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ABSTRACT

The Skills Map, a comprehensive classification of occupations based on their competency requirements, was developed to assess the employability of individuals and of various groups of individuals in different types of occupations. The data on which it was based were the ratings of required worker traits as given by the Dictionary of Occupational Titles (DOT). The practical and theoretical usefulness of the classification was examined according to seven criteria: valid job descriptors, comprehensive occupational coverage, comprehensive aptitude coverage, a comprehensible map of job differences, parallel assessment of people and jobs, a link to demographic data, and multiple levels of analysis. Data for job descriptor validity were positive but inadequate. The DOT ratings provided quite comprehensive coverage of jobs and reasonable coverage of academic and motor, but not interpersonal, aptitudes. Map structure was readily comprehensible. A way to assess jobs and people in parallel ways was not provided. The Skills Map was readily linked to demographic data available according to the Census Bureau's 1970 classification of occupations. It provided a global classification of occupations according to their general differences and additional detail about the aptitudes and activities that individual occupations require. (Appendixes amounting to approximately one-half of the report provide materials and data used in the analyses.) (YLB)

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The Validity of an Occupational Classification
Based on Job Competencies For Assessing
Employability

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January 1983

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Abstract

This report reviews the development of the Skills Map, a comprehensive classification of occupations based on their competency requirements. The purpose for which the classification was developed was to be able to assess the employability of individuals and of various groups of individuals in different types of occupations. The data on which it is based are the Dictionary of Occupational Titles (DOT) ratings of worker traits required. The bulk of the report is then devoted to examining the practical and theoretical usefulness of the classification according to seven criteria: job descriptors are valid, coverage of occupations is comprehensive, coverage of aptitudes is comprehensive, the classification provides a comprehensible and meaningful map of job differences, people and jobs are assessed in parallel ways, demographic data can be directly linked to the classification, and multiple levels of analysis are included.

Data for evaluating the Skills Map against the seven criteria were obtained from four major sources. Publications of the U.S. Employment Service provided data on aptitude patterns among individuals as assessed with the General Aptitude Test Battery (GATB), aptitude patterns among specific occupations as profiled in over 400 Specific Aptitude Test Batteries (SATBs), and aptitude patterns among several dozen major groups of jobs (i.e., the USES's own 66-category GOE occupational classification) as summarized by occupational Aptitude Patterns (OAPs). Data from the archives of the Position Analysis Questionnaire (PAQ) provided additional job descriptors for several thousand job titles. Data on competency requirements among primarily high-level jobs were collected in a survey of several

hundred adult males. Data on 1970 employment by detailed occupational category were obtained from Census Bureau publications.

Conclusions are that the Skills Map is potentially very useful for both practical and theoretical applications, but that modifications are needed. Specifically, (a) Data for the validity of the job descriptors is positive but more is needed. (b) The DOT ratings upon which the Skills Map is based provide quite comprehensive coverage of jobs in the U.S. economy. (c) The DOT provides reasonable coverage of academic (i.e., cognitive) and motor aptitudes but not of interpersonal ones. The PAQ contributes items on interpersonal activities, but they apply primarily to high-level jobs. Although the three dimensions of the Skills Map tap the major distinctions among the full range of jobs, the distinctions made by the "dealing with people" dimension should be modified. (d) The structure of the map is a readily comprehensible one. However, the apparent heterogeneity of some of the groups, much of it the result of variation along other dimensions of work (some competency-related and others not), may somewhat reduce the meaningfulness and acceptability of the classification to potential users. (e) The Skills Map does not provide a way to assess jobs and people in parallel ways. Partial links to GATB scales and curricular content are provided. (f) The Skills Map is readily linked to demographic data available according to the Census Bureau's 1970 classification of occupations. (g) The Skills Map provides a global classification of occupations according to their general differences. It also provides additional detail about the aptitudes and activities individual occupations require. A level of analysis intermediate to these two, which would provide "sub-maps" of competencies of secondary importance in several major sectors of work, would be

desirable. Lower (i.e., more detailed) levels of description can be obtained by organizing studies of specific occupations or training programs according to the Skills Map structure.

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The task of vocational counselors, employment counselors, and personnel officers is to help individuals find jobs suitable for their particular interests and abilities or to find employees suitable for jobs being filled. This task has stimulated considerable research for many decades on how to best match people and jobs and it has resulted in the development of innumerable devices for assessing vocational interests and aptitudes. It has also led to the development of a wide variety of job classifications based on similarities in the interests, abilities, or tasks required by different jobs. These efforts to match particular people with particular jobs are designed to promote both the job satisfaction and the satisfactoriness (Lofquist & Dawis, 1969) of the worker (i.e., his or her performance) in the job.

When significant numbers of people are deficient in the most basic attributes required by jobs and therefore their employment prospects are poor, people often speak of the problem of "employability." Employers' complaints that a high proportion of job applicants lack fundamental academic and social skills are often interpreted in terms of the employability of young entrants to the labor force. Discussions of employability generally encompass a concern with the fate of particular groups in society (e.g., high school dropouts, teenagers, or minority youth) rather than with the more general issue of the mismatch between the labor supply and labor demand in an economy.

As noted in an earlier report (Gottfredson, 1981) employability--what makes a person employable--depends upon the occupation being considered because different occupations often require different skills. To better understand the combinations and levels of skills

required by jobs in our economy, and thus to better assess how competitive different types of individuals or social groups might be in their search for jobs, we have developed a classification of all jobs in the United States according to the competencies they require. The present report briefly summarizes that work (Gottfredson, 1981). It then evaluates the limitations and potentials of our Skills Map job classification according to seven criteria that any classification should meet if its purpose is to help assess employability.

Development of the Skills Map

The objectives of the earlier research were (a) to identify the major dimensions of competency required by jobs, (b) to group occupations into a smaller number of categories according to the major types of aptitudes required (i.e., to create a competency-based job classification), and (c) to describe these groups and the individual occupations within them according to their specific job skills and working conditions.

Three major sets of data were used in that study: The Dictionary of Occupational Titles (DOT), the Position Analysis Questionnaire (PAQ), and 1970 census data on employment. Each of these sources was chosen because it provides data for a large and widely representative set of jobs in the U.S. economy. Only a brief description of these data is provided below. Details can be obtained in the previous report.

The DOT was developed by the U.S. Employment Service. The USES was established during the Depression to help classify workers and place them in appropriate jobs. Since then the Employment Service has car-

ried out extensive work in cataloging and describing jobs. Perhaps the most well known aspect of this work is the periodically-revised dictionary or compendium of job titles and job descriptions, The Dictionary of Occupational Titles (DOT, e.g., U.S. Department of Labor, 1965, 1977). Another aspect of that research has been the production of ratings of jobs according to their activities, requirements, and working conditions. Specifically, as of the latest edition in 1977, there are ratings of 46 job attributes: worker functions (3), training times (4), aptitudes (11), temperaments (10), interests (5), physical demands (6), and environmental conditions (7).

The PAQ was developed by a team of industrial psychologists during the last two decades to describe what workers do in different jobs (e.g., McCormick, Jeanneret, & Mecham, 1972; Mecham, McCormick, & Jeanneret, 1977a, 1977b). This questionnaire provides a structured means for rating a wide spectrum of jobs according to 194 "job elements:" types of information input (35), mental processes used (14), work output (49), relationships with other persons (36), job context (10), and other job characteristics such as work schedule and method of receiving pay (41). Objectives of the PAQ are to enable firms to create more effective and equitable compensation, performance appraisal, training, and career guidance systems.

The decennial census collects various types of information about workers which are subsequently published in tabular form (e.g., U.S. Bureau of the Census, 1973) according to the Census Bureau's detailed job classification: for example, number of employed men and women, percentage who are employed by the government, percentage who are

Negro, mean hours worked, median age of workers, median years of school completed, and median income.

DOT data were available for over 12,000 job titles and PAQ data for over 1,800 titles. These data were aggregated according to the 441-category 1970 census classification so that occupational categories could be characterized by both the DOT and PAQ competencies they require as well as the socioeconomic and demographic attributes of the workers they employ.

Factor analysis was used to determine what the major dimensions are among the various aptitude measures. Only the job attribute scales that seemed to reflect competencies (e.g., aptitudes, some temperaments, interests, specific behaviors required) were used in the factor analyses because the objective was to determine the major dimensions of job competencies required, not of all job characteristics. Education and training, working conditions, and method of receiving income were omitted from the factor analyses.

The major conclusions of the factor analyses were as follows:

- (1) The four major dimensions of general job aptitudes as measured by the DOT are academic aptitudes (e.g., facility with language and mathematics), dealing with people (presumably reflecting interpersonal competencies), psychomotor aptitudes (e.g., manual dexterity and eye-hand coordination), and strength. The first three, and most important, factors are similar to the much-used data-people-things trichotomy of worker functions in the DOT. Those three DOT variables do, in fact, correlate highly with the three respective factors. These were also the three major dimensions predicted

from studies of human abilities.

- (2) By far the most important dimension distinguishing among jobs is that of academic aptitudes.
- (3) The factors are essentially the same whether they are forced to be statistically independent (orthogonal) or allowed to be correlated (oblique). This was also predicted from knowledge of human ability patterns.
- (4) When oblique rotation is used, it is clear that dealing with people is slightly positively correlated with requirements for higher academic aptitudes ($r = .24$) but it is negatively correlated with psychomotor aptitudes ($r = -.35$).
- (5) When the PAQ data are factor analyzed together with the DOT data, they are largely incorporated into the original DOT factor structure indicating that the two types of data provide a consistent portrayal of job demands.
- (6) Several new, but less important, factors appear which are composed primarily of PAQ variables.
- (7) The addition of the PAQ variables helps to interpret the DOT factors and add new meaning to them.

Three of the four dimensions revealed by the factor analyses--academic competencies, psychomotor competencies, and dealing with people--were used to create a competency-based job classification. Strength was omitted because it was less important than the others and because its inclusion would have created a needlessly complex classification. The job classifi-

cation was designed to show which occupations require low versus moderate versus high levels of each of the three major types of general abilities. Academic aptitude was divided into four rather than three levels because it is so important in distinguishing among jobs. The psychomotor and people dimensions were divided into three levels. The cutting points were chosen with two criteria in mind: that there be a reasonable number of occupations at each level of that dimension and that the range of scores represent meaningful differences. All occupations were then grouped into 36 categories according to their level on each of the dimensions (4 academic levels by 3 psychomotor levels by 3 people levels = 36 groups). These groups are shown in Figure 1.

 Insert Figure 1 About Here

Among "low academic" jobs, there are no jobs requiring high motor skills that also require workers to deal with people (reducing the number of groups to 34). There are jobs, however, with all other combinations of skills. There are jobs requiring high motor skills but low academic skills (e.g., jewelers) and vice versa (e.g., mathematicians). There are some jobs requiring high levels of one of the types of aptitudes but only low levels of the other two types of skills (e.g., authors are high on academic ability, personal service attendants are high on dealing with people, and jewelers are high on psychomotor aptitudes). Although there are jobs for almost all combinations of general aptitudes, not all combinations of skills are equally numerous when the number of jobs in each category is considered. Table 1 shows that almost one out of five workers in 1970 was employed in Group 4, which consists of jobs that require moderate psychomotor aptitude but little or no academic aptitude or dealing with people

(e.g., assembler, welder). About 4% were in jobs requiring moderate levels of all three general competencies (Group 14; e.g., file clerk, plumber) and less than 1% were in jobs requiring the highest levels of all three (Group 36; e.g., physician, dentist).

 Insert Table 1 About Here

The classification is a guide for focusing attention on the major requirements of jobs and for stimulating an evaluation of an individual's current and desired skills. It may also help to narrow a person's attention to one or several groups of jobs that seem suitable and interesting. But there are still differences among and within these occupational groups that are important considerations in career choice and preparation. Therefore, it is useful to supplement the classification with information about the specific activities occupations require and the working conditions they provide.

This more detailed information is provided in the earlier report in seven appendices; they include data on the following groups of job attributes: academic abilities and mental activities (Appendix C), psychomotor abilities and motor tasks (D), dealing with people and interpersonal activities (E), other abilities, bipolar interests, and sources of information (F), responsibility, vigilance, and education and training (G), working conditions (H), and prestige level and Holland field of work (I).

Three types of information were provided in these appendices.

(1) Correlations of each of the DOT and PAQ variables with the three major competency dimensions are shown. These correlations indicate how

closely related each of the individual competencies is to the three general dimensions. For example, decision making, reasoning, planning, writing, and compiling, combining, and analyzing information are highly correlated (.7) with the academic dimension and moderately (.5) with dealing with people. The correlations also show to what extent non-ability attributes of jobs are related to the competency dimensions. For example, lack of job structure is most strongly related to the academic dimension: the greater the demands for academic aptitude are, the greater the variety and change, the less repetitious the work or continuous the workplace, and the less structured or supervised the activities.

(2) Average scores on each job attribute were calculated for each of the 36 occupational groups and then translated into percentile scores. These percentiles indicate to what extent the jobs require the competencies in question relative to other occupations. For example, Group 1 occupations (those requiring only low levels of academic aptitude, psychomotor aptitude, or dealing with people) are at the second percentile on verbal ability. In other words, they require less verbal ability than almost all other occupations.

(3) Each individual occupation is marked as being either low, moderate, or high on each of the job attributes. These designations are useful because they provide some indication of the variability of requirements within the same occupational group, variability that is masked by the percentile (which is based on an average score). In addition, these designations indicate roughly how important these attributes are in absolute rather than relative terms. For example, very few occupations require workers to entertain people, so a high percentile does not necessarily mean

that there is much demand by the job for this activity.

Appendix A of this report lists the DOT and PAQ variables used in the earlier report. Appendix B reviews the correlations of those variables with the three dimensions of the Skills Map; it also briefly describes the 36 Skills Map groups. Both appendices are taken in large part from the earlier report and are included here for interpreting analyses to be presented in later sections of the present report.

Evaluation of the Skills Map

Seven criteria are used below to evaluate the Skills Map just described. Some of the criteria, such as reliable and valid job ratings, apply to any job classification. Others are specific to the purposes of the Skills Map, which is to understand the employability of different types of individuals.

Many classifications or typologies have been developed to portray differences among jobs in their tasks and requirements. Some meet more of the seven criteria than do others. Because of the DOT's widespread dissemination and use, as well as its attractive features, the following pages will devote considerable attention to the occupational classification accompanying the DOT.

In order to evaluate the Skills Map according to the different criteria, relevant additional data were collected from a variety of sources. These data will be described as they are introduced.

Criterion 1: Valid job descriptors. The classification should be based on reliable and valid data on the abilities required by jobs.

Type of job data. For the purpose of assessing employability, job requirements should be determined by analyzing the job itself rather than

the characteristics of its incumbents. For example, the educational level or cognitive skills of current workers in a job may not accurately reflect the levels necessary for satisfactory performance on the job (they may be higher or lower), but may be in large part a function of past supply and demand in the labor market or of restrictions in access to jobs or training. Both the DOT and PAQ data are based on analyses of jobs themselves.

Both the DOT and PAQ data consist of job ratings made by job analysts or job incumbents themselves. DOT analysts rate aptitudes according to the level required for "average, satisfactory performance" (U.S. Department of Labor, 1972, p. 233). They rate temperaments as present if they are "important in relation to the kinds of adjustments which the worker must make for successful job performance" (p. 313). Interests are likewise rated for their importance for job performance. Thus the implied criterion for the ratings is the level (in some cases just the presence) of the skill required for satisfactory job performance.

PAQ ratings are of several types as noted in Appendix A; extent of use, importance, and several special scales that were used for the particular job elements listed in the appendix. Most of those elements are rated according to their importance to the job, which the PAQ Manual (Mecham et al., 1977b, p. 5) suggests might "include consideration of such factors as the influence of the item upon overall job performance of the worker, the time spent, and the criticality of the activity to the job." Although a relation with job performance is thus an important consideration in the PAQ ratings, extent of use is another. The special codes (e.g., the scale for decision making) generally refer to another implied criterion--the difficulty level typically required (regardless of the criticality or extent of

use of the skill).

An alternative type of job data is exemplified by the Specific Aptitude Test Batteries (SATBs) developed by the U.S. Employment Service (U.S. Department of Labor, 1980b). SATBs are the cutting scores required for satisfactory job performance on the two to four (of the nine) General Aptitude Test Battery (GATB) aptitudes most predictive of job performance. The point here is that job descriptors can be based on data relating worker aptitudes to actual worker performance on the job. While this procedure would seem likely to produce more valid job descriptors than would expert ratings such as those in the DOT and PAQ, there are problems with the procedure. Data such as the SATBs are more costly and difficult to obtain. Over several decades the USES has published fewer than 500 SATB's. The USES has concluded that there is considerable unreliability in the profiles, because SATB's for the same job often differ. As a result of these limitations, the USES's own occupational classification is based on a combination of DOT ratings and SATBs. (The USES classification will be discussed further below.)

Reliability and validity of data. The Skills Map was created primarily from DOT data. In addition, more information is available for examining the properties of DOT data than of the PAQ data. Therefore, the following discussion will focus on the former and make only brief mention of the PAQ data.

Mecham et al. (1977a, Table 1) report PAQ reliabilities. When job elements were rated by different analysts, the average reliability coefficient was .68, with over two-thirds of the coefficients being between .6 and .8. When rated by the same analyst, reliabilities averaged .78, with almost 80%

of the reliabilities falling between .7 and .9. Unfortunately, no information is provided in the PAQ manual about the reliability of individual items or of specific types of items.

Less information is available about the reliability of the DOT scales, and that which is available is mixed. Miller, Treiman, Cain, and Roos (1980) report reliabilities for 9 of the 46 DOT scales. Minimum estimates of reliabilities were .84 (Data), .80 (People), .25 (Things), .75 (GED-Reason), .58 (GED-Math), .67 (GED-Language), .76 (SVP), .34 (Strength), and .64 (Location). With the exception of Things, Strength, and GED-Math, the reliabilities are reasonable. However, these represent but a fraction of all the DOT traits and none of those most central to the Skills Map. When the four DOT and PAQ variables of seemingly identical content are compared, their correlations are consistent with the foregoing reliabilities--.60 (SVP with Training), .76 (MathDOT with MathPAQ), .77 (Strength with Exertion), and .82 (GED with Education). While the reliability evidence is generally positive, clearly more is needed.

Our procedure of aggregating both DOT and PAQ data according to 1970 census categories probably increased the reliability of the ratings if it is assumed that all job titles within a census category are reasonably homogeneous in their demands. (The number of cases aggregated in each census category is provided in Appendix C.)

Some indications of the probable quality of the DOT and PAQ data can be obtained by examining the procedures by which occupations are rated. PAQ questionnaires are completed either by someone familiar with the job (e.g., a job analyst, worker, or supervisor) or by interviewing someone who is familiar with the job. Job analysts are generally positive about the PAQ

(Mecham et al., 1977a, Table 2). They report that the instructions on how to use the questionnaire are easy to follow (94%), the format of the PAQ is easy to follow (88%), and the PAQ items are easy to understand (71%). They are less positive about their ability to describe a job accurately (62%) or thoroughly (44%) using the PAQ.

DOT ratings are made by trained job analysts. However, several types of problems have been reported with DOT rating procedures (see Miller et al., 1980). Raters do not always have access to all the information they need about a job in order to follow their job analysis guidelines. Sixteen percent of DOT occupational descriptions (most ratings are made from such descriptions) are unsupported by job analysis schedules and an additional 29% are supported by only one schedule. In addition, only two-thirds of these schedules are acceptable by the procedures outlined in the Handbook for Analyzing Jobs (U.S. Department of Labor, 1972). DOT analysts also report problems making ratings, particularly of SVP and the aptitudes. The various worker traits are not clearly defined nor, apparently, do the rating instructions or illustrations provided in the Handbook provide sufficient guidance for how to assign ratings. Miller et al. also report that because of time constraints, procedures were relaxed during the latter phases of compiling ratings for the fourth edition DOT.

The three foregoing problems probably exacerbate a problem that plagues all ratings of jobs--illusory halo. Illusory halo refers to correlations that are spuriously high. There is indeed reason to worry about halo in the DOT ratings, because correlations among many of the DOT scales are quite high (cf., Miller et al. who report that correlations are particularly high when the same rater is responsible for all ratings). This prob-

lem will be examined further below because it constitutes a potential source of systematic bias, making it a more insidious problem than unreliability which only introduces "noise" into the results.

Cooper (1981) reviewed the problem of illusory vs. true halo and distinguished among various sources of illusory halo. Those sources which seem particularly relevant to DOT data in light of the previous discussion include: (a) having insufficient opportunity to observe the job being rated, (b) using rating categories that are abstract and a priori vs. highly descriptive, empirically derived, specific, and concrete, and (c) expending insufficient effort in making ratings. In the absence of sufficient information, raters tend to impose their own theories of "what goes with what" when they make ratings.

Several analyses are provided below to further assess the quality of the DOT data and to better specify the meaning of the different DOT scales. Because of the lack of specificity about what many of the DOT variables are supposed to mean or to measure, establishing their validity means finding out what they do seem to measure in practice. The following analyses examine the distributions of the different DOT variables and the relations of the aptitudes to one another in different types of samples. These analyses suggest what effects aggregating DOT data according to census categories may have, which variables may be more useful than others, and where illusory halo may be a problem.

Distributions for the DOT aptitude ratings. Selected characteristics of the distributions of most of the DOT ratings are provided in Table 2. (Because they were not relevant to the Skills Map, the working conditions and all but one physical demand are excluded here.) Results are provided

separately for two sets of data: a 10% random sample of all 12,099 DOT titles (Miller et al., 1980, p. 174) and all 12,064 DOT civilian job titles aggregated for the Skills Map study according to 396 1970 census categories. Differences in results for the two samples are not large. The aggregated data reflect higher mean skill levels among jobs because, as will be discussed further later, manufacturing jobs, which are lower level on the average than are the non-manufacturing jobs, are more highly aggregated by the census categories. The three variables that depart most from normality in both samples are the worker function people and the aptitudes of eye-hand-foot coordination and color discrimination. These three show most jobs bunched together at the low skill levels with titles skewing off toward the higher skill levels. The people variable is frequently used in research, but the other two are not.

 Insert Table 2 About Here

Verbal, data vs. things, and machines vs. social welfare are also highly skewed in the 10% random sample, but are less so when aggregated. Data, things, and SVP are fairly flat distributions in both samples; finger dexterity is flat in the aggregated sample only; science vs. business and productive vs. prestige are flat in the random sample. Overall, then, aggregation appears to have reduced the number of distributions that differ markedly from normality.

Correlations among DOT ratings and GATB scores for aptitudes. There are several sources of data for examining the properties of the aptitude scales, the scales that are most relevant here. The DOT aptitude scales used for rating job requirements parallel the scales of the USES General Apti-

tude Test Battery (GATB; U.S. Department of Labor, 1970). The latter is a set of tests administered to individuals for assessing whether or not they possess minimum levels of the particular aptitudes most highly related to satisfactory job performance in different jobs.

The three panels of Table 3 present three types of correlations among the nine aptitude scales: (a) among aptitude scores of people taking the GATB, (b) among aptitudes for 446 occupations based on the average GATB scores (and also the minimum scores) of people in those occupations, and (c) among job analysts' DOT ratings of the level of each aptitude required in different jobs. Although all three types of correlations involve the same nine aptitudes, they represent different types of information about aptitudes. The correlations among GATB scores at the individual level (the upper panel) reflect the structure of human abilities (at least those tested with the GATB); that is, they reveal to what extent people who are high in one aptitude are also high in another. The correlations among job ratings (the bottom panel) reflect the structure of job demands; that is, they reveal to what extent jobs that are rated as having high demands for one aptitude also have high demands for another. There is no reason to expect these two structures--of human abilities and of job demands--to be the same. However, it is reasonable to suppose that they are similar or consistent. To the extent that the two aptitude structures are different, there may be a less than optimal fit between what workers can do and what jobs in our economy demand. The correlations in the middle panel reflect the compromise which does in fact exist between the human aptitudes and job demands structures, because they reflect the characteristics of individuals who have been "sorted" into different occupations, presumably in part on the basis of their job-related aptitudes. The correlations above the diag-

onal are for average scores of people in each occupation; those below the diagonal are for estimated minimum scores (i.e., scores one standard deviation below the mean). Of the two sets of correlations, those for the lower boundary levels of the skills possessed by incumbents are probably more affected by job requirements. This is because the average skill level of workers in a job is less important than is the fact that they possess at least the minimum skills required to perform the job in a satisfactory manner.

 Insert Table 3 About Here

There are other reasons to expect the different sets of correlations to differ. For example, the job ratings in the third panel are based on a more representative set of jobs than are the GATB data in the second panel, and the two sets of job ratings themselves differ in sample size and degree of aggregation. Because of both theoretical and methodological reasons, then, differences in correlations across the different sets of correlations cannot automatically be attributed to differences in reliability or validity of the GATB and the DOT rating scales. The following discussion of the various correlations will try to disentangle some of these differences in order to draw some conclusions about both the quality and the substantive meaning of the different types of data.

Looking first at the correlations among GATB test scores for individuals (the upper panel of Table 3), we see that all the aptitudes are positively correlated in both samples. The results below the diagonal are for a larger and more representative sample of people, so the following discussion will focus on them. The pattern is much the same in both samples.

Among individuals, intelligence is very highly correlated with verbal (.84) and numerical aptitude (.86); less so with spatial aptitude (.74), form perception (.61), and clerical perception (.64); and little with the three motor aptitudes (.36, .25, and .19). Spatial, form, and clerical are generally moderately highly correlated (.5 to .6) with each other and with the three other cognitive aptitudes, but spatial and form perception are more related to numerical than to verbal ability. Finger and manual dexterity have low correlations (.1 to .3) with the more intellectual abilities (intelligence, verbal, numerical, and spatial); correlations for the third motor aptitude (motor coordination) are somewhat higher (.3 to .4). All three motor aptitudes are moderately correlated to form and clerical perception and to each other (.3 to .5).

The second panel also provides data from GATB test scores, but it applies to correlations for job titles rather than for individuals. The GATB Manual (U.S. Department of Labor, 1970, Table 9-3) presents means and standard deviations on the nine aptitude scales for people training for or employed in (primarily the latter, see GATB Table 9-1) 446 different occupations. The second panel in Table 3 is based on these data.

Correlations above the diagonal are correlations among the means for the individuals in the 446 occupations. Whereas these correlations reflect the average level of aptitude in an occupation, the correlations below the diagonal better represent the minimum level of aptitude required to perform the job satisfactorily. As such, the latter are weighted more by job requirements than are the former. The 446 occupations cannot be considered a representative sample of all jobs because they overrepresent the entry-level manufacturing jobs which have been of most interest in the past to

the Employment Service (cf. Miller et al., 1980, Chapter 7). The mean aptitude scores (not shown here) are several points below the 100-point population average for the more cognitive aptitudes and somewhat above average for the motor ones, which is consistent with an overrepresentation of manufacturing jobs. Nevertheless, it is useful to compare these correlations to those from the other sources of data represented in Table 3.

Correlations among the means for job titles are generally .1 to .2 higher than those just discussed for individuals. For example, the correlations between intelligence, verbal, and numerical are .9 and above for job titles vs. .8 and above for individuals. The other patterns noted for individuals are reflected in the correlations for job titles, except the correlations are higher for the titles. The correlations for the cutting points are also generally higher than for individuals, but they show a greater bifurcation between the intellectual aptitudes and the motor ones than do the other sets of correlations. As was the case for the individual-level correlations, intelligence, verbal, and numerical are very highly correlated (although there is greater correspondence between verbal and numerical attitudes in the middle panel). Spatial, form perception, and clerical perception also continue to cluster around the foregoing set of core cognitive aptitudes; correlations with each other and with intelligence, verbal, and numerical generally range between .7 and .9. Several of these peripheral cognitive aptitudes (i.e., spatial and form) continue to be more highly related to numerical than verbal aptitude. Finger and manual dexterity form an even more distinct cluster of their own in the job-level data of the middle panel, because their intercorrelation is much higher (.83 vs. .52) and they are somewhat less correlated with the intellectual cluster than was the case for the individual-level scores. The

third motor aptitude, motor coordination, seems to lie between the core intellectual and the motor aptitudes because correlations with both are around .5 and are closer to .7 with some of the peripheral cognitive aptitudes (i.e., form and clerical perception). This position intermediate to the motor and intellectual aptitudes seems consistent with the definitions of the variables. Motor coordination involves not only skilled manual movements, as do finger and manual dexterity, but also greater coordination with the eyes. If this in turn requires better reaction time or more judgment, then it is likely to involve more high order processes as well.

The third panel shows correlations among job ratings rather than GATB scores. Correlations above the mean are for a 10% random sample of the 12,099 DOT job titles; those below the diagonal are for the 12,064 civilian DOT titles aggregated to the 396 census categories used in our earlier report. As already noted, the latter give less weight to the manufacturing and lower-level jobs. Both sets of correlations for job ratings present much the same picture, both differing from the correlations discussed above, although those based on the aggregated data are more striking. Instead of positive correlations among all aptitudes, there are now some negative correlations and an even greater bifurcation between the core cognitive and the motor aptitudes. The composition of the intellectual and motor clusters has changed also. Motor coordination now behaves as do the other motor aptitudes, both in its correlations to them and to the other aptitudes. Of the three aptitudes previously found to be peripheral to the core cognitive aptitudes for the job-level GATB data, only clerical perception remains. Spatial and form perception are still more highly related to numerical than verbal aptitude, but they now occupy an intermediate position between the core cognitive and the motor aptitudes. Whereas form and

clerical perception were correlated over .8 with each other in the middle panel and over .5 in the upper one, their correlation is only .2 in the job ratings.

Do the differences between the different sets of correlations reveal anything about the quality of the DOT ratings upon which the Skills Map is based? That is not clear, because the differences could stem either from illusory halo or from valid differences in the structure of human and job attributes. If the ratings illustrate illusory halo, then it would be primarily of one or more of the following types: (a) motor coordination is judged as more similar to finger and manual dexterity than is true, (b) spatial and form perception are seen as more related to motor skills, and less to cognitive ones (particularly clerical perception) than is the case, and (c) cognitive and motor aptitudes are seen as less related to each other (or even as more mutually exclusive) than is the case. An alternative explanation to illusory halo is that some of these differences actually represent the structure of job demands. For example, if motor and cognitive skills are largely independent, the segregation of tasks into "head" vs. "hand" work may be convenient organizationally and optimal for selection purposes. The inherent nature of some tasks may also structure job demands somewhat differently than human abilities. For example, handling physical objects (versus dealing with people or abstract data) may often require not only manipulative motor skills (motor coordination as well as finger and manual dexterity), but also a capacity to perceive pertinent detail in objects or graphic material (form perception) and to conceptualize relations among objects in space (spatial aptitude) although the latter are more highly related to the intellectual than the motor skills people possess.

If PAQ data can be assumed to contain less illusory halo than the DOT data, then an examination of the relations among selected PAQ items might shed some light on this issue.

Despite the differences, whatever their origin, the major dimensions of job requirements they reveal are the same for the purposes of the Skills Map. General cognitive and motor aptitudes are largely separate and independent dimensions. The assignment of particular occupations to the 36 Skills Map groups might change somewhat, as would the more specific job demands noted in the appendices of the earlier report, but the overall portrait provided by the classification would not.

Criterion 2: Occupational coverage. The classification should provide comprehensive coverage of occupations in the economy.

To be most useful for program planning and for general counseling, as well as for providing an overall picture of the levels and combinations of competencies required of our labor force, a job classification must include most of the jobs in the economy. Many classifications or typologies have been developed using data on the skills required by jobs, but they generally include only a small number of jobs. To take one example, the Canada Department of Employment and Immigration (Smith, 1975) has done extensive work documenting the skills required by jobs, but this work has focussed on 76 occupations "which are generally agreed to be at the vocational levels." Reviews by Dunnette (1976), Sjogren (1971), and Pearlman (1980) cite a variety of job classifications that have been developed for purposes such as curriculum development, the organization of training programs, and validity generalization, but because of their particular objectives these studies typically are limited to particular occupations (e.g., foremen), firms

(e.g., an insurance company), or government agencies (e.g., the Navy).

The archives of the PAQ contain comparable job analysis data for about 1,800 occupations, which is one reason that they were obtained for this study. When classified according to 1970 census categories, these PAQ titles represent 304 of the relevant 427 census categories. (The 427 census titles and the number of PAQ titles aggregated within each of them are provided in Appendix C.) Although quite comprehensive, both the reviews cited above and the PAQ manuals suggest that no particular effort has been made to create a general comprehensive classification of job demands, but that most classification with the PAQ is undertaken in specific settings or for other purposes (e.g., see Shaw, DeNisi, & McCormick, 1977).

DOT ratings provide the most comprehensive coverage of any job analysis system, which is why we based the Skills Map on them and used the PAQ primarily to supplement, interpret, and validate analyses with the former. When the 12,064 civilian job titles are aggregated according to the 1970 census categories, they represent 396 of the 427 relevant categories. (See Appendix C for a list.) When the census categories are weighted according to the number of workers in them, the DOT ratings cover 93.2% of all workers. Of the remaining 6.8%, occupations were not known for 6.0%, which leaves only 0.8% of workers without potential DOT ratings.

It should be noted, however, that some types of jobs are overrepresented and others are underrepresented. Census titles for which no DOT data are available are not distributed randomly (most are college professors) nor probably are the additional titles that might have been aggregated together with the others under any particular census category, thus potentially biasing the estimated DOT ratings for those census titles. The National

Academy of Science's evaluation of the DOT (Miller et al., 1980, p. 146) states that "Although the methodology used provides a standardized and relatively objective means of obtaining job data, it is time consuming and not suitable for all jobs. In particular, it can be applied most practically to manufacturing jobs, or, more generally, to any type of structured job that can be broken down into discrete tasks and performed over a limited amount of time. It is less suited to unstructured jobs, such as certain service jobs that entail widely varying tasks." The fourth edition DOT (U.S. Department of Labor, 1977a) was produced to a large extent by updating information in the third edition (U.S. Department of Labor, 1965), but as Miller et al. (p. 146) note, "These practices were efficient in some ways, but they were also rather conservative, minimizing the probability of incorporating newly emerging jobs in the DOT or of picking up changes in existing jobs." Although it is not possible to determine the sampling strategy that was in effect used for selecting organizations or specific job titles for analysis, a comparison of DOT titles to the distribution of the labor force shows that professional, clerical and sales, and service work are grossly underrepresented in the DOT whereas processing, machine trades, and benchwork are grossly overrepresented (Miller et al., 1980, p. 155). Whereas 66% of workers in 1971 were employed in the former types of work, only 24% of the DOT titles were from these categories. Jobs in large establishments are also overrepresented (p. 153). Aggregating DOT titles according to 1970 census categories probably redresses this imbalance in representation to some extent, although it would probably still be true that ratings for service jobs are less reliable than those for manufacturing ones (Miller et al., 1980, p. 172). Despite the foregoing shortcomings, the DOT ratings provide the most comprehensive occupational cover-

age to date for creating the Skills Map.

The U.S. Employment Service itself has developed a 66-category classification using DOT data. (This classification supercedes several others, including the Worker Trait Group Arrangement, that the USES has developed over the years.) The USES classification, together with most of the more than 12,000 DOT titles, is presented in the Guide for Occupational Exploration (GOE, U.S. Department of Labor, 1977b). DOT analysts used their knowledge of traits and job characteristics to assign titles to 66 groups, and then Occupational Aptitude Patterns (OAPs) were developed for 59 of these 66 groups (as will be discussed in more detail further below). These OAPs cover 97% of the approximately 11,000 non-supervisory occupations listed in the GOE and DOT. Thus, the OAPs provide extensive, though not necessarily representative, coverage of occupations in the U.S. It is less clear what proportion of civilian workers is covered by OAPs, although it is apparently not as high as for the Skills Map because of the exclusion of an undetermined number of supervisory jobs from OAP coverage.

Criterion 3: Aptitude coverage. The classification should be based on information about worker traits required: all important types of job-related competencies should be included and data not directly relevant to worker competencies should be excluded.

Job-oriented, worker-oriented, vs. attribute requirements data. As Pearlman (1980) advises, although apparently it is infrequently implemented, careful attention must be paid to the type of job descriptor on which to build a classification. The job descriptors must fit the purpose for which they are intended. Pearlman recapitulates different types of job descriptors (as discussed, in particular, by Fleishman, 1975, and Dunnette,

1976): job-oriented content (e.g., work outcomes), worker-oriented content (e.g., human behaviors or elemental motions), attribute requirements of jobs (e.g., aptitudes), and overall nature of the job. These distinctions are not clear-cut in practice, but they are useful for evaluating the relevance of different data to one's own purposes and for comparing and interpreting results generated with different types of data.

