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Study topic 1

Questionnaire Design and Question Testing

Invited paper submitted by the Austrian Central Statistical Office<sup>2</sup>

I. Preparation of the 2001 Population and Housing Census in Austria

General Planning

1. The preparation work of the 2001 Population and Housing Census started in 1996. After having examined the existent administrative registers it was decided to conduct a traditional census. The basis for a register based census was very weak at that time. The most important register, the Central Population Register, which should run in 1998, was not even in a planning status (in fact, the responsible Ministry of the Interior has just begun testing how to install the register). There was no legal basis to combine individual data from different registers. It was anticipated that the public opinion would be very much against linking personal information even if only for statistical purposes.

2. A survey of user needs was conducted. Additionally, advisory boards with experts and census users were installed to discuss the content of the questionnaires (topics). In co-operation with the systems and methods

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1 The papers which are prepared for this work session will be treated in the same manner, as papers that are prepared for seminars.

2 Prepared by Adelheid Bauer.

division of the Statistical Office a concept was developed to implement new data capture techniques.

3. The concept of the 2001 Population and Housing Census is as follows:

- There will be a traditional census using questionnaires.
- As far as possible, the census will be supported by registers.
- A Census of Local Units of Employment will be conducted at the same time.
- The enumeration will be carried out by the communes.
- At the same time the local population registers will be checked with regard to double counts, over counts etc. It is actually discussed whether an adjustment of the local population registers will take place after the census.
- Two census tests (1998 and 1999) and a "dress rehearsal" (2000) have been planned.
- Technically, there will be many innovations compared to the 1991 Census. The questionnaires will be captured by scanning technology, the entries of text and numbers read by a recognition software followed by the automated coding of text entries, for example nationality, occupation and field of study.

#### 1998 Census Test

4. In spring 1998 a Census Test was conducted in 16 communes and in Vienna. In each of the communes test areas of about 700 to 800 inhabitants were chosen. Vienna participated with five test areas in different parts of the city. The test areas were chosen to provide a cross-section of the population and of types of housing which will be encountered in the full census (urban/rural; suburbs, inner city, exclusive residential districts, areas with a high percentage of foreign population, municipal housing etc.).

5. Objectives of the 1998 Census Test:

- To test the questions (acceptability of each question, common understanding),
- to test the enumeration organisation in the communes,
- to test the acceptability of the 2001 Census and of the Census Test with the public,
- to test new technologies at the processing stage and
- to check differences between the local population register and the residence status given by the respondents.

6. During the enumeration stage, census project members of the Austrian Central Statistical Office joined the enumerators and the local census officials in order to observe the course of the enumeration. In some communes they accompanied the enumerators to the households or attended the interviews with the respondents at the local census office. Their experiences are summed up in a report. Together with the results of the statistical analysis of the data derived from the questionnaires (non-response etc.) this report will be

the basis for further discussions and decisions with regard to the design of the 2001 Census.

## **II. Questionnaire Design**

### General Considerations

7. The 1991 individual questionnaire was too crowded: 17 questions on one sheet in a two-column-design. The type-size was very small, the fields for text entries did not provide enough space for write-in answers. The building and dwelling questionnaires were similarly designed but without fields for text entries. Each questionnaire was characterised by a different colour.

8. The above mentioned form design was based on the technical demands of the optical reader used in 1991.

9. For the 2001 Census form design we developed some general rules. First, the number of questions should not increase but the format of the questionnaire should be changed and become more user-friendly with a good graphic design. We wanted to stick to the concept of separate questionnaires for buildings, dwellings and persons. They should again be distinguished by different colours. The number of text entries should be minimised, questions should preferably be answered by ticking a box where applicable.

10. Second, we set up some rules which we tried to follow. A questionnaire should begin with simple questions which have to be answered by all respondents. Information which is needed only from a subgroup of the population should be asked at the end of the form.

11. Thirdly, we wanted to ask for information which respondents can provide easily and quickly. The questions, instructions and terms we use are such that they can be understood by everyone easily and in the same way. Because detailed instructions are only read by a minority of the population they should be as short as possible. The same applies to questions: we tried to make them as short as possible.

12. And fourthly, in order to differentiate between "non-response" and "does not apply", closed questions should supply exhaustive categories.

