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# THE CENSUS—QUANTITATIVE INTERPRETER FOR THE REPUBLIC

*The author reviews the quantitative processes of the census and the anticipated impressive accomplishment when, in Spring 1970, the United States will count its entire population—an estimated 200,000,000 people.*

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In the wilderness of Sinai, in the mountains of Arabia, the Lord spoke to Moses, ordering him to count the children of Israel "according to the number of the names, by their polls, every male from twenty years old and upward."<sup>1</sup> The time was some 1500 years before the birth of Christ, "on the first day of the second month,"<sup>2</sup> which is to say, the Spring of the year and approximately the first of May. The purpose: to obtain a list of young men for military conscription.

In the hills of Judea at the point in time that heralded Christendom, Joseph of Nazareth returned to Bethlehem, the city of his forefather, David, obeying the decree of Caesar Augustus "that all the world should be taxed."<sup>3</sup> The Roman empire at that time dominated Egypt and the Near East, and the provincial citizenry was counted at least once every fourteen years<sup>4</sup> to ensure the maximum in poll tax.

In the United States of America on April 1, 1970, every man, woman and child will be counted, and their dwellings will be counted as well. These dwellings make a motley group. They include houses, apartments, ships, tents, trailers, houseboats, railroad cars, shacks and lighthouses. The counting will also employ some rather unusual types of transportation such as mules in the hills of Kentucky, pirogues in Louisiana marshlands, and dog or motorized sleds in Alaska.<sup>5</sup>

The purpose of this nineteenth decennial counting that is called the census is neither conscription or taxation. It is intended as a tool for sociological study that will guide the ad-

ministration of the most complex and wealthy nation in the world's history.

As the accountant discovers, along with the economist, sociologist and statistician, comparison sightings can reflect more truth than the viewpoint of isolation. Therefore, it may be well to review the quantitative processes of the census.

## Historical Development

What has happened to bring that primitive counting at Mt. Sinai to the modern concepts of statistical sampling and computer processing as a nation enumerates over two hundred million people and tabulates the condition of their housing?

### *King David*

About half a millenium after the twelve tribes of Israel were counted by Moses, his descendant, David, was king and the Biblical record states that the Lord commanded David to "Go, number Israel and Judah." King David in turn ordered the captain of his host to "Go now through all the tribes of Israel, from Dan even to Beer-sheba, and number ye the people, that I may know the number of the people."<sup>6</sup>

<sup>1</sup>Numbers 1: 1-46

<sup>2</sup>Ibid

<sup>3</sup>St. Luke 2: 104

<sup>4</sup>Sherman LeRoy Wallace, "Census and Poll-Tax in Ptolemaic Egypt," *American Journal of Philology* LIX (October, 1938)

<sup>5</sup>U.S. Bureau of the Census, "Bureau of the Census: Fact-Finder for the Nation," 1965, Washington, D.C. pp. 10-11

<sup>6</sup>II Samuel 24: 1-2



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A knowledgeable reader must smile with tolerance at this stratagem from antiquity to impute to God the wishes of the leader. Both Moses and his descendant, David, understood very well the craft defined in a later age by Machiavelli: "In truth, there has never been, in any country, an extraordinary legislator who has not had recourse to God, for otherwise his laws would not have been accepted."<sup>7</sup>

Biblical history further records that divine wrath in the form of a pestilence killed seventy thousand men following the King's census, and that the pestilence was abated only after David built an altar to the Lord and made burnt offerings. The memory of this dreadful sequence created a resistance to census taking and was carried along by folklore into medieval times.

The census of the tribes of Israel from Dan to Beer-sheba required "nine months and twenty days,"<sup>8</sup> a gestation period during which there must have been many births and deaths. The twentieth century concept of a census relates it to a particular point in time, like the accountant's inventory of merchandise. To this inventory of people, modern man makes additions and subtractions of vital statistics as they are recorded. A perpetual inventory is thus maintained and adjusted each decade to the actual physical count.

