given year, either to the marriages of the year, or to a weight-ed average of the marriages of the current and of the preceding years.

2. Also, fertility distribution or fertility function.

4. This is not a rate in the meaning of (133-4). Total fertility for a given year represents the number of children that would be born per 1,000 women if they experienced no mortality and were subject to the age-specific fertility rates observed for that year. The period gross reproduction rate (see 711-4) which is derived by multiplying the total fertility rate by the proportion of female births, has often been used in the past, but the total fertility rate is preferred at present as the summary index of period fertility.

5. Or total marital fertility. The term is also used to describe the sum of the age-specific marital fertility rates above age 20.

Where induced abortion (604-2) has been legalized, it is possible to compile statistics on legal abortions (604-4). The abortion rate is a measure of the frequency of abortion in a population during a given period, usually a year. Abortions may be related to the total population or to the number of women in the reproductive ages and may be specific for age, parity or any other characteristic. The abortion ratio is a measure of the frequency of abortions in relation to the number of live births (601-4) during the same period. The life-time abortion rate is the sum of age-specific abortion rates and is a synthetic measure of abortion per woman or per 1000 women. These rates are the ratio of the number of abortions reported at each age to years lived by all women of the same age. If women can be classified according to their marital status, abortion rates by age and marital status can be obtained. It is often also relevant to divide the number of abortions by the number of conceptions and so to calculate the probability that a pregnancy results in an abortion by age and marital status.
Chapter 7
Population growth and replacement

701

The interaction of fertility, mortality and migration leads to a consideration of population growth. A zero population growth refers to a population of invariable size. It is convenient to regard population decline as negative growth. A distinction may be drawn between a closed population in which there is no migration either inwards or outwards and whose growth depends entirely on the difference between births and deaths, and an open population in which there may be migration. The growth of an open population consists of the balance of migration or net migration and natural increase, which is the excess of births over deaths or deficit of births over deaths sometimes called the balance of births and deaths. Any change in one variable affects the overall growth and structure of a population; in this context growth effects and structural effects are determined.

702

The ratio of total growth in a given period to the mean population of that period is called the growth rate. Occasionally this rate is computed with the population at the beginning of the period rather than with the mean population as a denominator. When population increase over a period of more than one calendar year is studied, the mean annual rate of growth may be computed. In computing this rate it is sometimes assumed that the population is subjected to exponential growth during the period, and time is treated as a continuous variable. The size of an exponential population would grow as an exponential function of time. The exponential growth rate is equal to the instantaneous rate of growth. The ratio of natural increase (701-7) to the average population during a period is called the crude rate of natural
increase\textsuperscript{6} and is equal to the difference between the crude birth rate and the crude death rate. The vital index\textsuperscript{7} is the ratio of the number of births to the number of deaths during a period; this measure is no longer much used.

3. When time is treated as a discrete variable, reference is made to geometric growth.

4. This is occasionally called a Malthusian population, but the term is ambiguous in view of its sociological connotations (see 906-1).

703

It can be shown that when a closed population (701-4) is subjected to constant age-specific fertility and mortality rates (631-8; 412-1) for a sufficiently long period of time, its annual rate of increase will tend to become constant. This constant rate of increase is called the intrinsic rate of natural increase\textsuperscript{1}, and a population which has reached this stage is called a stable population\textsuperscript{2}. The proportion of persons in different age groups in such a population will be constant, i.e., the population will have a stable age distribution\textsuperscript{3}. This stable age distribution is independent of the initial age distribution\textsuperscript{4} and depends only on the fertility and mortality rates that are kept constant. Human populations never reach exact stability in practice, as fertility and mortality rates constantly change, but the computation of a stable population as a model and of its intrinsic rates may provide an index of the growth potential\textsuperscript{5} of a set of age-specific fertility rates applied to a non stabilized age structure. Related to the growth potential, the moment of inertia of a population or demographic momentum\textsuperscript{11\ast} should be mentioned: it refers to the dynamics hidden in the age structure due to a delayed growth response caused by the biological fact that from the time of birth of a cohort (116-2) to the beginning of their period of fertility (620-1) a certain amount of time passes. A population may for this reason still grow, even though the birth rate drops long ago. The reverse case is also possible. The momentum is particularly altered in case of discontinuity in the evolution of births (during wars for example) and abrupt reversals of trends. A stable population in which the intrinsic rate of natural increase is zero is called a stationary population\textsuperscript{6}. In such a population the numbers in a given age group are equal to the integral of the survivorship function (431-3) of the life tables taken between the upper and lower age limits of the group, multiplied by a factor of proportionality common to all age groups. A quasi-stable population\textsuperscript{7} is a formerly stable population with constant fertility and gradually changing mortality; characteristics of this type of population are similar to those of semi-stable populations\textsuperscript{8\ast} which are closed population with a constant age structure. A logistic population\textsuperscript{9} is a population growing in accordance with the logistic law\textsuperscript{10} of growth, i.e., a population in which the growth rate decreases as a linear function of the population already alive and which will tend asymptotically to an upper limit.
1. The intrinsic rate, also called by its inventor Lotka, the true rate of natural increase, is equal to the difference between the intrinsic birth rate (or stable birth rate) and the intrinsic death rate (or stable death rate).