Job demands that can be directly translated into terms that are used to assess or characterize individuals are the most directly relevant and most convenient type of data for assessing the match between people and jobs. For assessing employability, attribute requirements of jobs are clearly the most suitable. These include individual characteristics such as personality traits and interests as well as aptitudes. Although more difficult to use, worker behaviors are also useful, because they often can be treated as particular skills or manifestations of broader aptitudes or personality traits (e.g., public speaking reflects the need for verbal aptitude). And, in fact, when it comes to actually designing programs to teach skills and devices to test them, general traits have to be translated into specific behaviors (see, for example, the Generic Skills Project described by Smith, 1975).

Job-oriented content was not considered appropriate for constructing the Skills Map classification because work outcomes (rather than the abilities or behaviors required to produce them) cannot be directly linked to the assessment of individuals, something that is of paramount importance when studying employability. In addition, classifications created from job-oriented data are likely to be different than those constructed from worker-oriented data (Pearlman, 1980). Thus the inclusion of irrelevant job

information might lead to a less than optimal classification for purposes of assessing employability. Attribute requirements data also have the practical advantage of being more general (i.e., having greater validity generalization) than do task descriptors; tasks tend to be more specific to different jobs and settings than are attribute requirements (Pearlman, 1980).

Several types of content are represented by the DOT variables. (See Appendix A for a list of all DOT variables.) The eleven aptitudes, the five bipolar interests, the three components of GED (reasoning, math, and language), and strength (one of the six DOT physical demands) can be considered attribute requirements and were included in the factor analyses for the Skills Map. Also included were the DOT variables which are better considered worker behaviors: the three worker functions (data, people, and things), and two of the ten temperaments (dealing with people, influencing). Because the temperaments are dichotomous variables and are not well defined, they were excluded unless there was a compelling reason to include them, so potentially relevant DOT variables such as "direction, control, and planning" were excluded from the factor analyses (although information for them was provided for them in the appendices of the earlier report). SVP and the remaining five physical demands (e.g., climbing, seeing) were excluded because they were not clearly related to job competencies as we conceptualized them; the same was true for the seven job-oriented DOT working conditions (e.g., noise, hazards).

The PAQ job elements (shown in Appendix A) measure worker-oriented content, but some elements do not seem directly relevant to job competencies and so were excluded from our analyses. None of the elements tap attribute

requirements as do the DOT data, with the exception of the memory and exertion job elements. Of the total 187 job elements and several dozen dimension (factor) scores of the PAQ, we purchased the most relevant 58 job elements together with the dimension scores. (Although we refer to them simply as dimension scores, specifically, they are actually the "divisional" dimension scores created from factor analyses of separate sets of PAQ job elements rather than the broader "overall" dimension scores.) Forty-one of the job elements and ten of the dimensions scores were used in the supplementary factor analyses for the Skills Map because they reflected either competency-related worker behaviors (e.g., analyzing) or temperaments (e.g., dealing with strained personal contacts). (The ten dimension scores were used to summarize the many job elements for motor tasks that we did not purchase.) Most PAQ job conditions (e.g., cycled or repetitious work) and training requirements were excluded from the analyses but were included in Appendices C through H of the earlier report in order to provide more specific information about individual occupations. The PAQ job elements used in the factor analyses are listed in the appendices under the headings of mental activities, motor activities, interpersonal activities, other abilities, sources of information, and vigilance.

Factor analyses of more- vs. less-relevant DOT data. The issue of excluding apparently less relevant job descriptors can be examined to some extent by comparing some results of Miller et al. (1980) to ours. They factor analyzed all 44 DOT scales (using GED alone rather than its three components separately) for a 10% random sample of fourth edition DOT titles. Thus, their analysis included all the temperaments, physical demands, and working conditions that we omitted in our Skills Map analysis. Using varimax rotation, Miller et al. obtained factors quite similar to

ours. In both analyses, the variables loading highly on the first factor (and most highly on that rather than any other factor) included data, GED (or its three components), intelligence, verbal aptitude, numerical aptitude, spatial aptitude, clerical perception, and abstract or creative vs. routine work. Miller et al. labelled this first factor "substantive complexity of work;" we labelled it "academic aptitude." Their second factor, and our third, both described motor skills: involvement with things, form perception, motor coordination, finger dexterity, and manual dexterity. Their third factor is analogous to our fourth, which taps the strength required for jobs. Several of the physical demands that we excluded (e.g., stooping) loaded highly on this factor. Miller et al. characterized it as a factor measuring arduous rather than fine motor skills. Their fourth factor largely corresponds to our second, "dealing with people:" involvement with people, Dept (the temperament of dealing with people), data vs. things, business vs. science, and esteem vs. tangible products. A number of the DOT items we omitted from the factor analysis loaded highly on the Miller et al. factors, but the first four factors are the same in both analyses. Their order of importance differs because of where the extra variables loaded most highly. Nevertheless, the inclusion of the less relevant variables does not fundamentally change the factor structure of competencies reflected by the DOT and may in fact add to its interpretation. Were there to be a greater ratio of irrelevant to relevant variables, however, the factor structure would probably become a poorer representation of worker competencies.

In another study (Parcel & Mueller, 1983) an oblique factor analysis of 39 of the 44 DOT scales (excluding the five bipolar interests) for third edition titles aggregated to 419 1970 census categories was consistent with

the foregoing results. That analysis revealed the same first four factors.

It appears, then, that the DOT scales provide a stable portrait of the attribute requirements of jobs despite variations in the variables included, type of factor analysis rotation (as was also demonstrated in our earlier report), edition of the DOT, or aggregation of the titles. Although this is reassuring, a more important issue is whether this stable portrait is a complete one.

DOT and PAQ Coverage of academic, motor, and interpersonal competencies.

Our review of the literature on human abilities and job requirements (including, for example, Dunnette, 1976) pointed to at least three major dimensions of job competency: cognitive, interpersonal, and psychomotor skills. The DOT aptitude scales seem to represent the cognitive and motor dimensions reasonably well. Three DOT variables reflect dealings with people, but on the whole the DOT is very poor for characterizing jobs according to their interpersonal skills. As Miller et al.'s (1980) evaluation of the DOT notes, the DOT scales are not well suited to many non-manufacturing jobs, jobs that are less likely than service ones to demand interpersonal skills. The PAQ includes many behaviors in the interpersonal as well as the cognitive and motor domains, although our earlier report concluded that lower-level interpersonal behaviors or skills are not well represented by the PAQ.

Together, the DOT and PAQ provide a valuable look at job demands because they sample aptitudes or behaviors from the three dimensions of competency we deemed, a priori, to be most important for understanding job demands. Nevertheless, it is not clear that they are comprehensive in their coverage of all important types of worker traits. In particular, analyses of worker

traits and behaviors important in particular jobs, such as in the critical incident studies cited by Dunnette (1976), reveal some worker-oriented content (e.g., poise, cooperating with coworkers) not reflected by the DOT or PAQ. Although one might not consider traits such as poise to be aptitudes in the usual sense in which the term is used, they nevertheless appear to be important to job performance in some jobs and thus important to assessing employability.

Aptitude factors in high-level work as revealed by the Gilman data.

Additional data were collected to examine this issue, data which will hereafter be referred to as the Gilman data. As described in detail elsewhere (Gottfredson, Finucci, & Childs, 1982), several hundred alumni from 1940 through 1979 of a private secondary school (the Gilman School in Baltimore) were surveyed in adulthood to examine their career outcomes. These men were asked to rate how critical each of 37 worker traits is for performing their own jobs well. This list was created to tap the major types of traits that appeared in reports of critical incident studies of particular occupations (e.g., see Dunnette, 1976) as well as abilities identified in other analyses of job requirements and human abilities. Several social resources (e.g., good contacts) were included as well. About 95% of the respondents held professional, managerial, or sales jobs. Although the sample is not representative of all types of work, it is particularly valuable because it represents the types of work that the DOT is probably poorest in describing.

The Gilman data were factor analyzed to examine the structure of work competencies underlying the respondents' jobs, and then several general groups of jobs as well as a number of specific occupations were examined in

detail. Table 4 shows the results of a factor analysis (varimax rotation, N=290) of the 37 worker traits or behaviors. The sample used for the factor analysis included only men aged 26-55 who were not students, and thus men who presumably were established in their careers. The DOT temperament Depl (dealing with people) and occupational prestige were also included in the factor analysis as marker variables for the "dealing with people" and the "academic aptitude" factors found in the Skills Map analysis. Six factors had eigenvalues of at least 1.0; these are shown in Table 4. Those factors are: (I) good personal presentation (e.g., be tactful and considerate, be attractive and well groomed, have poise, have integrity), (II) well organized and responsible (e.g., plan ahead and anticipate problems, coordinate and schedule activities, spot and tackle problems quickly, visualize things before completion), (III) physically coordinated (have physical coordination, have manual dexterity, have physical strength and endurance), (IV) well educated (have higher degree or credential, give information by writing, reports, etc., have attended the right college, get information by reading), (V) creative (have a lot of ideas, think of new approaches to problems), and (VI) competitive (be competitive, have good contacts).

To help interpret the foregoing factors, Appendix D presents more detailed data. Table D-1 tests for the significance of differences in responses to the 37 traits by three general types of workers (professional, managerial, and sales) and by men in four specific occupations (physician, lawyer, VP/President/CEO, and other managers, n.e.c.). Tables D-2 through D-14 indicate which traits are the most and least critical for good job performance in thirteen occupations. As the appendix indicates, all but one of the occupations in Tables D-2 through D-14 is classified as very

high on the academic aptitude factor (i.e., in Groups 28-36).

The "well educated" factor corresponds roughly to the "academic aptitudes" factor in the Skills Map, both because of its apparent emphasis on academic skills such as reading and writing and because of its high correlation with prestige. The "well organized and responsible" factor essentially reflects being a good manager, though without the usual connotation of managing people. Many of the items in this factor are quite similar to those in the PAQ such as analyzing information, decision making, reasoning, and planning. When the PAQ and DOT items were factor analyzed together, the items just mentioned loaded highly on the "academic aptitude" factor (see the earlier report). When dealing primarily with high-level jobs, academic vs. managerial competence appears to be an important distinction. When specific occupations are examined, for example, the items in the "well educated" factor are reported as critical by most lawyers (Table D-3) but the managerial items are less important; for physicians (D-14), both seem to be critical; and stock and bond salesmen (D-10), school administrators (D-6), and presidents/CEOs (D-8) are high on the managerial/organizational factor but low (relative to other high-level jobs) on the academic one.

"Good personal presentation" is the factor most highly associated with the DOT variable "dealing with people." The items of this factor are critical for stock and bond salesmen (D-10); important but somewhat less critical for secondary teachers (D-13), insurance agents (D-9), lawyers (D-3), school administrators (D-6), and various types of managers (D-5, D-7, D-8); helpful but not critical for architects (D-12), engineers (D-11), physicians (D-14), and elementary teachers (D-2); and unimportant for editors and reporters (D-4). Although this factor is related to dealing with peo-

ple, it appears to mean primarily dealing with people to persuade or motivate under conditions without authority. Jobs involving interaction without attempts to persuade (e.g., a reporter gathering information) or involving persuasion with actual or perceived authority (e.g., physicians and elementary teachers) are low on this factor. As Table D-1 shows, it is more important for salesmen than for managers and less important for the typical professional.

Because personal presentation is more important for workers who are not perceived as possessing either authority or expertise, this factor would be expected to also distinguish among different types of lower- and moderate-level jobs dealing with people. The particular interpersonal skills associated with the personal presentation factor might differ at different job levels (i.e., different Skills Map academic levels), however. For instance, among lower-level jobs dealing with people, interactions are probably more routine and deference rather than persuasiveness is probably the more important trait. Following orders and cooperating with coworkers did form an additional but unimportant factor (not shown in Table 4) which might have been quite important if a wider range of jobs had been included in the sample. Critical incident analyses of jobs such as foreman, fire fighter, and police officer (see Dunnette's, 1976, review) suggest that this would be expected. There are few items in either the DOT or PAQ which tap this particular interpersonal factor. Most of the items dealing with people are the types of interpersonal activities found most often in high-level jobs (e.g., advising, negotiating), probably partly accounting for why they loaded highly on the academic aptitude factor in the Skills Map analysis. Only items such as entertaining, catering, behavior as a source of information, and social welfare versus machines loaded highly on the

dealing with people factor in the Skills Map.

The "being competitive" factor is distinct from the personal presentation factor, although they both tend to be particularly important for salesmen versus managers and professionals (Table D-1). Being competitive is also important for editors and reporters (D-4), indicating that it applies not only to sales situations but also to any situation where establishing priority is important. Thus, while competitiveness may often accompany jobs dealing with people (such as sales), it may be important in a great variety of types of work. Creativity (the need for new or many ideas) is very helpful in jobs such as elementary teacher (D-2), architect (D-12), engineer (D-11), and school administrator (D-6), and less important for the probably more routinized activities of insurance agents (D-9). Finally, the physical coordination factor corresponds roughly to the "motor skills" factor in the Skills Map.

In summary, the foregoing data confirm the importance of the academic, people, and motor aptitude factors of the Skills Map. However the factor structure shown in Table 4 suggests that the Skills Map does not embody some major distinctions among jobs, at least among predominantly high-level ones. Creativity and competitiveness are two types of traits not included in the PAQ or DOT data on which the Skills Map was based, although creativity or ideational fluency has been proposed as a major dimension of human ability (e.g., see Dunnette, 1976). The DOT interest in creative or abstract vs. routine work is not a good measure of creativity and appears to reflect general intellectual level. Also, organizational and academic ability tend to be distinct skills among high-level jobs, but this distinction is not made in the Skills Map even though both types of variables are

present. The skills map does make a meaningful distinction between people-related and non-people jobs, but neither the DOT nor FAQ provide much information about what sort of interpersonal skills or behavior are required in "people" jobs, particularly in the low- and moderate-level (i.e., academic level) jobs. Referring back to Figure 1, it can be seen that most of the high and very high academic level jobs are classified as high on the people factor, but they form heterogeneous groups not well distinguished by the other two factors (i.e., by academic or motor skills). For example, 11 of the 13 occupations shown in Appendix D are in Skills Map groups high in their dealings with people, 8 are in one group alone (Group 30), but a glance at the tables in Appendix D shows that their job demands differ considerably along the dimensions shown in Table 4. As noted earlier, for example, good personal presentation is not critical for editors and reporters but it is for stock and bond salesmen. And although all but one of the occupations described in Appendix D is classified as very high in academic aptitude in the Skills Map, they differ in how well educated the workers must be. This is consistent with other research on managerial sales vs. other types of work (Gottfredson & Brown, 1981; Gottfredson, 1978).

The question is how to incorporate additional meaningful distinctions into the Skills Map. Adding even one more factor to the present Skills Map structure would make it unwieldy. One solution may be to supplement the Skills Map with "sub-maps." If the three-dimensional Skills Map as presented in Figure 1 is assumed to present a "first cut" showing only the most important distinctions among all jobs in the economy, then it is probably a valid portrait. As already suggested, the additional distinctions to be made among jobs may differ according to the broad academic level

being considered. For example, it might be useful to present sub-maps for each of the four academic aptitude levels of the Skills Map. The factor structure shown in Table 4 for high-level jobs provides a guide for one such sub-map. Whereas the sub-map for very-high academic level work might focus on differences in interpersonal, managerial, and academic skills, sub-maps for low-level jobs would probably concentrate more on differences in psychomotor skills because only a small proportion of those jobs have any substantial involvement with people.

Although the DOT and PAQ data would be useful for this purpose, new data are desirable. In particular, much more attention needs to be paid to interpersonal skills, many of which are conceptualized as personality traits rather than as aptitudes. Past research has generally found only low validities for predicting job performance for personality traits (e.g., Guion & Gottier, 1965; Lent, Aurbach, & Levin, 1971; Ghiselli, 1973), but that research has not been guided by a theory of job-related competencies. We would expect only certain personality traits to be directly related to job performance, and even those would be important only in particular types of jobs (e.g., in jobs dealing with people). Related work on the social skills important in managerial, sales, and other work (e.g., Argyle, 1981) might be helpful in guiding the selection of traits for a more comprehensive examination of job competency requirements in all types of work.

Criterion 4: Comprehensible map. The classification should provide a meaningful and readily comprehensible map for grasping the major differences among the competencies required by different jobs.

Rational vs. empirical methods and face validity. The method of analysis used to produce the classification should be clearly documented and

methodologically defensible. The results should also be consistent with other well-established knowledge of job differences. Both are important for establishing the comprehensibility and meaningfulness (i.e., construct validity) of the classification. For practical application, however, additional care must be devoted to making the scheme look clear and sensible. For example, the structure underlying the classification (e.g., the types of differences and similarities it shows) should be obvious. Or, the groups should "make sense" and be few enough in number to present a memorable or coherent display. The analogy to a map is meant to illustrate the idea of being able to see the relation between different occupational groups or clusters in an occupational classification, that is, to get an idea not only of the ways in which occupations differ or are similar but also of how "far apart" they are along these dimensions. This means that the classification should either be monothetic (i.e., groups are defined in terms of a unique combination of values on a usually small set of attributes) or else it should be polythetic (i.e., groups share a large proportion of their properties but do not necessarily agree on any one property) with an additional analysis to show extent of overlap or the major types of distinctions among the groups. With these specific guidelines in mind, the following pages will assess the Skills Map on the criterion of being a comprehensible and meaningful map.

To some extent clear documentation and defensibility of classification procedures may be inconsistent with the meaningfulness and comprehensibility of the resulting classificatory scheme. Cluster analysis is often used to create occupational classifications or typologies, but differences between the groups seldom are intuitively clear. Factor analyses can be done to identify the major dimensions of aptitude underlying a set of job attri-

bute ratings, and then groups can then be created using factor scores on one or more of the emergent dimensions. The differences among the resulting groups are clearer than among groups created through cluster analysis, and so create a more comprehensible "map," but they are still somewhat difficult to comprehend. A specific example of the drawbacks of purely empirical procedures is provided by the USES. For several decades the U.S. Employment Service used strictly empirical methods for identifying worker trait groups, but the successive classifications were very sensitive to the instability of the Specific Aptitude Test Batteries (SATBs) used to describe jobs, coverage was limited because of the limited number of SATBs available, and many of the resultant groups were not meaningful (e.g., see comments in the OAP Manual on the 1970 OAP structure, U.S. Department of Labor, 1980a, p. 4). The most recent USES classificatory scheme is primarily a rationally-based one. Analysts created face-valid groups largely on the basis of their knowledge about jobs, although they were guided by empirical analyses of the major differences in vocational interests required by jobs. Occupational Aptitude Patterns were developed to summarize aptitude patterns in most of these groups. The more recent and largely rationally-based scheme is more comprehensive, comprehensible, stable, and flexible than the earlier ones. The drawbacks are that the process of creating the classification is not clear (i.e., replicable or "objective") nor does the resulting classification constitute a map in the sense described earlier even though the individual groups are face-valid meaningful groups. Both rational and empirical methods have advantages and disadvantages and there is certainly no consensus that one is to be preferred exclusively to the other. A compromise tailored to one's specific needs is probably best.

To create the Skills Map, we opted for a rational modification of an empirical method. Factor analyses were performed to identify the major dimensions that the Skills Map should incorporate. As described earlier, the first three factors were selected: academic, people, and motor competencies. Meaningful variables were then selected to represent those factors. The variables selected were those that loaded highly on the factors they were to represent and which would be meaningful to potential users of the Skills Map. Taking the academic aptitudes dimension as an example, it seemed more meaningful to use the average of the verbal and numerical aptitude ratings to characterize occupations along this dimension than to create factor scores. (Those two variables correlated .89 and .92 with the academic competencies factor.) The former has a more direct educational meaning than the factor scores. Using this method, the three resulting dimensions are no longer orthogonal, but they need not be, and correlated factors may better represent reality than statistically independent ones. In summary, the structure underlying the classification is clear and additional occupations could easily be added as long as they have scores on the six DOT variables used to define the three dimensions.

The three competency dimensions were divided into several substantively meaningful levels in order to create a set of occupational groups, as was described earlier. (See Appendix A for the cutting points used to create the different levels.) The levels were established to make as much distinction as possible without becoming unwieldy. The result was 36 groups, a manageable number considering the clarity of the similarities and differences among them.

There are several immediately apparent problems with the resulting

groups, however. One is that the occupations within any particular group do not always seem to belong together (see Figure 1 or Appendix B). The face validity of the groups depends on the general impressions and knowledge that the user has about how jobs are similar or different. Although such reactions probably depend on the overall nature of the job (that is, they probably reflect a personal polythetic view of jobs) rather than just on the (more relevant) worker-oriented content, they nevertheless raise doubts about the acceptance and the practical utility of the classification scheme. Groups 19, 23, 26, and 35 seem particularly heterogeneous. Other groups fall into a few coherent subgroups. Group 24, for example, includes several jobs such as cashier that deal with people in routine, nonstressful ways as well as others (such as several types of teachers) that require more responsibility and more complex and stressful dealings with people. To take another example, Group 27 includes several jobs such as therapy assistant which require dealing with people primarily as physical objects as well as including clerical workers such as secretary who deal with people primarily for routine exchange of information and business detail. Some such heterogeneity is an inevitable outcome of limiting the number of dimensions along which to distinguish among occupations. Sub-maps were suggested above as one way of displaying important secondary differences.

Another problem is that the "moderate people" level does not seem very useful; it might be better to divide the "dealing with people" factor into only two levels. A reexamination and modification of cutting points for the different levels might improve the appearance of intra-group homogeneity as well as consolidating the three "people" divisions into two. This would also have the advantage of reducing the number of groups by one-third or allowing the incorporation of other distinctions into the map without

increasing the current number of groups. As already illustrated, and as will be discussed more extensively below, it would be useful to distinguish between the types of interpersonal activities required in jobs that do deal extensively with people.

Finally, the dimensions of the Skills Map obscure some important differences among jobs unless one examines the more detailed data in the appendices. Most important is the distinction between requirements for math and verbal aptitude. Both numerical and verbal aptitude are weighted equally in the "academic aptitude" dimension underlying the Skills Map, but it is apparent from the descriptions of the 36 groups (in Appendix B in the present report) that some groups of jobs emphasize one aptitude rather than the other. In particular, most of the groups with high dealings with people (and that are at least moderate on the academic dimension) require higher verbal than numerical aptitude (i.e., the percentiles for verbal are higher than those for numerical in Appendix C of the earlier report). Conversely, numerical aptitude is more important in the groups with only moderate or low dealings with people. In fact, the earlier report (Table 4) revealed that when factor analyses were performed separately for occupations divided into three levels of academic aptitude, separate math and verbal factors were found for the middle group. Although it is not made explicit in the Skills Map, this distinction between numerical and verbal domination is important for both practical and theoretical purposes.

* See Note on p. 104 concerning this section
Comparison of the Skills Map to the USES occupational classification.

The meaningfulness of the scheme can be assessed, and perhaps augmented, by contrasting it with related work. The following pages examine another classification based to a large extent on DOT ratings--the 66-category

classification developed by the U.S. Employment Service and published in the Guide for Occupational Exploration (GOE, U.S. Department of Labor, 1979a). As already noted, the GOE classification is the only other comprehensive classification that characterizes occupations according to the aptitudes they require. That system as published has several major limitations for purposes of assessing employability, but it is very instructive to compare the occupational map emerging from that classification to the Skills Map. A brief description of how that classification was created is necessary in order to better compare it with the Skills Map.

The major steps in creating the GOE classification were as follows. A factor analysis of vocational interest items revealed eleven major dimensions of vocational interest. Job analysts then assigned all DOT occupations to one of eleven Interest Areas on the basis of their knowledge of those occupations. A twelfth Interest Area was added because some occupations did not fit well in any of the eleven areas. These twelve Interest Areas were subdivided by the job analysts into more homogeneous groups, resulting in a total of 66 Work Groups as presented in the GOE. As noted earlier, the procedure is largely a rational rather than an empirical one based on job analysts' familiarity with tasks, working conditions, and interest and temperament requirements as well as aptitude requirements. (See Droege & Hawk, 1977; Strohmenger & Padgett, 1979; Droege & Padgett, 1979; U.S. Department of Labor, 1982a for a description of the GOE and its development.)

Occupational Aptitude Patterns (OAPs) were then developed for the Work Groups as follows. Specific Aptitude Test Batteries (SATBs) had been developed for over 400 specific occupations. A total of 460 such SATBs

were classified into the 66 GOE Work Groups. The SATB profiles varied from occupation to occupation within any one group, so a modal SATB was produced to represent as many of the 66 groups as possible. Data were sufficient to create modal patterns for 31 of the Work Groups. (The list of SATBs provided in Appendix F to a large extent overlaps these 460 SATBs. Section II-A of the GATB Manual lists which specific SATBs were included in the OAP development.) These modal SATBs were used together with the DOT ratings for the same occupations to develop a way of predicting modal SATBs from DOT data. This was done because DOT ratings are available for all 12,099 DOT occupations, and so provide a means to create modal SATBs for all the Work Groups. First, cutting scores were developed separately for each aptitude from the DOT ratings. (Cutting scores refer to the minimum level of the aptitude necessary for satisfactory job performance. Applicants must meet all cutting scores on the designated aptitudes to be considered good candidates for the job.) Then the presence or absence of each aptitude was predicted, the aim being to represent each group with two to four aptitudes. No more than four aptitudes are ever selected when creating SATBs for individual occupations or OAPs for groups of them, even though more may be valid predictors, because a fifth aptitude rarely improves the prediction of job performance very much (U. S. Department of Labor, 1969). The resulting modal SATBs for all 66 Work Groups, together with the predicted SATBs for individual occupations, were reviewed and modifications in the modal SATBs (i.e., OAPs) were made in some cases. The major changes were to exclude occupations with certain data codes (i.e., the higher codes for dealing with data) from the OAP groups (meaning that some OAP groups are a somewhat smaller subset of the analogous GOE Work Groups). In addition, it was found that the predicted SATBs were too heterogeneous for 14

of the Work Groups for them to be well represented by a single OAP. For seven of the groups, two different OAPs were developed. No OAPs were retained for the other seven. As a result there are 66 OAPs representing 59 of the GOE Work Groups. With the exception of some customer service occupations such as waiter (GOE Group 09.04), most of the excluded occupations are either supervisory (e.g., farm supervisor) or unusual (e.g., model, psychic reader, athlete, juggler). (See U.S. Department of Labor, 1980a; Droege & Boese, 1982, for descriptions of the development of the OAP groups.)

One section of the GATB Manual (U.S. Department of Labor, 1979b) presents the 66 OAP groups together with a list of the occupations of most interest in each of them (a total of 2,556 occupations). Although this publication is a valuable adjunct to the GOE, it does not provide a readily comprehensible map of the similarities and differences among the 66 occupational groups, thus limiting its usefulness for both theoretical and practical purposes. Inspection of the OAPs reveals, however, that many of them are identical or quite similar. Table 5 reorganizes the OAPs to highlight their similarities and in so doing reveals a very interesting occupational map. All OAP (i.e., GOE) groups with similar or identical OAPs are listed together in Table 5 under one of eleven headings labelled here as Clusters A through K. Figure 2 further summarizes and schematizes the data in Table 5 and makes clearer the relation of the clusters to one another. It should be noted at the outset, however, that this portrait highlights the consistencies and ignores the variability shown in the more detailed data (Table 5 and Appendices E and F) upon which the figure is based.

Insert Table 5 and Figure 2 About Here

Figure 2 groups the eleven clusters into four major sectors or foci of work: dealing with physical relations, maintaining bureaucratic order, dealing with social and economic relations, and performing. The information shown for each cluster includes a summary of the major focus of work, sample occupations, and the level of the most important aptitudes (i.e., the OAP) the work requires. Work focus was inferred from examining descriptions of the GOE groups and lists of the occupations they include. Appendix E reproduces the lists of occupations provided in the manual for the OAP groups (U.S. Department of Labor, 1979b), but it reorders them to be consistent with Table 5. The aptitudes noted in the cluster profiles in Figure 2 are those that were most typical of the constituent GOE groups (see Table 5). The level required of each important aptitude is noted simply as minimal, average, above average, or high in the figure (see the key in Figure 2 for details).

The following pages describe the similarities and differences among occupational clusters based on OAPs.

Clusters A to D: Dealing with Physical Relations. Clusters A through D include jobs whose workers deal with physical systems, be they mechanical or biological. They range from those requiring high intelligence and quantitative abilities to those requiring only physical skills. On the DOT worker function scales of "complexity of dealing with things" and "complexity of dealing with data" they probably range from very complex (Cluster A) to very simple (Cluster D). Likewise, they appear to range from high or above average to average or low on requirements for intelligence, verbal, numerical, and spatial aptitudes. Motor skills are important predictors of job performance only in the two manual work clusters.

Cluster A includes mathematics, physical sciences, medicine, and engineering. These occupations require high intelligence, but they are distinctive from all other clusters for their high demands for numerical and spatial skills.

Cluster B represents technological occupations: managing operating systems (e.g., production superintendent), implementing general design specifications (e.g., drafting), and operating complex vehicles (e.g., aircraft). Although not as demanding as the Cluster A occupations, they too stress quantitative rather than verbal cognitive skills.

Cluster C includes craftsmen and many machine operatives. These include workers who create, assemble, or inspect various types of goods and who set up or operate machines to produce, transform, or transport goods. Most would be considered skilled or semiskilled workers. Although the jobs require form perception and manual dexterity, one subcluster requires the ability to deal with or think about the relations of objects in space (spatial aptitude) and the other requires motor (eye-hand) coordination for quick, accurate manipulations.

Cluster D consists of what is often characterized as semiskilled or unskilled manual work. These jobs require only minimal levels of motor coordination and manual dexterity in order to perform manual or farm labor, tend or feed machines, assemble objects, help more skilled workers, or provide elementary services to the public (e.g., shining shoes).

Clusters E to G: Dealing with Social and Economic Relations. Whereas some of the clusters dealing with physical systems had high demands for quantitative versus verbal aptitude, Groups E to G have more balanced

demands. They do not require the spatial aptitude typically associated with the physical sciences and technical work. Instead, they often require clerical perception, which is the ability to perceive pertinent detail in verbal or tabular material. These three clusters range from high (Cluster E) to at least average (Cluster G) in intelligence required. Also, they probably range from more to less complex in their dealings with people and data (two of the DOT worker functions). None of the OAP groups included within these clusters requires any spatial or motor aptitudes, which is the major difference between these three clusters and the four just discussed.

Cluster E includes social scientists, administrators, and professionals who help clients deal with the social system (e.g., lawyers, lobbyists). These occupations require high intelligence and above average verbal and numerical abilities. Thus, they appear to be somewhat less demanding in this regard than are the Cluster A occupations which include math, medicine, and the physical sciences.

Cluster F occupations include a variety of types of work activities--teaching and nursing, disseminating news and information, selling, and business management--but the aptitudes are much the same. They require above average intelligence, verbal aptitude, and usually clerical perception, and average numerical aptitude. Thus they are somewhat less demanding cognitively than are the Cluster E occupations.

Cluster G workers serve or care for people in a variety of ways: hospitality (e.g., flight attendant), child and adult care (e.g., practical nurse), and security (e.g., some police officers). They also include animal trainers. All require average intelligence, but apparently no other GATB aptitude is important in predicting job performance.

Clusters H to J: Maintaining Bureaucratic Order. These clusters constitute the records keepers and rules keepers of all other activities, and they carry out many of the minor transactions for the organization. The required aptitudes differ, ranging from purely cognitive to primarily non-cognitive.

Cluster H includes occupations whose workers inspect work processes and products for conformity to government rules and regulations, as well as clerks, secretaries, tellers, cashiers, and salespeople. These jobs require average intelligence, numerical ability, and clerical perception. The requirements are much the same, although slightly lower, as those for Cluster F (persuading, informing, and helping individuals), except that Cluster H has no particular demand for verbal aptitude. Various police and fire officers (other than those in Cluster G) are included in this cluster even though their aptitude pattern resembles that of the next cluster (which also requires intelligence and clerical aptitude but not numerical aptitude), because it seemed to be a more sensible assignment.

Whereas Cluster H occupations maintain bureaucratic rules, records, and transactions, Cluster I occupations primarily process (e.g., claims clerk) or orally transmit (e.g., dispatcher) bureaucratic detail. These occupations require average intelligence and clerical perception.

Cluster J occupations are distinctive from those in Cluster I by requiring less cognitive and more physical processing of records. They include, for example, clerical machine operators. Cluster J occupations require average clerical perception and minimal manual dexterity.

Cluster K: Performing These occupations require above average intelli-

gence, but the other aptitude requirements create two subclusters: music, literary arts, and drama which tend to require verbal aptitude and clerical perception (both above average), and dance and visual arts which require spatial aptitude (average or above).

The OAP clusters are clearly a meaningful way of distinguishing the aptitude requirements of different types of occupations. The important question in the context of this report is: To what extent do the OAP clusters and the Skills Map groups provide consistent or complementary views of occupational demands?

In order to answer this question, half of the occupations in Appendix E (Appendix E shows specific occupational titles included in each of the OAP clusters) were classified according to census category (using the Classified Index of Industries and Occupations, U.S. Bureau of the Census, 1971) and then according to Skills Map aptitude group (using the census code and Appendix C). Many supervisory occupations are not included in the OAP data, but overlap of coverage of the two schemes is quite good otherwise.

Table 6 provides a summary of this cross classification procedure by showing the predominant OAP clusters appearing within each of the Skills Map aptitude groups. To aid interpretation, results are listed separately by major focus of work--physical relations, social relations, and bureaucratic relations. Cluster K, the performing occupations, is not included in the figure but will be mentioned later.

 Insert Table 6 About Here

Looking first at the results for the Physical Relations clusters (A-D),

it is apparent that they differ systematically with the general level of academic aptitude required according to the DOT ratings. The very high academic aptitude level is represented primarily by Cluster A, high academic aptitude by Cluster B, moderate academic aptitude by Subcluster C1, and the lowest level by Clusters C1, C2, and D. Neither the motor nor the dealing with people dimensions seem to distinguish among the four clusters, although it is the case that C1, C2, and B are not found among the "low motor" aptitude groups.

Turning to the Social and Economic Relations clusters (E-G), the academic dimension once again distinguishes among the clusters. In contrast to the wide range of cognitive demands among Clusters A to D, dealing with social and economic relations, except in a serving capacity (Cluster G), requires at least above average intelligence. Although the three clusters are found at all Skills Map levels of motor skill and involvement with people, they tend to fall toward the lower end of the motor skills dimension.

The three Bureaucratic Relations clusters (I-J) are found only at the moderate and high academic aptitude levels of the Skills Map, the high level being represented primarily by Cluster H. They tend not to be high on the Skills Map motor aptitudes dimension. Cluster J (manipulating records) does not have high involvement with people whereas Cluster H tends to. Overall, however, the three clusters are not distinguished well by either the motor aptitude or people dimensions of the Skills Map. In summary, Table 6 shows that there is clear differentiation among the OAP clusters by academic aptitude level in ways consistent with the OAP cutting points. The other two dimensions of the Skills Map are only somewhat related to the OAP clusters.

The next table affords a better assessment of how consistent the OAP clusters and the Skills Map aptitude groups are, as well as disclosing additional information not available from either scheme alone. Because the motor and dealing with people dimensions did not distinguish clusters well, they have been ignored in Table 7. Table 7 lists the summary aptitude requirements for the clusters predominating at each of the four Skills Map aptitude levels and the three OAP foci of work.

Insert Table 7 About Here

The pattern of requirements shown in Table 7 reveals the effects of using different types of occupational comparisons even when the job descriptors are basically the same. The Skills Map is based on inter-occupational comparisons because it classifies all occupations on the basis of their scores relative to one another on the same three dimensions, dimensions that were selected precisely because they distinguished well among occupations. In contrast, OAPs were developed from SATBs, which in turn are based on intra-occupational comparisons of the value of different aptitudes in predicting job performance. Interoccupational comparisons with OAPs are limited to determining which aptitudes are most related to job performance. If the same aptitudes are important in two occupations, then the cutting scores can also be compared. One effect of the difference between data based on inter- versus intraoccupational comparisons is apparent from looking at the OAP aptitudes for the Physical Relations clusters.

Cluster B occupations require above average cognitive skills according to their OAPs and "high" academic aptitude according to the Skills Map; results are also consistent for Cluster A occupations because they require

even higher cognitive aptitude according to both schemes. Although the Skills Map makes distinctions among occupations within Clusters A and B according to the two other competency dimensions (motor skills and involvement with people), the OAPs do not. Even though some workers in these OAP clusters may exercise relatively high motor skills, their importance for job performance is probably secondary to the cognitive skills and therefore given no opportunity to show up in the OAPs because the OAPs emphasize the most important aptitudes and because no more than four aptitudes are ever included in an OAP. Because the OAPs do not incorporate any clear measures of interpersonal aptitude, there is no reason to expect OAPs to be able to distinguish among jobs dealing with people and those that do not in the Physical Relations clusters. What the OAPs show, then, is the skills that are most important (among those assessed by the GATB) while the Skills Map shows the level of the skill exercised, important or not.