### *The Ptolemaic Kings*

The Ptolemaic kings discovered the bonanza of a poll tax levied on every household. In the years 220-219 B.C. King Ptolemy IV introduced the fourteen-year census period to illuminate every source of potential revenue.<sup>9</sup> Rome entered the Egyptian political picture during the reign of Ptolemy XI, father of Cleopatra, and the fourteen-year cycle apparently continued there although Roman practice tended to a quinquennial count. One researcher indicates that a questionnaire form for the head of the household appeared at this time, with copies for various officials and one for a record.<sup>10</sup> This seems to contradict the probable illiteracy of the era but, if true, the Egyptian questionnaire does adumbrate the mail-in form that will appear in United States households in 1970.

### *Other Early Census*

Although the literature is inconclusive, Biblical records are reflective of the earliest census. There are indications that in the third millennium B.C. Babylonia had a complete charting by plots of land, a cadastral and agricultural survey for financial purposes. Persia and China are also known to have had some very early form of census.<sup>11</sup>

The Romans first recognized the value of

regular census taking. The very word "census" is a heritage from Rome: the Latin verb "censere" means to value or tax, while the Roman magistrate delegated to perform such work was the "censor". Servius Tullius, sixth king of Rome (578-534 B.C.) instituted the Roman census and by the fifth century B.C. Caesar Augustus extended the census to the entire Roman Empire, including the Nazareth of Joseph and Mary. The Roman census was both financial and military in purpose, being a preliminary to military draft. In the fifth century A.D. came the decline of the Roman Empire and with it the regular administration of a census.

Charlemagne, in his dream of restoring the Roman world, made an effort to revive the census in 808 A.D.<sup>12</sup> but the counting, like his dream, was short-lived. It was not until the end of the Dark Ages that an English king envisioned the charting of English feudalism. William the Conqueror, through his Domesday inquest, intended to settle the controversies about the feudal land holdings that produced revenue for the throne. Sir Winston Churchill wrote: "The inquest or description, as it was called, was carried through with a degree of minuteness and regularity unique in that age and unequalled for centuries after. The history of many an English village begins with an entry in Domesday Book."<sup>13</sup>

### *The Seventeenth and Eighteenth Centuries*

A radical thought occurred in the mind of man as the seventeenth century washed over him. He awakened to the idea that the state could serve mankind rather than exploit it. He also had a vision of looking at society and himself objectively, and so, slowly, a concept of sociological studies emerged. The church records became the instrument of counting for those early studies. It must be remembered that only the churches had records of births and deaths.

Among the first efforts at an appraisal of a country's population for the common good was the clergyman's count in Sweden in 1749.

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<sup>7</sup>Niccolo Machiavelli, *Discourses on Livy*, Bk V, Ch XI, quoted from the Italian by Jean Jacques Rousseau, *The Social Contract and Discourses*, Book II Ch VII, trans. by G. D. H. Cole (Everyman's Library: E. P. Dutton & Co., Inc., reprinted by The Great Books Foundation, 1955)

<sup>8</sup>II Samuel 24: 8; 15-25

<sup>9</sup>Wallace, "Census and Poll-Tax" op. cit.

<sup>10</sup>Sherman LeRoy Wallace, *Taxation in Egypt from Augustus to Diocletian* Ch VII and VIII, (Princeton, 1938) pp 418-442

<sup>11</sup>"Census" *Encyclopedia Britannica*, 1967, 5 pp 167-168

<sup>12</sup>"Census" *Encyclopedia Americana*, 1965, 6, p 194

<sup>13</sup>Winston S. Churchill, *The Birth of Britain*, (New York: Dodd, Mead & Company, 1956) Book II, Ch X, p 173

Simultaneously, LaNouvelle France and Acadie, Quebec and Nova Scotia today, had sixteen enumerations between 1665 and 1754. The British took a census of Virginia in 1635, and by 1790 had taken thirty-eight colonial censuses in what is now the United States.<sup>14</sup>

A few paragraphs have scanned over three thousand years of man's relationship to the state up to the eighteenth century. As often happens, creative thought flowered in various areas at the same time, and from previously barren surfaces. The Social Contract of Rousseau appeared in 1762, followed by *Wealth of Nations* by Adam Smith in 1776, and in 1787 the Federalist Papers (Hamilton, Madison and Jay).