13. The layout was designed by means of Corel Draw in the Statistical Office.

### *Technical Implications*

14. Scanning technology and image processing solutions demand some changes of the form design to optimise automation. We had to take into consideration special requirements as for example:

- selection of non-read colour for instructions and background,
- a special layout of the fields read,
- minimum spaces for write-in answers.

15. To meet these technical demands without risking poor response due to a less attractive appearance was a great challenge for the graphic design. Some of these restrictions were not very advantageous, especially the colour proved to be a problem.

16. On the other hand, the technology chosen provided some advantages with regard to the format of the questionnaires. The scanners read a sheet which is printed on both sides. As a result, the building and dwelling forms do not have to crowd all questions on one page but have two pages at their disposal. The individual questionnaire even consists of two sheets printed on both sides. The questions are placed more generously with bigger type-size and enough space for textual answers.

### *Realisation of Questionnaire Design*

#### **a) Drafts of questions are prepared**

17. Each group of questions (for example demographic topics, education, economic activity, place of work; buildings, dwellings, local units of employment) was drafted by a small team of the census project staff. Emphasis was put on the selection of topics and wording of the questions and instructions.

#### **b) Discussion by the census project team**

18. The 2001 Census project team then discussed the drafted questions (without layout), reformulated them, discussed the second, the third draft (by that time provided with some layout) and so on.

#### **2.1.1 Discussion with experts from the office's advisory groups**

19. At the beginning of the preparation of the Census the most important purpose of consultations with experts and census users of the office's advisory groups is that of topic selection. In a second round of the work sessions drafts of the questionnaires are discussed. Most of the time the discussions are very helpful with regard to the design of the questionnaires, especially if our attention is drawn to details which we did not notice because of our deep involvement and sometimes biased ideas.

The Census Test Questionnaires

20. The questionnaires tested in spring 1998 consisted of a separate form for buildings (to be filled in by the owner of the building) and dwellings, a census list for private households, a census list for institutional households and individual forms for each person. Because of the new format, a set of questionnaires for an average household is much thicker now than in 1991 although the number of questions did not increase.

21. The following section shortly describes the forms with a stress on the areas which could represent a problem at the enumeration. The results of the question testing is presented in chapter 3.

**The individual form**

22. The individual questionnaire consists of four pages, the first page with questions on demographic characteristics (sex, date of birth, country of birth, marital status, nationality, place of residence one year prior to census, relationship to the household reference person as well as number of children born by women of the age of 16 years and over). Most of the questions have to be answered by ticking boxes except date of birth, address of prior place of residence, other country of birth and other nationality.

23. Nationality and place of birth (a new question in the Austrian Population Census) provide boxes for Austria and the most important countries immigrants come from: the neighbouring countries, Turkey, the successor states of former Yugoslavia, Poland and Romania. Thus the number of text entries (and the amount of automated coding) is limited.

24. The question concerning the number of children born also provides boxes (from zero up to ten or more children). Entering a figure (1981 Census) did not work as well as the box-method which has been applied since 1991. The discussion on selecting this question was controversial. The census project team proposed to delete it from the form because it was poorly accepted in 1991. However, a very important group of census users was in favour of the question to be asked again.

25. The question on relationship in the household has not been changed considerably since 1991. Nevertheless, the design turned out to be a special problem. In German there is no adequate translation for household reference person, so we had to stick to "head of household" which had been used ever since or to avoid it, at all. We tested a version where both partners could tick themselves as joint head of household. But then we would not have been able to distinguish between married and cohabitant couples if marital status was missing.

26. We tried to find an alternative with our advisory board experts. The representatives of the rural municipalities insisted on using the old term, as people were used to it and any other term would cause confusion. The opposite opinion was that this term is not neutral and does not go well with

a family model of equal partners, in short, is discriminating particularly women.

27. The conclusion of the debate was that the term "*statistical*" was added to "head of household". The intention was to indicate one person as head of household, but only for statistical purposes in connection with the census. An instruction was added in brackets ("person with the highest income"), which was meant as an example.