2. Stable, adj. - stability, n. - stabilize, v. Stable population analysis uses the properties of stable population models to estimate various characteristics of real populations.


710

The study of reproduction (see § 116) or population replacement is concerned with the natural process through which a population replaces its numbers. The theory behind treats population as a renewable resource in the mathematical sense of the term. A distinction is drawn between gross reproduction or gross replacement, where no account is taken of mortality before the end of the reproductive period (620-1), and net reproduction or net replacement, in which this mortality is taken into account.

1. Also reproductivity. For another sense of reproduction see 601-2.

711

In this study of replacement a number of indices, replacement rates or reproduction rates are used. Reproduction rates are generally female reproduction rates or maternal reproduction rates. The female net reproduction rate is defined as the average number of live daughters that would be born to a hypothetical female birth cohort (116-2) which would be subjected to a set of current age-specific fertility (631-8) and mortality rates (401-2). A female gross reproduction rate is computed similarly on the assumption that mortality before the end of the reproductive age is zero. Male reproduction rates or paternal reproduction rates can be computed analogously using male births and a male birth cohort, and certain types of joint reproduction rates which take both sexes into account have been proposed. Where the experience of an actual cohort is used in the construction of reproduction rates, cohort reproduction rates or generation reproduction rates are obtained. The mortality and the fertility rates used in the construction of these rates will refer to different periods of time. Where statistics of fertility by age are not available, the so-called replacement index may be used. This ratio
relates the quotient of the population of children of a given age (as a rule those 0-4 years) to the number of women of childbearing age in the actual population, to the corresponding quotient in the *stationary population* (703-6).

712

Other replacement indices are also computed. For instance, the net reproduction rate is sometimes split into a *legitimate component*¹ and an *illegitimate component*². Again, a *nuptial reproduction rate*³ has been computed, showing the number of legitimate daughters that will be born to a newly-born female if current rates of mortality, fertility, nuptiality and dissolution of marriage remain unchanged. Generally such rates are for females, but it would be possible to compute analogous rates for males.

713

The *net reproduction rate* (711-3) and the *intrinsic rate of natural increase* (703-1) are closely related to one another. The net reproduction rate measures the increase in the *stable population* (703-2) implied by the given age-specific fertility and mortality rates over a period equivalent to the *mean length of a generation*¹ or the *mean interval between successive generations*¹. This length of a female generation is equal to the *mean age of mothers*² giving birth to live daughters, with current age-specific fertility and mortality rates. Period reproduction rates are current indices (cf. 152) which relate to *hypothetical cohorts*³ or *synthetic cohorts*³.

2. The *mean age of fertility*, i.e., the mean age of the fertility schedule is only approximately equal to the mean length of a generation. The mean length of a male generation similarly is equal to the *mean age of fathers* at the birth of their children.

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720

*Population projections*¹ are calculations which show the future development of a population when certain assumptions are made about the future course of population change, usually with respect to fertility, mortality and migration. They are in general purely formal calculations, developing the implications of the assumptions that are made. A *population forecast*² is a projection in which the assumptions are considered to yield a realistic picture of the
probable future development of a population. Although the projection period is variable, short-term forecasts are the rule, as the margin of error to which forecasts are subject increases considerably as the length of the forecast’s period increases. The most frequently used method of projection is the component method or cohort-component method which takes the population distributed by age and sex at a base date and carries it forward in time, cohort by cohort, on the basis of separate allowances for fertility, mortality and migration. When matrix algebra is used for component projections, the method is sometimes called matrix method of projection.

1. Projections are also made in terms of educational, economic and social characteristics. Backward projections which might be more accurately called retrojections, use similar methods to trace the past evolution of the population.

721

Estimates of the population by size and composition at various dates in the past and present may be made by various methods, including many of the methods used for population projections. Demographic estimates include estimates of the population and of such characteristics as fertility, mortality, etc. The annual extrapolation of population from the last census is carried out on the basis of the last census and vital statistics in subsequent years. Intercensal estimates relate to dates intermediate to two or more censuses, and take the results of these censuses into account. The error of closure is the difference between the size of a population enumerated at a new census and the population estimated for that census date on the basis of a previous census, the excess of births over deaths, and net migration during the intercensal period. This difference represents the balance of errors in the data on births, deaths, net migration, and the coverage of the two censuses.

3. Postcensal estimates take the results of a previous census into account, but not those of the next census.

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730

A demographic model consists of a theoretical construct representing the evolution of a population (of individuals, couples, families, households, etc.) and its structure on the basis of its initial state and the effect of various de-
mographic variables (such as fertility, fecundability, mortality, etc.). In a static model, these variables remain constant; in a dynamic model, they are allowed to change over time. A further distinction is made between deterministic models which assign functional relations between definite values of the variables, as if the studied population were infinitely large, and stochastic models or probabilistic models which consider the probability of various events occurring to individuals over the duration of the process under study. The model may be set out in mathematical formulas or take the form of a simulation where specific values of the variables are included in a system of relations. Macrosimulations may for example involve population projections made by the component method. In microsimulations, events are made to occur randomly to individuals or groups over time according to sets of probabilities assigned to the variables in the model.