The year 1787 produced another social milestone, the Constitution of the United States. The French statistician, Moreau de Jonnes, has declared that the United States presents a phenomenon without a parallel in history, "that of a people who instituted the statistics of their country on the very day when they founded their government, and who regulated by the same instrument the census of inhabitants, their civil and political rights, and the destinies of the nation."<sup>15</sup>

George Washington had been president one year when our first crude census was taken in 1790. It was a public display of private information. It encountered ignorance, hostility and deceit, and required eighteen months for completion, but it was a beginning.

### *The Nineteenth Century*

By trial and error administration of the census has passed from United States marshals, to temporary appointees, to an office with the Department of Interior, to the Department of Commerce and Labor and in 1913, when that Department was split, to the Department of Commerce.

The first census in 1790 determined only the number of free men and slaves in each state.<sup>16</sup> The Secretary of Commerce is now directed by law to take censuses of the population (by sex, age and color), housing, agriculture, irrigation, drainage, manufactures, mineral industries, business (wholesale, retail and service trades), governments and transportation.<sup>17</sup>

By law the Census Bureau is permitted to use the information obtained from questionnaires for statistical purposes only. It may not be used for taxation, investigation or regulation. Questionnaires are seen by Census Bureau employees exclusively, and they are under oath not to disclose information.<sup>18</sup> In a government that respects the dignity of the individual citizen such safeguards of privacy have become mandatory.

Constitutional authority directs that a population census be taken in years ending in zero, but Congressional Act authorizes the multitude of supplemental surveys.

## **The Census Process**

### *Selecting the Questions*

Questions on the 1970 census will follow the basic format of the 1950 and 1960 censuses, in the interest of maintaining comparability, but they will reflect a deeper probing for information in special areas on a sample basis, namely, the 20 per cent, 15 per cent, and 5 per cent questions. The areas of inquiry were selected after long and careful deliberation, and after consultation with census users everywhere. The interests of Federal agencies were primary, of course, but the Census Bureau has sponsored public meetings in twenty-three cities across the country to collect suggestions from interested individuals and organizations.<sup>19</sup>

Interest in census results is shared by planners at all government levels. These planners serve the public in arranging for transportation, schools, water supply, and sewage removal, for the general health and welfare, and all of those services that Americans consider their civic privilege. To aid the planners the "place of work" questions have been expanded from the 1960 form to pinpoint the street address, as well as the city and county, since fine geographic detail is a necessity for effective service systems.

In an effort to gain more accurate information concerning the condition of housing in the United States the 1970 survey replaces opinions with precise facts. The elegance or humbleness of a home will not be appraised by an enumerator. Each householder will be asked many specific questions to develop an objective classification of his dwelling.<sup>20</sup> The infamous bathtub-or-shower question is not a probe as to personal cleanliness. It is one of several means for identifying living quarters as sound, deteriorating, or dilapidated.

### *Collecting the Information*

Certain housing and employment information can be satisfied by scientific sampling techniques but population data must be collected

<sup>14</sup>"Census" *Colliers Encyclopedia*, 1968, 5, p 636

<sup>15</sup>Moreau de Jonnes, quoted by W. S. Rossiter, "Bureau of the Census: Fact-Finder for the Nation," p 1

<sup>16</sup>"Bureau of the Census: Fact-Finder," op. cit. pp 2-3

<sup>17</sup>*Ibid.* p 6

<sup>18</sup>Department of Commerce, U.S. Bureau of the Census, *the 70 Census of population and housing*, p 7