28. During the Census Test in spring 1998 efforts were especially focused on examining how this question works.

29. The second page of the individual questionnaire refers to the educational background of the respondents.

30. Eurostat and the EU-member states have agreed upon a tabulation programme which includes data on the highest education attained according to ISCED levels starting with no education, pre-primary, primary education etc. Following these guidelines we would have to ask the respondents to state their whole educational biography. For the Census Test we listed all school types of compulsory education (primary school, special education, secondary, first stage education) in addition to the school types of secondary, second stage education as well as of tertiary education (together with the category for "other" these were 12 boxes).

31. In Austria, the Population Census does not only provide data on completed education but also on pupils and students by different types of school (required in addition to the address of the school for commuter statistics). In 1991, this information was derived from the question of "name of employer/school", but it was not possible, then, to distinguish between certain types of school.

32. For the 2001 Census the idea was to design a question on school enrolment providing categories to be ticked instead of a write-in answer. During one of the meetings with experts and census users they proposed to combine the question on education completed and on school attendance. The suggested design seemed to be very logic and easy to apply but the implementation was the opposite. There should be two columns, one for students to indicate which type of school they were attending at census day and one for education successfully completed. The question on education completed also demands a text entry as additional information to the level completed (for example, for vocational training: the occupation, for university: the field of study). There was some fear that this question would not work as we hoped because it was too complex and needed too many instructions.

33. Page three of the questionnaire contains questions on economic activity. The first one begins with "Are you..." and is a closed question with boxes for employed, retired, students, children etc. There are instructions for those who have to answer the questions on occupation, industry and place of work/school.

34. Time worked: We chose a closed question with three categories, one for full-time job and two for part-time jobs, with a given range of hours worked per week. One of the part-time categories was for "jobs with marginal earnings" (from one hour per week onwards). Thus our concept of economic activity corresponds to the ILO labour force concept.

35. Branch of economic activity: we plan to take over the NACE code of the branch of economic activity from the business register of the Central Statistical Office with the help of the address of the workplace (and the name of the employer) given on the questionnaire. Thus coding of the textual answers should not be necessary.

36. But anyway we shall have to include a question on industry in the census form for cases of non identifiable addresses and for those who are working abroad. Depending on the completeness of the identification procedure we need different amounts of information: an exhaustive "branch of economic activity" or only broad categories of industry. In the Census Test we asked the respondents to state the branch of economic activity of his or her employer, to enter the name of his or her employer and to chose among broad categories of industry one to which his or her firm mainly belongs. If the second information serves our purpose, the branch will not be coded.

37. Page four includes all questions on place of work/school and travelling to work(school). In order to produce commuter statistics the address of the place of work/school of the employed (students) must be known. There is a certain restraint to give the address of the workplace (and the name of the employer) because people fear that the office gets in contact with the employer verifying the employee's statements. For the 2001 Census we thought of even asking the telephone number of the place of work or school. We shall try to find the place of work in the business register with the help of the telephone number first. If a certain percentage of addresses are thus identified the address and NACE code are taken from the register.

#### **The building and dwelling forms**

38. The Housing Census uses two questionnaires, one for the building and one for the dwelling. In order to reduce the burden for the respondents the building questionnaire has been split up according to two types of characteristics: building characteristics that do not change (period of construction for example) and characteristics that may change like "type of ownership". Page one contains questions on attributes that change. These have to be answered for each building. On page 2 the respondents are asked to answer certain questions only if their building has been completed since 1991. For buildings erected before 1991 the information will be drawn from the 1991 Housing Census data set. This is possible because each building has a distinctive number from the building register which is printed on the questionnaire and saved on the data set.

*Outsourcing of Questionnaire Design?*

39. The Census Test questionnaires had to be ready for printing in December 1997. At this time a set of questionnaires was given to a firm which is specialised in designing questionnaires for surveys and opinion polls. Their proposals for improvement could not be taken into consideration in the Census Test, but a separate questionnaire with the aim to measure the acceptance of the Census was designed in accordance.

40. Although the 2001 Census forms would profit from a co-operation with graphic designers, it has not yet been decided if the future questionnaire design should be given to a private sector firm.

**III. Question Testing**

41. The Austrian Central Statistical Office has no central unit for question testing or questionnaire design. Both agendas are always carried out by the project team. For the 2001 Census question testing is part of the two test censuses. There are no other small-scale pre-tests concerning the wording of questions and no qualitative interviews with voluntary participants.