1. The word is also used as an adjective in such expressions as model tables.
Chapter 8
Spatial mobility

801

The study of spatial mobility\(^1\) or geographic mobility\(^1\) is concerned with the quantitative aspects of moves\(^2\) made by individuals in geographic space. The distinguishing characteristic of migration\(^3\) is that it involves a change in usual place of residence (310-6\(^*\)) and implies movement across an administrative boundary. The administrative unit left by the migrant is the place of origin\(^4\) or place of departure\(^4\); the unit to which the migrant goes is the place of destination\(^5\) or place of arrival\(^5\). The concept of migration is often not applied to moves made by persons without a fixed place of residence, for example, nomads are excluded from the count of migrants in many countries. In practice it is sometimes difficult to distinguish between migration, which implies a relatively permanent change of residence, and temporary moves\(^6\), except on the basis of criteria of length of absence\(^7\) from the place of origin or duration of stay\(^8\) at the place of destination. In general, geographic mobility does not include short-term trips which involve no change of usual residence, even though such moves may deserve study because of their economic and social importance. Commuting\(^9\) involves the daily or weekly journey from place of residence to place of work or schooling; seasonal moves\(^10\) have a yearly periodicity. Transits\(^11\), which are moves across a territory to reach a destination, do not involve migration with respect to the territory crossed. Tourist traffic\(^12\) or vacationing\(^12\) also are not included in geographic mobility.

1. Spatial mobility is distinguished from social mobility (920-4) and occupational mobility (921-3).

3. Migration, n. - migrate, v. - migrant, n.: one who migrates, also used as adj. - migratory, adj.: pertaining to migration. The term migration refers to a process and cannot serve in English (in contrast to French) to describe a particular move; it is rarely used in the plural. Some
authors view all residential mobility (803-6) as migration. For most, however, migratory moves involve the crossing of a boundary, and the administrative unit selected is called the migration defining area.

5. The terms country of arrival and country of reception are appropriate when international migration is the subject of interest.

9. Commute, v. - commuter, n.: one who regularly travels from his place of residence to his place of work. The expression journey to work is also used to describe this type of movement.

10. Seasonal movement is more accurate than the frequently used term seasonal migration since these moves rarely involve a change of usual residence.

802

When migration is observed over time, it is convenient to compare the place of residence at a fixed past date with the place of current residence. An individual whose administrative unit of residence differs at the beginning and end of a certain interval is identified as a migrant. Migrants may be classified as emigrants or out-migrants with respect to their place of origin and as immigrants or in-migrants with respect to their place of current residence. When a census or survey has included a question on previous place of residence, the information generated concerns in fact the latest migration or latest change of residence, whatever its date. A migrant is any individual who has had at least one prior residence in a different administrative unit from his or her current residence; such an individual can be considered to have migrated into the current residence, and migrated out of the previous one. A lifetime migrant is a person whose place of birth was in a different administrative unit from his or her current residence. In specific cases, migrants can be qualified as emigrants for political, religious or ethical reasons, or immigrants for political, religious or ethical reasons.

4. Strictly speaking, under this concept a migrant must have been born before the beginning of the migration defining interval and must survive until the end. This definition is sometimes extended to include children born during the interval who are allocated to the place of residence of their mother at the beginning of the interval. The number of recorded migrants is not necessarily equal to the number of moves which occurred during the interval for these individuals, as any one may have moved several times in the interval, or even have returned to his previous place of residence by the time of the census or survey.
10. Usually the place of birth is defined as the place of usual residence of the mother at the time of the birth even though custom or the location of medical facilities may have resulted in the birth occurring elsewhere.

803

The population of a sovereign country (305-3) may be involved in internal migration\(^1\) when both place of departure (801-4) and place of destination (801-5) are within the country, or in international migration\(^2\) which occurs across national boundaries. The term external migration\(^3\) is sometimes encountered in the latter sense. International migration is called immigration\(^4\) or emigration\(^5\) according to whether the country in question is the country of destination or the country of origin. When the country is divided into sub-areas, movement within the boundaries of each sub-area are local moves\(^6\) and constitute residential mobility\(^6\), while movement between sub-areas is called in-migration\(^7\) or out-migration\(^8\) depending on whether the sub-area considered is the place of destination or the place of origin for the migrants. A migration stream\(^9\) is a group of migrants having a common origin and destination. The larger stream between two sub-areas is called the dominant stream\(^10\) and the smaller the counterstream\(^11\).

1. The definitions of migration in this paragraph can be extended to the migrants involved. The distinction between internal and international migration is not always precise when territories within a country are more or less autonomous.

2. Simple commuting across a national border receives the name of border traffic, and should not be mistaken for international migration.