<sup>19</sup>David L. Kaplan, "Plans for the 1970 Census of Population and Housing," *Statistical Reporter*, (November, 1967) p 73

<sup>20</sup>*Ibid.* p 74

for each and every citizen.<sup>21</sup> Counting will be as inclusive as possible with a combination of mailed forms and personal interviews. Metropolitan centers will be counted by mailed questionnaire system, each householder returning his form to the census office after the questions have been answered. This has been developed after extensive study and field testing over the years. In each standard metropolitan statistical area (SMSA) enumerators will follow up every non-response situation.<sup>22</sup> For all other sections of the country the traditional census-taker will appear at every door.

Dress rehearsal programs for both the mail and personal interview systems were scheduled for May, 1968, in Dane County (Madison SMSA) Wisconsin, and two rural South Carolina counties.

A prodigious task of preparing mailing lists begins in the latter half of 1969 and will utilize commercial lists, computer print-outs, and Post Office personnel who will verify each metropolitan residence address. About mid-March in 1970, or two weeks before Census Day, there will be a final verification and correction of addresses. Meanwhile, the addresses will be coded for enumeration district (ED), and serial number within the ED. A random start serialization technique will designate one of three types of questionnaires for each address.

### Sampling

What questions will appear in the sample groups? When a questionnaire arrives, if it is lengthy and inquisitive not only as to the total number of homes owned but also about the presence in the home of a washing machine, T-V sets, home freezer, dishwasher, etc., that household may consider itself one of a select few, one in twenty, in fact. If the householder has to answer, instead, about air-conditioning and the number of automobiles he owns he is still in a minority but not quite so selectly so. He will be in the 20 per cent group, or one in five. In this group he will also be asked how many bathrooms his home contains, but so will everyone else because this is in the 100 per cent group. Statistical identity with the 20 per cent sample (and either the 15 per cent or 5 per cent group) will also be associated with employment questions. These will include hours and weeks worked in 1969, and income from salary, self-employment and "other sources". Four fifths (or 80%) of the United States households will enjoy the easy procedure of the Short Form.

Total distribution of questionnaires will fol-

low this pattern:

<i>Short Form: 80%</i>	<i>Long Form: 15%</i>	<i>Long Form: 5%</i>
100% Items	100% Items	100% Items
	20% Items	20% Items
	15% Items	5% Items

### Processing the Data

As the quality of man's social thinking has improved, so has his technical skill. Before the 1960 census Congress amended the census law to give the Bureau specific authority to develop electronic equipment, use sampling, and purchase maps and other materials. A. Ross Eckler, Acting Director, Bureau of the Census, writes: "The Bureau's task of providing figures for the government and business and for the public in general has led to its development as one of the world's largest and most modern statistical agencies."<sup>23</sup>

The major purpose of census data processing is the production of statistical tables containing the results of the census.<sup>24</sup> Initial procedures are done at the Jeffersonville, Indiana, Census Operations Office, whose large clerical staff will check enumeration records coming in from the field against control records. The staff will code information from questions that are not readily answered in a scannable form at the source (the 20 per cent sample), and then microfilm the schedules.

At this stage the microfilm will be sent to Washington and other installations for conversion through FOSDIC (Film Optical Sensing Device for Input to Computers). The FOSDIC tapes and programming tapes will then be computer processed for editing and tabulating the data. Further computer processing will result in print-outs of a variety of statistical tables.

The Bureau performs a critical review at the early processing stage in Jeffersonville by running a bias check to detect any deviation in sizes of households between all households in an area and those in the 20 per cent selected for sampling. Past experience has indicated that bias may easily occur when the number of enumerators in a particular area is small.