Whereas only cognitive skills are represented in the relatively high level Clusters A and B, only motor skills or the more peripheral cognitive skills (form perception and spatial aptitude) are important in the lower level Clusters C1, C2, and D. In fact, it is only by cross classifying the OAP clusters by Skills Map group that it is possible to estimate what the typical academic aptitude is in clusters C1, C2, or D. It appears that these three clusters do not require more than an average level of intelligence or academic aptitude and that it is the motor skills that best predict job performance.

In the Social Relations clusters (E-G), no motor aptitudes are important in even the lowest level cluster (G), so a clear progression in level of intelligence required has a chance to appear: high for E, above average

for F, and average for G.

Turning to the Bureaucratic Relations clusters (H-J), motor skills show up in only one cluster (J). Only cognitive aptitudes are most important in the other two clusters, both of which require at least average intelligence.

Looking across all three OAP foci of work, it also appears that the cutting point on any aptitude, whether cognitive or not, is related to level of academic aptitude on the Skills Map. For example, Clusters C1, C2, and D are low on the academic aptitude dimension and require only minimal motor skills, even though differences in motor skills are important according to the OAP. This pattern does not appear to be an artifact of the procedure used to develop modal OAPs. Both the OAP manual (U.S. Department of Labor, 1980a, Table 9) and the list of several hundred SATBs (reorganized in Appendix F according to OAP cluster) reveal that few occupations require more than minimal motor aptitude, even when motor aptitudes are the most important ones for predicting job performance. They also show that this is not the case for the cognitive skills because the cutting scores for the latter range all the way from minimal to high. In addition, if intelligence does appear in a SATB together with a motor aptitude, the cutting score for intelligence also tends to be low.

The Skills Map shows occupations in three levels of motor skill, but the OAP clusters do not because no GOE group requires more than minimal motor skills. Reference to Table 1 and Appendix F may help explain this inconsistency. Among the low and moderate academic groups in the Skills Map, there are few occupations rated as anything other than moderate in their demands for motor aptitude; that is, there is little variance in these DOT

apptitude ratings (see Table 1). The SATB's that are available for specific occupations within the relevant OAP clusters (C1, C2, and D) show a similar pattern of very few low or high scoring occupations within each of those clusters (see Appendix F). Thus, although variation in the cutting scores for motor aptitude requirements does exist according to the SATB's, it is not large enough to affect the OAPs for the GOE groups where motor aptitude is a useful job predictor. Ironically, the GOE groups where higher cutting scores for motor aptitude might be found tend to be occupations where cognitive skills are most important and so dominate the OAPs. Table 1 shows, for example, that the largest Skills Map group with high motor skills is Group 27; it employs 4% of workers. This group is also high on both the academic aptitude and dealing with people dimensions, and includes occupations such as secretary and chiropractor. An examination of the SATB publications for individual occupations might shed some light on this apparent inconsistency between the OAP clusters and the Skills Map, because those publications document how the OAPs were constructed from various assessments of the importance of all nine of the GATB aptitudes.

Table 7 shows that intelligence and numerical aptitude are core skills in all three OAP foci at the two highest Skills Map academic levels, but that the auxiliary skills differ by OAP focus of work in ways that make sense but which were not all apparent in the Skills Map analysis. The Physical Relations clusters (at the two highest levels) are more quantitative than other high level OAP clusters. Verbal aptitude is important in more of the Social Relations clusters than in the other foci. Only the highest level Physical Relations cluster (A) has a requirement for verbal aptitude. Although a numerical vs. verbal distinction was not built into the Skills Map, it was readily apparent in the resulting Skills Map groups. What was

less emphasized was that spatial aptitude is typically associated with the dominance of quantitative aptitude.

The OAP clusters show another variation in the types of cognitive skills required in different kinds of work where above average intelligence is required. The ability to perceive pertinent detail in verbal or tabular material (clerical perception) is important in both the Social and Bureaucratic Relations clusters, but not in the Physical Relations ones. This distinction was not explicitly noted in the Skills Map analyses, but it is consistent with the earlier discussion of the heterogeneity of some of the Skills Map groups. In particular, a number of the groups appear to contain clerical vs. non-clerical subgroups.

Turning to the two lower levels of academic aptitude, only motor skills, form perception, and spatial aptitude are required in the Physical Relations clusters. With the exception of manual dexterity in the relatively low level Bureaucratic Cluster J (manipulating records), these aptitudes are not required for the lower level Social and Bureaucratic clusters. At least average intelligence and clerical perception tend to be the requirements in the latter.

A comparison of the Skills Map to the OAP clusters shows that "dealing with people" is not the same as "dealing with social and economic relations." With the exception of Clusters C2 (quick, accurate manipulation in crafts, etc.) and J (manipulating records), all OAP clusters contain occupations where workers deal with people. Conversely, with the exception of Clusters F (persuading, informing, and helping individuals) and G (serving and caring for individuals) all contain occupations that do not have substantial dealings with people. The low relation between these two dimen-

sions focuses attention on differences in the types of dealings with people different types of workers have. Many of the workers in the Dealing with Physical Relations clusters who deal with people probably deal with people primarily as physical objects (e.g., physician, barber, bus driver, elevator operator). Many workers in the Bureaucratic Relations clusters who deal with people probably do so by exchanging information, perhaps to facilitate some routine exchange (e.g., sales clerk, secretary, bank teller, operator, receptionist). Workers who deal with people in all their complexity are found primarily in the Social and Economic Relations clusters (e.g., lawyer, social worker, teacher, manager). Maintaining social and economic relations does not necessarily involve extensive dealings with people (e.g., accountant, librarian, political scientist), but it usually does.

Neither the Skills Map nor the OAP clusters deal well with artistic occupations. They are scattered throughout the Skills Map and the OAPs for Cluster K (performing) are heterogeneous. The inadequacies of the DOT and GATB aptitude scales for describing occupations in general have been noted above, but apparently they are more severe for artistic and aesthetic occupations. The OAP clusters, however, are somewhat more meaningful for describing such jobs than is the Skills Map.

To summarize, both the Skills Map and the OAP map created here are meaningful and comprehensible, but in different ways. A major distinction according to cognitive or academic aptitude is made by both, but the other distinctions they emphasize are different. But because they are largely consistent, each augments the meaning of the other. For example, the relation of the OAP clusters to one another is clearer, and hence their value as a map of occupational differences is improved, by being compared to the

Skills Map. In turn, the relative importance of each of the Skills Map dimensions to job performance is clearer as a result of the comparison.

Criterion 5: Parallel assessment. The classification should be directly linked to a way of assessing whether individuals possess required job competencies.

Establishing a link between people and jobs in the assessment of aptitudes and tasks has been a longstanding but largely unfulfilled goal in industrial psychology. Dunnette (1976) reviewed both job analysis research and the study of human abilities and showed that the task requirements characterizing jobs are very difficult to translate into the terms typically used to assess aptitudes. Fleishman's (1975) work shows the extensive work that is required to specify the component cognitive and motor aptitudes required at different stages of mastering and performing even elemental tasks.

Linkage to GATB scales. The Skills Map has no direct link between people and jobs built into it because the DOT ratings are not explicitly anchored or linked to any particular means of assessing aptitudes. By way of contrast, the OAP groups do have such a direct link because they are stated in terms of scores on the GATB, which is the battery of aptitude tests used in developing the OAP. At least a partial link can be forged, however, between the Skills Map for jobs and ways of assessing people.

Table 7, which compares Skills Map academic levels with OAP clusters, is useful in this regard. Specifically, this table suggests typical GATB cutting scores for the four different academic aptitude levels of the Skills Map. The intelligence scale appears to be a good representation for the academic aptitude dimension of the Skills Map. Minimum scores for the

groups appear to be about 110 for the "very high" group, 100 for the "high" group, and perhaps 90 for the "moderate" group. It is not clear what the cutting point for the lowest group might be. The three cutting scores are, respectively, .5 standard deviations above the mean, the mean, and .5 standard deviations below the mean. Translated into IQ scores, they would be, respectively, 92, 100, and 108 (using 100 and 16, respectively, as estimates of the mean and standard deviation of IQ in the general population). These are very rough estimates, of course, because there is variability within the OAP clusters themselves in the minimum level of intelligence required. For example, Appendix F shows that SATB cutting scores for intelligence in Cluster A occupations range from 130 for mathematician (which is 1.5 standard deviations above the mean) to 105 for numerical control tool programmer and osteopathic physician (which is just slightly above the mean). Comparisons with the OAPs do not help in establishing a similar link for the motor or people dimensions of the Skills Map.

Specification of the practical meaning of the DOT scales used in creating the Skills Map. Figures 3-10 were also created to help link job demands to ways of assessing the skills people might possess. Figures 3-6 provide several types of information about the academic competencies dimension of the Skills Map because they provide additional information about the meaning of the components of that dimension. Figure 3 presents the scale for the DOT variable verbal aptitude, which as shown in the figure ranges from a low of 5 to a high of 1. The triangles along this scale mark off the range over which the scores of most of the occupations in each of the four Skills Map academic levels fall. (Specifically the triangles mark off one standard deviation above and below the mean of each group.) Sample occupations for different scale values are also shown. To the far right;

illustrations are provided of the job activities and skills that correspond to the integer scale values. To illustrate, operating a switchboard to provide an answering service for clients is an example of an activity of occupations at the moderate academic level (that group generally ranges from 3.5 to 2.9 on the verbal aptitude scale) and stock clerks and barbers are examples of occupations at this level. To the far left of the table are shown percentages of census job titles, and then percentages of workers, that are found at or below various scale values. (The number of workers according to 1970 census category was taken from U.S. Bureau of the Census, 1973, Table 38). For example, approximately 60% of both titles and workers represent job demands at or below scale value 3, which includes both the low and moderate academic groups. This seems consistent with the definition in Appendix A for that scale value: the "middle third of the population" which "possesses a medium degree of the aptitude."

 Insert Figures 3 and 4 About Here

Figure 4 provides additional information about the verbal component of the academic aptitude dimension. Although the variable "language development" shown in this figure is not an actual component of the Skills Map dimension, as was verbal aptitude, it is almost as highly correlated with the dimension (.91 vs. -.93, scoring is reversed in one scale accounting for the difference in sign). The illustrations for language development are in terms of academic curricula and so may be of greater practical value. For example, the moderate academic group is required to be able to write somewhere between the level of compound and complex sentences and the level of writing entire reports with proper form and grammar. The cumula-

tive percentages suggest that over half of workers (see scale value 3) have to read, write, or speak so that they can read various rules, instructions, atlases, or magazines, write reports and essays, and speak with poise in correct English.

Before discussing the other figures, it can be noted that the figures provide two ways to link the job demands to the evaluation of an individual's skills: absolute (Does the individual have the skills necessary to perform the work?) and relative (How competitive is the individual compared to other people who might be seeking the same job?). A person might possess all the language skills just cited, and so have the minimum verbal skills demanded in a job at about the 55th percentile in demands for verbal aptitude. But if 75% of the population actually possesses such verbal skills, the individual may be at a disadvantage when competing for the job. To some extent many people applying for the job may be "overqualified" in terms of the minimal skills required, but it may still be wise for an employer to select them because their greater verbal aptitude may in fact make them somewhat better workers. Studies of the validity generalization of cognitive tests suggests that this is the case (Schmidt & Hunter, 1981). It is not clear what proportion of the population is qualified at each absolute level, but there are many academic or intellectual assessments that can provide data on the relative standing of individuals. The unique advantage of the Skills Map (as portrayed in Figures 3-10) is to provide a useful way of ranking occupations in their demands.

Figures 5 and 6 refer to the other component of the Skills Map academic aptitude dimension: numerical or mathematical competence. According to Figure 6 for mathematical development, over half of jobs require the abil-

ity to make computations such as ratios, proportions, discounts, interest, or to do simple algebra or geometry. The "very high" level group covers a considerable range of numerical and math skills. One difference between the DOT verbal and numerical aptitude scales appears to be that the definition (in Appendix A) of what is moderate (i.e., scale value 3) does not correspond to what is average in terms of actual job demands, because the latter is lower (i.e., closer to scale value 4). Referring back to the OAP patterns in Table 5 or to the OAP Manual (U.S. Department of Labor, 1980a, Table 9), it appears that the DOT scale used to estimate numerical aptitude should be adjusted somewhat. This would have no effect on the Skills Map, however, because it essentially makes this adjustment (i.e., the means of the Skills Map "moderate" level group are lower on DOT numerical than on verbal ratings).

 Insert Figures 5-10 About Here

Figures 7-9 refer to the three components of the Skills Map motor aptitude dimension: motor coordination, finger dexterity, and manual dexterity. All are correlated about $-.8$ with that dimension. These three figures are interesting because they show that around 90% of both job titles and workers are at or below scale value 3, which means that 90% require no more than a moderate amount of the skill. In fact, most jobs fall in the narrow range between 4 and 3 on the motor scales. This relatively low level and restricted range of motor skill demands according to the DOT ratings is consistent with the OAP patterns discussed earlier. Even where variation in motor skills is related to job performance, the SATBs show that the minimal level needed for satisfactory performance is almost always

low.

The final figure applies to the third Skills Map dimension, dealing with people. The DOT worker function shown in Figure 10, "complexity of involvement with people," is the only DOT variable general enough to represent the third Skills Map dimension, but it has limitations. It represents the difficulty level at which a worker deals with people rather than degree of involvement. Difficulty level and degree of involvement may be much the same, because the variables "dealing with people" (Depl) and the worker function "complexity of involvement with people" are highly correlated (.75). Nevertheless, they are conceptually distinct. Parking attendants and sales clerks are two examples of jobs with high involvement with people but at a relatively low level (serving or exchanging information).

It is clear from the figure that involvement with people comes in many varieties, but most workers have only simple relations, if any at all, with people as part of their jobs. Two-thirds are at or below the difficulty level of exchanging information (speaking-signalling). There is considerable overlap on this scale of the moderate and high dealing-with-people groups, reinforcing the earlier suggestion that the three people groups should be consolidated to two. It would be useful to make further distinctions in the type of involvement workers have who do deal extensively with people. The complexity of involvement with people variable would be a potential variable for this purpose; of the DOT variables, it is the only option.

It should be noted that this latter variable should generally be used in conjunction with the DOT temperament Depl because no matter how slight the involvement with people among high level jobs, their level of complexity of

involvement is high (refer to the percentiles in Appendix E in the previous report). Another limitation of the complexity of involvement with people variable is noted in its documentation: "As each of the relationships to People represents a wide range of complexity, resulting in considerable overlap among occupations, their arrangement is somewhat arbitrary and can be considered a hierarchy in the most general sense" (U.S. Department of Labor, 1977a, p. 1369). The placement of the "diverting" item (scale value 4) seems most questionable.

Criterion 6: Link to demographic data. It should be possible to link the classification of job demands to employment statistics or demographic data about workers.

Both the DOT and the PAQ job ratings were aggregated according to the over 400 1970 detailed census occupational titles before creating the Skills Map. (Appendix C lists those census categories and the Skills Map aptitude groups to which they were assigned.) The advantage of this procedure linking job descriptors to the census classification is that it provides access to the wide range of demographic data on the labor force that is collected by the Census Bureau. The distributions of the number of workers at each aptitude level in Figures 3-10 were available only because the DOT data were arranged by census code, which allowed us to use data published by the Census Bureau on the number of workers employed in each detailed census title. We also used these data to produce Table 1, which showed the number of workers employed in jobs demanding different combinations of academic, motor, and people competencies. Table 1 shows that many combinations of competencies can be found in the U.S. economy, but half of all jobs fall into just a few groups: 4, 13, 15, 21, and 30. The first two account for 27% of all employment, they consist of jobs with low to

moderate academic demands, moderate demands for motor aptitudes, and no dealings with people, and they are represented primarily by craftsmen and machine operatives. The other three groups account for 25% of employment, and involve dealing with people but not motor skills, the major difference among them being academic level (moderate vs. high vs. very high). With low academic aptitude or skills, Group 4 is the most likely source of a job. With moderate academic skills, there is more choice because there are as many people as non-people jobs. At the high and very high academic levels, by far most of the jobs involve dealing with people. If one wants to obtain a job where one can exercise high motor aptitude, neither the lowest nor the highest academic level jobs are likely candidates.

By linking the Skills Map to demographic data, it would also be possible to look at the relation between the types of demands jobs make and the types of people (age, race, sex, income, etc.) who fill those jobs and to examine questions about income determination, race and sex differences in employment, labor market segmentation, supply versus demand for different types of labor, and the role of education in preparing people for jobs. We will be using the Skills Map in future research to explore such issues.

In order to link the Skills Map with demographic data collected in 1980, the Map would have to be recreated after aggregating DOT ratings to the 1980 categories. The 1980 census classification is quite different than the one for 1970.

Criterion 7: Multiple levels of analysis. The classification should incorporate several levels of analysis so as to allow several levels of decision making (from broad to narrow) and to allow linkage with other materials developed at various levels of specificity.

The Skills Map is a broad and simplified picture of how jobs differ in their aptitude demands. It was designed to be. For some types of decisions, broad dimensions for distinguishing among jobs are quite useful. The process of vocational choice is a process of narrowing one's alternatives, and it makes sense in counseling settings to use the Skills Map to narrow them first according to the most general and important requirements and then proceed to examine the more specific skills required. For example, if the major difference among jobs is an academic competence or intelligence factor, then it may be a useful strategy for individuals to focus their attention on jobs that are neither far below nor far above their apparent academic aptitude level. It may even be useful for them to just realize what jobs are and are not available to people with below average, average, or above average academic competencies. Knowing what sorts of jobs are usually available to someone with only a high school degree versus those that are available to a more highly educated person may help people who are uncertain about continuing their educations to decide whether or not it is worthwhile or important for them to continue in school. Also, more specific training is generally required for most jobs, but the types of training that are realistic options often depend upon one's general aptitudes, whether they be academic, motor, or interpersonal. Likewise, if an individual is very interested in or good at working with their hands or working with people, the Skills Map can give them an overview of their options, including the other general competencies that may be required for them to obtain a job where they can exercise their motor or interpersonal skills.

Appendices C-I were included in the earlier report in order to provide more detailed information about job demands. They show for each of the 400

or so census categories whether the demand for each worker trait is low, moderate, or high. These data were used to provide descriptive profiles of the 36 Skills Map aptitude groups (see Appendix B in the present report) as well as to highlight the variation within the groups along other dimensions of job demands (e.g., need for vigilance, tolerance of stress). As discussed earlier, however, an intermediate level of analysis would also be desirable. "Sub-maps" showing distinctions of secondary importance would be useful, in part because the secondary dimensions are likely to be different for high vs. low-level jobs. As already discussed, the interpersonal skills required probably differ by job level.

Once people have narrowed their options, they need to know more about the skills or training required in the one or few occupations they are seriously considering. Likewise, training or selection programs for specific types of jobs should specify the particular aptitudes (and levels of those aptitudes) necessary for entry as well as the particular skills that the job entrant is expected to develop. Such detailed information is beyond the scope of the Skills Map. Any one classification system, particularly a global one, is going to be limited in the amount of detail it provides. However, a classification becomes more useful to the extent that it can be explicitly linked to other sources of information. Also, if it can be used to organize disparate sources of information and thereby make their relations to the classification and to each other clearer, all the sources of information as well as the classification increase in both practical and theoretical value. The discussion earlier in this report of the similarities and differences between the Skills Map and the U.S. Employment Service's OAP groups provides a clear example. Linking the occupations in the Occupational Outlook Handbook (U.S. Department of Labor, 1982b) to the

Skills Map would be another. Many studies have been done examining job demands but, as noted earlier, they have typically been limited in the job descriptors, occupations, or job settings analyzed. It would therefore be informative to organize studies of the validity of various predictors of job performance according to the major Skills Map competencies they require, because it might reveal patterns of validity generalization by type of occupation or type of job attribute. As already noted, job classification and validity studies could profit from better theory about job demands. Several other examples illustrate the potential organizational value of a broad classification such as the Skills Map.

The program at the National Center for Research in Vocational Education on occupational adaptability, employability, and transferable skills (e.g., Selz, 1980; Sjogren, 1971; Altman, 1976; Faddis, 1979; McKinlay, 1976; Miguel, 1977; Selz, Jones, & Ashley, 1980) focused on job-related skills general to all jobs. The objective of the Skills Map is not the same; it is to show the differences in what makes a person employable from one occupation to another. Selz (1980, p. 24) provides a list of 39 employability skills that were developed "through a search of literature, an examination of numerous programs to prepare people for work, and the advice and consultation of educators and personnel in business and industry" (pp. 1-2). She classified each under one or more of four headings: "doing what the man wants" (e.g., follow rules and policies, get along with others, use the tools and equipment a job calls for), "getting yours" (e.g., ask for a raise, manage one's own time and activities, know one's rights as an employee), "taking charge" (e.g., figure out a better way to get things done, persuade others to one's way of thinking, interview for different job positions when necessary), and "finding your niche" (e.g., get a job for

which one has the training and background, know what kind of work one wants to do, fill out forms as required by law or an employer). Most of the "getting yours" and "finding your niche" items reflect career management and job finding skills and so are outside the scope of the Skills Map. Items in the other two sets are more relevant to the Skills Map, although some are vague in order to be applicable to all jobs (e.g., use the reading, writing, and math skills the job calls for). The items that are more specific (e.g., get along with others) are fairly elemental. Taken together, the set of 39 items can most usefully be conceptualized as skills useful for teenagers looking for work, work which is probably low level and entry level. As such, these skills are only peripherally relevant to most groups in the Skills Map because it deals with the full range of jobs in the economy.

Sjogren's (1971) report for NCRVE on occupational adaptability reviews the need for clustering occupations according to their similarities in order to develop more efficient and effective vocational curricula and training programs. He also reviews efforts to do so. Although the review reflects somewhat narrower focus than the concerns underlying the development of the Skills Map (because of the former's focus on job training programs), the two are consistent because of their common concern with variations in demands from one job to another. Sjogren does not discuss any particular lists of skills that are transferable from some jobs to others, but the studies he cites could probably be usefully organized according to the Skills Map dimensions.

The Generic Skills project of the Canada Department of Manpower and Immigration (e.g., Smith, 1975; Kawula & Smith, 1975; Randhawa, 1978) is

another example of an effort to identify skills that are common vs. unique to different occupations for training purposes. The five a priori types of skills that were assessed are similar to the dimensions of the Skills Map: mathematics, communication, and reasoning (all three of which correspond to math, verbal, and reasoning variables highly correlated with the Skills Map academic aptitude dimension) and interpersonal and manipulative skills (which correspond, respectively, to the Skills Map people and motor dimensions). Each of these five skill areas is represented by specific items of a curricular nature (e.g., change fractions to decimals or percentages, write single paragraph letters). Comparing these items to the content of the three GED components (see math, language, and reasoning, Appendix A) suggests that the Generic Skills Project items correspond primarily to the two lowest levels on the three GED scales, which in turn correspond to the low and some of the moderate academic aptitude groups in the Skills Map. When the 76 occupations included in the Generic Skills Project are classified according to the Skills Map, most are found at the moderate academic level although some are found at each of the four levels. All levels of motor aptitude and dealing with people are represented. Examples of occupations at each of the academic aptitude levels are: welder and janitor (low), auto mechanic and barber (moderate), bookkeeper and secretary (high), and medical laboratory technician and draftsman (very high). The 76 occupations are not representative of all occupations but instead are occupations which are "generally agreed to be at the vocational levels (trades, aides, technicians, craftsmen, and technologists) and not for those occupations in which people are generally prepared by university degree programs" (p. 2).

The Generic Skills Project analyses of which skills are core to all non-supervisory and to all supervisory occupations versus the skills that are required in only some jobs and not others (e.g., Kawula & Smith, 1975) could be reviewed for their relation to the Skills Map and its appendices. This would help to link the Skills Map to detailed information it does not now incorporate. It is clear from the preceding comments, however, that any generic skills the Generic Skills Project reveals refer to only a subset of all jobs. Specifically, they apply primarily to jobs requiring moderate levels of academic aptitude.

In summary, little has been done to link the Skills Map to other sources of job information, but it appears to offer a useful organizing scheme for more detailed data. The strength of the Skills Map is its breadth and generality. Its usefulness could be extended with additional (more detailed) levels of analysis. With the exception of the proposed sub-maps, that may best be accomplished by incorporating and reorganizing existing more piecemeal research and information about job demands.

Conclusions

This report reviewed the development of the Skills Map, a comprehensive classification of occupations based on their competency requirements. The bulk of the report was then devoted to assessing that classification according to seven criteria. Although some of the criteria could be applied to any classification, they were posed with the specific goal of producing a scheme useful for assessing the employability of individuals or different groups in the population for different types of work. The Skills Map ranges from poor to excellent across the different criteria.

Criterion 1: Valid job descriptors. There is insufficient information for evaluating the reliability of most DOT items and of the individual PAQ items, although on the whole the available evidence is positive. Because of the greater problems DOT raters seem to experience than do PAQ analysts in producing job ratings, the DOT may suffer from more illusory halo, which is a problem characterizing all job ratings. A comparison of GATB and DOT data suggested where illusory halo may be a particular problem. Despite the problems job ratings have, they are the only practical way to obtain relevant job data for a large set of occupations, and such ratings are superior to data based on the attributes of job incumbents. Aggregating the job ratings for the 12,064 civilian DOT occupations into 396 census categories appears to ameliorate some of the problems of the DOT data, particularly their overrepresentation of manufacturing vs. service occupations. Overall, the data upon which the Skills Map is based are probably of fair to good quality when aggregated.

Criterion 2: Occupational coverage. The DOT data provide excellent coverage of the range and variety of jobs in the U.S. economy. Less than 1% of the workforce is not covered by DOT ratings because of lack of DOT data for their occupations. (About 6% are not covered because of lack of data for determining what occupations they hold.) Thus the Skills Map also provides excellent coverage.

Criterion 3: Aptitude coverage. Most of the DOT scales have the advantage of measuring worker attribute requirements and worker behaviors as opposed to task requirements, the latter being less relevant for assessing the employability of individuals. The PAQ items refer primarily to worker behaviors. The DOT provides good coverage of two of the three general

types of competency judged, a priori, to be important: cognitive and motor aptitudes. Although one DOT variable distinguishes between jobs dealing with people and those not, it does not provide a good description of the interpersonal skills required by jobs, the third dimension judged to be important a priori. The PAQ provides more data on interpersonal activities, but primarily for the higher-level jobs. The lack of data on interpersonal skills is the greatest aptitude omission of the Skills Map in its present form. Data from other sources, together with an analysis of the internal problems of the Skills Map itself, were used to suggest improvements. In particular, the importance of personal presentation skills (e.g., attractiveness, persuasiveness) and level of complexity of dealing with people are attributes that could be added to the Map to more usefully distinguish among jobs dealing with people. "Sub-maps" were also suggested so that competencies of secondary importance, but which probably differ according to general level of work, could be specified. Physical strength, organization and planning skills, and particular interpersonal competencies (e.g., persuasiveness vs. deference) are examples of potential secondary dimensions.

Criterion 4: Comprehensible map. The Skills Map was created by an objective and replicable method; it was also designed so that the underlying dimensions of the map, which were used to create the 36 Skills Map groups, would be clear and meaningful to potential users. The resulting groups are heterogeneous along other dimensions of competency and job conditions, which is a result that is to be expected but which decreases the face validity of the map to potential users. The incorporation of "sub-maps" into the Skills Map is one way to create more homogeneous groups. The USES job classification published in the Guide for Occupational Explo-

ration was reorganized according to the Occupational Aptitude Patterns (OAPs) of the groups and then compared to the Skills Map. The two ways of mapping the aptitude requirements of jobs are consistent in distinguishing the cognitive demands of jobs. The other distinctions the two schemes make differ, however, because the OAPs make intra-occupational comparisons (i.e., of which aptitude is most important for job performance within a job) whereas the DOT ratings as used in the Skills Map make inter-occupational comparisons (i.e., of the relative standing of all occupations on an aptitude dimension, whether the aptitude is important or not in any particular job). Both schemes provide useful maps of the distinctions among jobs, although each is limited in the types of distinctions it draws.

Criterion 5: Parallel assessment. The greatest limitation of the Skills Map is that it provides no direct way to compare the skills people possess with the skills jobs require, a failing also characterizing most assessments of jobs or people. Partial links were created, however, between the Skills Map academic dimension and GATB or IQ scores. In addition, sample occupations and worker tasks and behaviors were used to illustrate the skill levels required in the different Skills Map groups. Additional links are desirable.

Criterion 6: Link to demographic data. A valuable feature of the Skills Map is that it links the assessment of job competency requirements to a wide range of data about employment levels and worker characteristics. Several figures showed, for example, what proportion of jobs in 1970 required workers to perform at specific skill levels.

Criterion 7: Multiple levels of analysis. Another valuable feature of the Skills Map is that it provides a broad, simplified portrait of the com-

petency demands of all jobs in the U.S. This global view is useful for making the broad decisions that typify the earliest stages of vocational decision making. It also helps to organize, interpret, and put into perspective the many studies of jobs which are more limited in the jobs, aptitudes, or job settings they incorporate. Nevertheless, it is useful to be able to move systematically to more detailed levels of analysis for both decision making and theoretical purposes. The Skills Map incorporates a set of appendices which provide more detailed data about the 400 of so detailed census titles as well as about the 36 Skills Map groups, but at least one more intermediate level of analysis would be desirable. The suggested sub-maps could constitute this intermediate level. In addition, it would be useful to show how other sources of data about jobs, such as the Occupational Outlook Handbook, could be used in conjunction with the Skills Map.

Finally, some general comments about strengths and limitations of the Skills Map are in order. Any classification is good for some purposes but not others. The Skills Map was designed to provide information about the employability of people for different kinds of work according to the competencies those jobs require. Clearly, more than job-related competencies are involved in locating, being hired for, being promoted in, and being paid for particular types of work. Educational credentials are important in many jobs, but they are not equivalent to any particular competency even though they are strongly related to academic competence. Tenure and job conditions which are considered compensable (e.g., hazardous work) are important and legitimate determinants of pay. A person's vocational interests, not just their capabilities, may also influence their career development. But competencies do play a part, perhaps particularly in determining

who is not suitable for particular jobs, that is, as a knock-out factor. And with the increasing pressure upon employers to show that their job selection procedures are actually related to job demands, information about job competency requirements may become increasingly important as well.

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Table 1

Percentage of Workers Employed in Jobs Requiring
Different Levels and Combinations of General Competencies

| Academic Aptitude | Motor Aptitude | Dealing with people | | | Total |
|----------------------|-------------------|---------------------|----------|------------|-------------------|
| | | Low | Moderate | High | |
| Lo | Lo | 2.6 | 1.8 | 0.6 | 5.0 |
| | Mod | <u>19.1</u> | 1.5 | 0.4 | 21.0 |
| | Hi | 1.9 | -- | -- | 1.9 |
| Mod | Lo | 0.04 | 2.5 | 2.1 | 4.6 |
| | Mod | <u>8.3</u> | 4.3 | <u>9.2</u> | 21.8 |
| | Hi | <u>3.3</u> | 0.8 | 0.9 | 5.0 |
| Hi | Lo | 0.04 | 0.6 | <u>7.0</u> | 7.7 |
| | Mod | 2.4 | 0.4 | <u>1.7</u> | 4.5 |
| | Hi | 1.1 | 0.2 | 4.1 | 5.4 |
| Very Hi | Lo | 0.3 | 1.1 | <u>9.0</u> | 10.4 |
| | Mod | 0.4 | 1.4 | <u>2.6</u> | 4.4 |
| | Hi | 0.8 | 0.2 | 0.6 | 1.6 |
| Total | Lo | 3.0 | 6.0 | 18.7 | 27.7 |
| | Mod | 30.2 | 7.6 | 13.9 | 51.7 |
| | Hi | 7.1 | 1.2 | 5.6 | 13.9 |
| Total | Total | 40.3 | 14.8 | 38.2 | 93.3 ^a |

^aOccupations of 6.0% of employed workers were not known; 0.8% held occupations which could not be classified in the skills map.

Table 2

The Distributions of Most DOT Ratings for
Two Sets of Job Titles: A 10% Random Sample (N=1,172)
of DOT Job Titles^a and 12,064 DOT Job Titles Aggregated
into 396 Census Categories

| Variable | Mean | | SD | | Kurtosis | | Skew | | Min. and Max. | |
|--------------------------------------|--------|---------|--------|---------|----------|---------|--------|---------|---------------|---------|
| | Sample | Aggreg. | Sample | Aggreg. | Sample | Aggreg. | Sample | Aggreg. | Sample | Aggreg. |
| <u>Worker functions</u> ^b | | | | | | | | | | |
| Data | 4.11 | 3.12 | 2.09 | 1.74 | -1.40 | -1.06 | -0.47 | 0.09 | 0,6 | 0,6 |
| People | 6.83 | 6.20 | 1.85 | 1.63 | 1.90 | 1.95 | -1.63 | -1.35 | 0,8 | 0,8 |
| Things | 4.32 | 4.21 | 2.31 | 2.10 | -1.27 | -1.40 | -0.28 | -0.07 | 0,7 | .5,7 |
| <u>Training times</u> | | | | | | | | | | |
| GED | 3.00 | 3.62 | 1.09 | 1.08 | -.45 | -.61 | .12 | -.27 | 1,6 | 1,6 |
| Reasoning | - | 3.62 | - | 1.08 | - | -.61 | - | .27 | - | 1,6 |
| Math | - | 2.72 | - | 1.19 | - | -.10 | - | .73 | - | 1,6 |
| Language | - | 3.06 | - | 1.27 | - | -.80 | - | .42 | - | 1,6 |
| SVP | 4.46 | 5.44 | 2.06 | 1.74 | -1.26 | -1.05 | .23 | -.27 | 1,9 | 1.7,9 |
| <u>Aptitudes</u> ^c | | | | | | | | | | |
| Intelligence | 3.19 | 2.78 | .72 | .74 | .31 | -.31 | -.65 | -.58 | 1,4 | 1,4 |
| Verbal | 3.43 | 2.96 | .78 | .83 | .83 | -.63 | -1.17 | -.57 | 1,5 | 1,4.2 |
| Numerical | 3.63 | 3.26 | .78 | .76 | .43 | .34 | -.49 | -.79 | 1,5 | 1,5 |
| Spatial | 3.47 | 3.28 | .71 | .69 | .37 | .40 | -.77 | -.72 | 1,5 | 1,5 |
| Form perception | 3.36 | 3.22 | .67 | .57 | -.30 | .16 | -.53 | -.64 | 2,5 | 1.1,4.3 |

Table 2 - cont.

| Variable | Mean | | SD | | Kurtosis | | Skew | | Min. and Max. | |
|----------------------------|--------|---------|--------|---------|----------|---------|--------|---------|---------------|---------|
| | Sample | Aggreg. | Sample | Aggreg. | Sample | Aggreg. | Sample | Aggreg. | Sample | Aggreg. |
| Clerical perception | 3.89 | 3.52 | .79 | .73 | -.28 | -.37 | -.36 | -.51 | 2,5 | 1,5 |
| Motor coordination | 3.46 | 3.42 | .56 | .44 | -.79 | .71 | -.24 | -.54 | 1,5 | 2,4.7 |
| Finger dexterity | 3.56 | 3.43 | .61 | .51 | .30 | 1.17 | -.88 | -.97 | 1,5 | 1.4,4.7 |
| Manual dexterity | 3.21 | 3.28 | .53 | .47 | .72 | .52 | .32 | -.89 | 1,5 | 1.5,4.7 |
| Eye-hand-foot coordination | 4.67 | 4.53 | .60 | .54 | 2.89 | 3.39 | -1.80 | -1.63 | 1,5 | 1.5,5 |
| Color discrimination | 4.52 | 4.33 | .70 | .56 | 1.85 | 1.04 | -1.42 | -1.03 | 1,5 | 2,5 |
| <u>Temperaments</u> | | | | | | | | | | |
| DCP | .18 | .24 | .38 | .32 | - | - | - | - | 0,1 | 0,1 |
| FIF | .01 | .03 | .10 | .13 | - | - | - | - | 0,1 | 0,1 |
| INFLU | .04 | .09 | .20 | .23 | - | - | - | - | 0,1 | 0,1 |
| SJC | .17 | .30 | .38 | .33 | - | - | - | - | 0,1 | 0,1 |
| MVC | .39 | .47 | .49 | .36 | - | - | - | - | 0,1 | 0,1 |
| DEPL | .23 | .38 | .42 | .39 | - | - | - | - | 0,1 | 0,1 |
| REPCON | .46 | .26 | .50 | .32 | - | - | - | - | 0,1 | 0,1 |
| PUS | .02 | .03 | .16 | .10 | - | - | - | - | 0,1 | 0,.9 |
| STS | .60 | .51 | .49 | .38 | - | - | - | - | 0,1 | 0,1 |
| VARCH | .20 | .29 | .40 | .30 | - | - | - | - | 0,1 | 0,1 |
| <u>Interests</u> | | | | | | | | | | |
| Data vs. things | -.57 | -.26 | .66 | .66 | .27 | -1.00 | 1.23 | .56 | -1,1 | -1,1 |

Table 2 - cont.

| Variable | Mean | | SD | | Kurtosis | | Skew | | Min. and Max. | |
|--------------------------------------|--------|---------|--------|---------|----------|---------|--------|---------|---------------|---------|
| | Sample | Aggreg. | Sample | Aggreg. | Sample | Aggreg. | Sample | Aggreg. | Sample | Aggreg. |
| Science vs. business | -.12 | -.11 | .45 | .53 | 1.40 | -.05 | -.49 | .22 | -1,1 | -1,1 |
| Creative vs. routine | -.47 | -.28 | .53 | .44 | -1.25 | -.01 | .21 | .24 | -1,1 | -1,1 |
| Machines vs. social welfare | .62 | .38 | .55 | .54 | .08 | .06 | -1.05 | -.83 | -1,1 | -1,1 |
| Productive vs. prestige | -.05 | -.05 | .47 | .40 | 1.50 | 1.01 | -.18 | -.18 | -1,1 | -1,1 |
| <u>Physical demands</u> ^d | | | | | | | | | | |
| Strength | 2.39 | 2.22 | .91 | .67 | -.15 | -.43 | .42 | .14 | 1,5 | 1,4 |

a

Data for the 10% sample of job titles are taken from Miller, et al., (1980, p. 174).

b

High scores for worker functions represent low complexity of involvement.

c

High scores for aptitudes represent low levels of the aptitudes.

d

First item is scored 1; second item -1.

e

Only one of the physical demands is listed here. None of the working conditions is.