804

When an individual migrates several times during a certain period, his or her moves may be distinguished according to the order of migration\(^1\). The duration of residence\(^2\) or duration of stay\(^2\) refers either to the interval between the arrival in a place and the subsequent departure for another destination or to the interval since the most recent move. Return migration\(^3\) involves movement back either to the initial area, or to any previous place of residence. Repeat migration\(^4\) or chronic migration\(^4\) refers to a tendency to migrate several times over a relatively short time interval. Rural-urban migration\(^5\) sometimes takes the form of serial migration\(^6\), stage migration\(^6\) or step migration\(^6\), as migrants tend to move to large cities as a final place
of destination by a series of shorter, intermediate migrations to cities or areas of successively larger size. The serial migrations between a series of cities of different sizes is sometimes used when net migration of each city is positive and results from an excess of immigration from the rural sector and smaller cities over emigration to the larger cities.

3. Individuals involved in return migration are called return migrants.

4. When repeat migration involves moving to new areas, some authors talk of secondary migration and of secondary migrants, in contrast to primary migration which involves first order or primary migrants. This is a source of confusion, since these terms usually take the meaning of 806-4.

805

The contribution of migration (801-3) to overall population growth or population growth due to migration (701-1) is due to net migration, i.e., the difference between the number of arrivals and the number of departures. Net migration can have a negative or a positive sign; net immigration or net in-migration is used when arrivals exceed departures, and net emigration or net out-migration when the opposite is true. The sum of arrivals and departures in a country can be used to measure the volume of migration. A similar concept, applied to sub-areas of a country, is the migration turnover. The net stream or net interchange of migration between two areas is defined as the difference between the stream and the counterstream, whereas the gross interchange is the sum of stream and counterstream.

2. This may also be called the balance of migration or the migration balance. Terms such as *net migrant* should be avoided, and phrases such as the net number of migrants should be preferred.

806

Spontaneous migration, voluntary migration or free migration is the result of the initiative and free choice of the migrants. In the absence of concerted action, the movement is referred to as individual migration. When entire families are moving together, the term family migration is sometimes encountered. Secondary migration or ancillary migration is induced by the movement of others, as when children follow the head of the family. An example of such migration is family reunification, which pertains to the migration of family members, including children, of the family head. The movement of workers or of members of the labor force in response to employment
opportunities is referred to as labor migration. Moves occurring as a result of marriage and when individuals retire from the labor force are sometimes referred to respectively as marriage migration or retirement migration. Chain migration or linked migration refers to a pattern of migration to specific places of destination, where a prospective migrant has a relative or friend who has established a residence and is willing to provide information and support.

4. Although the terms are sometimes used in a different sense (cf. 804-4*), a primary migrant is the person who makes the actual migration decision while a secondary migrant is an individual such as a young child whose migration is the result of another person’s decision.

807

Where groups of individuals or families decide to migrate together collective migration or group migration will result. Mass migration involves a very large number of migrants. The term exodus may be used for a sudden mass migration caused by some emergency or catastrophe.

808

Voluntary migration (806-1) contrasts with forced migration, in which individuals are compelled by public authorities to move. Repatriation applies to forced return of individuals to their country of origin. Another example of forced migration is the expulsion from their places of abode either of individuals or of whole groups of people. The term evacuation is generally reserved for the movement of whole populations in order to safeguard them from some catastrophe, such as earthquakes, floods, operations of war or the like. A refugee has usually migrated on his own volition, though there may have been strong pressure on him to migrate because his continued stay in his country of origin may have exposed him to danger of persecution. A displaced person is a person who has been moved by a public authority from his place of origin. This move may have taken place as a result of large-scale displacement of population or population transfer, or population exchange.


3. Expulsion, n. - expel, v - expellee, n., one who has been expelled. The term deportation is used for expulsion of an individual person from his country of residence because his continued residence is considered undesirable by the authorities. Deportation, n. - deport, v. - deportee, n.
4. Evacuation, n. evacuate, v., evacuee, n., a person who has been evacuated.

809

The process by which immigrants adjust themselves to conditions in the area of destination falls into several categories: naturalization (331-1), the acquisition of legal citizenship; absorption\(^1\) the entry into productive economic activity; assimilation\(^3\), integration into the social structure on terms of equality; and acculturation\(^2\) the adoption of the customs and values of the population in the place of destination.

810

When immigrants from a particular territory do not assimilate in their new country but retain the customs of their place of origin (801-3), they are called a colony\(^1\). When the receiving country is already inhabited, this raises problems of coexistence\(^2\) between different populations. These may be solved by the fusion\(^3\) of the populations, i.e. by the disappearance of recognizable differences, or by the integration\(^4\) of one of the populations into the other. Segregation\(^5\) exists in a territory where two or more populations live but remain separated by barriers imposed by custom or by the force of law.

1. Colony, n. colonize, v., to found a colony, also used in the sense of settling a new territory - colonist, n., member of a colony.
2. Coexistence, n.-coexist, v.
   In extreme cases, the conflict may result in genocide, i.e. an attempt by one population to exterminate the other. Exterminate, v. - extermination, n.