The quality of the data will be subject to review at later stages throughout the processing. The computer will also perform a ratio-estimation process for inflating the sample and

<sup>21</sup>"Bureau of the Census: Fact-Finder," op. cit., p 12

<sup>22</sup>Kaplan, "Plans for the 1970 Census," pp 73-76

<sup>23</sup>"Bureau of the Census: Fact-Finder," p 11, and Foreword

<sup>24</sup>U.S. Department of Commerce, Bureau of the Census, *1960 Census of Population and Housing: Procedural History, Processing the Data*

assigning sample weights. These are statistical techniques and, as such, the particular responsibility of the statistician. However, the accountant with his dual function in the areas of verification and evaluation has reason for intelligent interest in the collection of social and economic data.<sup>25</sup>

## How The Information Is Used

### *Federal Uses*

Census results are essential for government of the United States, its principal and continuous user. Population figures are the basis for determining the number of representatives each State sends to the House of Representatives. Census statistics guide social and economic security reforms such as minimum wage legislation, public housing developments and the social security program. Federal funds are distributed to States for school-building programs, etc., on the basis of population. The Department of Agriculture uses census information to plan acreage allotments, crop insurance and marketing quotas. Analysis of information about economic development is basic in promoting full employment.

Ghetto population and housing statistics flamed into riot as tragic urban crises spread across the land. The Bureau of the Census is frequently cited in the Report of the National Advisory Commission on Civil Disorders (the Kerner Report). Revitalization of the inner city and other areas of depression will require detailed information about the people that are trapped there, their skills, education, family patterns and any business enterprises that may survive there.

### *Financial and Business Uses*

Of pertinence to the accounting profession, and certainly to the accountant's clients, are the services of the Bureau of the Census in the field of business and trade. The decennial counting of the population is obviously the project with the most common touch, but interlaced with this periodicity is the rhythm of the quincennial census of manufacturers, mineral wealth, business enterprises, local government activities and transportation. These are supplemented with interim surveys of various cycles, the most frequent being the weekly report of retail sales.

Concurrent with these are the reports on foreign trade and domestic construction. The value of imports and exports has been recorded for every year since 1789. The Bureau of the Census has prepared these statistics since 1941.<sup>26</sup> Since then, the foreign trade reports

have proliferated to monthly frequency with segregation as to commodity, country of origin, country of destination, customs district and further breakdown by means of conveyance, i.e., airborne or waterborne.

The fantastic building boom of the last decade has not gone without record. In 1959 the Bureau of the Census was designated as the agency to collect construction statistics for the Federal Government and the current rate of report is five separate categories per month.

### *Accountants and the Census*

With quantitative data of this sort in such profusion it is somewhat mystifying to learn that the accounting profession has remained aloof from involvement with census projects. David F. Linowes, CPA, discussing Socio-Economic Accounting in the *Journal of Accountancy*, writes:

"Since the end of World War II in particular, government, through the Department of Commerce, has been providing figures on the nation's economic activity. Gross national product figures have been computed each year from accounting data furnished largely by business entities. These GNP figures have become the bases for major programs of legislative and executive branches. Private industry also often bases plans on trends reflected in the GNP.

The elements which are added together to arrive at the GNP in any one year are: total sales of goods to customers, including goods sold to national and local governmental agencies; the value of new construction (including homes) and equipment built; the value of increases in inventories and net exports. These are accounting data, material with which every CPA is comfortably familiar. Yet CPAs have been strangely missing from the hierarchy responsible for the development of these data.<sup>27</sup>"

In an autonomy it follows naturally that government projects should be, and are, used by those governed. Next to the Federal Government itself, the business world is the most important user of Census Bureau statistics. Market analysts in every phase of the economy rely on the various reports from the census. Labor unions, welfare agencies, social and economic research groups also have their special interests served.