Table 3

Correlations Between Aptitudes for Two Samples of
Individuals Assessed with the GATB and Correlations
Between Ratings of Aptitude Requirements for Two Sets of
Job Titles

| Correlation between aptitudes on the GATB for two samples of people ^a | | | | | | | | | |
|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | G | V | N | S | P | Q | K | F | M |
| G-Intelligence | | .77 | .78 | .62 | .43 | .45 | .31 | --- | --- |
| V-Verbal Aptitude | .84 | | .50 | .34 | .27 | .38 | .25 | --- | --- |
| N-Numerical Aptitude | .86 | .67 | | .28 | .39 | .50 | .35 | --- | --- |
| S-Spatial Aptitude | .74 | .46 | .51 | | .46 | .27 | .16 | --- | --- |
| P-Form Perception | .61 | .47 | .58 | .59 | | .52 | .32 | --- | --- |
| Q-Clerical Perception | .64 | .62 | .66 | .39 | .65 | | .39 | --- | --- |
| K-Motor Coordination | .36 | .37 | .41 | .20 | .45 | .51 | | --- | --- |
| F-Finger Dexterity | .25 | .17 | .24 | .29 | .42 | .32 | .37 | --- | --- |
| M-Manual Dexterity | .19 | .10 | .21 | .21 | .37 | .26 | .46 | .52 | --- |

| Correlations between (1) mean GATB scores of people in different occupations and (2) scores one SD below the mean (estimated minimum requirements for the job) ^b | | | | | | | | | |
|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| G-Intelligence | (.99) | .93 | .97 | .91 | .80 | .76 | .65 | .38 | .41 |
| V-Verbal Aptitude | .91 | (.98) | .89 | .76 | .74 | .82 | .73 | .40 | .33 |
| N-Numerical Aptitude | .91 | .88 | (.99) | .85 | .82 | .80 | .69 | .39 | .43 |
| S-Spatial Aptitude | .86 | .71 | .77 | (.98) | .79 | .63 | .52 | .37 | .45 |
| P-Form Perception | .77 | .69 | .81 | .77 | (.98) | .86 | .81 | .64 | .58 |
| Q-Clerical Perception | .72 | .81 | .82 | .60 | .82 | (.98) | .87 | .53 | .46 |
| K-Motor Coordination | .46 | .49 | .56 | .37 | .67 | .69 | (.98) | .66 | .57 |
| F-Finger Dexterity | .17 | .16 | .21 | .20 | .37 | .26 | .56 | (.97) | .63 |
| M-Manual Dexterity | .17 | .11 | .20 | .22 | .31 | .22 | .50 | .83 | (.96) |

| Correlations between DOT aptitude ratings for two sets of job titles ^c | | | | | | | | | |
|---|------|------|------|-----|-----|------|-----|-----|------|
| G-Intelligence | | .82 | .73 | .51 | .40 | .61 | .09 | .19 | -.12 |
| V-Verbal Aptitude | .95 | | .71 | .40 | .32 | .63 | .00 | .14 | -.22 |
| N-Numerical Aptitude | .87 | .83 | | .47 | .41 | .68 | .09 | .20 | -.08 |
| S-Spatial Aptitude | .47 | .36 | .53 | | .60 | .21 | .31 | .36 | .27 |
| P-Form Perception | .46 | .37 | .50 | .77 | | .23 | .31 | .47 | .25 |
| Q-Clerical Perception | .67 | .71 | .67 | .07 | .20 | | .02 | .12 | -.20 |
| K-Motor Coordination | -.08 | -.16 | -.08 | .37 | .44 | -.13 | | .53 | .52 |
| F-Finger Dexterity | .15 | .06 | .17 | .43 | .65 | -.00 | .72 | | .44 |
| M-Manual Dexterity | -.25 | -.36 | -.19 | .41 | .43 | -.48 | .71 | .69 | |

^aSource: U.S. Department of Labor, Manual for the USTES General Aptitude Test Battery, Section III: Development, (1970, p. 34).

Above the diagonal: 2,649 basic airmen. Below the diagonal: 23,428 employed workers, applicants, apprentices, students, and trainees.

^bAbove the diagonal: correlations among means; below the diagonal: correlations among lower cutting points set at one standard deviation below the mean; in the diagonal: correlations between means and cutting points on the same scale. Correlations calculated from data in the GATB Manual, Section III (Table 9-3).

^cAbove the diagonal: a 10% random sample of all DOT titles (N=1,172; Miller, et al., 1980, p. 178). Below the diagonal: 12,064 DOT titles aggregated to 396 1970 census categories.

Table 4

Factor Loadings^a of Job-Related Traits on Six Dimensions
of Job Competencies Required among
Relatively High-Level Jobs (N=290)

| Trait | Factors | | | | | | \bar{X}^c | SD |
|---|-------------------------------|--------------------------------------|---------------------------|------------------|----------|-------------|-------------|-----|
| | I. | II. | III. | IV. | V. | VI. | | |
| | Good personal presentation | Well organized and responsible | Physically coordinated | Well Educated | Creative | Competitive | | |
| Be tactful and considerate | .64 | | | | | | 2.9 | 0.7 |
| Be attractive & well groomed | .62 | | | | | .38 | 2.4 | 0.8 |
| Have poise | .59 | | | | | | 2.9 | 0.8 |
| Have integrity | .52 | | | | | | 3.5 | 0.7 |
| Be persuasive & motivating | .44 | | -.28 | | | .32 | 3.1 | 0.8 |
| Represent company well to the public | .43 | .26 | | | | .37 | 2.8 | 1.0 |
| DOT - Dealing with people | .39 | | | | | | 0.8 | 0.3 |
| Be fair & impartial | .35 | | | | | | 2.9 | 0.9 |
| Plan ahead & anticipate problems | | .69 | | | | | 3.4 | 0.7 |
| Coordinate & schedule activities | .36 | .58 | | | | | 3.1 | 0.8 |
| Spot & tackle problems quickly | | .55 | | | .26 | | 3.3 | 0.7 |
| Visualize things before completion | | .47 | | | .45 | | 3.1 | 0.8 |
| Handle several tasks at one time | | .44 | | | | | 3.4 | 0.7 |
| Take initiative & responsibility | .27 | .43 | | | .27 | .26 | 3.3 | 0.7 |
| Think logically & analytically | | .39 | | .34 | .30 | | 3.5 | 0.6 |
| Be good at math | | .32 | | | | | 2.5 | 0.9 |
| Pay attention to details | | .31 | | | | | 3.4 | 0.6 |
| Make decisions quickly | | .31 | | | | | 2.9 | 0.8 |
| Have physical coordination | | | .86 | | | | 1.6 | 0.9 |
| Have manual dexterity | | | .85 | | | | 1.7 | 1.0 |

Table 4 - cont.

| Trait | Factors | | | | | | \bar{X} | SD |
|---|-------------------------------------|---|-----------------------------------|-------------------------|----------------|--------------------|-----------|------|
| | I. Good personal presentation | II. Well organized and responsible | III. Physically coordinated | IV. Well Educated | V. Creative | VI. Competitive | | |
| Have physical strength and endurance | | | .60 | | | | 1.7 | 0.9 |
| Have higher degree or credential | | | | .78 | | | 2.4 | 1.1 |
| PRESTIGE | | | | .65 | | | 61.8 | 14.6 |
| Give information by writing reports, memos, etc. | | | -.28 | .50 | | | 2.9 | 1.0 |
| Have attended the right college | | | | .49 | | | 1.5 | 0.8 |
| Get information by reading | | | | .41 | | | 3.3 | 0.8 |
| Have a <u>lot</u> of ideas | | | | | .71 | | 2.7 | 0.8 |
| Think of <u>new</u> approaches to problems | | | | | .59 | | 3.1 | 0.7 |
| Learn quickly | | | | | .26 | | 3.2 | 0.6 |
| Be competitive | .26 | | | | | | .68 | 2.6 |
| Have good contacts | | | | | | | .57 | 2.6 |

Table 4 - cont.

| Trait | Factors | | | | | | \bar{X} | SD |
|---|-------------------------------------|---|-----------------------------------|-------------------------|----------------|--------------------|-----------|-----|
| | I. Good personal presentation | II. Well organized and responsible | III. Physically coordinated | IV. Well Educated | V. Creative | VI. Competitive | | |
| <u>Traits not related to any of the six factors</u> | | | | | | | | |
| Get information by talking with people | | | | | | | 3.6 | 0.5 |
| Give information by talking with people | | | | | | | 3.5 | 0.7 |
| Evaluate, discipline, and praise others | | | | | | | 2.9 | 1.0 |
| Be dedicated and conscientious | | | | | | | 3.5 | 0.6 |
| Cooperate with coworkers | | | | | | | 3.0 | 0.7 |
| Have a good memory | | | | | | | 3.0 | 0.7 |
| Concentrate in distracting or stressful situations | | | | | | | 3.1 | 0.8 |
| Follow orders & support company policies | | | | | | | 2.4 | 0.9 |
| <u>Eigenvalues</u> | 7.4 | 2.6 | 2.3 | 1.8 | 1.3 | 1.1 | | |

^aOnly factor loadings greater than .25 are shown. Orthogonal factor analysis with varimax rotation.

^bSee Gottfredson, Finucci, and Childs (1982) for a description of the study from which these results are taken.

^cPrestige measured on a scale from 0 to 96; dealing with people, 0 to 1; other traits: 1=makes no difference, 2=helps a little, 3=helps a lot, 4=critical.

Table 5

Occupational Aptitude Patterns (OAPs) for the
66 Work Groups for the Guide for Occupational
Exploration (GOE): Organized into 11
Occupational Clusters According to
the Similarity of their OAPs ⁿ

| OAP No. | GOE Code ^a | GOE Group | GATB Scale ^b | | | | | | | | |
|--|-----------------------|--------------------------------------|-------------------------|-----|-----|-----|---|---|---|---|---|
| | | | G | V | N | S | P | Q | K | F | M |
| Occupations Dealing with Physical Relations | | | | | | | | | | | |
| <u>Cluster A: Researching, designing, and modifying physical systems</u> | | | | | | | | | | | |
| 7 | 02.01 | Physical sciences | 115 | 105 | 110 | 110 | | | | | |
| 8 | 02.02 | Life sciences | 115 | 105 | 110 | 110 | | | | | |
| 9 | 02.03 | Medical sciences | 115 | 105 | 110 | 110 | | | | | |
| 52 | 11.01 | Mathematics & statistics | 115 | 100 | 110 | 100 | | | | | |
| 17 | 05.01 | Engineering | 115 | | 105 | 110 | | | | | |
| <u>Cluster B: Operating and testing physical systems</u> | | | | | | | | | | | |
| 18 | 05.02 | Managerial work: mechanical | 105 | 100 | 100 | 95 | | | | | |
| 19 | 05.03 | Engineering technology | 105 | | 100 | 100 | | | | | |
| 20 | 05.04 | Air & water vehicle operation | 105 | | 100 | 100 | | | | | |
| 10 | 02.04 | Laboratory technology | 105 | | 100 | | | | | | |
| 11 | 03.01 | Managerial work: plants & animals | 100 | | 90 | | | | | | |

Table 5 - cont.

| OAP No. | GOE Code | GOE Group | G | V | N | S | P | Q | K | F | M |
|--|----------------|----------------------------------|---|---|----|----|----|---|----|----|----|
| <u>Cluster C: Crafting, assembling, repairing, inspecting, and setting up or operating equipment</u> | | | | | | | | | | | |
| Sub-cluster C-1: Spatial orientation | | | | | | | | | | | |
| 22 | 05.07 | Quality control | | | 90 | 90 | 85 | | | | |
| 30 | 06.01 (1-2) | Production technology | | | 85 | 90 | 85 | | | | |
| 6 | 01.06 | Crafts arts | | | | 90 | 85 | | | | 85 |
| 21 | 05.05 | Craft technology | | | | 90 | 85 | | | | 85 |
| 23 | 05.08 | Land & water vehicle operation | | | | 85 | 80 | | | | 85 |
| 26 | 05.10 (1-4) | Crafts | | | | 85 | 80 | | | | 85 |
| 28 | 05.11 | Equipment operation | | | | 85 | 80 | | | | 85 |
| 31 | 06.01 (3-6) | Production technology | | | | 85 | 85 | | | | 85 |
| 46 | 09.02 | Barber & beauty services | | | | 85 | 85 | | 90 | | 85 |
| 47 | 09.03 | Passenger services | | | | 85 | | | | | 85 |
| Sub-cluster C-2: Quick, accurate manipulation | | | | | | | | | | | |
| 27 | 05.10 (5-6) | Crafts | | | | | 80 | | 85 | | 85 |
| 32 | 06.02 | Production work | | | | | 80 | | 85 | | 85 |
| 33 | 06.03 | Quality control | | | | | 80 | | 85 | | 85 |
| <u>Cluster D: Tending (machines, building, plants, animals) and attending (workers, the public)</u> | | | | | | | | | | | |
| 34 | 06.04 | Elemental work: industrial | | | | | | | 85 | 80 | 80 |
| 13 | 03.03 (3-6) | Animal training & service | | | | | | | 85 | | 85 |
| 14 | 03.04 | Elemental work: plants & animals | | | | | | | 85 | | 80 |
| 29 | 05.12 | Elemental work: mechanical | | | | | | | 85 | | 80 |
| 44 | 08.03 | Vending | | | | | | | 85 | | 80 |
| 48 | 09.05 | Attendant services | | | | | | | 85 | | 80 |

Table 5 - cont.

| OAP No. | GOE Code | GOE Group | G | V | N | S | P | Q | K | F | M |
|---|----------------|--|-----|-----|-----|---|---|-----|---|---|---|
| <u>Dealing with Social and Economic Relations</u> | | | | | | | | | | | |
| <u>Cluster E: Researching, planning, and maintaining societal systems</u> | | | | | | | | | | | |
| 55 | 11.03 (0-1) | Social research | 110 | 100 | 105 | | | | | | |
| 57 | 11.04 (1) | Law | 110 | 100 | 105 | | | | | | |
| 60 | 11.06 | Finance | 110 | 95 | 105 | | | 100 | | | |
| 49 | 10.01 | Social services | 105 | 100 | 100 | | | 95 | | | |
| 59 | 11.05 | Business administration | 105 | 95 | 100 | | | 100 | | | |
| 61 | 11.07 | Services administration | 105 | 95 | 100 | | | 100 | | | |
| 63 | 11.09 | Promotion | 105 | 95 | 100 | | | 100 | | | |
| <u>Cluster F: Persuading, informing, and helping individuals</u> | | | | | | | | | | | |
| 50 | 10.02 | Nursing, therapy, and specialized teaching services | 105 | 100 | | | | | | | |
| 42 | 08.01 | Sales technology | 100 | 100 | 95 | | | 100 | | | |
| 53 | 11.02 (1-2) | Educational & library services | 100 | 100 | 95 | | | 100 | | | |
| 56 | 11.03 (2-3) | Social research | 100 | 100 | 95 | | | 100 | | | |
| 58 | 11.04 (2) | Law | 100 | 100 | 95 | | | 100 | | | |
| 62 | 11.08 | Communications | 100 | 100 | 95 | | | 100 | | | |
| 65 | 11.11 | Business management | 100 | 95 | 95 | | | 100 | | | |
| 66 | 11.12 | Contracts & claims | 100 | 95 | 95 | | | 100 | | | |
| <u>Cluster G: Serving and caring for individuals</u> | | | | | | | | | | | |
| 45 | 09.01 | Hospitality services | | | 95 | | | | | | |
| 51 | 10.03 | Child & adult care | | | 95 | | | | | | |
| 16 | 04.02 | Security services | | | 95 | | | | | | |
| 12 | 03.03 (2) | Animal training & service | | | 95 | | | 85 | | | |

Table 5 - cont.

| OAP No. | GOE Code | GOE Group | G | V | N | S | P | Q | K | F | M |
|---|----------|--------------------------------|-----|-----|----|---|---|-----|----|---|---|
| <u>Maintaining Bureaucratic Order</u> | | | | | | | | | | | |
| <u>Cluster H: Maintaining bureaucratic rules, records, and transactions</u> | | | | | | | | | | | |
| 64 | 11.10 | Regulations enforcement | 105 | | 95 | | | 95 | | | |
| 15 | 04.01 | Safety & law enforcement | 100 | | | | | 95 | | | |
| 35 | 07.01 | Administrative detail | 100 | | 95 | | | 100 | | | |
| 36 | 07.02 | Mathematical detail | 95 | | 90 | | | 100 | | | |
| 37 | 07.03 | Financial detail | 95 | | 90 | | | 100 | | | |
| 43 | 08.02 | General sales | 95 | | 90 | | | 90 | | | |
| 24 | 05.09 | Materials control | 95 | | 85 | | | 90 | | | |
| | (1-4) | | | | | | | | | | |
| <u>Cluster I: Processing information</u> | | | | | | | | | | | |
| 38 | 07.04 | Oral communications | 95 | | | | | 95 | | | |
| 39 | 07.05 | Records processing | 95 | | | | | 95 | | | |
| 54 | 11.02 | Educational & library services | 95 | | | | | 95 | | | |
| | (3) | | | | | | | | | | |
| <u>Cluster J: Manipulating records</u> | | | | | | | | | | | |
| 40 | 07.06 | Clerical machine operation | 95 | | | | | 100 | 95 | | |
| 41 | 07.07 | Clerical handling | | | | | | 90 | 85 | | |
| 25 | 05.09 | Materials control | | | | | | 85 | 85 | | |
| | (5) | | | | | | | | | | |
| <u>Cluster K: Performing</u> | | | | | | | | | | | |
| Sub-cluster K-1: Verbal arts | | | | | | | | | | | |
| 4 | 01.04 | Performing arts: music | 100 | 100 | | | | 100 | | | |
| 1 | 01.01 | Literary arts | 100 | 100 | | | | 100 | | | |
| 3 | 01.03 | Performing arts: drama | 100 | 100 | | | | | | | |

Table 5 - cont.

| OAP No. | GOE Code | GOE Group | G | V | N | S | P | Q | K | F | M |
|-------------------------------|----------|------------------------|-----|---|---|-----|---|----|----|---|---|
| Sub-cluster K-2: Spatial arts | | | | | | | | | | | |
| 2 | 01.02 | Visual arts | 100 | | | 100 | | | 85 | | |
| 5 | 01.05 | Performing arts: dance | 100 | | | | | 95 | | | |

GOE Groups without OAPs

| | |
|-------|---|
| 01.07 | Elemental arts |
| 01.08 | Modeling |
| 03.02 | General supervision: Plants and animals |
| 05.06 | Systems operation |
| 09.04 | Customer services |
| 12.01 | Sports |
| 12.02 | Physical feats |

^a Source of data: U.S. Department of Labor, Manual for the USTES General Aptitude Test Battery. Section II: Occupational Aptitude Pattern Structure. Washington, DC: U.S. Government Printing Office, 1979.

^b G - Intelligence; V - Verbal aptitude; N - Numerical aptitude;
 S - Spatial aptitude; P - Form perception; Q - Clerical perception;
 K - Motor coordination; F - Finger dexterity; M - Manual dexterity.

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Table 6

The Predominant OAP Clusters within each of the Skills Map Aptitude Combinations:
Shown Separately by Three Foci of Work

| Academic aptitude | Motor aptitude | Dealing with people | | | | | | | | |
|----------------------|-------------------|---------------------------|------|----|----------------------------------|-----|-----|-------------------------------|-----|-----|
| | | Lo | Mod | Hi | Lo | Mod | Hi | Lo | Mod | Hi |
| | | <u>PHYSICAL RELATIONS</u> | | | <u>SOCIAL/ECONOMIC RELATIONS</u> | | | <u>BUREAUCRATIC RELATIONS</u> | | |
| Lo | Lo | D | D | D | | | | | | |
| | Mod | C1,C2,D | C1,D | D | | | G | | | |
| | Hi | C2,D | -- | -- | | -- | -- | | -- | -- |
| Mod | Lo | | | | | | | I | H,I | H,I |
| | Mod | C1 | C1 | C1 | | G | G | H,J | H,J | H,I |
| | Hi | C1 | C1 | C1 | | | | J | I | |
| Hi | Lo | A | | | E | F | F,G | | H,I | H |
| | Mod | B | B | B | | | F | II | H | H |
| | Hi | B,C1 | -- | | | -- | F | J | -- | H |
| Very hi | Lo | A | A | | E | E | E,F | | | |
| | Mod | A | A | A | | E | F | | | |
| | Hi | A,B | B | A | | | F | | | |

96

Note: See Figure 1 for the Skills Map aptitude group numbers and sample occupations for each combination of academic aptitude, motor aptitude, and people involvement levels.

Table 7

Most Predominant Pattern(s) of Aptitudes
Required in Three Foci of Work and
Four Academic Aptitude Levels

| Academic Aptitude ^a | Focus of Work ^b | | |
|-----------------------------------|---|---|---|
| | Physical relations | Social/economic relations | Bureaucratic relations |
| Low | Clusters: <u>C1</u> <u>C2</u> <u>D</u> S1, 2 P1 K1 P1 K1 M1 M1 M1 | <u>Cluster G</u> G2 | |
| Moderate | <u>Cluster C1</u> S1, 2 | <u>Cluster G</u> G2 | Clusters: <u>H</u> <u>I</u> <u>J</u> G2, 3 G2 Q2 N2 Q2 M1 Q2, 3 |
| High | <u>Cluster B</u> G3 N3 (S3) | <u>Cluster F</u> G3 V3 N2 Q3 | <u>Cluster H</u> G2, 3 N2 Q2, 3 |
| Very High | <u>Cluster A</u> G4 V3 N4 S4 | Clusters: <u>F</u> <u>E</u> G3 G4 V3 V2, 3 N2 N3 Q3 Q3 | |

^aThese are the four levels on the academic aptitude dimension of the Skills Map.

^bData for work foci taken from Figure 2.

G = intelligence, V = verbal aptitude, N = numerical aptitude, S = spatial aptitude, P = form perception, Q = clerical perception, K = motor coordination, F = finger dexterity, M = manual dexterity. 1 = minimal level required, 2 = average, 3 = above average, 4 = high. (The foregoing cutting points refer to the minimum aptitude level required for satisfactory job performance.)

Figure 1

36 Occupational Groups Defined According to Levels of Academic Abilities, Motor Abilities, and Dealings with People Required

| | | <u>Low academic abilities</u> | | |
|---------------------------|--|--|--|--|
| | | Low dealings with people | Moderate dealings with people | High dealings with people |
| Low motor abilities | | freight + materials handlers (753) longshoremen + stevedores (760) stock handlers (762) meral heaters (626) chambermaids + maids, exc. private household (901) cleaners + charwomen (902) dishwashers (913) laundresses, private household (983) | furniture + wood finishers (443) deliverymen + routemen (705) cashiers, recreation + amusement (953) crossing guards + bridge tenders (960) maids + servants, private household (984) | Parking attendants (711) busboys (911) attendants, personal service (933) baggage porters + bellhops (934) boorblacks (941) elevator operators (943) childcare workers, private household (980) |
| | | weighers (392) bakers (402) bulldozer operators (412) forgemen + hammermen (442) tile setters (560) assemblers (602) graders + sorters, manufacturings (624) drill press operatives (650) welders + flame-cutters (680) farm laborers, wage workers (822) | messengers + office boys (333) garage workers + gas station attendants (623) boatmen + canalmen (701) railroad brakemen (712) taxicab drivers + chauffeurs (714) animal caretakers, exc. farm (740) garbage collectors (754) food service workers, exc. private household (916) | food counter + fountain workers (914) childcare workers, exc. private household (942) |
| | | postal clerks (361) farriers (444) jewelers + watchmakers (453) shoe repairmen (542) meat cutters + butchers, exc. manuf. (631) sewers + stitchers (663) knitters, loopers, + coppers (671) | none | none |
| | | *see appendix C for 71 other titles | | |

100

Figure 1 - cont.

Moderate Academic Abilities

Low dealings with people

Moderate dealings with people

High dealings with people

| | | |
|---------------------------|--------------------|----|
| Low motor abilities | proofreaders (362) | 10 |
|---------------------------|--------------------|----|

| | | |
|--------------------------------|---|----|
| Moderate motor abilities | expeditors + production controllers (323) | 11 |
| | library attendants + assistants (330) | |
| | mail handlers, exc. post office (332) | |
| | stock clerks + storekeepers (381) | |
| | not specified clerical workers (395) | |
| | bartenders (910) | |
| | cooks, private household (981) | |

| | | |
|----------------------------|---|----|
| High motor abilities | actors (175) | 12 |
| | collectors, bill + account (313) | |
| | dispatchers + starters, vehicle (315) | |
| | cameraters + interviewers (320) | |
| | receptionists (364) | |
| | boarding + lodging house keepers (940) guards + watchmen (962) | |

*see appendix C for 8 other titles

| | | |
|--------------------------------|---|----|
| Moderate motor abilities | billing clerks (303) | 13 |
| | keypunch operators (345) | |
| | shipping + receiving clerks (374) | |
| | carpenters (415) | |
| | compositors + typesetters (422) | |
| | job + die setters, metal (454) | |
| | auto mechanics (473) structural metal craftsmen (550) farmers (801) | |

| | | |
|--------------------------------|---|----|
| Moderate motor abilities | athletes + kindred workers (180) | 14 |
| | file clerks (325) | |
| | mail carriers, post office (331) | |
| | electric power linemen + cablemen (433) | |
| | plumbers + pipe fitters (522) | |
| | power station operators (525) | |
| | roofers + slaters (534) | |
| | telephone linemen + splicers (554) | |
| | dental assistants (921) | |

| | | |
|----------------------------|---|----|
| High motor abilities | podiatrists (71) | 15 |
| | sales clerks, retail trade (283) | |
| | telephone operators (385) | |
| | foremen, nec (441) | |
| | bus drivers (703) | |
| | waiters (915) | |
| | nursing aides, orderlies, attendants (925) | |

*see appendix C for 6 other titles

| | | |
|----------------------------|--|----|
| High motor abilities | painters + sculptors (190) | 16 |
| | typists (391) | |
| | cabinet makers (413) | |
| | dental laboratory technicians (426) | |
| | radio repairmen (482) | |
| | photoengravers + lithographers (515) | |
| | sign painters + letterers (543) tool + die makers (561) | |

| | | |
|--------------------------------|---|----|
| Moderate motor abilities | stenographers (376) | 17 |
| | brickmason + stonemason apprentices (411) | |
| | electricians (430) | |
| | drywall installers + lathers (615) | |

| | | |
|----------------------------|---|----|
| High motor abilities | clerical assistants, social welfare (311) | 18 |
| | lay midwives (924) | |
| | barbers (935) | |
| | hairstylists + cosmetologists (944) | |
| | personal service apprentices (945) | |

*see appendix C for 13 other titles

*see appendix C for 10 other titles

*see appendix C for 6 other titles

Figure 1 - cont.

High Academic Abilities

| | Low dealings with people | Moderate dealings with people | High dealings with people |
|--------------------------|---|---|--|
| Low motor abilities | <p>political scientists (92) 19 tool programmers, numerical control (172) authors (181)</p> | <p>librarians (32) 20 construction inspectors, public administration (213) inspectors, exc. construction, public administration estimators + investigators, nec (321)</p> | <p>farm management advisors (24) 21 foresters + conservationists (25) dieticians (74) social workers (100) elementary school teachers (142) buyers, wholesale + retail trade (205) office managers, nec (220) sales representatives (281,282) policemen + detectives (964) *see appendix C for 21 other titles</p> |
| Moderate motor abilities | <p>chemical technicians (151) 22 surveyors (161) engineering & science technicians, nec (162) bookkeepers (305)</p> | <p>industrial engineering technicians (154) 23 air traffic controllers (164) technicians, exc. health, engineering, + science, nec (173) dancers (182) photographers (191) payroll + timekeeping clerks (360)</p> | <p>home management advisors (26) 24 health technicians + technologists, nec (85) art drama + music teachers, college (123) adult education teachers, exc. college (141) teachers, exc. college, nec (145) teachers aides, exc. school monitors (382) officers, pilots + pursers; ship (221) cashiers (310) conductors + motormen, urban rail transit (704)</p> |
| High motor abilities | <p>mechanical engineering technicians (155) 25 radio operators (171) bookkeeping + billing machine operators (341) decorators + windowdressers (425) machinists (461) sheetmetal apprentices (536) carpet installers (420) tailors (551) *see appendix C for 7 other titles</p> | <p>designers (183) 26 millwrights (502)</p> | <p>chiropractors (61) 27 therapy assistants (84) coaches + physical education teachers, college (124) pre and kindergarten teachers (143) bank tellers (301) secretaries, legal (370) secretaries, medical (371) secretaries, nec (372)</p> |

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Figure 1 - cont.

Very High Academic Abilities

| | Low dealings with people | Moderate dealings with people | High dealings with people |
|--------------------------|---|--|--|
| Low motor abilities | computer programmers (3) 28 computer specialists, nec (5) actuaries (34) mathematicians (35) statisticians (36) atmospheric + space scientists (43) sociologists (94) social scientists, nec (96) | accountants (1) 29 operations + systems research analysts (55) economists (91) | judges (30) 30 lawyers (31) personnel + labor relations workers (56) clergymen (86) psychologists (93) teachers, college, subject not specified (140) editors + reporters (184) bank officers + financial managers (202) managers + administrators, nec (245) *see appendix C for 18 other titles |
| Moderate motor abilities | aeronautical + aeronautical engineers (6) 31 chemical engineers (10) civil engineers (11) mathematical technicians (156) | architects (2) 32 industrial engineers (13) mechanical engineers (14) mining engineers (20) petroleum engineers (21) archivists + curators (33) chemists (45) geologists (51) urban + regional planners (95) *see appendix C for 3 other titles | sales engineers (22) 33 registered nurses (75) therapists (76) health specialties teachers, college (113) secondary school teachers (144) |
| High motor abilities | metallurgical + materials engineers (15) 34 agricultural scientists (42) biological scientists (44) marine scientists (52) life + physical scientists, nec (54) pharmacists (64) veterinarians (72) clinical lab technicians and technologists (80) draftsmen (152) | health practitioners, nec (73) 35 airplane pilots (163) musicians + composers (185) | dentists (62) 36 optometrists (63) physicians (65) dental hygienists (81) radiological technicians + technologists (83) |

Figure 2

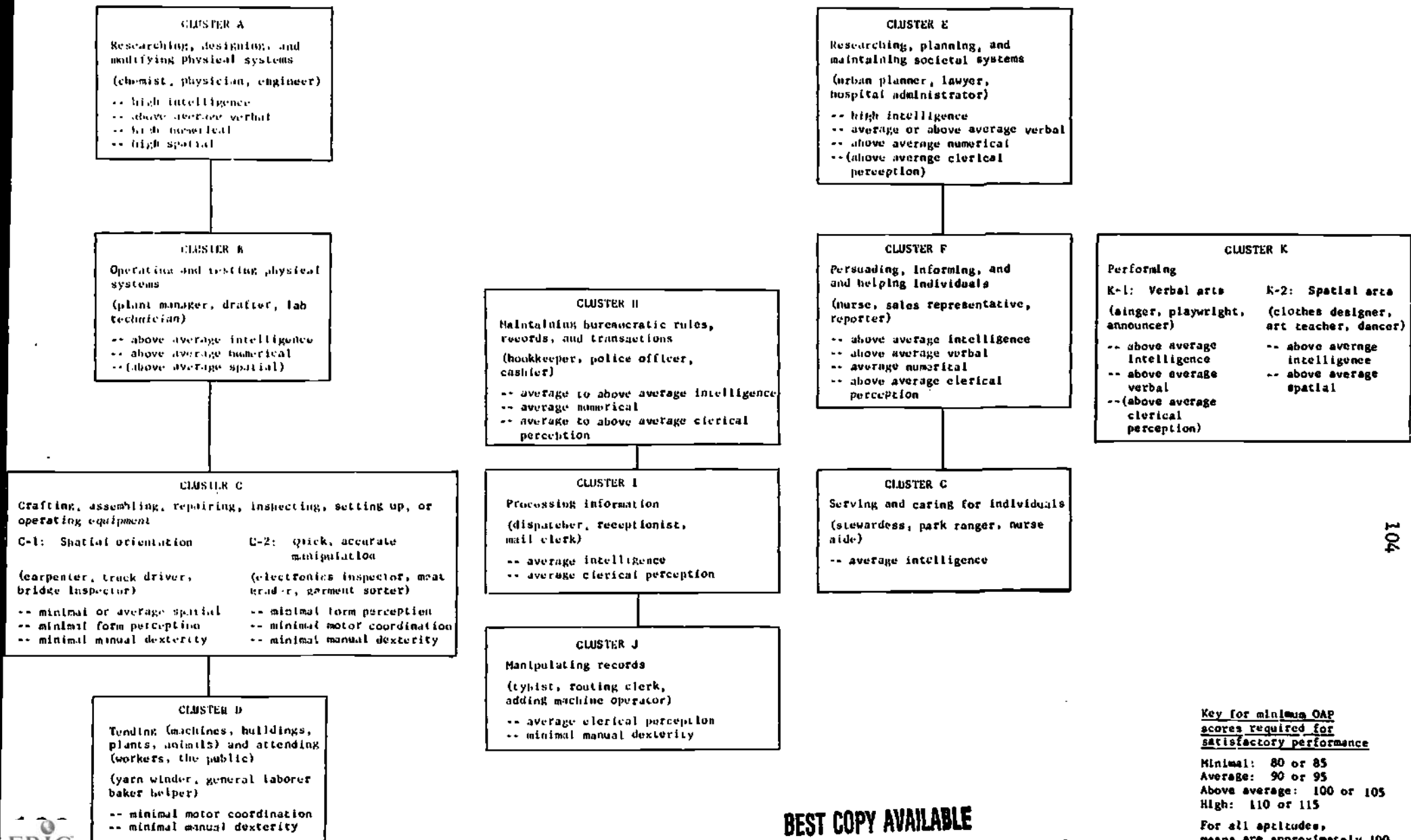
Job Clusters Based on Similarities among Occupational Aptitude Patterns (OAPs)
(Excluding some supervisory occupations)

DEALING WITH PHYSICAL
RELATIONS

MAINTAINING BUREAUCRATIC
ORDER

DEALING WITH SOCIAL AND
ECONOMIC RELATIONS

PERFORMING



Key for minimum OAP scores required for satisfactory performance

Minimal: 80 or 85
Average: 90 or 95
Above average: 100 or 105
High: 110 or 115

For all aptitudes, means are approximately 100 and standard deviations 20.

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Figure 3

BEST Holdings of Job Requirements: Verbal Aptitude

The ability to understand meaning of words and to use them effectively. The ability to comprehend language, to understand relationships between words and to understand meanings of whole sentences and paragraphs. (Correlated .93 with the "Academic Competencies" factor in the Skills Map.)

No illustrations.