*1998 Census Test*

42. There are two possibilities to examine how well a question was understood and answered: the experiences of the observation teams during the Census Test and the statistical analyses of the data captured from the questionnaires.

**a) Results of the field work**

43. During the enumeration stage members of our office's census project staff spent two days in each of the Census Test communes. They interviewed the local census officials and the enumerators about their experiences with the organisation of the enumeration and with public acceptance. How did the respondents react, angrily or in a co-operative manner? How much propaganda work had to be invested to obtain co-operation? Did many people refuse to fill in the questionnaires (note: participation was on voluntary basis)? Which questions were the cause of annoyance, were often misunderstood and needed explanation?

44. In addition, in some communes the observers had the chance to accompany the enumerators to the households and speak with the respondents. In other municipalities the questionnaires were handed out to the households and the respondents were asked to deliver them at the local census office. In the latter case, the observation team took the chance of interviewing the person who brought back the filled-in set of questionnaires. In some test areas the questionnaires were filled in at the census office by the official interviewing the respondent, especially if he or she was an elderly person.



45. Finally, the observers had the possibility to take a look at the questionnaires which were delivered by the respondents or enumerators. We asked the local census officials not to intervene too much in how the forms are filled in. Otherwise we would get biased information on how the questions were understood.

46. Back at the office, the observers met to exchange their experiences and impressions. Their reports will be a part of the general Census Test report.

47. Some of the results of the 1998 Census Test:

48. The preparation of the Census Test and the organisation of the enumeration was well done by the communes. The local census officials were very co-operative and so were most of the respondents. Problems to get in contact with the households mainly arose in cities (Graz and Vienna).

49. With regard to the questionnaires, individual problems were observed concerning the understanding of the questions and the design of the forms. Although they are rather isolated these problems will be taken very seriously.

#### **Demographic topics**

50. In general, people had no problems with the demographic questions except with "relationship to the *statistical* head of household" and "number of children born". The second one has been described as "intimate", especially in case of young unmarried women who were still living at home with their parents.

51. When asking for the "relationship to the *statistical* head of household" we made some mistakes. First of all, many people could not identify themselves with a "*statistical*" head of household. In many cases, both members of a couple ticked the box "husband, wife" (many of them presumably did not want to be a head of household anyway but regarded themselves as equal partners). Secondly, any hint about the income of a person should be avoided.

52. We also noticed that there were respondents who mixed up two things: their household status and their family role. An older woman, for example, who was head of household ticked "mother" (because she is the mother of a son).

53. Furthermore, we noticed that some people had problems to find the appropriate box for their son or daughter-in-law because we only provided "partner of son, daughter": This term was understood as being the unmarried partner and not the husband or wife.

54. Single persons sometimes did not find an appropriate category for their status not realising that they were the head of their household.

**Education**

55. The Census Test showed that our design (two columns, one for students to answer which school they were attending, one for education completed) was not always successful. Some respondents mixed up both columns because they did not read the headings and instructions. Although the columns were distinguished by different colours, people started ticking the wrong boxes. Only later they came to understand what was meant by the two column design. Then they started to delete the wrong marks and tick the right boxes. Some respondents even thought that the first column was provided to state "school attended, but not successfully completed".

56. To many respondents the question on education completed was very unpleasant especially to those who had only completed a low grade of schooling. Another reason of disapproval was that the question on education seemed to be an endless one (it takes the total of one page but only because of a bigger type-size and due to the many text fields for levels completed).

**Economic activity**

57. Many enumerators observed that the instructions ("Please, answer question on occupation" etc.) were hardly noticed by the respondents. Other instructions were missing, for example that retired or children under the compulsory schooling age did not have to answer more questions. Retired often did not know whether they should write in their former occupation, branch of economic activity and name of employer. Very often parents forgot to tick "child below schooling age" or "pupil, student" for their children.

**Branch of economic activity**

58. The Census Test showed that many people were unable to select an appropriate category from the closed question on branch of economic activity (agriculture, manufacture, retail etc.) but ticked either two boxes or the category "other".

**Place of work/school**

59. If the address and/or telephone number were missing, people in the first place did not know it (for example if one representative of the household was interviewed at the local office). The address and telephone number of the school is lesser known than the address of the workplace. It cannot be denied that some of the missing answers were refusals.