Since the advent of the computer the Bureau has on file a variety of data in a form ready for manipulation on electronic computers or

<sup>25</sup>David F. Linowes, C.P.A., "Socio-Economic Accounting," *The Journal of Accountancy*, (November, 1968) p 37

<sup>26</sup>"Bureau of the Census: Fact-Finder," pp 28-35

<sup>27</sup>Linowes, op. cit., p 38

punchboard equipment. These files represent almost limitless possibilities for cross classifications by subject and selections of geographic areas. Census information is available in published form regarding agriculture, business, housing, manufactures, minerals, population, etc.<sup>28</sup>

Compilation of the 1970 census will offer even more utility from the data. David L. Kaplan, of the Bureau of the Census, writes:

"In both its standard tabulations and the special services, the Bureau plans much greater utilization of the computer to help the user understand what the data mean. Users have emphasized that the computer, which has contributed largely to the quantitative expansion of decennial census information, should now be made to have an analytical impact on census results.<sup>29</sup>"

Clearly, the census is coming of age and the accounting profession must contribute talent to all levels of the process.

On that ancient Spring day at Mt. Sinai, Moses, his brother, Aaron, and the princes of the twelve tribes of Israel counted 606,550 male Israelites. It was quite a feat. When Spring comes in 1970 the United States will count its entire population with an estimated total of over 200,000,000. This, too, will be an impressive accomplishment. It will give evidence of a people brilliant in technical prowess and, it is hoped, of a republic whose self-examination will serve toward fulfillment of the national potential.

<sup>28</sup>U.S. Department of Commerce, Bureau of the Census, *Inventory of Machine Readable Data and Selected Special Tabulations, 1964*, and, Superintendent of Documents, Government Printing Office, Washington, D.C., *Census Publications*

<sup>29</sup>Kaplan, op. cit., p 78

## SHAKESPEARE

*(Continued from page 4)*

suggests that his client's worth is best shown in previous accounts ("His beauty shall in these black lines be seen" (63)) and again ("O let my books be then the eloquence" (23)). He concludes his report on a highly optimistic note, "Finding thy worth a limit past my praise" (82).

So far so good. Then the troubles begin. There is difficulty in the following year when Shakespeare tries to check the inventories—"Though in thy store's account I one must be" (136). The client tries to postpone the audit, and the Bard is forced to warn—"Her audit, though delay'd, answer'd must be" (126). The storm-warning signals have been raised. When the accounts are produced, it is obvious that the future profits forecast has been wildly overstated ("That poor retention could not so much hold" (122)). "Retention" here, of course, is used in the sense of retained profits. Not only that, but the concern is obviously overcapitalised ("Profitless usurer, why dost thou use/ So great a sum of sums yet canst not live?" (4)). He is also reproachful of his client's amortisation "policy, that heretic/Which works on leases on short-number'd hours" (124). Nastier still, he is forced to conclude that in the past profits had been bolstered by income which did not relate to the company's activities at all ("Robb'd others' beds' revenues of their rents" (142)).

As a last resort Shakespeare proposes a reconstruction scheme in which "All losses are

restor'd, and sorrows end" (30). This is to no avail, and he reluctantly decides to withdraw his services, refusing even to deal with his client's Section 341 claim in terms of "And do not drop in for an after-loss" (90). The tone in the correspondence now becomes bitterly reproachful—"For I have sworn thee fair, . . . / Who art black as hell, as dark as night" (147) and again "For thy records, and what we see, doth lie" (123).

Obviously, after the errors in the report had been found, Shakespeare would have to be called to account (a word, incidentally, which appears fifteen times in the Sonnets). While evidence is lacking, we must assume that he was called before the Disciplinary Committee. He is quick to admit his mistakes—"Book both my wilfulness and errors down" (117). Expulsion inevitably follows, and all that remains is for him to tidy up the remains of his professional life. His practice is passed over to a young assistant—"This fair child of mine/ Shall sum my count, and make my old excuse" (2). In his despair, he wonders whether his failure with one client might not apply to all others, and muses "What acceptable audit canst thou leave?" (4). After his professional ruin, what became of him? I admit my uncertainty, but the following lines seem significant: "Whilst I, my sovereign, watch the clock for you" (57). I deduce from these that Shakespeare entered industry as a cost clerk, with particular responsibility for the analysis of labour variances.

It would be unfair to think of Shakespeare

*(Continued on page 12)*