Cumulative

Percentiles

0 0

10 10

41 8

70 32

81 59

73 74

87 92

95 98

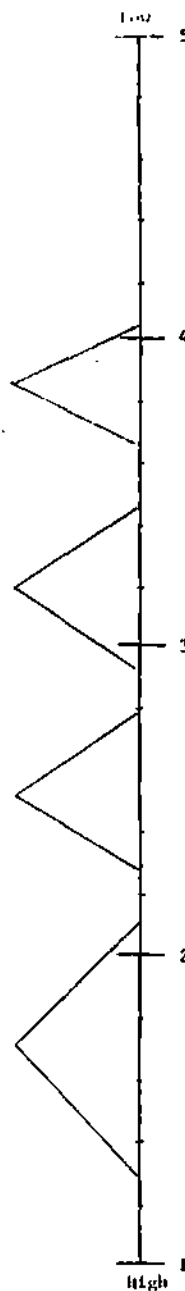
100 100

Low Academic

Moderate Academic

High Academic

Very high Academic



Freight handler (1-753)

Foreman (4-442)

Stock clerk (11-381)

Barber (18-935)

Building superintendent (21-216)

Sales manager (21-233)

Social worker (21-100)

Industrial engineer (32-13)

Author (19-181)

Judge (30-30)

V-1:3 Tends one or more machines that knit fabrics, garment parts, or other articles from yarn.

Reads knitting ticket for each machine to find out amount to be knitted, style, size, part, dimensions, yarn type, color, and dye lot number; receives any instructions for adjustment of machine to obtain desired quality; records production records for day; and reports any unusual problems encountered.

V-3:1 Operates switchboard to provide answering service for clients.

Greets caller and announces name and phone number of client; records and delivers messages; furnishes information; accepts orders; and relays calls.

V-2:11 Schedules and assigns motor vehicles and drivers for the conveyance of freight according to company and government regulations and policies.

Verbal aptitude is required to read and understand the rules, laws, regulations, and/or policies of the company, union, and Interstate Commerce Commission; to effectively communicate instructions to drivers; and to write reports.

V-1:5 Designs chemical plant equipment and devises processes for manufacturing chemicals and products, such as gasoline, synthetic rubber, plastics, detergent, cement, and paper and pulp, applying principles and technology of chemistry, physics, mechanical and electrical engineering, and related areas.

Verbal aptitude is required to acquire the technical vocabulary of chemistry and engineering; in order to read and understand reference materials; and to write technical reports, and design or production specifications.

V-4:11 Drives gasoline or electric-powered fork lift truck to move or stack bulk materials in warehouse or factory.

Must read assignment sheet specifying which vehicle to operate; understand and instructions from foreman about materials to convey and their specific location and destination. Tells maintenance crew of any irregularities in tractor operation.

V-3:3 Sets type by hand and machine, and assembles type and cuts in a galley, for printing articles, headings, and other printed matter; determining type size, style, and compositional pattern from work order.

Verbal aptitude is required to understand the meaning of words when proof-reading copy and written instructions; and for knowledge of proper spelling, grammar, and punctuation.

V-2:2 Instructs students in one or more subjects such as English, mathematics, or social studies in private, religious, or public secondary school (high school).

Verbal aptitude is required to read and understand textbooks or other literature related to the subject matter taught; to lecture on, discuss, and explain subject matter to convey information to the students; to write lesson plans and outlines; and to read students' papers and write critiques.

V-1:5 Directs editorial activities of newspaper and negotiates with production, advertising, and circulation department heads as owner's representative.

Verbal aptitude is necessary to write lead or policy editorials explaining complex political, social, or other issues in language which will be understood by most readers; to interpret the editorial policy of the firm on specific issues in other editorial writers; and to speak at professional and community functions as a representative of the publisher.

Figure 3 -- cont'd.

This figure provides the following information from left to right:

Cumulative percentages

The first column shows what percentage of 396 census occupational titles require verbal aptitude at or below the levels shown opposite on the scale. The second column shows what percentage of all employed workers in 1970 held jobs requiring verbal aptitude at or below the specified levels.

Groups that are low, moderate, high, or very high on the general "Academic Competencies" factor

The triangles mark off one standard deviation on either side of the mean for each of the four groups; therefore, they indicate the range over which about two thirds of the occupations in each group fall.

Sample occupations at different levels of the scale

The first number in parentheses refers to the Skills Map aptitude group to which the occupation has been assigned; the second number is the occupation's 1970 census code.

Sample activities at each level of the scale

Two illustrations are provided for each of the five levels of the scale used by DOT job analysts. (Occupations in this report may have scores between these integer levels because for this report ratings were averaged for titles grouped under the same census occupational heading). The letters and numbers refer to the numbering of these benchmark illustrations in the DOT Handbook for Analyzing Jobs (U.S. Department of Labor, 1972).

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DOT Ratings of Job Requirements: Language Development

This is one of three components of General Educational Development (GED) level. GED embraces those aspects of education (formal and informal) which contribute to the worker's (a) reasoning development and ability to follow instructions, and (b) acquisition of "tool" knowledges such as language and mathematical skills. This is education of a general nature which does not have a recognized, fairly specific occupational objective. (Correlated .91 with the "Academic Competencies" factor in the Skills Map.)

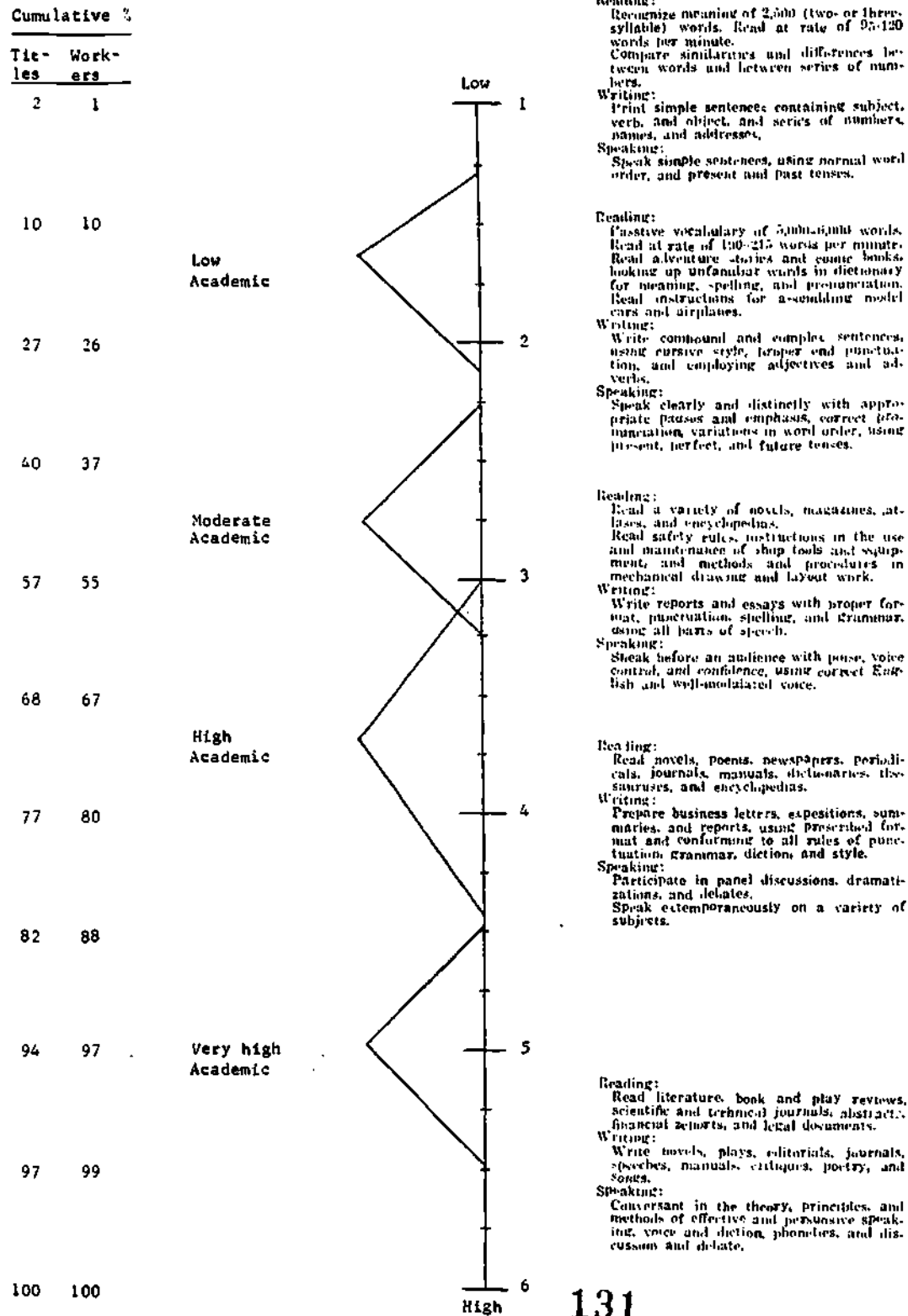


Figure 4 -- cont'd.

This figure provides the following information from left to right:

Cumulative percentages

The first column shows what percentage of 396 census occupational titles require language skills at or below the levels shown opposite on the scale. The second column shows what percentage of all employed workers in 1970 held jobs requiring language skills at or below the specified levels.

Groups that are low, moderate, high, or very high on the general "Academic Competencies" factor

The triangles mark off one standard deviation on either side of the mean for each of the four groups; therefore, they indicate the range over which about two thirds of the occupations in each group fall.

The skill levels represented by the scale values

These are six levels of language skills provided at increasingly higher levels of school curricula (Levels 5 and 6 are the same).

Examples of job tasks utilizing these skills are provided in the Handbook for Analyzing Jobs (U.S. Department of Labor, 1972).

Figure 5

DOT Ratings of Job Requirements: Numerical Aptitude

The ability to perform arithmetic operations quickly and accurately. (Correlated .88 with the "Academic Competencies" dimension in the Skills Map.)

Source: Lock (1-94). See illustrations.

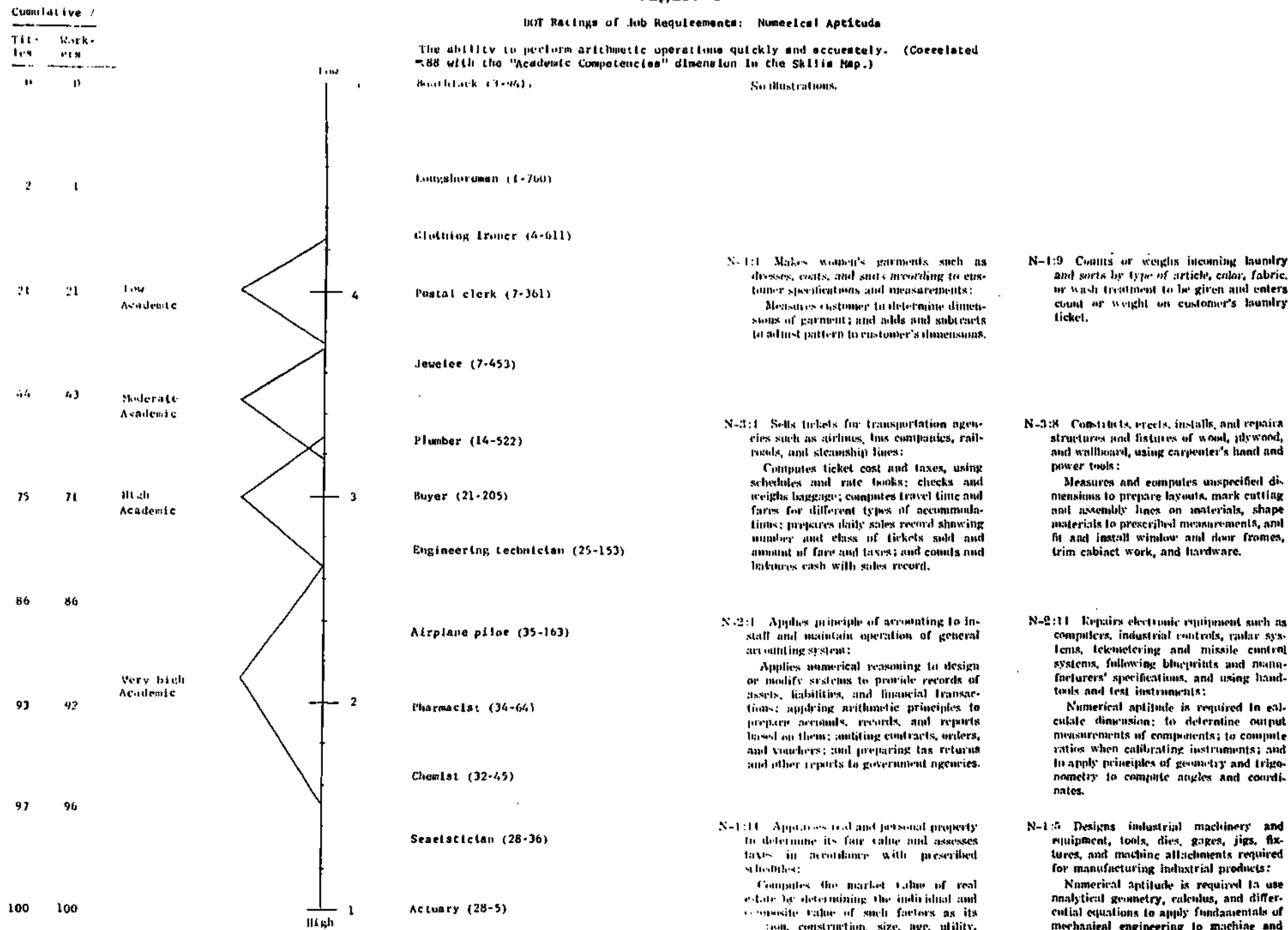


Figure 5 -- cont'd.

This figure provides the following information from left to right:

Cumulative percentages

The first column shows what percentage of 396 census occupational titles require numerical aptitude at or below the levels shown opposite on the scale. The second column shows what percentage of all employed workers in 1970 held jobs requiring numerical aptitude at or below the specified levels.

Groups that are low, moderate, high, or very high on the general "Academic Competencies" factor

The triangles mark off one standard deviation on either side of the mean for each of the four groups; therefore, they indicate the range over which about two thirds of the occupations in each group fall.

Sample occupations at different levels of the scale

The first number in parentheses refers to the Skills Map aptitude group to which the occupation has been assigned; the second number is the occupation's 1970 census code.

Sample activities at each level of the scale

Two illustrations are provided for each of the five levels of the scale used by DOT job analysts. (Occupations in this report may have scores between these integer levels because for this report ratings were averaged for titles grouped under the same census occupational heading). The letters and numbers refer to the numbering of these benchmark illustrations in the DOT Handbook for Analyzing Jobs (U.S. Department of Labor, 1972).

Figure 6

DOT Ratings of Job Requirements: Mathematical Development

This is one of three components of General Educational Development (GED) level. GED embraces those aspects of education (formal and informal) which contribute to the worker's (a) reasoning development and ability to follow instructions, and (b) acquisition of "tool" knowledges such as language and mathematical skills. This is education of a general nature which does not have a recognized fairly specific occupational objective. (Correlated .88 with the "Academic Competencies" factor in the Skills Map.)

Cumulative %

| Tit-les | Work-ers |
|---------|----------|
| 3 | 2 |
| 17 | 21 |
| 37 | 37 |
| 50 | 49 |
| 68 | 70 |
| 79 | 84 |
| 87 | 93 |
| 90 | 96 |
| 95 | 98 |
| 98 | 99 |
| 100 | 100 |

Low
AcademicModerate
AcademicHigh
AcademicVery High
Academic

Low

1

2

3

4

5

6

High

Add and subtract two digit numbers. Multiply and divide 10's and 100's by 2, 3, 4, 5. Perform the four basic arithmetic operations with coins as part of a dollar. Perform operations with units such as cup, pint, and quart; inch, foot, and yard; and ounce and pound.

Add, subtract, multiply, and divide all units of measure. Perform the four operations with like common and unlike fractions. Compute ratio, rate, and percent. Draw and interpret bar graphs. Perform arithmetic operations involving all American monetary units.

Compute discount, interest, profit, and loss; commission, markup, and selling price; ratio and proportion, and percentage. Calculate surfaces, volumes, weights, and measures.

Algebra:
Calculate variables and formulas; monomials and polynomials; ratio and proportion variables; and square roots and radicals.

Geometry:
Calculate plane and solid figures; circumference, area, and volume. Understand kinds of angles, and properties of pairs of angles.

Algebra:
Deal with system of real numbers; linear, quadratic, rational, exponential, logarithmic, and circular functions, and inverse functions; related algebraic solution of equations and inequalities; limits and continuity, and probability and statistical inference.

Geometry:
Deductive axiomatic geometry, plane and solid; and rectangular coordinates.

Shop Math:
Practical application of fractions, percentages, ratio and proportion, mensuration, logarithms, slide rule, practical algebra, geometric construction, and essentials of trigonometry.

Algebra:
Work with exponents and logarithms, linear equations, quadratic equations, mathematical induction and binomial theorem, and permutations.

Calculus:
Apply concepts of analytic geometry, differentiation and integration of algebraic functions with applications.

Statistics:
Apply mathematical operations to frequency distributions, reliability and validity of tests, normal curve, analysis of variance, correlation techniques, chi-square application and sampling theory, and factor analysis.

Advanced calculus:
Work with limits, continuity, real number systems, mean value theorems, and implicit function theorems.

Modern algebra:
Apply fundamental concepts of theories of groups, rings, and fields. Work with differential equations, linear algebra, infinite series, advanced operations methods, and functions of real and complex variables.

Statistics:
Work with mathematical statistics, mathematical probability and applications, experimental design, statistical inference, and econometrics.

Figure 6 -- cont'd.

This figure provides the following information from left to right:

Cumulative Percentages

The first column shows what percentage of 396 census occupational titles require math skills at or below the levels shown opposite on the scale.

The second column shows what percentage of all employed workers in 1970 held jobs requiring math skills at or below the specified levels.

Groups that are low, moderate, high, or very high on the general "Academic Competencies" factor

The triangles mark off one standard deviation on either side of the mean for each of the four groups; therefore, they indicate the range over which about two thirds of the occupations in each group fall.

The skill levels represented by the scale values

These are six levels of math skills provided at increasingly higher levels of school curricula.

Examples of job tasks utilizing these skills are provided in the Handbook for Analyzing Jobs (U.S. Department of Labor, 1972).

Figure 7

IKT Ratings of Job Requirements: Motor Coordination

The ability to coordinate eyes and hands or fingers rapidly and accurately in making precise movements with speed. The ability to make a movement response accurately and swiftly. (Correlated .82 with the "Motor Competencies" factor in the Skills Map.)

Cumulative /
Tit- / Work-
les / ers

0 / 0

0 / 0

17 / 12

47 / 49

92 / 92

96 / 93

100 / 100

Low
Motor

Moderate
Motor

High
Motor

Low

5

4

3

2

High
1

Judge (30-30)

Systems analyst (25-55)

Bill collector (12-313)

Sales representative (21-281)

Tailor (25-551)

Tile setter (4-560)

Agricultural scientist (34-32)

Sign painter/letterer (16-543)

Physician (36-65)

Veterinarian (34-72)

No illustrations.

K-1:1 Performs tasks to finish and press household linens:

Motor coordination is required in placing garments into machine, making sure garments are properly aligned so that no wrinkles will be ironed into garments.

K-3:5 Performs beauty services for patrons of beauty shop:

Coordination of eyes, hands, and fingers is required to cut, style, and tint hair, give facials, arch eyebrows, and manicure nails.

K-2:1 Types letters, reports, stencils, forms, addresses, or other straight copy material from rough draft or corrected copy:

Eye-finger coordination is required to type by "touch", with the fingers striking the appropriate keys as the eyes follow the copy.

K-4:5 Sets up and operates machine tools, and fits and assembles parts to make or repair metal parts, mechanisms, tools, or machines:

Motor coordination is required to align workpiece and cutting tool in relation to one another; to move levers when operating machines; and in using handtools to perform such functions as chipping, filing, and scraping.

K-3:13 Assembles cells and other components in battery case to make complete storage battery:

Eyes and hands must function in constant coordination and at assembly line pace in placing paper liner over battery case with left hand while picking up battery case from a conveyor with right hand; inserting core into battery can, forcing liner under and around core; and placing filled cans onto conveyor.

K-2:3 Diagnoses and treats diseases, injuries, and malformations of the teeth, gums, and related oral structures:

Motor coordination is essential in using drills and other dental tools to extract, fill, or cap teeth; in positioning novacaine needle in gums; and in fitting artificial teeth, plates, and bridges.

No illustrations.

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139

138

113

Figure 8

DOT Ratings of Job Requirements: Finger Dexterity

The ability to move the fingers, and manipulate small objects with the fingers, rapidly or accurately. (Correlated .80 with the "Motor Competencies" factor in the Skills Map.)

Cumulative
Titles
0 0

0 0

23 14

55 61

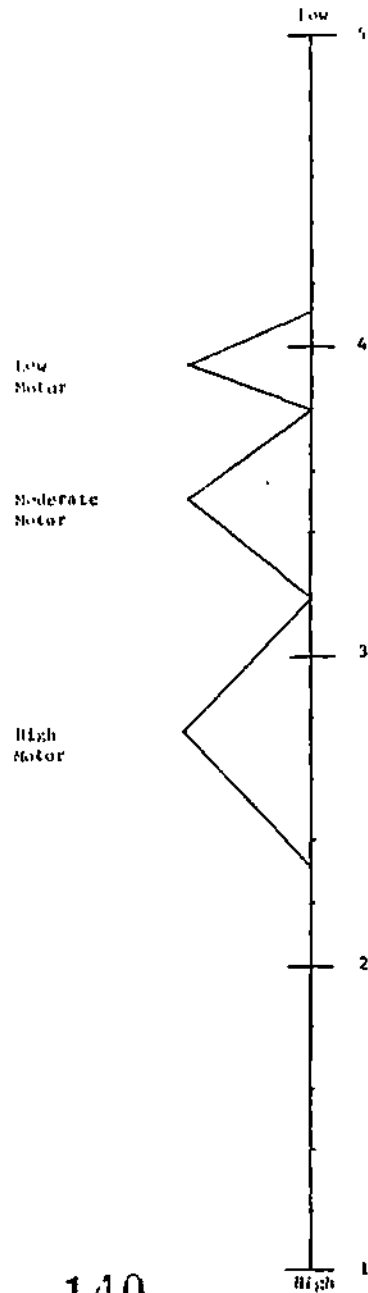
88 88

96 95

99 99

99 99

100 100



No illustrations.

F-1:4 Receives, orders, and issues equipment, material, supplies, merchandise, foodstuff, or tools and completes records in stockroom, warehouse, or storage yard.

Finger dexterity is required to pick up variety of items carried in stock and to place them in containers and on storage shelves.

F-3:1 Feeds tungsten filament wire coils into machine that mounts them to stems in electric light bulb.

Finger dexterity is required to grasp coils with tweezers and insert them into slotted plate of mounting machine; and to pick up and examine finished mounts as they emerge from machine.

F-2:2 Adjusts watch movements to comply with mechanical and timing specifications.

Controls placement and movement of watchmaker tools and watch components with fingers in disassembling and cleaning watch movements; in adjusting lock, drop, and slide of escapement; in timing wheel and hairspring assembly; and in reassembling watch movements.

F-1:1 Plays organ in recital, as accompanist, or as a member of orchestra, band, or other musical group.

All ten fingers must be positioned in rapid interrelated movements to depress specified keys at varying tempos on one or more keyboards of an organ.

F-1:5 Prepares, seasons, and cooks soups, meats, vegetables, desserts, and other foodstuffs for consumption in medical institutions.

Finger dexterity is required in using knives, brushes, scrapers, and other tools to clean, trim, slice, and dice vegetables, fruits, and meats; in portioning foods; in turning dials and valves on kitchen equipment; in removing dishes, napkins, and waste materials from food carts; in sorting and stacking dishes; and in lining pans and shelves with paper.

F-3:2 Plans architectural and structural features of buildings.

Finger dexterity is required in making rough sketches and detail drawings, employing drafting instruments such as protractors, triangles, compasses, rulers, and straight edges.

F-2:6 Assembles modules (units) of micro-electronic equipment, such as satellite communications devices and hearing aids, using handtools, magnifying lens, and spotwelder.

Finger dexterity is required to insert lead wires of components, such as micro-diodes, resistors, capacitors, and micro-transistors, into mounting holes of plastic plate; and to attach color-coded wires between specified component leads to make circuit connections.

F-1:2 Performs surgical operations upon human body.

Finger movements of one hand are required to locate broken or cut blood vessel, to position vessel and place ligature about it, and to tie one of several types of knots in ligature to stem flow of blood from vessel.

Figure 8 -- cont'd.

This figure provides the following information from left to right:

Cumulative percentages

The first column shows what percentage of 396 census occupational titles require finger dexterity at or below the levels shown opposite on the scale. The second column shows what percentage of all employed workers in 1970 held jobs requiring finger dexterity at or below the specified levels.

Groups that are low, moderate or high on the general "Motor Competencies" factor

The triangles mark off one standard deviation on either side of the mean for each of the three groups; therefore, they indicate the range over which about two thirds of the occupations in each group fall.

Sample occupations at different levels of the scale

The first number in parentheses refers to the Skills Map aptitude group to which the occupation has been assigned; the second number is the occupation's 1970 census code.

Sample activities at each level of the scale

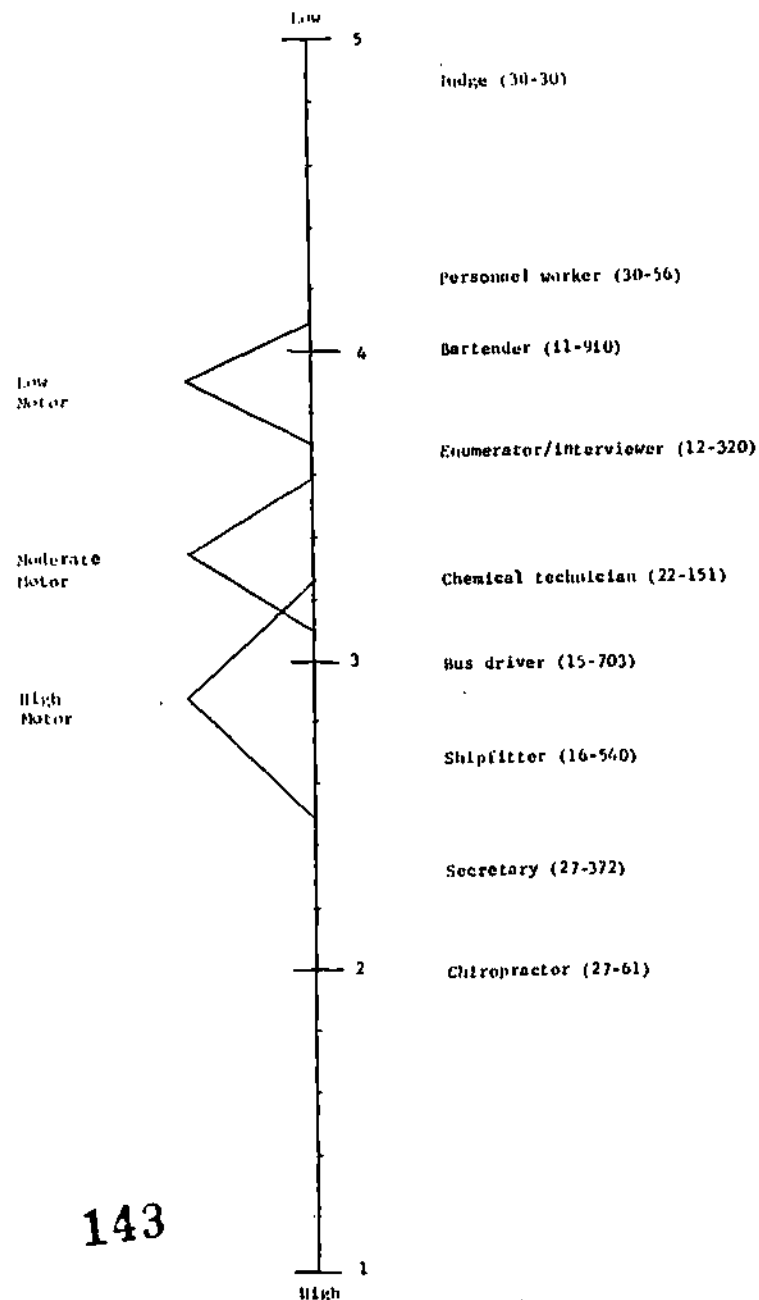
Two illustrations are provided for each of the five levels of the scale used by DOT job analysts. (Occupations in this report may have scores between these integer levels because for this report ratings were averaged for titles grouped under the same census occupational heading). The letters and numbers refer to the numbering of these benchmark illustrations in the DOT Handbook for Analyzing Jobs (U.S. Department of Labor, 1972).

Figure 9

DIFF Ratings of Job Requirements: Manual Dexterity

The ability to move the hands easily and skillfully. The ability to work with the hands in placing and turning motions. (Correlated .79 with the "Motor Competencies" factor in the Skills Map.)

| Cumulative | |
|------------|-------|
| Per- | Rank- |
| cent- | order |
| 0 | 0 |
| 0 | 11 |
| 14 | 10 |
| 33 | 53 |
| 83 | 89 |
| 97 | 99 |
| 99 | 99 |
| 100 | 100 |



No illustrations.

Judge (30-30)

Personnel worker (30-56)

Bartender (11-910)

Enumerator/interviewer (12-320)

Chemical technician (22-151)

Bus driver (15-703)

Shipfitter (16-540)

Secretary (27-372)

Chiropractor (27-61)

M-4:7 Tends circular knitting machine with automatic pattern controls that knit seamless hose:

Manual dexterity is required to pull hose over hands during operation, separate hose, stack yarns, thread yarn through proper channels when thread breaks; and to clean grease, lint, oil, etc., from machine.

M-4:10 Teaches elementary school pupils academic, social, and manipulative skills:

Manual dexterity is required to prepare outlines, correct tests, record results, and to operate audio-visual teaching aids.

M-3:1 Sets up, inspects, and repairs looms to weave cloth:

A variety of hand and wrist movements are required to adjust screws and levers, install gears, tighten bolts, and to repair and replace various mechanical parts of machine.

M-3:9 Treats patients with disabilities, disorders, and injuries to relieve pain, develop or restore function, and maintain maximum performance, using physical means, such as exercise, massage, heat, water, or light:

Manual dexterity is needed to position, adjust, and operate treatment equipment; to assist patient in transfer activities and ambulation; to position and drape patient for treatment; and to massage and exercise patient's affected part.

M-2:1 Inspects eggs to ascertain quality and fitness for consumption or incubation, according to prescribed standards:

Manual dexterity is required to pick up eggs from cardboard cases; roll and shift eggs within palm while inspecting them; and place acceptable eggs on shuffler cart while working at production line pace.

M-2:11 Covers baked goods with icing or frosting by hand:

Manual dexterity is required in spreading icing over surfaces of baked goods with spatula; in filling and icing layer cakes; in applying glaze or thin icing to sweet rolls; in rolling dough; and in handling trays and other items.

No illustrations.

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Figure 9 -- cont'd.

This figure provides the following information from left to right:

Cumulative percentages

The first column shows what percentage of 396 census occupational titles require manual dexterity at or below the levels shown opposite on the scale. The second column shows what percentage of all employed workers in 1970 held jobs requiring manual dexterity at or below the specified levels.

Groups that are low, moderate, or high on the general "Motor Competencies" factor

The triangles mark off one standard deviation on either side of the mean for each of the three groups; therefore, they indicate the range over which about two thirds of the occupations in each group fall.

Sample occupations at different levels of the scale

The first number in parentheses refers to the Skills Map aptitude group to which the occupation has been assigned; the second number is the occupation's 1970 census code.

Sample activities at each level of the scale

Two illustrations are provided for each of the five levels of the scale used by DOT job analysts. (Occupations in this report may have scores between these integer levels because for this report ratings were averaged for titles grouped under the same census occupational heading). The letters and numbers refer to the numbering of these benchmark illustrations in the DOT Handbook for Analyzing Jobs (U.S. Department of Labor, 1972).

Figure 10

DOT Ratings of Job Requirements: Complexity of Involvement with People

Dealing with human beings, also animals on an individual basis as if they were human. (Correlated -.75 with the "Dealing with People" factor in the Skills Map.)

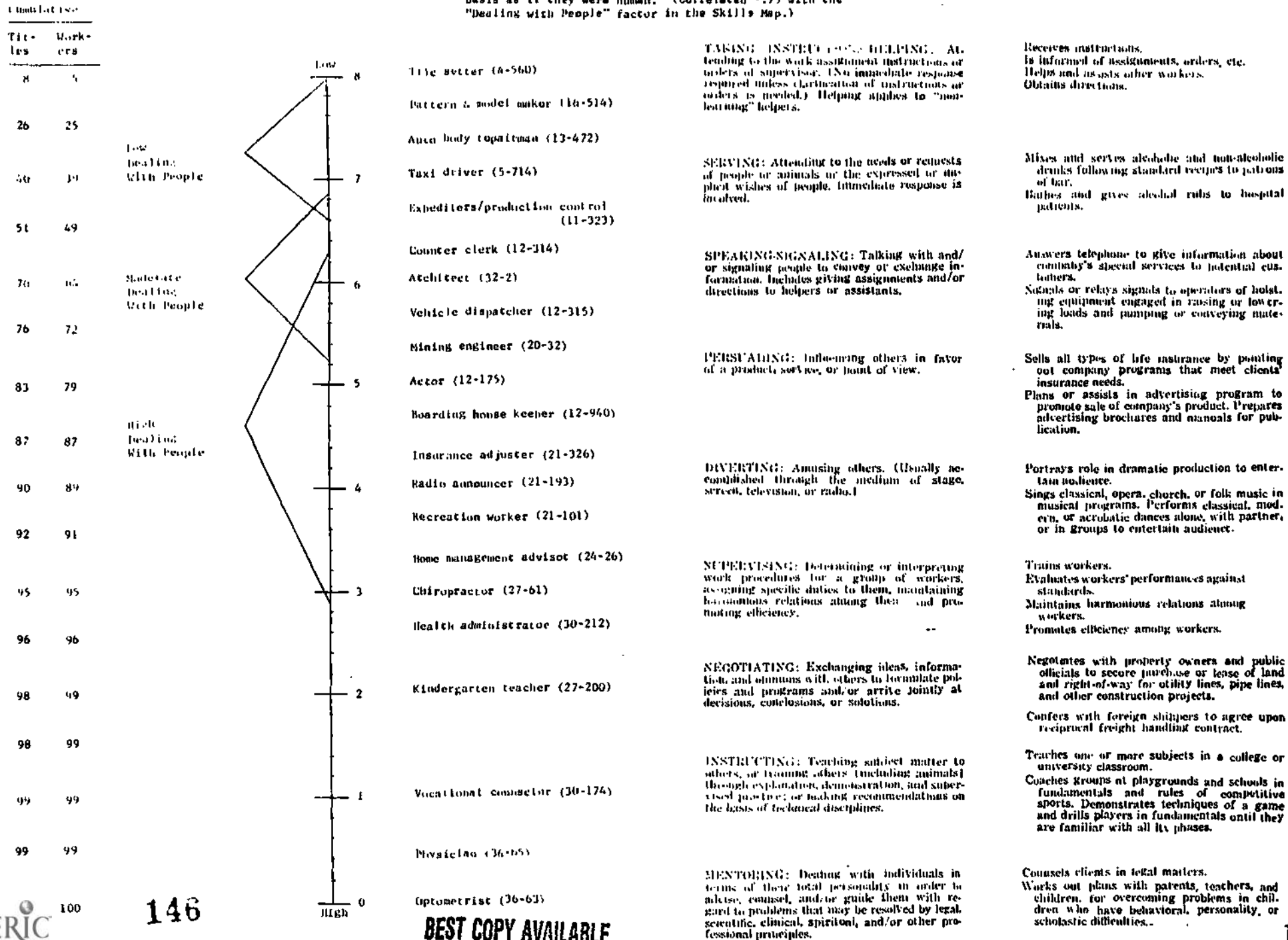


Figure 10-- cont'd.

This figure provides the following information from left to right:

Cumulative percentages

The first column shows what percentage of 396 census occupational titles require dealing with people at or below the levels of complexity shown opposite on the scale. The second column shows what percentage of all employed workers in 1970 held jobs that require dealing with people at or below the specified levels of complexity.

Groups that are low, moderate, or high on the general "Dealing with People" factor

The triangles mark off one standard deviation on either side of the mean for each of the three groups; therefore, they indicate the range over which about two thirds of the occupations in each group fall.

Worker functions represented by the scale values

Sample activities for each scale value

Several examples of worker activities at each of the nine levels of the scale are shown.

Additional examples are provided in the Handbook for Analyzing Jobs (U.S. Department of Labor, 1972).

Appendix A

DOT and PAQ Variables Used
in the Skills Map Analyses

Sources of variable descriptions:

DOT - Miller et al. (1980)

PAQ job elements - McCormick et al (1969)

PAQ dimensions - Mecham et al. (1977b)

Page A-23 shows the cutting points on the three Skills Map dimensions that were used to create the 36 Skills Map occupational groups.