811

Migration policy\(^1\) is one aspect of population policy (105-2). Most countries through their immigration laws\(^4\), restrict the admittance of foreign nationals. These laws frequently provide for selective immigration\(^3\) of persons with certain specified characteristics. Some countries have established quota systems\(^4\) whereby the number of immigrants is fixed in relation to the national origin\(^5\). Measures designed to influence the redistribution of population\(^6\) within a country through internal migration (803-1) are usually more indirect in character.
Migration statistics are compiled to reveal the volume of migration, the direction of migratory movement and the characteristics of migrants. The accuracy with which each of these kinds of facts is ascertained depends upon the method of compilation, as most migration statistics consists of approximations and estimates rather than precise measurements. Direct measurement of migration requires a system of recording movements as they occur. The most complete migration statistics are developed from population registers in which all changes of residence are recorded. They allow measurement of internal and of international migration, but are more satisfactory for the former than for the latter. In countries where these population registers do not exist, a certain number of administrative record systems which do not cover the entire population can be used for particular purposes. Thus, voter registration records, social security records tax-payers records or dwelling records may yield information on internal migration. In the case of overseas migration, statistics may be based on passenger lists or manifests of ships and aircraft. Counts of persons crossing a political frontier yield only very crude data; most of all in areas with much frontier traffic (803-2*) special steps must be taken to distinguish migrants from travellers, who do not change their place of residence, and persons in transit. The number of visas or entry permits granted and the number of residence permits or labor permits issued may also be used as an indication of the migration of foreign nationals.


9. In certain countries residents who wish to travel abroad are required to obtain exit permits or exit visas, records of which may serve as a source of information on migratory movements.

Information collected in censuses and surveys allows the development of statistics on migrants. Depending on the questions asked, these usually include statistics on in-migrants, statistics on out-migrants and place-of-birth statistics. This approach has limits for the study of international migration; emigrants cannot be studied, whereas immigrants are known, whatever their country of origin.
814

Where it is not possible to determine migration directly, indirect estimates of net migration may be obtained by the residual method or method of residues in which the change in population between two dates is compared with the change due to natural growth; the difference between the two figures is attributed to migration. The vital statistics method consists of computing the difference between total population change, as assessed from two censuses, and natural increase (701-7) during the intercensal period. The survival ratio method is commonly used to estimate net migration by age; it does not require actual death statistics. Survival ratios may be derived either from life tables or from the comparison of successive censuses, and they are applied to a sub-population in one census to give expected numbers by age at the time of the other census. A comparison between the observed and the expected population may be used to estimate the balance of migration by age for the sub-population. When place-of-birth statistics by age and current residence are available in two consecutive censuses, it is possible to make indirect estimates of migration streams.

2. The equation showing that the difference between total population change and natural increase is equal to migration has sometimes received the name of balancing equation. In order to use it for the estimation of net migration, one must assume that omissions (230-3) and multiple countings (230-5) are equal for both censuses.

3. The major variants of this procedure are called the life table survival ratio method and the national census survival ratio method. In the forward survival ratio method, the population at the beginning of an intercensal period serves to estimate the expected population at the end of the period, and the procedure is reversed in the reverse survival ratio method; the average survival ratio method combines these two approaches.

815

The generic term migration rate refers to any rate which measures the relative frequency of migration within a population. Unless indicated otherwise these rates should be taken as annual migration rates. They may be obtained as the ratio of the average annual number of movements during a certain period, to the average population of the period. An annual rate of net migration and an annual rate of total migration are calculated in a similar fashion by using the appropriate information on net and total migration. An index of migration effectiveness or effectiveness index is calculated as the ratio of net migration to total in- and out-migration. The range of the
index is from zero, when arrivals and departures are equal in number, to one, when migration is entirely one way.

2. Other denominators may serve to compute the rate, such as the population at the beginning or the end of the period, or the number of person-years lived by the population of the area.

5. Also: Index of migration efficiency or efficiency index.

816

Proportions of migrants\(^1\) can be obtained by relating the number of migrants during a period to the population to which or from which they are migrating. When the proportion of out-migrants\(^2\) is obtained by dividing the number who reported moving out of the area by the population residing in the area at the beginning of the period and alive at the end, this index measures the probability of moving for the population at risk, and among other uses, it can be used in the preparation of population projections where migration is accounted for separately. But other populations are often used in practice as denominators to compute proportions of migrants. Similarly, the proportion of in-migrants\(^3\) is sometimes obtained by dividing the number of in-migrants in an area during a period, by the population of the area at the end of the period; but the denominator could also be the population at the beginning of the period, or the average of the beginning and end populations. The proportion of lifetime in-migrants\(^4\) can be derived from information on the place of birth, dividing the number of persons born out of the area by the enumerated population of the area. The proportion of lifetime out-migrants\(^5\) can be obtained by dividing the number of persons in a country living outside of their area of origin, either by the total number of persons born in that area, or by those among them who still live there. When such characteristics of the migrants as age (322-1), occupation (352-2) or level of education (342-1) are known, indices of migration differentials\(^6\) are used to contrast the migrants and the rest of the population of destination. The index is equal to the quantity 1 minus the ratio of the proportion of migrants in the population having the characteristic studied to the proportion of migrants in the whole population. The index of migration differentials is equal to zero when the population with the given characteristic has the same migration behavior as the rest of the population. The term selectivity of migration\(^7\) indicates that the comparison is between the in-migrants and the population from which they were drawn, at the area of origin (801-4). When comparing the characteristics of the in-migrants to those of the population at the place of arrival (801-5) the term differential migration\(^8\) or migration difference\(^8\) is sometimes used.