**Buildings**

60. As mentioned before the split of the building form (some questions were only to be answered for newly built buildings) was planned to reduce the burden of the respondents. But many of them did not recognise the intention and also filled in page two of the building questionnaire. This was mainly due to layout mistakes. We learned that we should put the instruction

"Please, answer the following questions only if the building was built after 1.1.1991" after a question on the construction period of the building.

61. Some instructions ("Please, also answer question x. Go on to question xx") could not serve their purpose because of colour problems. The colour of the boxes, arrows and text field frames of the building questionnaire was supposed to be a warm yellow but the printing firm did not correspond to our intentions and came out with a colour that was hardly seen on the white paper.

62. In rural communes where most of the inhabitants live in houses of their own (with one dwelling) people had problems with the question "How many dwellings are in this building?" Very often the enumerator was told "I do not have a dwelling, I am living in a house". This question serves as a control for the number of dwelling questionnaires that have been filled in. But sometimes these respondents also ignored the dwelling questionnaire thinking that it did not apply to them.

### **Dwellings**

63. For the 2001 Census a new question was included: *"Is the dwelling to be entered without a staircase?"* <sup>3</sup> The categories for answering were "yes" and "no". When observing the reactions of the respondents we learned that sentences with a negation should be avoided. We also learned that we did not tell the respondents what we really wanted to know. People who lived in a building which was equipped with an elevator did not know whether to answer in the affirmative or in the negative (the elevator might be out of work some times).

64. Another question deals with the equipment of the dwelling (kitchen or kitchenette, bathroom, water and gas supply, balcony, terrace, garden, central heating, garage etc). Then the respondent has to give the number of rooms (up from a size of 4m<sup>2</sup> without kitchen, bathroom) of his or her dwelling. Comparing the number of rooms and the floor area of the dwelling we learned that many people counted each room including the kitchen, the bathroom and so on although there was an instruction not to do so.

65. Other problems of wording arose in the question on equipment characteristics. The term "parking space" was not very clear. Whilst parking space on the property was meant, people thought of public parking space in front of the building, too. Concerning bathroom and shower some people did not know whether to count the shower in the bathroom (which many people have in addition to the bath tub) separately or not. Even the difference between balcony and terrace was not so clear to some persons.

66. A problem of design was that arrows pointing to additional questions were not noticed because of their faint colour (similar to the building form).

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<sup>3</sup> To ask for this information was suggested by organisations of the handicapped.

**b) Statistical analysis**

67. The reports of the field staff revealed some points to be improved in the questionnaires. The results were confirmed by the statistical analysis of the data set.

**Opinion poll**

68. The questionnaire of the 1998 Census Test included a two-page form for each household asking questions about the Census Test, the 2001 Population and Housing Census, the acceptance of the questions, the quality and use of the instructions etc. This form has been answered by two thirds of the households. The results of the statistical analysis confirm the experiences made by the field staff with regard to the acceptance of some questions. A few people felt uneasy at certain questions which they would have liked to be better explained or even deleted: "Commuting" (presumably the address and telephone number of the workplace) and "Name of employer" (the background is that people fear that the employer is contacted), "Education" (people with a lower grade may feel embarrassed), "Relationship to head of household" (not understanding the meaning of the question, the term "statistical"), "Number of children born" (has always been a sensitive topic), "Rent" (it's nobody's business what I pay for rent), "Useful floor area" (don't know the m<sup>2</sup>) and "Equipment" (like "Rent" an indicator of living standard; some categories liable to be misunderstood). Here are the results 4 of the opinion poll concerning the census questions:

***Questions which people did not like to answer:***

Unpleasant		
No	3,911	(80.4%)
Yes	393	(8.1%)
Missing	560	(11.5%)

**Variables**

Commuting	53	(1.1%)
Name of employer	42	(0.9%)
Rent	38	(0.8%)
Education	30	(0.6%)
Branch of economic activity	22	(0.5%)
Occupation	20	(0.4%)
Relationship to head of household	18	(0.4%)
Number of children born	15	(0.3%)
Economic activity	13	(0.3%)
Broad category of industry	13	(0.3%)
Useful floor area	13	(0.3%)
Equipment of dwelling	12	(0.2%)
Marital status	11	(0.2%)
Occupational status	10	(0.2%)

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4 These are similar to the results of an opinion poll which was conducted after the 1991 Census by an opinion research institute.