Items from DOT (Dictionary of Occupational Titles)

I. Worker Functions

Data Complexity of function in relation to data. Information, knowledge, and conceptions, related to data, people, or things, obtained by observation, investigation, interpretation, visualization, and mental creation. Data are intangible and include numbers, words, symbols, ideas, concepts, and oral verbalization.

Codes

- 0 Synthesizing: Integrating analyses of data to discover facts and/or develop knowledge concepts or interpretations.
- 1 Coordinating: Determining time, place, and sequence of operations or action to be taken on the basis of analysis of data; executing determination and/or reporting on events.
- 2 Analyzing: Examining and evaluating data. Presenting alternative actions in relation to the evaluation is frequently involved.
- 3 Compiling: Gathering, collating, or classifying information about data, people, or things. Reporting and/or carrying out a prescribed action in relation to the information is frequently involved.
- 4 Computing: Performing arithmetic operations and reporting on and/or carrying out a prescribed action in relation to them. Does not include counting.
- 5 Copying: Transcribing, entering, or posting data.
- 6 Comparing: Judging the readily observable functional, structural, or compositional characteristics (whether similar to or divergent from obvious standards) of data, people, or things.

People

Complexity of function in relation to people. Human beings; also animals dealt with on an individual basis as if they were human.

Codes

- 0 Mentoring: Dealing with individuals in terms of their total personality in order to advise, counsel, and/or guide them with regard to problems that may be resolved by legal, scientific, clinical, spiritual, and/or other professional principles.
- 1 Negotiating: Exchanging ideas, information, and opinions with others to formulate policies and programs and/or arrive jointly at decisions, conclusions, or solutions.
- 2 Instructing: Teaching subject matter to others, or training others (including animals) through explanation, demonstration, and supervised practice; or making recommendations on the basis of technical disciplines.
- 3 Supervising: Determining or interpreting work procedures for a group of workers, assigning specific duties to them, maintaining harmonious relations among them, and promoting efficiency. A variety of responsibilities is involved in this function.
- 4 Diverting: Amusing others. (Usually accomplished through the medium of stage, screen, television, or radio.)
- 5 Persuading: Influencing others in favor of a product, service, or point of view.
- 6 Speaking-Signaling: Talking with and/or signaling people to convey or exchange information. Includes giving assignments and/or directions to helpers or assistants.
- 7 Serving: Attending to the needs or requests of people or animals or the expressed or implicit wishes of people. Immediate response is involved.
- 8 Taking Instructions-Helping: Helping applies to "non-learning" helpers. No variety of responsibility is involved in this function.

Things

Complexity of function in relation to things. Inanimate objects as distinguished from human beings, substances or materials; machines, tools, equipment and products. A thing is tangible and has shape, form, and other physical characteristics.

Codes

- 0 Setting up: Adjusting machines or equipment by replacing or altering tools, jigs, fixtures, and attachments to prepare them to perform their functions, change their performance, or restore their proper functioning if they break down. Workers who set up one or a number of machines for other workers or who set up and personally operate a variety of machines are included here.
- 1 Precision Working: Using body members and/or tools or work aids to work, move, guide, or place objects or materials in situations where ultimate responsibility for the attainment of standards occurs and selection of appropriate tools, objects, or materials, and the adjustment of the tool to the task require exercise of considerable judgment.
- 2 Operating--Controlling: Starting, stopping, controlling, and adjusting the progress of machines or equipment. Operating machines involves setting up and adjusting the machine or material(s) as the work progresses. Controlling involves observing gages, dials, etc., and turning valves and other devices to regulate factors such as temperature, pressure, flow of liquids, speed of pumps, and reactions of materials.
- 3 Driving--Operating: Starting, stopping, and controlling the actions of machines or equipment for which a course must be steered, or which must be guided, in order to fabricate, process, and/or move things or people. Involves such activities as observing gages and dials; estimating distances and determining speed and direction of other objects; turning cranks and wheels; pushing or pulling gear lifts or levers. Includes such machines as cranes, conveyor systems, tractors, furnace charging machines, paving machines and hoisting machines. Excludes manually powered machines, such as handtrucks and dollies, and power assisted machines, such as electric wheelbarrows and handtrucks.
- 4 Manipulating: Using body members, tools, or special devices to work, move, guide, or place objects or materials. Involves some latitude for judgment with regard to precision attained and selecting appropriate tool, object, or material, although this is readily manifest.
- 5 Tending: Starting, stopping, and observing the functioning of machines and equipment. Involves adjusting materials or controls of the machine, such as changing guides, adjusting timers and temperature gages. Turning valves to allow flow of materials, and flipping switches in response to lights. Little judgment is involved in making these adjustments.
- 6 Feeding-Offbearing: Inserting, throwing, dumping, or placing materials in or removing them from machines or equipment which are automatic or tended or operated by other workers.
- 7 Handling: Using body members, handtools, and/or special devices to work, move or carry objects or materials. Involves little or no latitude for judgment with regard to attainment of standards or in selecting appropriate tool, object, or material.

II. Training Times

GED General educational development

This variable was created by taking the highest value of the following three variables: ReasonDT , MathDOT , Lang.

ReasonDT Reasoning Development

Level

- 6 Apply principles of logical or scientific thinking to a wide range of intellectual and practical problems. Deal with nonverbal symbolism (formulas, scientific equations, graphs, musical notes, etc.) in its most difficult phases. Deal with a variety of abstract and concrete variables. Apprehend the most abstruse classes of concepts.
- 5 Apply principles of logical or scientific thinking to define problems, collect data, establishments, and draw valid conclusions. Interpret an extensive variety of technical instructions in mathematical or diagrammatic form. Deal with several abstract and concrete variables.
- 4 Apply principles of rational systems to solve practical problems and deal with a variety of concrete variables in situations where only limited standardization exists. Interpret a variety of instructions furnished in written, oral, diagrammatic, or schedule form.
- 3 Apply commonsense understanding to carry out instructions furnished in written, oral, or diagrammatic form. Deal with problems involving several concrete variables in or from standardized situations.
- 2 Apply commonsense understanding to carry out detailed but uninvolved written or oral instructions. Deal with problems involving a few concrete variables in or from standardized situations.
- 1 Apply commonsense understanding to carry out simple one- or two-step instructions. Deal with standardized situations with occasional or no variables in or from these situations encountered on the job.

Level

- 6 Advanced calculus:
 - Work with limits, continuity, real number systems, mean value theorems, and implicit function theorems.
 Modern algebra:
 Apply fundamental concepts of theories of groups, rings, and fields. Work with differential equations, linear algebra, infinite series, advanced operations methods, and functions of real and complex variables.
 Statistics:
 Work with mathematical statistics, mathematical probability and applications, experimental design, statistical inference, and econometrics.
- 5 Algebra:
 Work with exponents and logarithms, linear equations, quadratic equations, mathematical induction and binomial theorem, and permutations.
 Calculus:
 Apply concepts of analytic geometry, differentiations and integration of algebraic functions with applications.
 Statistics:
 Apply mathematical operations to frequency distributions, reliability and validity of tests, normal curve, analysis of variance, correlation techniques, chi-square application and sampling theory, and factor analysis.
- 4 Algebra:
 Deal with system of real numbers; linear, quadratic, rational, exponential, logarithmic, angle and circular functions, and inverse functions; related algebraic solution of equations and probability and statistical inference.
 Geometry:
 Deductive axiomatic geometry, plane and solid; and rectangular coordinates.
 Shop Math:
 Practical application of fractions, percentages, ratio and proportion, mensuration, logarithms, slide rule, practical algebra, geometric construction, and essentials of trigonometry.
- 3 Compute discount, interest, profit, and loss; commission, markup, and selling price; ratio and proportion, and percentage. Calculate surfaces, volumes, weights, and measures.
 Algebra:
 Calculate variables and formulas; monomials and polynomials; ratio and proportion variables; and square roots and radicals.
 Geometry:
 Calculate plane and solid figures; circumference, area, and volume. Understand kinds of angles, and properties of pairs of angles.
- 2 Add, subtract, multiply, and divide all units of measure. Perform the four operations with like common and decimal fractions. Compute ratio, rate, and percent. Draw and interpret bar graphs. Perform arithmetic operations involving all American monetary units.

1. Add and subtract two digit numbers.
Multiply and divide 10's and 100's by 2, 3, 4, 5.
- Perform the four basic arithmetic operations with coins as part of a dollar.
Perform operations with units such as cup, pint, and quart; inch, foot, and yard; and ounce and pound.

Lang

Language development

Level

- 6 Reading:
Read literature, book and play reviews, scientific and technical journals, abstracts, financial reports, and legal documents.
- Writing:
Write novels, plays, editorials, journals, speeches, manuals, critiques, poetry, and songs.
- Speaking:
Conversant in the theory, principles, and methods of effective and persuasive speaking, voice and diction, phonetics and discussion and debate.
- 5 Same as Level 6.
- 4 Reading:
Read novels, poems, newspapers, periodicals, journals, manuals, dictionaries, thesauruses, and encyclopedias.
- Writing:
Prepare business letters, expositions, summaries, and reports, using prescribed format and conforming to all rules of punctuation, grammar, diction, and style.
- Speaking:
Participate in panel discussions, dramatizations, and debates. Speak extemporaneously on a variety of subjects.
- 3 Reading:
Read a variety of novels, magazines, atlases, and encyclopedias. Read safety rules, instructions in the use and maintenance of shop tools and equipment, and methods and procedures in mechanical drawing and layout work.
- Writing:
Write reports and essays with proper format, punctuation, spelling, and grammar, using all parts of speech.
- Speaking:
Speak before an audience with poise, voice control, and confidence, using correct English and well-modulated voice.
- 2 Reading:
Passive vocabulary of 5,000-6,000 words.
Read at rate of 190-215 words per minute.
Read adventure stories and comic books, looking up unfamiliar words in dictionary for meaning, spelling, and pronunciation.
Read instructions for assembling model cars and airplanes.
- Writing:
Write compound and complex sentences, using cursive style, proper end punctuation, and employing adjectives and adverbs.
- Speaking:
Speak clearly and distinctly with appropriate pauses and emphasis, correct pronunciation, variations in word order, using present, perfect, and future tenses.

1 Reading:

Recognize meaning of 2,500 (two- or three-syllable) words.
Read at rate of 95-120 words per minute.
Compare similarities and differences between words and
between series of numbers.

Writing:

Print simple sentences containing subject, verb, and object,
and series of numbers, names, and addresses.

Speaking:

Speak simple sentences, using normal word order, and
present and past tenses.

SVP Specific vocational preparation

| <u>Level</u> | <u>Time</u> |
|--------------|---|
| 1 | Short demonstration only |
| 2 | Anything beyond short demonstration up to and including 30 days |
| 3 | Over 30 days up to and including 3 months |
| 4 | Over 3 months up to and including 6 months |
| 5 | Over 6 months up to and including 1 year |
| 6 | Over 1 year up to and including 2 years |
| 7 | Over 2 years up to and including 4 years |
| 8 | Over 4 years up to and including 10 years |
| 9 | Over 10 years |

III. Aptitudes

Note: These scales have been reversed for purposes of this study. In DOT publications, a high score means a low level.

Quintiles for Rating Aptitudes

- 5 The top 10 percent of the population. This segment of the population possesses an extremely high degree of the aptitude.
- 4 The highest third exclusive of the top 10 percent of the population. This segment of the population possesses an above average of high degree of the aptitude.
- 3 The middle third of the population. This segment of the population possesses a medium degree of the aptitude, ranging from slightly below to slightly above average.
- 2 The lowest third exclusive of the bottom 10 percent of the population. This segment of the population possesses a below average or low degree of the aptitude.
- 1 The lowest 10 percent of the population. This segment of the population possesses a negligible degree of the aptitude.

- Intel** Intelligence: General learning ability. The ability to "catch on" or understand instructions and underlying principles. Ability to reason and make judgments. Closely related to doing well in school.
- Note: Level 1 is not assigned on this aptitude because it is assumed that every job requires at least a "2."
- VerbalDT** Verbal: Ability to understand meanings of words and ideas associated with them, and to use them effectively. To comprehend language, to understand relationships between words, and to understand meanings of whole sentences and paragraphs. To present information or ideas clearly.
- Num** Numerical: Ability to perform arithmetic operations quickly and accurately.
- Spatial** Spatial: Ability to comprehend forms in space and understand relationships of plane and solid objects. May be used in such tasks as blueprint reading and in solving geometry problems. Frequently described as the ability to "visualize" objects of two or three dimensions, or to think visually of geometric forms.
- Formper** Form Perception: Ability to perceive pertinent detail in objects or in pictorial or graphic material; to make visual comparisons and discriminations and see slight differences in shapes and shadings of figures and widths and lengths of lines.
- Clerical** Clerical Perception: Ability to perceive pertinent detail in verbal or tabular material. To observe differences in copy, to proofread words and numbers, and to avoid perceptual errors in arithmetic computation.

| | |
|----------|--|
| Motorcor | Motor Coordination: Ability to coordinate eyes and hands or fingers rapidly and accurately in making precise movements with speed. Ability to make a movement response accurately and quickly. |
| Findex | Finger Dexterity: Ability to move the fingers and manipulate small objects with the fingers rapidly or accurately. |
| Mandex | Manual Dexterity: Ability to move the hands easily and skillfully. To work with the hands in placing and turning motions. |
| Iftcoor | Eye-Hand-Foot Coordination: Ability to move the hand and foot coordinately with each other in accordance with visual stimuli. |
| Colordis | Color Discrimination: Ability to perceive or recognize similarities or differences in colors, or in shades or other values of the same color; to identify a particular color, or to recognize harmonious or contrasting color combinations, or to match colors accurately. |

IV. Temperaments: Different types of occupational situations to which workers must adjust.

| | |
|---|--------------|
| 0 | not required |
| 1 | required |

| | |
|--------|--------------------------------------|
| DCP | Direction, control, and planning |
| FIF | Feelings, ideas, or facts |
| Influ | Influencing people |
| SJC | Sensory or judgmental criteria |
| MVC | Measurable or verifiable criteria |
| Depl | Dealing with people |
| Repcon | Repetitive or continuous processes |
| PUS | Performing under stress |
| STS | Set limits, tolerances, or standards |
| Varch | Variety and change |

- V. Interests: Preferences for certain types of work activities or experiences, with accompanying rejection of contrary types of activities or experiences. Five pairs of interest factors are provided so that a positive preference for one factor of a pair also implies rejection of the other factor of that pair.

Idata Communication of data versus activities with things

Codes

-1 Situations involving a preference for activities dealing with things and objects.

vs.

1 Situations involving a preference for activities concerned with people and the communication of ideas.

Iscience Scientific and technical activities versus business contact

Codes

-1 Situations involving a preference for activities involving business contact with people.

vs.

1 Situations involving a preference for activities of a scientific and technical nature.

Icreate Abstract and creative versus routine, concrete activities

Codes

-1 Situations involving a preference for activities of a routine, concrete, organized nature.

vs.

1 Situations involving a preference for activities of an abstract and creative nature.

Imach Activities involving processes, machines, or techniques versus social welfare

Codes

-1 Situations involving a preference for working for people for their presumed good, as in the social welfare sense, or for dealing with people and language in social situations.

vs.

1 Situations involving a preference for activities that are nonsocial in nature, and are carried on in relation to processes, machines, and techniques.

Iproduct

Activities resulting in tangible, productive satisfaction versus
prestige, esteem

Codes

-1 Situations involving a preference for activities resulting in
tangible, productive satisfaction.

vs.

1 Situations involving a preference for activities resulting
in prestige or the esteem of others.

VI. Physical Demands: Those physical activities required of a worker in a job.

Strength Lifting, carrying, pulling, pushing

Codes

1 Sedentary Work

Lifting 10 lbs. maximum and occasionally lifting and/or carrying such articles as dockets, ledgers, and small tools. Although a sedentary job is defined as one which involves sitting, a certain amount of walking and standing is often necessary in carrying out job duties. Jobs are sedentary if walking and standing are required only occasionally and other sedentary criteria are met.

2 Light Work

Lifting 20 lbs. maximum with frequent lifting and/or carrying of objects weighing up to 10 lbs. Even though the weight lifted may be only a negligible amount, a job is in this category when it requires walking or standing to a significant degree, or when it involves sitting most of the time with a degree of pushing and pulling of arm and/or leg controls.

3 Medium Work

Lifting 50 lbs. maximum with frequent lifting and/or carrying of objects weighing up to 25 lbs.

4 Heavy Work

Lifting 100 lbs. maximum with frequent lifting and/or carrying of objects weighing up to 50 lbs.

5 Very Heavy Work

Lifting objects in excess of 100 lbs. with frequent lifting and/or carrying of objects weighing 50 lbs. or more.

0 not required

1 required

| | |
|----------|--|
| Climbing | Climbing and/or balancing |
| Stooping | Stooping, kneeling, crouching, and/or crawling |
| Reaching | Reaching, handling, fingering, and/or feeling |
| Talking | Talking and/or hearing |
| Seeing | Seeing |

VII. Working Conditions: The physical surroundings of a worker in a specific job.

Location Outside working conditions

Codes

- 1 Inside
- 2 Both inside and outside
- 3 Outside

| |
|-----------------|
| 0 - not present |
| 1 - present |

| | |
|---------|---|
| Cold | Extreme cold |
| Heat | Extreme heat |
| Wet | Wet, humid |
| Noise | Noise, vibration |
| Hazards | Hazardous conditions |
| Aircon | Fumes, odors, dust, gases, poor ventilation |

Items from the PAQ (Position Analysis Questionnaire)

| Variable Name | PAQ Item Number | Item description | Type of rating |
|--|-----------------|--|---------------------|
| 1. Information input | | | |
| Written | 1 | Use of written materials | Extent of use |
| Quant | 2 | Use of quantitative materials | Extent of use |
| Pictorial | 3 | Use of pictorial materials | Extent of use |
| Patterns | 4 | Use of patterns/related devices | Extent of use |
| Behavior | 12 | Observation of behavior | Extent of use |
| Events | 13 | Observation of events or circumstances | Extent of use |
| VerbalPQ | 15 | Use of verbal (sic, oral) sources | Extent of use |
| 2. Mental processes | | | |
| Decide | 36 | Decision making | Level of |
| ReasonPQ | 37 | Reasoning in problem solving | Level of |
| Plan | 38 | Amount of planning/Scheduling | Amount of |
| Combine | 39 | Combining information | Importance |
| Analyze | 40 | Analyzing information or data | Importance |
| Compile | 41 | Compiling | Importance |
| Code | 42 | Coding/decoding | Importance |
| Transcrb | 43 | Transcribing | Importance |
| Memory | 45 | Short-term memory | Importance |
| Educate n | 46 | Education | Level of curriculum |
| Expernce | 47 | Job-related experience | Months/years |
| Training | 48 | Training | Months/years |
| MathPAQ | 49 | Using mathematics | Level of |
| 3. Work output | | | |
| Exertion | 87 | Level of physical exertion | Level of |
| 4. Relationships with other persons | | | |
| Advise | 99 | Advising | Importance |
| Negotiat | 100 | Negotiating | Importance |
| Persuade | 101 | Persuading | Importance |
| Instruct | 102 | Instructing | Importance |
| Pubspcak | 106 | Public speaking | Importance |
| Write | 107 | Writing | Importance |
| Entertn | 110 | Entertaining | Importance |
| Cater | 111 | Serving/catering | Importance |
| Reqcont | 112 | Job-required personal contact | Extent of |
| Supervis | 131 | Supervises nonemployees | Importance |
| Coordin | 132 | Coordinates activities (no line authority) | Importance |
| Staffunc | 133 | Staff functions | Importance |
| Recsuper | 134 | Supervision received | Level of |

| Variable Name | PAQ Item Number | Item Description | Type of rating |
|-------------------------------------|-----------------|--|-----------------|
| 5. Job context | | | |
| Civicob | 148 | Civic obligations | Importance |
| Frust | 149 | Frustrating situations | Importance |
| Strained | 150 | Strained personal contacts | Importance |
| Sacrific | 151 | Personal sacrifice | Importance |
| Conflict | 152 | Interpersonal conflict situations | Importance |
| Soccont | 153 | Non-job-required social contact | Opportunity for |
| 6. Other job characteristics | | | |
| License | 160 | Licensing/certification required | No/Yes |
| Workpace | 169 | Specified work pace | Importance |
| Repetit | 170 | Repetitive activities | Importance |
| Cycled | 171 | Cycled work activities | Importance |
| Setproc | 172 | Following set procedures | Importance |
| Timepres | 173 | Time pressure of situation | Importance |
| Precise | 174 | Precision | Importance |
| Detail | 175 | Attention to detail | Importance |
| Recognit | 176 | Recognition | Importance |
| Viginfre | 177 | Vigilance: infrequent events | Importance |
| Vigchang | 178 | Vigilance: continually changing events | Importance |
| Distract | 179 | Working under distractions | Importance |
| Update | 180 | Updating job knowledge | Importance |
| Respsaf | 183 | Responsibility for safety of others | Degree of |
| Respmat | 184 | Responsibility for material assets | Degree of |
| Respgen | 185 | General responsibility | Degree of |
| Structur | 186 | Job structure | Amount of |
| Critical | 187 | Criticality of position | Degree of |

Factors Used from PAQ (Position Analysis Questionnaire)

Dim 9 Using machines/tools/equipment

This dimension is dominated by activities involving the use of any of various types of machines, tools, equipment, devices, etc., many of which require the use of control mechanisms.

| <u>The Four Job Elements Correlating Most Highly with Dimension</u> | | <u>Correlation</u> |
|---|---------------------------|--------------------|
| 62 | Activation controls | .73 |
| 64 | Variable setting controls | .70 |
| 63 | Fixed setting controls | .70 |
| 61 | Machines/equipment | .69 |

Dim 10 Performing activities requiring general body movements

This dimension relates to the degree to which workers perform activities requiring general body movements. The movements primarily include those activities in which the entire body is involved, such as climbing, balancing, standing, and walking, but also, to a lesser degree, those activities emphasizing the use of major parts of the body (i.e. arms, legs, etc.

| <u>The Four Job Elements Correlating Most Highly with Dimension</u> | | <u>Correlation</u> |
|---|----------------------------|--------------------|
| 92 | Kneeling/stooping | .66 |
| 89 | Standing | .63 |
| 90 | Walking/running | .60 |
| 87 | Level of physical exertion | .58 |

Dim 11 Controlling machines/processes

This dimension primarily involves activities relating to the control of machines, processes, and related operations. The control frequently is executed by the use of various control mechanisms, or by direct physical control of some mechanism or device.

| <u>The Four Job Elements Correlating Most Highly with Dimension</u> | | <u>Correlation</u> |
|---|-----------------------------------|--------------------|
| 69 | Foot-operated controls continuous | .89 |
| 67 | Foot-operated controls frequent | .85 |
| 68 | Hand-operated controls continuous | .81 |
| 71 | Powered highway/rail vehicles | .74 |

Dim 12 Performing skilled/technical activities

This dimension is characterized primarily by job activities of a skilled or technical nature, some of which may involve the use of control mechanisms, devices, and related equipment.

| <u>The Four Job Elements Correlating Most Highly with Dimension</u> | | <u>Correlation</u> |
|---|-------------------------------|--------------------|
| 59 | Technical and related devices | .75 |
| 56 | Drawing and related devices | .57 |
| 58 | Measuring devices | .50 |
| 50 | Precision tools/instruments | .47 |

Dim 13 Performing controlled manual/related activities

This dimension is dominated by the execution of controlled manual activities of various types. The activities may involve the use of tools, equipment, or other devices, or direct use of the hands as in assembling or adjusting tasks.

| <u>The Four Job Elements Correlating Most Highly with Dimension</u> | | <u>Correlation</u> |
|---|--------------------------------|--------------------|
| 55 | Nonprecision tools/instruments | .74 |
| 54 | Precision tools/instruments | .70 |
| 51 | Nonprecision tools/instruments | .63 |
| 81 | Assembling/disassembling | .60 |

Dim 14 Using miscellaneous equipment/devices

This dimension embraces the use of any of a variety of different types of equipment, devices, and facilities, including those involved in the operation of various types of vehicles. The activities embraced by this dimension frequently involve general body activities and manual functions.

| <u>The Four Job elements correlating most highly with Dimension</u> | | <u>Correlation</u> |
|---|-----------------------------|--------------------|
| 73 | Powered water vehicles | .72 |
| 74 | Air/space vehicles | .66 |
| 70 | Man-powered vehicles | .48 |
| 77 | Remote-controlled equipment | .47 |

Dim 15 Performing handling/related manual activities

This dimension is characterized primarily by job activities which involve the handling or movement of materials with the hands and arms, or which involve the manipulation of things with the hands. It includes handling, positioning, and moving functions in which the hands and arms are dominant.

| <u>The four Job Elements Correlating most highly with Dimension</u> | | <u>Correlation</u> |
|---|-----------------------|--------------------|
| 82 | Arranging/positioning | .68 |
| 84 | Physical handling | .56 |
| 83 | Feeding/off-bearing | .55 |
| 79 | Manually modifying | .50 |

Dim 16 General Physical Coordination

The primary activities involved in this dimension are those in which the body and body members are used in some coordinated fashion. This may involve the use of various types of mechanical devices, or the execution of coordination activities in the absence of physical equipment or machines or tools.

| <u>The four job elements correlating most highly with dimension</u> | | <u>Correlation</u> |
|---|--------------------------------------|--------------------|
| 97 | Limb movement without visual control | .73 |
| 93 | Finger manipulation | .67 |
| 98 | Hand-ear coordination | .58 |
| 65 | Keyboard devices | .54 |

Dim 19 Performing supervisory/coordination/related activities

This dimension represents a variety of communication activities such as those involved in supervisory, coordination, and related functions. In some instances it may involve the instruction or advising of others.

The Four Job Elements Correlating Most Highly with Dimension Correlation

| | | |
|-----|--|-----|
| 130 | Total number of personnel for whom responsible | .84 |
| 128 | Supervision of nonsupervisory personnel | .78 |
| 129 | Direction of supervisory personnel | .73 |
| 102 | Instructing | .37 |

Dim 21 Public/related personal contacts

This dimension involves personal contacts with the public or other persons typically outside the organization, such as in selling, dealing with special interest groups, clients, customers, patients, counselees, etc. Although this dimension is concerned primarily with personal contacts with individuals outside the organization, it also may involve communications with some individuals within the organization.

The Four Job Elements correlating most highly with Dimension Correlation

| | | |
|-----|-------------------------|-----|
| 122 | Public customers | .71 |
| 120 | Sales personnel | .71 |
| 121 | Buyers | .70 |
| 126 | Special interest groups | .34 |

The Levels of Academic, Psychomotor, and People
Aptitudes Used to Define Major Groups of Occupations

| Levels of the Major Dimensions | Range of Scores | % of Occupations |
|---|--------------------|---------------------|
| Academic aptitudes (Num + VerbalDT) | | |
| Low | 3.00 - 4.77 | 30% |
| Moderate | 4.78 - 5.99 | 30% |
| High | 6.00 - 7.00 | 20% |
| Very High | 7.01 - 10.00 | 20% |
| Psychomotor aptitudes (Findex + Mandex + Motorcor) | | |
| Low | 4.00 - 7.00 | 30% |
| Moderate | 7.01 - 8.99 | 50% |
| High | 9.00 - 12.00 | 20% |
| Dealing with people (Depl) | | |
| Low | .00 - 0.20 | 50% |
| Moderate | 0.21 - 0.66 | 20% |
| High | 0.67 - 1.00 | 30% |

Appendix B

Descriptions of
the 36 Skills Map Aptitude Groups

Pages B-12 to B-78 of this appendix are taken from the earlier Skills Map report (Gottfredson, 1981, pp. 42-92). The appendices (C-I) to which these descriptions refer are described earlier in the present report; they provide detailed data on each of the census occupational categories as well as the 36 Skills Map groups.

Pages B-2 to B-11 of this appendix list the variables included under each general heading in these earlier Appendices C-H, together with the correlations of these variables with the three Skills Map dimensions.

| Variable | Correlation with Skills Map dimension: | | |
|----------|--|-------|--------|
| | Academic | Motor | People |

Appendix C

Academic abilities. These include the variables constituting the academic aptitude factor. They are essentially unrelated to the psychomotor factor. These abilities, particularly the verbal abilities, are also related to dealing with people (r's of .3 to .5).

| | | | |
|-------------------|-----|------|-----|
| VerbalDT | .93 | -.16 | .49 |
| Lang | .91 | -.13 | .46 |
| ReasonDT | .91 | -.06 | .38 |
| Intel | .90 | -.07 | .38 |
| MathDOT | .88 | -.01 | .26 |
| Num | .88 | -.03 | .26 |
| MathPAQ | .68 | -.04 | .17 |
| Data ^a | .88 | -.11 | .46 |

Mental activities. Most of these variables are highly correlated (.7) with the academic dimension and moderately (.5) with dealing with people: decision making, reasoning, planning, writing and compiling, combining, and analyzing information. Coding and transcribing information and doing work demanding precision and attention to detail are related to the academic dimension at a lower level. Most of these mental activities are somewhat negatively correlated with the motor aptitudes dimension.

| | | | |
|----------|-----|------|-----|
| Decide | .67 | -.28 | .53 |
| ReasonPQ | .70 | -.26 | .46 |
| Plan | .68 | -.32 | .52 |
| Combine | .73 | -.34 | .55 |
| Analyze | .71 | -.24 | .43 |
| Compile | .73 | -.34 | .55 |
| Code | .58 | -.12 | .26 |
| Transcrb | .32 | -.18 | .34 |
| Write | .76 | -.37 | .56 |
| Precise | .34 | .12 | .05 |
| Detail | .38 | -.01 | .09 |

| Variable | Correlation with Skills Map dimension: | | |
|----------|--|-------|--------|
| | Academic | Motor | People |

Appendix D

Psychomotor abilities. Finger dexterity, manual dexterity, motor coordination, and complexity of dealing with things are highly correlated (.7 to .8) with the motor abilities factor, which is to be expected because the first three variables were summed to create that factor. As was also indicated in the factor analyses, form perception, spatial aptitude, and color discrimination are moderately correlated (.4 to .5) with this factor, though the former two are almost as highly correlated with requirements for academic aptitude. Correlations with the people factor range from 0 to -.5.

| | | | |
|---------------------|------|-----|------|
| Findex | .13 | .80 | -.20 |
| Mandex | -.30 | .79 | -.46 |
| Motorcor | -.12 | .82 | -.29 |
| Formper | .40 | .52 | -.17 |
| Colordis | .20 | .43 | -.05 |
| Things ^a | -.05 | .74 | -.47 |
| Spatial | .41 | .42 | -.20 |

Motor Activities. These variables were all classified here as motor activities because they all involve physical activities or controlling machines. However, the correlations make clear that only a few of these dimension scores reflect psychomotor abilities. Performing controlled manual and related activities (DIM13), which of all the dimension scores should have reflected the motor aptitude factor, did indeed do so at a moderate level ($r=.4$). None of the other dimension scales did so. Two are related only to the vigilance factor that was discussed in the earlier report but which was not used in constructing the occupational classification: controlling machines and

| Variable | Correlation with Skills Map dimension: | | |
|----------|--|-------|--------|
| | Academic | Motor | People |

processes (DIM11) and using miscellaneous equipment such as aircraft (DIM14). General physical coordination (DIM16) is related (negatively) only to the strength dimension. Apparently, exerting strength and the use of the body and body members in a coordinated fashion (e.g., limb movement without visual control) are not usually required by the same jobs, but neither has any particular relation to requirements for coordination and dexterity of the hands (the psychomotor factor here). General body movement (DIM10) and using machines and tools (DIM14) are associated with jobs requiring lower academic aptitude but skilled technical activities are associated with higher academic aptitude.

Thus, the psychomotor factor reflects a particular type of motor activity--primarily that involving the hands--and most of the PAQ "dimensions" measuring motor activities are unrelated to the three factors used in the classification.

| | | | |
|-------|------|------|------|
| Dim10 | -.42 | .20 | -.20 |
| Dim16 | .18 | .13 | .18 |
| Dim15 | -.26 | .02 | -.02 |
| Dim13 | -.17 | .40 | -.33 |
| Dim12 | .55 | .05 | .21 |
| Dim9 | -.44 | .33 | -.45 |
| Dim11 | -.04 | -.14 | .10 |
| Dim14 | .10 | -.18 | .12 |

Appendix E

Deal with people. Dealing with people often means that contact is required on the job (REQCONT, $r=.6$) and that it is at a complex level (PEOPLE, $r=.8$). And as already noted, it tends to be associated with requirements for higher academic abilities.

| | | | |
|---------------------|-----|------|------|
| Depl | .44 | -.40 | 1.00 |
| People ^a | .59 | -.29 | .75 |
| Reqcont | .49 | -.20 | .61 |

| Variable | Correlation with Skills Map dimension: | | |
|----------|--|-------|--------|
| | Academic | Motor | People |

Interpersonal activities. These activities suggest that, whereas some dealings with people are highly correlated with academic aptitudes, others are not. While the DOT variable DEPL (dealing with people) was used to define the people factor because it was less related to academic abilities than some of the other variables (e.g., PEOPLE), it is clear that it is a compromise between items more and less related to academic skills. Just like motor activities, there are actually several dimensions of interpersonal activities.

As was noted in the factor analysis of DOT and PAQ items, persuading, instructing, advising, negotiating, coordinating (but without line management authority, e.g., a social director), public speaking, and having staff functions (e.g., administrative assistant) are activities highly associated with jobs both requiring high academic aptitudes and occupations more often requiring dealings with people. Supervising non-employees (SUPERVIS) and entertaining people, catering to their needs, and dealing with the public (DIM21) are only weakly related to academic abilities and create two people-related factors independent of academic abilities when added to the factor analysis.

DIM19, called performing supervisory/coordination activities, is also related to dealing with people but its meaning seemed unclear after examining more detailed results.

| | | | |
|----------|-----|------|-----|
| Influ | .35 | -.33 | .50 |
| Persuade | .60 | -.41 | .68 |
| Instruct | .48 | -.22 | .45 |
| Advise | .70 | -.37 | .59 |
| Negotiat | .60 | -.46 | .62 |
| Coordin | .58 | -.36 | .54 |

| Variable | Correlation with Skills Map dimension: | | |
|----------|--|-------|--------|
| | Academic | Motor | People |
| Dim19 | .06 | -.16 | .18 |
| Supervis | .27 | -.12 | .45 |
| Dcp | .58 | -.32 | -.60 |
| Staffunc | .69 | -.37 | .49 |
| Pubspcak | .56 | -.35 | .55 |
| Entertn | .14 | -.05 | .29 |
| Cater | .01 | -.08 | .34 |
| Dim21 | .07 | -.25 | .38 |

Appendix F

Other abilities. Four of these variables correlated either negatively (CLERICAL) or positively (IFTCOOR, STRENGTH, EXERTION) with the strength factor. The two strength variables correlate negatively and clerical aptitude correlates positively with both the academic and people factors. As noted before, short-term memory is associated primarily with dealing with the public, a factor not shown here.

| | | | |
|----------|------|------|------|
| Clerical | .70 | -.22 | .45 |
| Memory | .20 | -.03 | .23 |
| Iftcoor | -.12 | .20 | -.07 |
| Exertion | -.49 | .27 | -.38 |
| Strength | -.57 | .30 | -.43 |

Bipolar interests. An interest in dealing with people and communication of ideas rather than with things and objects (IDATA) is characteristic of both the academic and people factors. The people factor is more highly associated than is the academic one with interests in business versus science (ISCIENCE), in social welfare versus machines (IMACH), and in esteem rather than productive satisfaction (IPRODUCT). In contrast, the academic factor is associated more highly with interest in creative versus routine work (ICREATE), and the psychomotor factor is associated with interests in machines (IMACH), things (IDATA), and productive satisfaction (IPRODUCT).

| Variable | Correlation with Skills Map dimension: | | |
|----------|--|-------|--------|
| | Academic | Motor | People |
| Idata | .65 | -.35 | .73 |
| Iscience | .21 | .28 | -.47 |
| Icreate | .69 | .05 | .31 |
| Imach | -.38 | .38 | -.68 |
| Iproduct | -.33 | .48 | -.61 |

Sources of information. Occupations requiring high academic aptitudes or dealing with people both require more frequent use of written materials (WRITTEN), oral communications (VERBALPO), or observation of behavior (BEHAVIOR), though the pattern differs somewhat for the two factors (written materials being more associated with academic aptitudes and observing behavior with the people factor). Use of quantitative and pictorial materials are moderately associated with the academic factor. As noted before, observation of events is associated with the vigilance factor not shown here.