7. For example, the selectivity of migration from Mexico was decreasing because differences in characteristics between migrants and
nonmigrants fade over time; also the origins of Mexican immigrants was increasingly diverse because of the spread of Mexican migration networks in the USA.

817

Longitudinal migration analysis requires information on the successive moves of an individual over time, information which is normally available only from population registers (213-1) or retrospective surveys (203-8). Several refined measures of migration are available from this type of data, such as a first migration probability, defined as the probability that a group of non-migrants aged x will be involved in migration for the first time before reaching age x + n. These probabilities can be used to calculate a non-migrant table. The latter, when combined with a life table (432-3) will lead to a double decrement survivorship schedule of non-migrants. Similarly, migration probabilities by order of move can be computed, as well as the proportion of migrants of a given order who have not gone on to make a subsequent move within a certain migration defining interval. The all orders migration rate is the ratio of moves of all orders in a year to the average population size of the cohort (117-2) over the year. The cumulation of these rates for a cohort up to a given date provides an estimate of the mean number of moves in the absence of mortality. A survivorship schedule can be combined with an age-specific all orders migration table to estimate the average number of remaining moves for an individual of a given age, given the prevailing mortality.

818

In studying migrants between two areas during a period, one commonly used measure is the index of migration intensity, obtained by dividing the number of migrants from area A to area B by the product of the number of inhabitants in B at the end of the period, and the number of inhabitants of A at the beginning of the period who are still alive at the end. This index, divided by the ratio of the total number of migrants to the square of the population of the country, yields a migration preference index. When the numerator is restricted to the net stream of migration, the resulting measure is called an index of net velocity. The effectiveness of migration streams is measured by relating the absolute value of the net migration stream to the gross interchange.

1. This index can be interpreted as the probability that two individuals alive at the end of the period selected randomly, one among those residing in area A at the beginning of the period, and the other among the USA.
those residing in B at the end of the period, will be identical. The availability of data may impose various other denominators.

819

Migration models\(^1\) fall in two broad categories. The first relates migration streams (803-9) between two areas to social, economic or demographic variables. These variables are often classified as push factors\(^2\) when they characterize repulsion\(^2\) from the area of origin, as pull factors\(^3\) resulting in attraction\(^3\) to the area of destination, and as intervening obstacles\(^4\) between the two areas. The simplest of these models are gravity models\(^5\): the streams between the two areas are directly proportional to the size of their population, and inversely proportional to the distance\(^6\) between them, raised to a certain power. Other models consider that the streams are proportional to the opportunities in the area of destination, and inversely proportional to intervening opportunities\(^7\) between origin and destination. Models in the second broad category are stochastic models (730-5) and refer to individuals rather than to populations; they link the probability of migrating to a certain number of personal characteristics such as age or the previous history of migration.

5. Or Pareto-type models.

6. Distance can be measured in diverse ways: a straight line, the route, the number of intervening areas, etc.
Chapter 9
Economic and social aspects of demography

901

A part of population theory (105-1) is concerned with the social and economic determinants and consequences of population trends. The theoretical treatment of population was largely centered in the past on the relation between total population and resources\(^1\), i.e., the means available to maintain the population, or production\(^2\), the creation of goods and services. More recently, the emphasis has shifted to the interrelations between population growth (701-1) and its components, and economic growth (903-1), particularly with respect to consumption\(^3\), saving\(^4\), investment\(^5\) and labor market\(^6\).★

902

Consideration of the relations between population size and resources leads to the concepts of overpopulation\(^1\) and underpopulation\(^2\). These terms are defined only at a given fixed level of development\(^3\). When neither a larger nor a smaller population would yield advantages, there is said to be an optimum population\(^4\), sometimes briefly called an optimum\(^5\). The advantages yielded may be economic in character and in that case it is an economic optimum\(^5\). The discussion of economic optima generally proceeds in terms of economic welfare but, as this is difficult to ascertain empirically, the level of living\(^6\) or standard of living\(^6\) is sometimes substituted. This is approximated by the real national income per capita\(^7\) i.e., the total amount of goods and services produced in a particular period (or its equivalent in money income adjusted for variation in purchasing power) divided by the total population during the period.

1. Overpopulation, n. - overpopulated, adj.

5. Some writers have used the concept of a **power optimum** and a **social optimum** as well as of an **economic optimum**.

6. The expression "standard of living" is restricted by some economists to mean an accepted goal or recognized set of needs, as contrasted with the level of living actually attained. Others use these terms interchangeably.

7. Other measures such as the **gross national product per capita**, are also used. *Per capita*, although grammatically incorrect, is used in place of the expression "per head".

903

Economists have emphasized the dynamic relations between **economic growth**¹ or **economic development**¹ and rates of population growth and changes in population structure; they are less interested today in the static concept of an optimum size, than in the dynamic concept of the **optimum rate of growth**² of population, i.e., the rate of growth which will be consistent with the maximum rate of increase of the level of living. These relations are of particular concern in countries with a low level of living, which have come to be called **less developed countries**⁷ or **developing countries**³.