Which questions should have been better explained?

Better explained

No	3,215	(66.1%)
Yes	510	(10.5%)
Missing	1,139	(23.4%)

#### **Variables**

Relationship to head of household	58	(1.2%)
Branch of economic activity	40	(0.8%)
Economic activity	31	(0.6%)
Commuting	29	(0.6%)
Education	29	(0.6%)
Equipment of dwelling	26	(0.5%)
Occupational status	23	(0.5%)
Occupation	19	(0.4%)
Broad category of industry	15	(0.3%)
Useful floor area	13	(0.3%)
Type of heating	13	(0.3%)
Rent	11	(0.2%)

*If you could delete one question, which one would you chose?*

Delete a question

No	3,171	(65.2%)
Yes	395	(8.1%)
Missing	1,298	(26.7%)

#### **Variables**

Commuting	71	(1.5%)
Rent	55	(1.1%)
Name of employer	39	(0.8%)
Education	34	(0.7%)
Number of children born	31	(0.6%)
Relationship to head of household	21	(0.4%)
Occupation	16	(0.3%)
Branch of economic activity	15	(0.3%)

#### **Data generated from the Census Test forms**

69. The building, dwelling and individual forms of the 1998 Census Test were scanned to capture ticked and textual (numerical) answers. The data set which was generated and statistically analysed up to now 5 contains the results of a recognition procedure without data editing. In the following section some results of the individual data set are presented.

70. For questions which refer to the total of the respondents non-response rates are computed in *table 1*. They give us an indication of how the

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5 Because of the ongoing statistical analysis only a few results can be presented in this report.

questions worked. The Census Test included a total of 16,664 persons. 5.8% of them were absent during enumeration time or refused to fill in any form. The individual data set thus comprises 15,704 persons, who form the basis for a calculation of non-response rates.

**Table 1:** Non-response rates of characteristics which had to be answered by the total of respondents

CHARACTERISTICS	NON-RESPONSE	
Date of birth (year)	8	0.05%
Sex	102	0.65%
Nationality	407	2.59%
Country of birth	455	2.90%
Marital status	608	3.87%
Relationship to "statistical" head of household	1,237	7.88%
(Economic) activity	1,618	10.30%

71. Marital status has a surprisingly high non-response rate of 4 per cent but this is simply explained as some parents forgot to answer this question for their children. 8 per cent of the respondents did not answer the question on household relationship. The non-response rate for activity status is 10 per cent.

72. Non-response rates of economic characteristics are computed for different groups (*table 2*): full and part-time employed, unemployed and employed who are on parental leave. Unemployed should answer the questions for their former job.

73. The non-response rates are not high for full and part-time employed except for the branch of economic activity. We know that the branch of economic activity was not stated when people thought that it could obviously be derived from the name of the employer (for example: hospital XX). People with a job of only a few hours per week were more reluctant to answer the other questions on economic activity. So were unemployed and employed on parental leave.

74. Questions on place of work/school and travelling to work/school have higher non-response rates than questions on economic characteristics, but again there is a difference between the various subgroups.

**Table 2:** Non-response rates of economic variables by different categories of economic activity

CHARACTERISTICS	EMPLOYED			UNEM- PLOYED	MATERNITY , PARENTAL LEAVE
	FULL- TIME	PART- TIME	MARGINAL EARNINGS		
Occupational status	1.4%	3.8%	8.2%	17.4%	12.7%
Occupation	4.4%	7.0%	12.2%	22.0%	16.9%
Name of employer	5.5%	3.8%	15.1%	32.6%	21.4%
Branch of economic activity	16.6%	18.8%	28.3%	40.2%	29.9%
Broad category of industry	4.8%	4.6%	12.9%	26.7%	18.5%

#### IV. Conclusions

75. The results of observing the enumeration in the test areas and of the statistical analysis show some weak points although they are not a quantitative problem. But they will be seriously considered when reviewing the questionnaires. Layout and graphic design should be improved and some wording problems will be critically revised.

76. With problems of more general nature, like refusal to give the name of the employer and the address of the workplace we shall have to cope in a different way unless this information is essential to commuter statistics and to the coding of the branch of economic activity. Public relations work should give special attention to these issues before the full Census takes place.

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