The meaning of the DOT temperament FIF (feeling, ideas, or facts) is unclear and it is not associated with any of the three aptitude dimensions. The DOT temperament SJC (sensory or judgemental criteria) is associated with both the academic and people dimensions and presumably reflects the need for judgment in the face of ambiguous information that is probably characteristic of much high-level work and work dealing with people.

| | | | |
|-----------|------|------|------|
| Written | .66 | -.20 | .41 |
| Quant | .56 | -.19 | .23 |
| Pictorial | .38 | .11 | .06 |
| Patterns | .08 | .24 | -.13 |
| Behavior | .46 | -.30 | .63 |
| Events | -.03 | -.13 | .15 |
| VerbalPQ | .53 | -.17 | .54 |
| FIF | .16 | -.04 | .11 |
| SJC | .52 | -.15 | .44 |

| Variable | Correlation with Skills Map dimension: | | |
|----------|--|-------|--------|
| | Academic | Motor | People |

Appendix G

Responsibility. Responsibility for the safety of others (RESPSAF, e.g., avoiding injuries to coworkers) and for material assets (RESMAT) are unrelated to the three aptitude dimensions. General responsibility (RESPGEN) and criticality of the position (CRITICAL) are moderately positively correlated with both the academic and people dimension, but negatively with the psychomotor one.

| | | | |
|----------|------|------|------|
| Respsaf | -.24 | .19 | -.12 |
| Respmat | .06 | -.09 | .07 |
| Respge | .58 | -.35 | .47 |
| Critical | .48 | -.33 | .43 |

Vigilance. These three variables are unrelated to the three major dimensions, which is not surprising because it was shown in the earlier report that they form an independent dimension.

| | | | |
|----------|-----|------|-----|
| Recognit | .20 | -.04 | .11 |
| Viginfre | .06 | -.01 | .00 |
| Vigchang | .05 | -.09 | .11 |

Education and training. Level of formal education (EDUCATN, GED) and length of job-related training (SVP) are highly correlated (.8 to .9) with the academic factor, moderately (.3 to .5) with the people factor, and essentially not at all with the psychomotor one. (The PAQ variable TRAINING is almost the same in content as the DOT variable SVP, specific vocational training, but its correlations with the factors are lower.) The academic factor, and to a lesser extent the people factor, are also correlated with the need for job-related

| Variable | Correlation with Skills Map dimension: | | |
|--|--|-------|--------|
| | Academic | Motor | People |
| experience (EXPRNCE) and for keeping job knowledge current (UPDATE). Licensing, however, is most highly associated with dealing with people. | | | |
| Educate | .80 | -.26 | .49 |
| GED | .91 | -.06 | .38 |
| Training | .42 | -.02 | .14 |
| SVP | .81 | .09 | .27 |
| Exprnce | .54 | -.15 | .25 |
| Update | .63 | -.24 | .49 |
| License | .25 | -.05 | .36 |

Appendix H

Working conditions. The working conditions listed here can be divided into two major groups: the amount of structure to the job and the amount of stress induced by it. In general, lack of structure is most strongly related to the academic dimension: the greater the demands for academic aptitude, the greater the variety and change (VARCH), the less repetitious the work or continuous the workplace (REPETIT, REPCOM, WORKPACE), and the less structured or supervised the activities (STRUCTUR, RECSUPER). Time pressure (TIMEPRES), however, is most highly (but only moderately) correlated with the academic factor. The same pattern of relations, only weaker, is found with the people factor, but the psychomotor factor is generally unrelated to these job conditions.

Having to work with set limits, tolerances, or standards (STS) is moderately associated with both psychomotor and people requirements (R 's=.6, .5), but whereas the psychomotor factor is also positively associated with having measurable or verifiable criteria (MVC) for assessing work done, dealing with people means having less measurable or verifiable (i.e., more ambiguous) criteria.

| Variable | Correlation with Skills Map dimension: | | |
|----------|--|-------|--------|
| | Academic | Motor | People |

Although the DOT variable PUS (performing under stress) is unrelated to any of the three factors, all the specific types of stress measured by the PAQ are moderately correlated with both the academic (usually about .5) and people dimensions (usually about .6); working under distractions (DISTRACT), in frustrating situations (FRUST), with strained personal contacts (STRAIN) or interpersonal conflict situations (CONFLICT), or having civic obligations (CIVICOB) or making personal sacrifices (SACRIFC). (The negative correlation with the psychomotor factor may be a function of its being negatively correlated with the people dimension, for it is not clear why jobs requiring less psychomotor skill should be more stressful in these terms.)

Non-job-required social contact (SOCCONT) is most associated with the people dimension, but it is fairly independent of all of them.

The patterns of correlations just discussed are consistent with the factor analyses performed earlier and with a few exceptions the patterns all make a great deal of sense. Thus, the DOT and PAQ data probably provide a fairly valid view of job competency patterns and their relation to other job attributes, a view that provides an organized and comprehensible description of job competency requirements and their associated activities.

| | | | |
|----------|------|------|------|
| Varch | .36 | -.01 | .32 |
| Repcon | -.71 | -.01 | -.46 |
| MVC | .39 | .28 | -.26 |
| STS | -.14 | .58 | .51 |
| Workpace | -.36 | .06 | -.20 |
| Repetit | -.53 | .09 | -.30 |
| Cycled | -.02 | -.10 | .07 |
| Setproc | -.27 | .16 | -.30 |
| Timepres | .38 | -.09 | .30 |
| Structur | .70 | -.29 | .50 |

| Variable | Correlation with Skills Map dimension: | | |
|----------|--|-------|--------|
| | Academic | Motor | People |
| Recsuper | .61 | -.34 | .56 |
| Soccont | .18 | -.05 | .29 |
| Distract | .54 | -.29 | .58 |
| Civicob | .46 | -.34 | .59 |
| Frust | .55 | -.34 | .61 |
| Strained | .49 | -.39 | .66 |
| Sacrific | .45 | -.29 | .54 |
| Conflict | .57 | -.36 | .57 |
| PUS | .03 | -.01 | .12 |

^a Scoring of this variable has been reversed from that shown in Appendix A to aid in interpretation of the correlations.

Group 1: Low academic, low psychomotor, low people. (E.g., stock-handlers, chambermaids, dishwashers)

This group of occupations is the lowest in terms of academic aptitudes required (Appendix C). The percentiles for the average levels required range from only 2 to 7. Longshoremen, however, seem to require somewhat higher-level mental activities than do the other jobs in this group (decision-making, reasoning, planning, analyzing, and transcribing). Stockhandlers must make great use of written and quantitative materials but otherwise these occupations typically require only verbal sources of information and even that is low relative to other occupations (Appendix F).

These occupations, on the average, require high levels of general body movement (DIM10), handling (DIM15), use of machines, tools (DIM9) and miscellaneous equipment (DIM14), and controlling machines (DIM11), but they are low on all variables indicating dexterity (except manual dexterity, which is moderate) or coordination (Appendix D). They also require greater strength than most occupations, though only longshoremen require great strength (Appendix F).

Requirements are high relative to other occupations for interests in things rather than ideas or people (IDATA) and for routine versus creative work (ICREATE, Appendix F). Consistent with this is the extremely repetitious and structured nature of the work (Appendix H). Nevertheless these workers must exercise a moderate level of vigilance and often have moderate responsibility for safety and materials (Appendix G). Longshoremen, in particular, have responsibility for the safety of others.

Dealings with people are extremely low, the lowest of all groups (Appendix E). Relative to other occupations, this group is average in

catering to people's needs, though average means it is of only low importance on the job. Contact with the public is of moderate importance. However, personal stresses (e.g., working in frustrating or strained situations) are low (Appendix H).

Finally, education, training, and job experience requirements are the lowest of all groups (Appendix G). In summary, these jobs demand little but strength, a tolerance of repetitious work, and a moderate level of vigilance.

These occupations employ 2.6% of the workforce (Appendix I).

Group 2: Low academic, low psychomotor, moderate people. (E.g., deliverymen, crossing guards, servants)

This group averages around the 20th to 25th percentile in academic abilities, but somewhat lower on the mental activities (Appendix C). Even so, the deliverymen and crossing guards/bridge tenders do require a moderate amount of planning, transcribing and (like most occupations) a considerable amount of attention to detail. Education and training requirements are low relative to other occupations (Appendix G).

The profile for motor abilities and activities is essentially the same as that for Group 1: considerable movement, handling, and use of equipment, but low dexterity and coordination compared to other occupational groups. These jobs also require moderate strength, but less than Group I (Appendix F). The need for vigilance, however, is fairly high (around the 75th percentile), particularly for the deliveryman and crossing guards/bridgetenders. Not surprisingly, these two occupations have higher than average responsibility for safety and materials and the work of the deliverymen is highly critical to the performance of their organizations (Appendix G). The use of the sources of information listed in Appendix F is low, except for the observation of events which is high for crossing guards/bridgetenders.

Dealings with people -- and with the public in particular -- are at a moderate level. Looking at particular activities, however, only the deliverymen have moderate requirements for persuading, instructing, negotiating, and catering to personal needs (Appendix E). Not surprisingly, the deliverymen also stand out in this group for having more distracting, frustrating, and strained job situations. One would expect ushers to share some of these strains, but no data were available for them.

Although these jobs have relatively high structure and repetition, they vary somewhat in what particular type of structure: for example, the deliverymen have highly cycled activities with high time pressure. This group of jobs also requires a relatively high interest in routine versus creative work and in productive satisfaction rather than esteem (Appendix F).

In summary, these jobs are like those in Group 1 in terms of requirements for relatively unskilled physical activity, but they entail more dealings with people, more vigilance, and more responsibility. The jobs are not quite so routine, but still demand considerable tolerance or preference for repetitious and routine activities.

These jobs employ 1.8% of the workforce (Appendix I).

Group 3: Low academic, low psychomotor, high people. (E.g., parking attendants, baggage porters, elevator operators)

PAQ data are available for only two of the seven occupations (personal service attendants and elevator operators), so this group cannot be well described.

Requirements for academic skills are very low, between those of Groups 1 and 2 (Appendix C); so too are demands for motor aptitudes (Appendix D). But as with the previous two groups, this one appears to require considerable gross motor activity (Appendix D) and moderate physical strength or exertion (Appendix F).

Although dealings with people are frequent, they are only at a moderate level of complexity -- speaking/signaling, persuading, diverting (Appendix E). The little data available suggest that some of these jobs have moderate to high responsibility, but involve only extremely low requirements for vigilance.

These jobs also require considerable interest or tolerance for routine work, but more interest in social welfare rather than in machines in contrast to Groups 1 and 2 (Appendix F).

These jobs employ 0.6% of the workforce (Appendix I).

Group 4: Low academic, moderate psychomotor, low people. (E.g., bulldozer operators, assemblers, drill press operatives)

Most of the occupations in the first three groups are classified as service workers in the census scheme, particularly those in Group 3 that deal most with people. With increased demands for psychomotor skills in Group 4, most of the occupations are now machine operatives or, to a lesser extent, laborers or craftsmen.

Requirements for academic aptitudes and most mental activities are at or below the 20th percentile (Appendix C), but requirements for psychomotor aptitudes are moderate -- around the 40th to 50th percentiles on the average (Appendix D). Although this group is like the previous three (low psychomotor) groups in requiring considerable motor activity, use of machines, and strength, it differs because many of these occupations also require considerable controlled manual (DIM13) activities (Appendix D). There is considerable variation among the jobs in whether they involve skilled technical work (DIM12), but on the average this group is low relative to all others in this type of activity. Strength requirements are at the 75th percentile, generally at the "moderate" level (Appendix F). A high interest in machines rather than social welfare is required in almost all of the 74 occupations in this group.

Although many of the jobs require contact with the public (Appendix E) the level of involvement is quite low and almost none of the occupations have more than low demands for any interpersonal activities (except for DIM19 which, as noted before, is not readily interpretable). Interpersonal stresses are low (Appendix H).

Responsibility and vigilance vary, but are usually average relative to other groups of occupations (Appendix G). Duplicating machine operators, drill press operatives, and weavers require only low levels of respon-

sibility and vigilance in contrast to locomotive engineers and stationary firemen who require high levels of both. Education and training demands are relatively low. Although the jobs vary from high to low in how repetitious and structured they are, on the average they are quite routine (Appendix I)

In summary, these occupations are relatively low and homogeneous in their demands for academic aptitudes and mental and interpersonal activities. They are generally physically active jobs requiring hand dexterity and coordination, but particular motor activities and responsibilities vary considerably. They are routine jobs but they satisfy interests in working with things and machines. They also employ a very large proportion of the labor force -- 19.1% (Appendix I).

Group 5: Low academic, moderate psychomotor, moderate people
(E.g., garage workers, taxi drivers, garbage collectors)

These 8 occupations are primarily laborers and transport equipment operatives in the census scheme. As a rule, very few operatives or craftsmen are found in the moderate-or high-people groups, even if high psychomotor skills are required.

These occupations are not particularly distinguished from the previous ones in the low level of academic aptitudes required, but they tend to require more writing and more combining and analyzing of information. Taxicab drivers, in particular, require a moderate level of a wide variety of mental activities. Both taxicab drivers and railroad brakemen appear to require considerable short-term memory as well (Appendix F). Group 5 occupations are about average in requirements to use behavior, events, and oral communications as sources of job information (Appendix F). Requirements for using written, quantitative, patterns, or pictorial sources are lower than average. Education and training demands are low, but taxi drivers do need to be licensed (Appendix G).

Like the previous groups, these jobs require considerable physical activity and exertion (Appendices D and F), but the need to control machines (D1M11), exercise vigilance and take responsibility for the safety of others are fairly high on the average, particularly for taxi drivers (Appendices D and G).

Although contact with people is required by these jobs, it is of a fairly low level. Although these jobs are average (e.g., on persuading, advising, public speaking) or above average (e.g., on entertaining and catering to needs) on many of the interpersonal activities, these demands are of a fairly low level (Appendix E). (Jobs in general have low requirements for these interpersonal activities.) Correspondingly,

these jobs have at least average interpersonal stresses, taxicab drivers experiencing the highest levels of stress (but only a moderate level) among these 8 occupations (Appendix H).

These jobs are less structured, but just about as repetitious as the previous groups of jobs (Appendix H) and so most require a preference or tolerance for routine rather than creative work (Appendix F).

In summary, these jobs are similar to Group 2 occupations in that they are distinguished from other low-level groups by greater requirements for vigilance and responsibility, perhaps because of their greater involvement with people. Although there is of course a greater demand for psychomotor skills, there is also a suggestion of somewhat higher demands for mental and interpersonal activities for some of the jobs in Group 5 compared to those in Group 2. Nevertheless, education and training demands are still low. The interests required are also the same.

These occupations employ 1.5% of the work force (Appendix I).

Group 6: Low academic, moderate psychomotor, high people. (E.g., food counter and fountain workers, child care workers)

Only two occupations are found in this group, both of them being service workers in the census scheme.

Child care workers appear to have high demands for most of the mental activities but relatively low academic aptitude requirements (Appendix C). Behavior, events, and oral and written communications are all important sources of job information (Appendix F). In contrast, the food counter workers have no such demands for mental activity or information. Child care workers also have somewhat higher education and training demands and often require a license (Appendix H).

Although the DOT classifies child care workers as having contacts with people of only low complexity, the PAQ nevertheless classifies them as having high requirements for most interpersonal activities such as persuading, instructing, advising, and public speaking (Appendix E). (To some extent this apparent disagreement may result from the two sources of data rating different particular kinds of child care workers.) Once again, food counter workers have few such demands. Not surprisingly, child care workers also have greater interpersonal stresses, though both jobs require working under very distracting circumstances (Appendix H). The former also require considerable greater vigilance and more responsibility (Appendix G).

Both are quite active jobs involving a lot of handling (DIM15, Appendix D) and they require above average (but only moderate) strength or exertion (Appendix F). Demands for short-term memory are high for the food workers.

The jobs are of moderate structure, though the type of structure varies. For example, child care workers must follow more set procedures,

but food workers have a more specified workplace and greater time pressures (Appendix H).

In summary, the two occupations in this group differ considerably in the specific mental and interpersonal activities and responsibilities required of them, though they are similarly low in demands for academic aptitudes and moderate in both psychomotor aptitudes and in dealing with people. Both are physically active jobs of greater than average routine or repetition, and both require an interest in business rather than science.

These jobs employ only 0.4% of the work force (Appendix I).

Group 7: Low academic, high psychomotor, low people. (E.g., postal clerks, shoe repairmen, sewers and stitchers)

Most of these 7 occupations are craftsmen or operatives. PAQ data are available for only 3 of them, limiting the generalizations which can be drawn about the group.

These occupations are similarly low in academic aptitudes and above average in PAQ mental activities required (Appendix C). Demands for short-term memory are moderate, with only the postal clerks requiring high clerical aptitude (Appendix F). Educational requirements are low but training and experience required is high for a few of the occupations (Appendix C).

These jobs require few dealings with people, and require low (but no lower than average) interpersonal activities (at least those for which data were available, Appendix E). Interpersonal stresses and distractions are low but about average in relation to all other groups (but higher than for Groups 1 to 4).

Compared to the other low-level groups, these occupations require less general physical activity (DIM10) and exertion or strength and greater use of machines, tools, and equipment (DIM19) as well as much higher psychomotor aptitudes. These greater skills do not appear to be translated, however, into a greater importance of controlled manual work (DIM13) as often appears to be the case (Appendices D and F). Vigilance and responsibility are average to above average for the occupations for which there are data (Appendix G). A high interest in machines and things is required in almost all these occupations (Appendix F).

These jobs are fairly structured and repetitious or continuous and almost all have high demands for set limits, tolerances, or standards (STS); postal clerks experience high time pressure (Appendix H).

In summary, these jobs are distinctive from all other low-level jobs in their demands for high psychomotor skills and greater use of machines. Demands for exertion tend to be lower on the average.

These jobs employ 1.9% of the work force (Appendix I).

Group 8: Low academic, high psychomotor, moderate people.

There are no occupations in this group.

Group 9: Low academic, high psychomotor, high people.

There are no occupations in this group.

Group 10: Moderate academic, low psychomotor, low people.(proofreaders)

There is only one occupation in this group, proofreaders.

The occupation of proofreader demands high verbal skills but low mathematical aptitude (Appendix C). There is a high demand for precision and attention to detail, with average levels of the lower-level mental activities (e.g., coding, transcribing) but low levels of the other mental activities. Education and training is moderate, but no higher than average (Appendix G).

Written sources of information and clerical aptitude are very important (Appendix F). Demands for short-term memory and quantitative sources of information are moderate. Dealings with people and interpersonal activities rival Group 1 for being extremely low (Appendix E). Interpersonal stresses are also low (Appendix H).

Demands for vigilance and responsibility for safety and materials are minimal, though general responsibility to the organization is moderate (Appendix G). Demands for physical exertion are extremely low (Appendix F). There is a fair amount of handling, but general physical activity is low (Appendix D). Use of machines and tools is very low (Appendix D), as are the demands for an interest in things versus data (Appendix F). An interest in routine work is required (Appendix F) because the job is quite repetitious and structured, with very little variety or change, and with high demands for set procedural standards (STS) and criteria for judging performance (MVC).

In summary, this job is quite distinctive for its high demands for precision and following set procedures as well as for its extreme lack of demands for physical and interpersonal activities. It is also unusual because it demands much higher verbal than mathematical aptitude.

This job employs 0.04% of the work force (Appendix I).

Group 11: Moderate academic, low psychomotor, moderate people. (E.g., library attendants, stock clerks and storekeepers, bartenders)

These occupations demand average to below average academic aptitude and mental activities, with the exception of the mental activities more suggestive of clerical activities (compiling, coding, transcribing) which are somewhat above average. Although attention to detail is fairly typical, it is generally high (Appendix C). Demands for clerical aptitude and short-term memory are moderate but a bit above average (Appendix F).

Handling materials is above average, being particularly high for mail handlers and bartenders, but all other physical activities are moderate in level and average among all occupations (Appendix D). Only moderate exertion, nothing above average, is required (Appendix F). Demands for vigilance and responsibility are low relative to other occupations, although bartenders are critical to the performance of their organizations (Appendix G).

Bartenders are outstanding in this group in demands for catering to people's needs and dealing with the public (DIM21). The other occupations are low in requirements for the specific interpersonal activities listed, though they are average on most of them (Appendix E). Thus, like many occupations that require dealings with people, it is not at all clear from the PAQ and DOT data just what they do for or with people. These occupations do, however, require considerable use of written and oral sources of information, perhaps accounting for some of their dealings with people (Appendix F). Neither do these jobs require any particular interest either in business or social welfare. While these jobs have moderate or high distractions, all other interpersonal stresses are low (Appendix H).

Job structure is higher than average, but only moderate in level. Bartenders have somewhat less repetitious work but more set procedures to follow and greater time pressures.

In summary, most of these jobs seem to be low-level clerical jobs with a moderate component of handling the materials they work with. They deal with people to a moderate degree, but it may be largely for purposes of organizing work activities. When dealing with the public as bartenders do, this constitutes catering to people's needs. Responsibility is low, but not strikingly so, and job structure is high, but not strikingly so.

This group employs 2.5% of the work force (Appendix I).

Group 12: Moderate academic, low psychomotor, high people. (E.g., bill collectors, receptionists, guards and watchmen)

These 15 occupations tend to be what are called "boundary personnel" in other contexts, personnel who represent the organization to the public or deal with people outside the organization. Many of the jobs here are either service or clerical workers in the census scheme.

These occupations range from high to low in their demands for specific mental activities, but on the whole they are somewhat above average in these demands (Appendix C). Sheriffs, boarding house keepers, and hucksters have particularly high demands for activities such as deciding, reasoning, and planning. These particular occupations also require high use of written materials and observation of behavior (Appendix F). Clerical aptitudes and short-term memory are moderate for this group.

All these occupations have frequent dealings with people, but the nature of those activities varies (Appendix E). Housekeepers and hucksters cater to people's needs; these workers, together with railroad conductors, sheriffs and guards, also do a moderate amount of persuading, instructing and advising. But counter clerks, dispatchers, enumerators, receptionists and recreation attendants do little of any of these activities. Perhaps their activities are more routinized and less subject to resistance from the people they deal with. Interpersonal stresses such as frustrating and strained interpersonal situations are, in fact, fewer in these latter occupations (Appendix H). Sheriffs and boarding house keepers appear to have the most personally stressful and demanding jobs in this group.

Demands for psychomotor skills are low, but demands for most motor activities are at least average (Appendix D). Housekeepers appear to have quite physically active jobs. Only low to moderate exertion is required of this group (Appendix F). Vigilance is high for railroad

conductors, guards, and sheriffs. General and material responsibility is high for these three jobs as well as for the various types of housekeepers, with most of them being critical to the performance of their organizations (Appendix G). Education and training required is generally moderate, but railroad conductors and sheriffs require considerable job-related training and experience. Licensing requirements are above average for this group.

These occupations are characterized by a moderate amount of structure on the average, though there is variation from job to job (Appendix H). For example, railroad conductors have very repetitious, cycled activities requiring set procedures and meeting time schedules. In contrast, receptionists have few of these particular demands although the job is highly structured.

In summary, all these occupations have frequent dealings with people but they can be divided into highly-demanding versus less-demanding subgroups. The housekeepers, railroad conductors, sheriffs, and guards have higher demands for a variety mental and interpersonal activities, have greater responsibility, and suffer more stress in their dealings with people than do counter clerks, dispatchers, enumerators, receptionists, recreation attendants, and even bill collectors. None are particularly demanding of academic or psychomotor aptitudes, but most are at least moderately physically active.

These occupations employ 2.1% of the work force (Appendix I).

Group 13: Moderate academic, moderate psychomotor, low people.(E.g., carpenters, compositers, auto mechanics)

Most of these occupations are classified as craftsmen in the census scheme; a smaller number are classified as clerical workers.

Group 13 is similar to Groups 11 and 12 in its somewhat below average demands for academic aptitude (Appendix C). Most demands for mental activities are also somewhat below average, making them lower than those of Group 12 (that dealt more with people but less with psychomotor skills) but quite similar to Group 7 (that required lower academic but higher psychomotor aptitude).

These occupations demand somewhat higher than average psychomotor aptitudes and are considerably higher (at the 70th percentile) than the previous groups in complexity of involvement with things (Appendix D). Most operate or set up machines or do precision working, the highest levels of involvement with things. There is moderate to heavy use of machines and tools (DIM9), controlling machines and processes (DIM11), and controlled manual work (DIM13). General body movement (DIM10), an interest in machines, level of exertion, and use of patterns as a source of information (Appendix F) are also above average, the first two usually being quite high. Demands for vigilance and responsibility are only average, though most mechanics have high responsibility for materials (Appendix G). Many of the occupations require long training times and about half require considerable prior job-related experience, but it is not clear that the demands for the group as a whole are above average.

Demands for most interpersonal activities are low, but they are not much below average because jobs in general require little such activity (Appendix E). Likewise, interpersonal stresses are low but not much below

average (Appendix H). These jobs are moderate in degree of overall job structure and repetition, but most have set standards for performing (STS) and evaluating (MVC) work (Appendix H).

In summary, these occupations are similar to their counterparts at a lower academic level (Group 4) in their lack of involvement with people and in their satisfaction of interests in machines and objects, but they are less structured, have more demands for various interpersonal and mental activities, higher educational and training requirements, and a more complex involvement with things. Thus the work demands a somewhat greater variety of skills and opportunity to structure one's own activities.

These occupations employ 8.3% of the work force (Appendix I).

Group 14: Moderate academic, moderate psychomotor, moderate people.

(E.g., mail carriers, plumbers, dental assistants)

Occupations in this group come from a variety of census groups, though most often from craftsmen.

These jobs are at least average in demands for all academic and clerical aptitudes and mental activities (Appendix C). Psychomotor aptitudes and motor activities are generally somewhat above average (Appendix D), with most jobs requiring moderate to high levels of general body movements (DIM10) or coordination (DIM16) and activities with the hands (DIM15, DIM13) or machines (DIM9, DIM11, DIM14). Demands for vigilance and responsibility are somewhat above average (Appendix G). A few of the occupations (electrotypers, power station operators, health aides, and firemen) have particularly high responsibility. Education and training are at least average, with many of the jobs having long training times (Appendix G).

Interpersonal activities are generally low, but above average (Appendix E). Firemen require moderate levels of persuading, instructing, advising, negotiating, and coordinating; athletes and health aides require moderate levels of the first three of these; but other occupations require less. Firemen also have the most (moderately) interpersonally stressful of these jobs (Appendix H).

In summary, this group seems remarkable only for its moderate demands in all areas examined. A few particular occupations such as firemen have more marked responsibility and stress.

These occupations employ 4.3% of the work force (Appendix I).

Group 15: Moderate academic, moderate psychomotor, high people.

(E.g., telephone operators, bus drivers, waiters)

These occupations, which are from a variety of census groups, require average academic aptitudes. They are fairly average in demands for the various mental activities, except in demands for precision and attention to detail which are below average (though high for a few occupations, Appendix C). Clerical aptitudes are moderate, just a bit above average (Appendix F).

Psychomotor aptitudes, motor activities, and level of exertion are uniformly average on the whole, though there are higher than average demands for controlling machines (D1M11, Appendices D and F). Practical nurses appear to have the highest demands for motor activity of these jobs, though their motor skill requirements are the same. Demands for vigilance are a bit above average for the group, but the individual occupations range from low (e.g., sales clerks and waiters) to high (e.g., bus drivers and practical nurses, Appendix G).

Dealings with people are high, though the particular interpersonal activities required differ from job to job (Appendix E). Waiters must do some persuading and a lot of catering to people's needs; practical nurses must also, but they also do a lot of instructing and some advising, negotiating, and supervising of non-employees. Retail salesmen must do a lot of persuading and some instructing and advising; in contrast, telephone operators who also must deal extensively with the public do none of these interpersonal activities to any extent. Not surprisingly, these Group 15 occupations rely to a relatively high extent on behavior and events as sources of job information (Appendix F). Interpersonal stresses are somewhat above average, but generally they are only low to moderate (Appendix H). Responsibility, however, is high for some of these

occupations: safety for bus drivers and practical nurses, and materials for foremen and bus drivers (Appendix G).

This group is different than most the previous ones in the consistency of interests in people it requires. It is quite above average in interests in social welfare versus machines, business versus science, people and data versus machines, and esteem versus productive satisfaction (Appendix F). These workers are not required to be particularly interested in either routine or creative work, because the work is generally not highly structured or repetitious, though that does vary from job to job as does the type of structure involved (Appendix H). Education and training demands are usually moderate, though the amount of job experience required varies considerably and the need to update job knowledge is high in a few occupations (Appendix G).

In summary, these occupations are uniformly moderate in academic and psychomotor skills and activities, but range widely in the specific interpersonal activities, responsibilities, and job conditions they experience. Much like Group 12, this group stands out from the low-level jobs dealing with people in its consistent requirements for interests in people, business, and social welfare versus things, objects, machines, and productive satisfaction. And this is so despite the fact, unlike Group 12, it does deal with some machines to a greater than average extent and requires moderate psychomotor skills.

These occupations employ 9.2% of the work force (Appendix I).

Group 16: Moderate academic, high psychomotor, low people. (E.g., cabinet makers, photoengravers, tool and die makers)

This group consists primarily of craftsmen.

These occupations are average in academic aptitudes required, but their profile of verbal versus mathematical aptitudes illustrates an interesting trend within both the moderate- and high-academic strata of occupations (Appendix C). Group 16 has requirements for math aptitude (MATHDOT, NUM) that are relatively higher than those for verbal aptitude (VERBAL, LANG); the percentiles are, respectively, in the 50's for math but only the 40's for verbal. This predominance of math requirements is true for 4 of the 5 groups with low dealings with people and with low to moderate academic requirements (Groups 13, 16, 22, and 25). The reverse pattern is found for the groups with high dealings with people (Groups 12, 21, 27 and perhaps 15 and 18), verbal abilities being higher than math ones.

Demands for the mental activities are average or below (Appendix C). A few occupations have high demands for decision making and reasoning (aircraft mechanics, pattern and model makers), but otherwise demands are only low to moderate. Like most other groups, precision and detail are important. Written, quantitative, and oral sources of information are of average importance, but use of patterns is much higher than average (primarily because of the demands of pattern and model makers and of photoengravers), as is the use of pictorial materials (Appendix F). Events and behavior are relatively unimportant probably because these occupations have relatively little to do with controlling machines or dealing with people (Appendices D and E). And consistent with this, there are only low demands for vigilance (Appendix G).

Demands for all psychomotor aptitudes are very high relative to other occupations, generally from the 80th to 90th percentiles (Appendix D).

Manual dexterity, form perception, and spatial aptitude are high for most of the 21 occupations in this group. Controlled manual activities (D1M13) are particularly important among the motor activities, with less emphasis (an average level) on general body movement (D1M10), and relatively little handling (D1M16), controlling machines (D1M11), or using miscellaneous equipment (D1M14). Level of exertion is generally moderate (Appendix F). The mechanic with his hand tools represents well the type of motor activities carried out in this group. Most of the occupations clearly stress productive satisfaction rather than esteem (IPRODUCT) and an interest in processes, machines, or techniques versus social welfare (IMACH, Appendix F).

This group is below average in dealings with people, seldom having more than a low requirement for any of the interpersonal activities (Appendix E). And although some of the occupations involve working under moderate distractions, there are seldom any interpersonal stresses (Appendix H).

Amount of structure and repetition is average. The jobs are, however, almost always high in requirements for set limits and standards (STS) for performing work and in having measurable and verifiable criteria (MVC) for evaluating it.

In summary, this is a set of jobs homogeneous in its clear standards for how work must be performed; the skilled use of the hands in working with tools, machines, or equipment; the enjoyment of productive satisfaction; and the lack of demands for dealing with people. Mathematical and spatial aptitudes are more important than verbal ones.

This group employs 3.3% of the work force (Appendix I).

Group 17: Moderate academic, high psychomotor, moderate people.

(E.g., stenographers, electricians, drywall installers)

Although these 4 occupations of course share common demands along the three major competency dimensions, their particular job demands seem quite different. Nor is it clear that they are particularly different in their activities than the occupations in Group 16.

Stenographers require higher verbal and clerical aptitudes than the other occupations in this group, as well as greater finger dexterity and hand-related motor coordination and use of written sources of information (Appendices C, D, and F). In contrast, electricians require greater manual dexterity, spatial aptitude, and use of pictorial materials (Appendices D and E), and drywall installers and brickmason apprentices require greater strength (Appendix F).

Mental and interpersonal activities are not distinctive for any of the three occupations for which there are PAQ data (Appendices C and E). Motor activities are, however (Appendix D). For example, general body movement (DIM10) is low for stenographers, moderate for electricians, and high for brickmasons apprentices. The remaining motor activities also differ across the three occupations.

All four occupations require an interest in machines, processes, or techniques rather than social welfare (Appendix F). All are subject to set limits or standards (STS) and all but stenographers have measurable criteria for their work (MVC). Otherwise, the jobs seem to be only moderately structured on the average and not particularly stressful (Appendix H).

In summary, these jobs are similar in the general competencies and interests required and in job structure. Although they deal with people to a moderate extent, it is not really clear what those dealings consist

of. Although their motor skills are all moderate on the average, the particular aptitudes required and motor activities performed are different. This is a heterogeneous group not easily described.

This group employs 0.8% of the work force (Appendix I).

Group 18: Moderate academic, high psychomotor, high people. (E.g., barbers, hairdressers, and cosmetologists, personal service apprentices)

Four of these 5 occupations are service workers in the census classification. PAQ data are available for only 2 of the 5 occupations, so little can be said about this group.

These occupations require somewhat below average academic aptitudes (Appendix C), but higher than average (though generally only moderate) psychomotor skills (Appendix D). They have much dealing with people, but it is generally only at a low level (e.g., serving, Appendix E). Demands for clerical abilities range from high (clerical assistants) to low (hairdressers, personal service apprentices), and lower than average (generally only low to moderate) physical exertion is required (Appendix F). The work appears to have somewhat less than average structure (Appendix H), and sometimes even seems to require an interest in creative rather than routine work (barbers, personal service apprentices, Appendix F). This group generally requires an interest in social welfare rather than machines and processes and in all cases an interest in business rather than science.

These occupations employ 0.9% of the work force (Appendix I).

Group 19: High academic, low psychomotor, low people. (E.g., political scientists, numerical control tool programmers, authors)

There are only 3 occupations in this group, all of them professionals in the census scheme. PAQ information is available for only one of the occupations.

On the average, these occupations require above average academic abilities, though they vary from high (political scientists, tool programmers) to low (authors) in math aptitude required (Appendix C). Demands for psychomotor abilities are extremely low, lower for than any previous group, with the exception of tool programmers, who require high levels of form perception and spatial aptitude (Appendix D). These occupations deal with things at the lowest level of complexity (the zero percentile). Dealings with people are below average, but are of moderate complexity (Appendix E). Clerical aptitudes range from moderate to high (political scientists) and demands for strength or exertion are extremely low (Appendix F). High levels of both education and training are required (Appendix G). The interests required vary somewhat; political scientists require an interest in science and creative work, tool programmers in science, machines, and productive satisfaction, and authors in data and people versus things and in creative work (Appendix F). This group differs from the previous ones primarily because it is higher in academic abilities and training required and because it is very much lower in demands for psychomotor skills and exertion.

These occupations employ 0.04% of the work force (Appendix I).

Group 20: High academic, low psychomotor, moderate people. . (E.g., librarians, construction inspectors, estimators and investigators)

These 4 occupations are found in the professional, managerial, and clerical census groups.

As with all the groups requiring high or very high academic abilities, these occupations also require high intelligence and complex dealings with data such as analyzing, coordinating, and synthesizing data (Appendix C). Occupations requiring only low to moderate academic abilities rarely require more than computing and compiling data. The mental activities required differ from one occupation to another in this group, but all require moderate to high levels of each of the activities and the group as a whole is above average in such requirements. Librarians require high levels of planning and deciding and some of the inspectors require high levels of compiling, combining, and transcribing data.

Dealings with people are required and above average, but of only moderate complexity (Appendix E). The particular interpersonal activities are similar across the occupations, and they tend to require moderate to high levels of persuading, instructing, and advising. Interpersonal stresses are definitely above average for the group as a whole, with the inspectors, except construction, facing high levels of distraction, frustration, and strained and conflict-ridden personal contacts (Appendix H). The librarians and estimators face only low stresses.

Sources of job information vary, but all 4 make moderate to high use of written and oral communications and quantitative materials (Appendix F). The inspectors also make moderate to high use of events and pictorial materials. Requirements for clerical aptitude and short-term memory are above average and at least moderate in magnitude.

The psychomotor skills of finger dexterity, manual dexterity, and motor coordination are low, but demands for form perception and spatial aptitudes are average and moderate in level (Appendix D). As was noted in an earlier section, form perception and spatial aptitudes are moderately correlated with the academic as well as the psychomotor competency dimensions. All hand-related activities are relatively low--controlled manual activities (DIM13), handling (DIM15), and use of tools or equipment (DIM9, DIM14). However, these jobs often involve considerable controlling of machines (DIM11) and skilled technical activity (DIM12).