3. Also: **underdeveloped countries** or **low-income countries**. They are commonly contrasted with the **developed countries**, or more **developed countries**.

904

The **maximum population**¹ of a territory, sometimes called its **carrying capacity**¹, is generally understood in an absolute sense to mean the largest number of persons that could be sustained under specified conditions; but is sometimes used to denote the largest number that could be supported at an assumed standard of living. Conversely, the **minimum population**² is generally taken to be the smallest number of persons in an area which is consistent with **group survival**³.

905

The term **population pressure**¹ is linked to concepts relating the size of the population and the **resources** (901-1) available. To say that this pressure is strong or weak in a certain area is to suggest that the population of the area is
near or far from the maximum consistent with the resources which are available. According to *Malthusian population theory*, so called after its originator, Thomas Malthus, there will inevitably be pressure of population on the *means of subsistence*. Any change in the volume of available means of subsistence would generate *population growth* (701-1) until *population equilibrium* would again be attained when the level of living had reached a *subsistence level*, i.e., a level just sufficient to maintain life. The equilibrium would be maintained by the elimination of any *surplus population* either through positive checks, sometimes known as *Malthusian checks* (famine, pestilence and war), or through the *preventive check* of moral restraint consisting of *postponement of marriage*, coupled with abstinence from sexual relations before marriage.

6. and 7. The terms *positive check* and *preventive check* in English are generally used only with reference to the doctrines of Malthus.

**906**

Although the term *Malthusianism* originally refers to the theories of Malthus, it is often used today to denote the doctrine that a check in the rate of population growth is desirable. *Neo-Malthusianism*, whilst accepting the desirability of checking population growth, advocates that such restriction should be achieved through the use of *birth control methods* (627-3).

1. *Malthusianism*, n. - *Malthusian*, adj.: conforming to the doctrines of Malthus. The terms are sometimes used mistakenly to refer to the advocacy of family planning programs to solve economic problems.

**907**

The process of transition from a situation in which both fertility and mortality were relatively high to one in which they are relatively low which has been observed in many countries, is called the *demographic transition* or *population transition*. In the process of moving from a *pre-transitional stage* to a *post-transitional stage*, there is typically a lag between the declines of mortality and fertility, so that a stage of *transitional growth* of population results. Economists have studied changes in *productivity*, i.e., production per member of the labor force, or per head of the population, associated with this transitional period.

1. Sometimes called the *vital revolution*. A further distinction is made between the *fertility transition* and the *mortality transition*. The *theory of the demographic transition* associates historical changes...
in vital rates with socio-economic transformations attending the process of industrialization and urbanization.

* 

910

In eugenics\(^1\), a discipline which seeks to improve the quality of the population, attention is directed primarily to the role of heredity\(^2\), the transmission of hereditary characteristics\(^3\), such as the color of the eyes, from generation to generation. Acquired characteristics\(^4\) are not so transmitted. A lethal characteristic\(^5\) generally brings about the early death of the foetus.

1. Eugenics, n. - eugenic, adj. - eugenist, n.: a specialist in eugenics.

911

The transmission of hereditary characteristics operates through genes\(^1\) which are transmitted to children by their parents. Genetics\(^2\) is the science concerned with the transmission and effects of hereditary factors. The genes are carried by chromosomes\(^3\) which are long filaments of DNA (deoxyribonucleic acid) located in the cell’s nucleus. The position of a gene on a chromosome is called its locus\(^4\). Genes occupying the same locus affect the same characteristic, although they do so in various ways which correspond to various alleles\(^5\) of the gene in this locus. The new cell formed by the union of two sexual cells or gametes\(^6\) during the process of conception (602-1) is called a zygote\(^7\).

1. All of the genes carried by an individual are collectively called his or her genetic endowment.
2. Genetics, n. - genetic, adj. - geneticist, n.: a specialist in genetics.

912

The set of two genes of an individual at the same locus is called a genotype\(^1\); the genotype is said to be homozygous\(^2\) if the alleles are identical at a given locus; it is said to be heterozygous\(^3\) in the opposite case. The phenotype\(^4\) consists in the observable characteristics as determined by the genotype and the environment. If an heterozygous individual (AA') cannot be distinguished
from an homozygous individual (AA), the allele A is said to be dominant\(^5\) over allele A’, and A’ is said to be recessive\(^6\). Genes are subject to sudden and apparently random changes, called mutations\(^7\). Panmixia\(^8\) or random mating\(^8\) insures uniform distribution of genes within populations.

7. **Mutation**, n. - **mutant**, adj. or n.

913

A distinction is frequently made in eugenic policy between **positive eugenics**\(^1\), aimed at increasing the number of persons believed to have desirable characteristics, and **negative eugenics**\(^2\) aimed at restricting the reproduction of persons expected to transmit undesirable characteristics or **hereditary defects**\(^3\). Much attention has been given to the discussion of **eugenic sterilization**\(^4\), i.e., the sterilization of persons likely to transmit undesirable characteristics to their descendants. Objections to this measure have been raised on moral grounds and also because of its relatively low efficiency in reducing the frequency of recessive genes (912-6). Among the measures proposed, **pre-marital examination**\(^5\) may be mentioned; this is designed to give couples intending to marry information about the probable quality of their offspring, so that prospective partners to **dysgenic marriages**\(^6\), i.e., those likely to produce defectives, may be warned.

914

The probability that an individual of reproductive age will have a given number of offspring who also attain reproductive age may depend on his **genotype** (912-1). This differential reproduction is called **selection**\(^1\). The **selective value**\(^2\) or **fitness value**\(^2\) of a genotype is the relative number of children of individuals with the genotype who survive to reproductive age. The **mean selective value**\(^3\) or **fitness**\(^3\) of a population is equal to the average of the selective values for the genotypes of its members. The **genetic load**\(^4\) of the population is the relative decline in the mean value of fitness resulting from the presence of different genotypes with varying fitness values. Random fluctuation of the frequency with which a specific gene is found in different generations of a population is called the **genetic drift**\(^5\). The **gene structure**\(^6\) of a population refers to the distribution of the frequencies of different alleles (911-5) on a given locus (911-4) within the members of the population. The **genotypic structure**\(^7\) of a population refers to the distribution of different genotypes on the same locus.
915

In the case of an inbred individual, i.e., an individual whose parents have a common ancestor, two genes are said to be identical genes¹ by descent, if both were carried by the same ancestor and are on the same locus. The probability that an individual chosen at random in a population carries two genes identical by descent is the coefficient of inbreeding² of the population. The coefficient of kinship³ of a population is the probability that two individuals chosen at random in that population carry genes identical by descent on the same locus.

*  
**

920

In many studies, the population is divided into a number of social status groups¹ or into socioeconomic groups¹ according to occupation, income, education or similar indices of economic status. The term social class² has a sociological connotation which is only approximated by the type of grouping generally used in demographic work. The division of society into a number of such groups is called social stratification³. Movement between different social status groups is called social mobility⁴; a distinction is made between upward mobility⁵ and downward mobility⁶ in the social hierarchy. The mobility of children with respect to their parents' social class is called inter-generational social mobility⁷.

3. A caste is a closed social group in which social status and position in the social hierarchy are ascribed.

7. Social mobility by an individual in his or her own lifetime is called intra-generational social mobility.

921

Labor mobility¹ is the general term that covers not only an individual’s changes of occupation² under the name of occupational mobility³ but also job mobility⁴, or changes of employer, and industrial mobility⁵, or changes of industry.
Interest in the problems of aged persons (324-8) and aging (326-3) has given rise to a special branch of studies called gerontology\(^1\) including the special branch of medicine called geriatrics\(^2\).


A population policy (105-2) is a series of measures taken by public authorities to influence the trend of population change, or principles offered as a basis for such measures. A distinction is made between populationist\(^1\) policies designed to increase the population, to accelerate its rate of growth or to check actual or incipient population decline or depopulation\(^3\), and population control\(^3\) policies for the purpose of checking population growth or reducing the rate of population increase. Among the former, pronatalist\(^4\) policies, which attempt to increase the birth rate (332-1), are particularly important. In contrast to pronatalist policies, there are antinatalist\(^5\) policies, which are designed to reduce the frequency of births. Population policy may also include a component of population redistribution\(^6\) policy designed to influence the territorial distribution of population, as well as a component of migration policy\(^7\)*. Health policy\(^8\)*, which aims to reduce morbidity (420-1) and mortality (401-1), is an other component of population policy.

Also called Malthusian policies. See 906-1.

In many countries allowances\(^1\), benefits\(^1\) or grants\(^2\) are given to the parents of children. In general an allowance is a sum of money which is paid periodically, whereas a grant is paid on a single occasion only. Family allowance\(^3\) or children’s allowance\(^3\) denotes a sum of money paid regularly to parents with a specified number of children. In many fiscal systems, tax rebates\(^4\) are granted in respect of dependent children. Other monetary benefits paid in some countries include maternity grants\(^5\) or birth grants\(^5\) which are paid upon
the birth of a child, pre-natal allowances paid to expectant mothers during pregnancy, and on occasion marriage loans granted to newly-married couples in order to assist them in setting up a household.

932

Many other public measures, such as housing programs or measures in the field of public health, may have an impact on demographic phenomena. The provision of services for pregnant women such as pre-natal clinics and for parturient (603-4*) women may help in reducing late foetal, infant and maternal mortality (cf. 410, 411, 413, and 424-5). Services which are primarily designed to help the mother are called maternity services; those meant to assist the child are infant welfare services or child welfare services.

933

Population programs designed to reduce fertility in developing countries have included family-planning education and family-planning services, either alone or in association with health programs and social welfare programs, particularly maternal and child health programs designed to reduce mortality. Some countries have attempted to resort to incentives and disincentives of various kinds to elicit the motivation to use family limitation; social pressures and legal sanctions against disapproved fertility behavior are also encountered. The English term "Population Education" is used untranslated in some countries, especially Germany. In this specific context, it refers to the dissemination of information (in schools and other contexts) about the impact of individual reproductive behavior on broader society.
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Dictionnaire démographique multilingue
Mehrsprachiges Demographisches Wörterbuch
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