Demands for vigilance are average overall, and range from low (librarians, estimators) to moderate (the 2 types of inspectors, Appendix G). General responsibility is high, with the inspectors being particularly critical to the performance of their organizations. It is also important for the inspectors to update their job knowledge. As with many occupations requiring moderate academic aptitudes and with most occupations requiring higher academic abilities, these jobs require long (over one year's) job training (SVP).

These 4 jobs are not repetitious, nor is the work pace set, but they are only moderately structured (Appendix H). Procedures are fairly well set and time pressure is generally moderate.

In summary, the 4 jobs require high academic aptitudes, intelligence, and general responsibility, as well as moderate to high levels of the mental activities such as planning and analyzing data. The inspectors stand out from the other 2 occupations in this group by facing greater interpersonal stresses and needs for vigilance and updating job knowledge. Hand-related aptitudes and activities are low, but much of the work (primarily the inspectors') is considered skilled technical work and requires spatial aptitude and form perception. Thus, the psychomotor

skills and activities required tend to be more analytical than is the case with the previous groups required. No particular interests in people are required and the moderate dealings with people seem to be for the purpose of completing the more analytical (e.g., inspection) activities.

These occupations employ 0.6% of the labor force (Appendix I).

Group 21: High academic, low psychomotor, high people. (E.g., social workers, buyers, sales representatives)

These 30 occupations are mostly professional, managerial (including farm), or sales workers.

As noted earlier, this group has relatively higher requirements for verbal than math aptitude; percentiles for the former are in the 70's and for the latter are in the 60's (Appendix C). Most of these occupations have high requirements for the mental activities of decision making, reasoning, and planning. Demands for combining, analyzing, and compiling data and for writing are either moderate to high and are definitely above average on the whole.

Dealings with people are at a highly complex level for most of the professionals (i.e., supervising, instructing, negotiating, mentoring) but at only a moderately complex level (e.g., persuading and diverting) according to the DOT estimate (PEOPLE) for the remaining occupations (Appendix E). Looking at specific interpersonal activities measured by the PAQ, most of the occupations have moderate to high levels on almost all these activities and the percentiles are generally in the 70's and 80's. The clerical (e.g., ticket agents) and service workers (e.g., stewardesses) in this group tend to have lower interpersonal requirements. Although professionals, managers, and sales workers in this group all do a fair amount of persuading, instructing, advising, and negotiating, only the professionals have substantial involvement in supervising non-employees and in coordinating people (without line management authority).

Not surprisingly, written and oral communications and observations of behavior are important sources of job information (Appendix F), and high interests in data or people versus things are required (Appendix F).

With the exception of most of the professional workers, these occupations require an interest in business; the professional workers tend to require interests in social welfare. Interpersonal strains are relatively high (with percentiles around 80), particularly for elementary teachers and policemen (Appendix H). Demands for vigilance are average, but for responsibility and updating job information, they are above average. Most of the professionals, managers, sales workers, and policemen have high general responsibility and are critical to the performance of their organizations (Appendix G). Managerial workers also have high responsibility for material assets.

All psychomotor aptitudes are low (Appendix D). Demands for exertion are below average and are generally low to moderate. Most motor activities are generally moderate, although elementary teachers and stewardesses require a lot of general body movement as well as several other activities.

These occupations, particularly the professional, managerial, and sales ones, tend to be only loosely structured (Appendix H). Time pressure is at least moderate, but the work pace and procedures (STS) are not set, the work is not repetitious, and the supervision required is relatively low. However, no particular interest in creative work seems to be required (Appendix F). Moderate to high levels of education and training are required.

In summary, this group seems distinctive from previous ones discussed, not only because it has high requirements for both academic and interpersonal aptitudes and activities, but also because it is considerably less structured and gives workers much more discretion in determining when and how the work is done even though their performance is often critical to the performance of their organizations.

These occupations employ a sizeable proportion of the labor force--
7.0% (Appendix I).

Group 22: High academic, moderate psychomotor, low people. (E.g., chemical technicians, surveyors, bookkeepers)

Three of these 4 occupations are professional workers in the census scheme, most of them being technicians.

These occupations require relatively higher math than verbal ability; percentiles are, respectively, in the 80's and 60's for math and verbal aptitudes (Appendix C). Requirements for decision making, reasoning, planning, combining, and analyzing are moderate and generally somewhat above average. Compiling and transcribing data are also generally moderate but are above average. Use of pictorial materials is very high at the 92nd percentile, and use of written and oral communications is also high; observation of behavior and events is not important (Appendix F).

Psychomotor aptitudes are definitely above average, with demands for form perception usually being high. All but the surveyors have highly complex dealings with things, though this is not much above the average (Appendix D). Except for bookkeepers, the work is considered highly skilled technical work (D1M12). General activity and manual activities are about average, but the technicians make considerable use of tools, machines, and equipment (D1M9). Demands for vigilance are moderate for the surveyors and technicians, and all but the surveyors have only moderate responsibility (Appendix G). Demands for exertion or strength are below average and demands for clerical aptitude above average, particularly for the bookkeeper (Appendix F).

Dealings with people and demands for almost all interpersonal activities are low (Appendix E). Interpersonal stresses are below average (Appendix H).

Job structure and repetition are moderate, but there are set standards for performing (STS) and evaluating (MVC) work (Appendix H).

Except for bookkeepers, the work demands an interest in science and in machines, techniques, or processes rather than social welfare (Appendix F).

In summary, this work is highly quantitative and has little to do with people. Although the work deals at a complex level with things, it is of a very technical, scientific nature rather than of a very mechanical and manually manipulative one. Bookkeepers break from this pattern by having work of a more clerical and less scientific nature.

These occupations employ 2.4% of the work force (Appendix I).

Group 23: High academic, moderate psychomotor, moderate people.

(E.g., industrial engineering technicians, dancers, payroll and time keeping clerks)

With the exception of the payroll clerks, this seemingly heterogeneous group of 6 occupations is found in the professional group in the census scheme. Only 4 of the 6 have PAQ data.

These occupations generally require moderate but above average (around the 70th percentile) academic aptitudes (Appendix C). The same statement can be made about the mental activities with the exception of air traffic controllers. This occupation requires high levels of decision making, reasoning, planning, and combining information.

Demands for psychomotor aptitudes are generally moderate and about average (Appendix D) and demands for exertion below average (Appendix F). Spatial aptitude and complexity of involvement with things range from high to low depending on the occupation. The pattern of motor activities required also varies among the 4 occupations for which there are PAQ data. For example, use of machines, tools, or equipment (D1M9) ranges from high (air traffic controllers and photographers) to low (payroll clerks); handling (D1M15) also varies from high (photographers) to low (air traffic controllers). Clerical aptitude, eye-hand-foot coordination (IFTCOOR), needs for vigilance and responsibility also show similar variation (Appendices F and G). As would be expected, the air traffic controllers have high demands for vigilance and responsibility in contrast to the other occupations. Sources of job information vary. Air traffic controllers depend heavily on written, oral, and pictorial information as well as on the observation of events; payroll clerks depend on written, quantitative, and oral sources, but on none of the others.

Dealings with people are moderate, but range from high (dancers) to low (photographers and some of the technicians) in complexity (Appendix D). Demands for all interpersonal activities are low except for air traffic controllers (who do persuading, negotiating, advising, and a lot of instructing) and photographers (who do some instructing and advising). Workers in the 4 occupations for which there are PAQ data work under moderate distractions (Appendix H), but interpersonal stresses are low except for the air traffic controllers (who also had the most interpersonal activities).

Job structure varies among the jobs, some being very loosely structured (air traffic controllers) or having high time pressures (air traffic controllers, photographers, Appendix H). Interests in data versus things, people versus machines, creative versus routine work, and productive satisfaction versus esteem also vary widely but in patterns that would be expected (Appendix F).

In summary, this group is extremely heterogeneous in activities, interests, and responsibilities required. It seems to be more of a catch-all group than anything else.

These occupations employ 0.4% of the work force (Appendix I).

Group 24: High academic, moderate psychomotor, high people. (E.g., home management advisors, adult education teachers, ship officers)

Five of these 9 occupations are professional workers.

Academic aptitudes are around the 70th percentile of all occupations, as are most of the more highly academically-related mental activities (deciding, reasoning, planning, combining, and writing, Appendix C). The two teachers for which there are data and home management advisors are particularly high on these mental activities. The teachers and home management advisors also have the most complex dealings with people (Appendix E) and, specifically, have high demands for instructing and persuading. Teacher aides have lower requirements for interpersonal activities, though they do have moderate demands for instructing, coordinating, and supervising non-employees. Cashiers have only low interpersonal demands; presumably their dealings with people are very routinized (as is suggested by the high degree of structure of their jobs, Appendix H) and demand little in the way of interpersonal skills and activities. This is in clear contrast to the teachers and home advisors who have moderately to loosely structured jobs and more stressful and responsible ones (Appendices G and H). Likewise, written, oral, pictorial, and behavioral sources of information are less important to cashiers than to the other occupations (Appendix F). The health technologists fall between the cashiers and the other occupations in demands for interpersonal activities. Several of the occupations (adult education teachers and teacher aides) appear to require an interest in social welfare, and most require at least an interest in data and people versus things (Appendix F). Some (but not the teachers) require an interest in business.

Psychomotor aptitudes are generally moderate and average, with the exception of high demands for form perception and spatial aptitude required of health technologists, adult education teachers, and ship officers (Appendix D). Most psychomotor activities are average to above average, though the pattern differs for specific occupations. The exertion demanded is low to moderate and only around the 30th percentile (Appendix F).

In summary, the teaching jobs have high academic and interpersonal demands, higher than those of the technologists, cashiers, and teacher aides in this group, even though they all have extensive dealings with people. A few of these occupations have high demands for form perception and spatial aptitude, but are otherwise moderate in psychomotor demands. Interests vary somewhat, but are generally people-related. Most of the jobs are loosely structured but only the art teachers require an interest in creative work.

These occupations employ 1.7% of the work force (Appendix I).

Group 25: High academic, high psychomotor, low people. (E.g., radio operators, machinists, carpet installers)

This group includes 15 titles most of which are craftsmen or technical workers in the professional category.

Verbal abilities are around the 60th percentile and math abilities around the 70th, and all such demands tend to be moderate rather than high in magnitude (Appendix C). In contrast to the other "high academic" groups already discussed, demands for mental activities, particularly the higher level ones (e.g., deciding, reasoning, planning, combining data), are below average with most percentiles in the 30's and 40's. The demands for mental activities are more similar to the moderate academic groups (where most craftsmen are found) than the high ability ones. The technical workers in the professional category (electrical and mechanical technicians, radio operators) have higher demands for mental activities than do the craftsmen and crafts apprentices in this group.

All but the tailors in this group have complex dealings with things--operating, controlling, or setting up machines or doing precision work (Appendix D). And most of the occupations require high spatial aptitude, use of tools or equipment (DIM9), and controlled manual activities (DIM13). The crafts workers appear to require particularly high levels of manual dexterity. Most of the jobs require only low to moderate handling (DIM15), general body movement (DIM10), and exertion (Appendices D and F).

Written and oral sources of information are the most important, though not above average for occupations in general (Appendix F). Use of pictorial and quantitative information is generally at least moderate

and above average, but observation of behavior and events is unimportant (Appendix F). This is consistent with the very low level of involvement this group has with people (Appendix E). Demands for the interpersonal activities are almost always low, and the jobs are not stressful in personal terms (Appendix H). Demands for vigilance are moderate at most and responsibility is generally below average (Appendix G).

Unlike many of the high academic ability groups, these Group 25 occupations are fairly structured and repetitious (Appendix H). Work pace and work standards and procedures are set. Demands for training are relatively more important than those for formal education (Appendix G).

In summary, these occupations all involve an interest in and working with machines, processes, or techniques and involve relatively higher quantitative and spatial than verbal skills. Although apparently requiring higher than average academic aptitudes, these jobs do not make many demands for the specific mental activities measured by the PAQ. Of the two subgroups of occupations in this group, the crafts workers require less of the mental activities than do the other workers (e.g., technicians, radio operators). There is minimal involvement with people. This group is very similar to the moderate academic level Group 16 occupations, which also require high psychomotor but low people aptitudes and most of whom are also craftsmen. It is fairly skilled technical or mechanical work with fixed standards emphasizing quantitative rather than verbal skills but without much responsibility or interpersonal stress. The main difference between the groups is apparently in the general level of academic ability or intelligence required.

These Group 25 occupations employ 1.1% of the labor force (Appendix I).

Group 26: High academic, high psychomotor, moderate people. (E.g., designers, millwrights)

There are only 2 occupations in this group and only one has PAQ data available.

Academic aptitudes, particularly the mathematical ones, are above average for these 2 occupations, and the millwrights (for whom PAQ data are available) require average levels of decision-making, reasoning, planning, and analyzing (Appendix C).

Psychomotor abilities differ somewhat, with finger dexterity and form perception being high for designers but manual dexterity high for millwrights (Appendix D). Both, however, require high spatial aptitude and complex involvement with things. The millwrights are moderate on all motor activities except for controlled manual activities (D1M13) and use of tools, machines, and equipment (D1M11) which are high. Demands for exertion or strength are low for designers but moderate to high for millwrights (Appendix F). Although little data are available about the job structure of designers, it appears that their job is differently structured than that of the millwrights. The millwrights have set standards and criteria for their work (Appendix H). In contrast, designers do not have set criteria and instead must rely on more ambiguous criteria to guide their work (i.e., on feelings, ideas, or facts, FIF, or on sensory or judgmental criteria, SJC) and must be interested in creative work (Appendix F).

Dealings with people are moderate, but it is not clear what they consist of; there are no data for the designers and the millwrights do some instructing and rely on oral communications in their work but otherwise appear to have few interpersonal activities (Appendix E). Interpersonal stresses are low (Appendix H).

In summary, although these 2 occupations are similar in general competency levels required in the three major areas, the jobs seem to differ in specific requirements. Both stress complex dealings with things, but the designers have more ambiguous standards and creative jobs than do the millwrights who in turn seem to be more similar to the highly skilled craftsmen in motor activities and job structure.

These 2 occupations employ 0.2% of the labor force (Appendix I).

Group 27: High academic, high psychomotor, high people. (E.g., kindergarten teachers, bank tellers, secretaries)

Four of these occupations are professionals and 4 are clerical workers in the census scheme.

These occupations require high verbal aptitudes (percentiles in the 70's) but only moderate math aptitudes (percentiles in the 50's); this is opposite to the pattern found in the last 2 groups also requiring high academic and motor aptitudes but lower dealings with people (Appendix C). The college coaches and physical education teachers, in particular, require only low math aptitude. Only one of the 4 professional workers, kindergarten teachers, has PAQ data and those data show that this occupation requires high levels of almost all the mental activities (decision making, reasoning, planning, writing, and combining, compiling, and analyzing information). The clerical workers in this group require only low to moderate levels of these activities, though demands for transcribing information are sometimes high. The bank tellers and secretaries also require high clerical aptitude (Appendix F).

Psychomotor demands, particularly for finger dexterity and motor coordination, are high for all occupations except the kindergarten teachers (Appendix D). The clerical workers work at a complex level with things but require little spatial aptitude and form perception whereas the pattern is pretty much reversed for the professional workers. The kindergarten teachers are physically active (D1M10), whereas the secretaries are not, and the professional workers require moderate exertion whereas the clerical workers require little (Appendix F).

When interpersonal activities are considered (Appendix E), the professional and clerical workers are once again split into 2 differing

groups. The former generally deal with people at a complex level (e.g., supervising, instructing, negotiating, mentoring), whereas the latter do not (e.g., speaking - signaling, persuading). The PAQ data for kindergarten teachers versus the clerical workers dramatically confirm this. Correspondingly, kindergarten teachers use information from observing behavior and events (as well as written and oral sources of information) but the tellers and secretaries do not (Appendix F), and the teachers face considerably more interpersonal stresses (Appendix H) and demands for vigilance and responsibility (Appendix G). Interests in social welfare (IMACH) are required of the professionals but interests in business are required of the clerical workers (Appendix F).

Job structure and repetition are generally low to moderate, but the clerical workers do have set limits, tolerances, or standards for their work (Appendix H). The work demands neither an interest in creative nor routine work.

In summary, although these occupations require both high psychomotor skills and dealing with people, the interests required are clearly more people related than they are machines or things oriented. In particular, bank tellers and secretaries use machines and equipment but the interests demanded apparently are for business rather than machines and processes. The professional workers require more mental activities, interpersonal activities, interest in social welfare, and responsibility but less complex involvement with things. Presumably this difference between the subgroups appears despite similar demands for psychomotor skills because the professionals all work with people's bodies, whereas the clerical workers manipulate machines.

These occupations employ 4.1% of the labor force (Appendix I).

Group 28: Very high academic, low psychomotor, low people. (E.g., computer programmers, statisticians, social scientists)

The occupations in the very high academic groups are primarily professional workers in the census scheme; one group also includes a number of managerial and sales workers. Many of the occupations in the high academic stratum did not require college degrees, but most of those in this very high group do require a BA or higher. Most of the workers who provide those degrees, college and university teachers, would be in this very high academic stratum, but data are not available to examine them. Almost all occupations in the 9 very high academic groups require high verbal abilities, generally averaging the 90th percentile or above, and most require high levels of math, education, and training.

Turning back to Group 28 in particular, these 8 occupations generally require high levels of all the mental activities except the more clerical ones of coding and transcribing (Appendix C). The percentiles are in the 80's and 90's, thus placing this group (like most of those to follow) above the previous groups which required lower academic aptitude. Math aptitudes average just about the highest of any of the 34 occupational groups, rivaled only by 3 groups of engineers and scientists (Groups 31, 32, and 34).

Most of these jobs require high clerical and spatial aptitudes, but are very low in psychomotor aptitudes, exertion, and general body movement (DIM10) required (Appendices D and F). Generally, these occupations do not require the use of tools, machines, or equipment (DIM9) except for miscellaneous equipment (DIM14) or even a moderately complex relationship with things.

Dealings with people are few, but of a moderate level of complexity when they occur (Appendix E). Advising and having staff functions are

the most frequent interpersonal activities; supervising non-employees is unimportant and there are extremely low dealings with the public (9th percentile). Sociologists (non-academic sociologists) have the most interpersonal activities because they have high demands for persuading, instructing, advising, negotiating, and coordinating (without line management authority); actuaries are at least moderate in demands for all these activities but the other occupations have lower demands. Except for the sociologists, interpersonal stresses are low, though most of these occupations work under at least moderate distractions (Appendix A).

Observation of behavior and events is important only to the sociologists, but written, quantitative, and oral information are important to almost all these occupations. Responsibility for safety is low, responsibility for material assets is moderate and about average, but general responsibility is high (Appendix G). Actuaries, atmospheric and space scientists, and sociologists are considered fairly critical to the performance of their organizations.

Demands for education, training, and experience are high, generally around the 80th to 90th percentiles (Appendix G). Job structure and repetition are low and requirements for an interest in creative work are at the 92nd percentile (though generally still only moderate, Appendices F and H). Time pressures are moderate and the use of measurable or verifiable criteria for the work is high, both around the 85th percentile. High interests in science rather than business and in esteem rather than productive satisfaction are required.

In summary, these occupations are very mathematical and sedentary relative to other groups, and they require few physical or interpersonal activities. To the extent that machines are used, they are probably

used to further more mental and analytical tasks. With the exception of the sociologists, people seem to be dealt with only to get information from or to pass advice to (particularly to superiors within the organization). This group is more scientific and intellectually demanding than any of those yet examined--and most of those yet to be examined.

This group employs 0.3% of the labor force (Appendix I).

Group 29: Very high academic, low psychomotor, moderate people.

(E.g., accountants, operations and systems analysts, economists)

Like the previous group, this one generally requires high levels of the higher-level mental activities (Appendix C) as well as the same sources of information (written, quantitative, and oral, Appendix F). Demands for psychomotor aptitudes are even lower, however, rivaling only Group 30 for the absence of such demands (percentiles ranging from lows of 1 and 2, Appendix D). Many of the motor activities are at a moderate level, though often below average. Like the previous group, exertion is very low (Appendix F). This group deals more often with people than the previous group, but the level of specific interpersonal activities appears to be about the same. Interests and working conditions are also the same as the previous group.

In summary, this group is very similar to the previous one except that it is even lower in motor aptitudes and abilities, but deals with people more often but not in a substantially different manner.

These occupations employ 1.1% of the work force (Appendix I).

Group 30: Very high academic, low psychomotor, high people. (E.g., lawyers, psychologists, managers, and administrators)

This group includes 13 professionals, 10 managers, 3 salesmen, and 1 clerical worker.

Most mental activities as well as academic abilities are around the 90th percentile, almost all the occupations having high demands (Appendix C). Written and oral sources of information are very important, but quantitative materials and observing behavior are less so (Appendix F). Observing events is generally unimportant. Dealings with people are also high and most interpersonal activities range from moderate to high in importance (Appendix E). Coordinating and supervising non-employees are not particularly important in these occupations, but persuading, instructing, advising, and negotiating often are. For judges, clergymen, assessors and controllers, health administrators, insurance agents, real estate agents, and stock and bond salesmen, at least 3 of these 4 activities are very important. The first 3 of these occupations--judges, clergymen, and assessors and controllers--also suffer considerable stress on the job, with the judges and clergymen having high civic obligations and personal sacrifices required (Appendix A). Almost all the occupations in this group, however, have high general responsibility (but low responsibility for safety) and are considered critical to the performance of their organizations (Appendix G). All require high levels of education, training, and related job experience.

As with the previous group, Group 30 occupations require very little psychomotor aptitude or physical exertion (Appendices D and F). The specific motor activities generally range from low to moderate in importance, with the controlled or controlling activities being more important than general handling and body movement.

Almost all these occupations require an interest in data and people versus things and objects and in esteem rather than productive satisfaction (Appendix F). Many of the managerial and sales workers also require an interest in business. Only the lawyers and clergymen appear to require an interest in creative versus routine work, even though the PAQ data show that all these occupations are almost always loosely structured and not repetitious or with a set work pace (Appendix H). In fact, the work in this group is less structured on the average than that of any other occupational group. Time pressures are at least moderate for all the occupations, the group average being at the 78th percentile for all groups.

In summary, Group 30 is like the other 2 very-high-academic-ability and low-psychomotor-ability groups (Groups 28 and 29) in its very high academic and mental but very low motor requirements. This group differs most from the other 2 because of its extensive interpersonal activities, stresses, and responsibilities, but also because it is less oriented to science and quantitative materials.

These occupations employ a relatively large 9.0% of the work force (Appendix I).

Group 31: Very high academic, moderate psychomotor, low people.

(E.g., chemical engineers, civil engineers, mathematical technicians)

There are only 4 occupations in this group, 3 engineers and one technician.

This group is one of those with extremely high requirements for math aptitude (Appendix C). Demands for the mental activities are high for the engineers but only moderate for the technicians. Demands for spatial aptitude and form perception are also quite high with percentiles around 90 (Appendix D). The other psychomotor aptitudes are only moderate, however, the engineering work is considered quite skilled technical work (D1M12). Other motor activities are generally moderate, but little general body movement (D1M10) or exertion is required (Appendices D and F).

The mathematical technicians have only low demands for all the interpersonal activities, but the engineers do considerable advising (Appendix E). The engineers' dealings with people are apparently not very frequent, but they involve a moderate level of all the interpersonal activities when they do occur. Interpersonal stresses are above average, but still low (Appendix H). The most important stresses seem to be working in distracting and frustrating situations. The engineers have high general responsibility (Appendix G).

All 4 jobs require an interest in science (Appendix F). The jobs are loosely structured and not repetitious, but they all have high use of set limits, tolerances, and standards (STS) and measurable or verifiable criteria for their activities (Appendix H).

In summary, these jobs share the high demands for academic aptitudes, mental activities, and education and training of the last 3 groups examined, but they are more similar to those requiring high quantitative

rather than high people skills and they involve definitely higher psychomotor aptitudes. They are similar to some of the lower academic level crafts and technical worker groups (Groups 16 and 25) in having such set standards and criteria for work, but the Group 31 jobs are much less structured and more scientific.

These occupations employ 0.4% of the labor force (Appendix I).

Group 32: Very high academic, moderate psychomotor, moderate people.

(E.g., architects, industrial engineers, geologists)

Most of these 12 occupations are engineers or physical scientists, all professionals in the census scheme.

Like the previous group, also composed primarily of engineers, this one requires very high math aptitude as well as verbal aptitude (Appendix C). Mental and motor activities, psychomotor aptitudes, strength, interpersonal stresses, general responsibilities, and education and training are also similar. The differences between these 2 groups are few. Group 32 involves more frequent dealings with people, though the activities themselves are largely the same (mostly moderate in level). There tends to be more responsibility for materials, but less set standards for carrying out work. The engineers in this group also require more of an interest in machines and processes than do those in Group 31.

In summary, this is another group distinguished by its high level scientifically and quantitatively oriented demands, but it has more interpersonal activities than some of the others and few set procedures for performing work.

This group employs 1.4% of the labor force (Appendix I).

Group 33: Very high academic, moderate psychomotor, high people.

(E.g., sales engineers, registered nurses, secondary school teachers)

PAQ data are not available for 2 of these 5 professional occupations, 3 of which are health related.

These occupations require high verbal abilities but perhaps only moderate mathematical ones (Appendix C). However, the demands for mental activities are lower for secondary teachers than for the nurses and physical therapists. Motor activities are more similar and are generally moderate (Appendix D). In contrast to the other workers (with moderate demands), the teachers require only low finger and manual dexterity. (Most teachers are, in fact, in Group 30 which is the same in general academic competencies and dealings with people but which has lower psychomotor demands.)

These occupations have frequent dealings with people, with instructing and advising being the most important activities (though data are available only for the nurses, therapists, and teachers, Appendix E), and all three occupations have moderate demands for supervising non-employees. None of the 3 deal with the public (DIM21). Once again, the teachers have lower demands. The nurses and therapists also have high general responsibility and are considered critical to the performance of their organizations, but this is not the case with teachers (Appendix G).

This group exceeds all others in the importance of observing behavior, but oral and written sources of information are also important (Appendix F). As a group, interpersonal stresses are far above average, though very surprisingly they are all rated low for the secondary teachers (Appendix H). The work pace is not set nor the work repetitious, but the jobs are at least moderately structured (at least the 3 for which there are PAQ data). Nurses have the most job structure (high) and time pressure (moderate).

The interests required vary from job to job (Appendix F). Sales engineers require an interest in data and people rather than things and objects (but not an interest in science and machines in contrast to many of the engineers in Group 32). Nurses require an interest in science and social welfare (IMACH); therapists in social welfare only; college health specialties teachers in data and people versus things, science versus business, and esteem versus productive satisfaction; and secondary teachers in data and people versus things, social welfare versus machines, and esteem versus productive satisfaction.

In summary, only the health workers and teachers in this group can be well described because the other 2 do not have PAQ data. But the group seems fairly similar on the whole to Group 30 which also has high involvement with people but lower psychomotor aptitudes and less job structure. Teachers differ from the health workers in Group 33 by having fewer demands for interpersonal and mental activities and less responsibility.

These jobs employ 2.6% of the work force (Appendix I).

Group 34: Very high academic, high psychomotor, low people. (E.g., biological scientists, veterinarians, pharmacists)

These 9 occupations are all professional workers in the census scheme.

This is the last of the 4 groups with very high math as well as verbal aptitude (Appendix C). This group, however, has lower demands for the mental activities on the average than did the 3 other groups (percentiles around 70 rather than 80 to 90). This difference seems to occur because only the metallurgical engineers, agricultural scientists, and biological scientists have high demands for any of the higher level activities (e.g., deciding, reasoning, planning).

Like the other 3 high-math groups mentioned above, occupations in this group generally require high spatial aptitude and form perception, but they more uniformly require complex involvement with things (Appendix D). The hand-related psychomotor aptitudes (finger dexterity, manual dexterity, and motor coordination) are especially high for agricultural scientists, veterinarians, clinical lab technicians, and draftsmen. Most of the jobs are highly skilled technical work (D1M12) involving moderate but below average strength (Appendices D and F). Specific motor activities vary considerably from job to job, for example, some requiring much general body movement (metallurgical engineers and pharmacists) but others not (clinical lab technicians and draftsmen) and some requiring considerable handling (agricultural scientists and clinical lab technicians, but others not (metallurgical engineers and marine scientists). Responsibilities also vary (Appendix G). For example, agricultural scientists, clinical lab technicians, and pharmacists are rated as most critical to their organizations but they are, respectively, low, moderate, and high in responsibility for the safety of others.

These occupations do not have many dealings with people, and half of them have dealings of only low complexity (Appendix E). These workers do not persuade, negotiate, coordinate, or supervise non-employees. They do moderate instructing and advising, but they do not have staff functions. The pharmacists require business interests, but all the others require an interest in science (Appendix F). Half of the occupations also require an interest in machines, processes, and techniques versus social welfare.

Only the metallurgical engineers require an interest in creative work and all but these engineers and the agricultural scientists have moderately structured work (Appendices F and H). Time pressures are moderate and standards and criteria for work (STS, MVC) are set. Interpersonal stresses are average but low.

In summary, these jobs require high verbal, math, and psychomotor abilities. Although the work is generally technical, scientific, and skilled, the specific motor activities vary from job to job. Like many groups requiring high psychomotor but low people skills, work standards and criteria are clear. Responsibilities vary from high to low.

These occupations employ 0.8% of the work force (Appendix I).

Group 35: Very high academic, high psychomotor, moderate people.
(E.g., health practitioners, n.e.c., airplane pilots, musicians
and composers).

Although all 3 occupations are professional workers (only the last 2 of which have PAQ data), they form a seemingly heterogeneous group.

The airplane pilots require high levels of decision making, reasoning, planning, and combining and analyzing information, but the musicians and composers usually require little of these activities despite the high academic aptitudes required (Appendix C). The latter only do a lot of coding. These occupations are above average but generally only moderate in the hand-related psychomotor aptitudes required (Appendix D). Both pilots and musicians, however, require considerable body movement (DIM10) and general physical coordination (e.g., limb movement without visual control, DIM16). The pattern of motor activities is distinctive in this group because it requires more general body movement and coordination than any other group, but less handling (DIM15) and controlled manual activities (DIM13) than any other group.

Dealings with people are at a moderate level of complexity, with the pilots having more interpersonal activities (Appendix E). Musicians do some instructing and a lot of entertaining, but pilots have moderate demands for most of the interpersonal activities. Pilots work under highly distracting circumstances in contrast to the musicians who face only moderate distraction (Appendix H). The musicians face none of the interpersonal stresses but pilots do. The interests demanded are in machines (for pilots) and in things versus data or people (for musicians, Appendix F). Only the health practitioners are interested in social welfare versus machines.

Musicians need an interest in creative work and their work is unstructured except for having a set work pace and cycled activities

(Appendices F and H). In contrast, pilots have highly structured work with set limits, tolerances, and standards as well as measurable criteria for their work.

In summary, only 2 of the occupations in this group can be well-described and it is apparent that, although general competencies may be the same, specific activities and job conditions are extremely different. Pilots have very responsible jobs with clear standards and high job structure, whereas musicians have only loosely structured jobs with low demands for most of the mental and interpersonal demands measured here. Both occupations are similar, however, in their very high demands for general body movement and coordination but very low demands for handling and controlled manual activities.

This group employs 0.2% of the work force (Appendix I).

Group 36: Very high academic, high psychomotor, high people.

(E.g., dentists, physicians, radiological technicians)

These 5 professional occupations are all health related. PAQ data are available only for the physicians and radiological technicians. These jobs can be considered the most generally demanding because they make high demands on all the 3 general competency dimensions.

The physicians require high levels of all the mental activities except the most clerically-related ones; the radiological technicians generally require only moderate levels of these activities (Appendix C).

Demands for psychomotor aptitudes are higher in this group than in any other, the percentiles generally being in the high 90's (Appendix D). Specific motor activities vary, with physicians being high on skilled technical work (D1M12) and moderate on most the other activities, whereas the technicians are high on handling (D1M15) and the use of tools, machines, and equipment (D1M9, D1M14). Exertion is moderate for all occupations in this group (Appendix F).

Dentists, physicians, and optometrists deal with people at a higher level of complexity than do the dental hygienists or radiological technicians (Appendix E). The technicians have low demands for most of the interpersonal activities, their interactions presumably being standardized. Physicians, however, have at least moderate interpersonal demands and often high ones (i.e., for persuading, instructing, advising, and supervising non-employees). Sources of information are quite similar for the 2 occupations: high levels of written, pictorial, and oral information and at least moderate levels of quantitative and behavioral information (Appendix F). Physicians must exercise much vigilance and have considerable responsibility, but radiological technicians do not (Appendix F). Both require considerable education, training, and licenses.

All occupations in this group require an interest in science and all but dental hygienists require an interest in social welfare (Appendix F). The physicians must make personal sacrifices and they face moderate levels of all the personally stressful job conditions (Appendix H). The radiological technicians experience strained and conflict-ridden personal contacts. Job structure, time pressure, and repetition are at least moderate for these 2 occupations.

In summary, these occupations make high demands for all the general competencies, though specific activities vary. Although PAQ data are available for only 2 occupations, the 5 occupations probably break down into a more demanding and a less demanding subgroup (physicians, dentists, and perhaps optometrists versus dental hygienists and radiological technicians). If physicians and technicians are a guide, the first group faces considerable demands for most mental and interpersonal activities as well as considerable responsibility and stress, whereas the second subgroup does not. Group 36 as a whole is composed of scientific health-related jobs requiring higher psychomotor aptitudes than any other occupational group.

This group employs 0.6% of the work force (Appendix I).

Appendix C

Census Occupational Codes by which
DOT and PAQ Data were Aggregated
for the Skills Map

This appendix includes the number of titles aggregated for each census category and the Skills Map aptitude group number each census category was assigned.

| Occupation Code | | No. Det Titles | No. PAQ Titles | No. PAQ Responses | Aptitude Group No. |
|--|---|----------------|----------------|-------------------|--------------------|
| PROFESSIONAL, TECHNICAL, AND KINDRED WORKERS | | | | | |
| 001 | Accountants | 11 | 8 | 352 | 29 |
| 002 | Architects | 4 | 2 | 10 | 32 |
| | Computer specialists | | | | |
| 003 | Computer programmers | 4 | 2 | 134 | 28 |
| 004 | Computer systems analysts | 3 | 2 | 77 | 20 |
| 005 | Computer specialists, n.e.c. | 1 | - | - | 28 |
| | Engineers | | | | |
| 006 | Aeronautical and astronautical engineers | 12 | - | - | 31 |
| 010 | Chemical engineers | 8 | 1 | 26 | 31 |
| 011 | Civil engineers | 15 | 6 | 106 | 31 |
| 012 | Electrical and electronic engineers | 33 | 11 | 218 | 32 |
| 013 | Industrial engineers | 20 | 9 | 86 | 32 |
| 014 | Mechanical engineers | 12 | 3 | 20 | 32 |
| 015 | Metallurgical and materials engineers | 5 | 2 | 5 | 34 |
| 020 | Mining engineers | 2 | 1 | 8 | 32 |
| 021 | Petroleum engineers | 6 | - | - | 32 |
| 022 | Sales engineers | 6 | - | - | 33 |
| 023 | Engineers, n.e.c. | 30 | 2 | 18 | 32 |
| 024 | Farm management advisors | 7 | 3 | 79 | 21 |
| 025 | Foresters and conservationists | 21 | 4 | 8 | 21 |
| 026 | Home management advisors | 3 | 2 | 63 | 24 |
| | Lawyers and judges | | | | |
| 030 | Judges | 3 | 1 | 1 | 30 |
| 031 | Lawyers | 17 | 8 | 91 | 30 |
| | Librarians, archivists, and curators | | | | |
| 032 | Librarians | 17 | 9 | 75 | 20 |
| 033 | Archivists and curators | 7 | - | - | 32 |
| | Mathematical specialists | | | | |
| 034 | Actuaries | 1 | 1 | 16 | 28 |
| 035 | Mathematicians | 3 | - | - | 28 |
| 036 | Statisticians | 3 | 1 | 18 | 28 |
| | Life and physical scientists | | | | |
| 042 | Agricultural scientists | 13 | 2 | 7 | 34 |
| 043 | Atmospheric and space scientists | 1 | 3 | 1 | 28 |
| 044 | Biological scientists | 16 | 2 | 13 | 34 |
| 045 | Chemists | 9 | 4 | 27 | 32 |
| 051 | Geologists | 14 | 1 | 20 | 32 |
| 052 | Marine Scientists | 3 | 2 | 6 | 34 |
| 053 | Physicists and astronomers | 7 | - | - | 32 |
| 054 | Life and physical scientists, n.e.c. | 1 | - | - | 34 |
| 055 | Operations and systems researchers and analysts | 13 | 7 | 97 | 29 |
| 056 | Personnel and labor relations workers | 29 | 12 | 386 | 30 |

| Occupation Code | | No. Dot Titles | No. PAQ Titles | No. PAQ Responses | Aptitude Group No. |
|---|---|----------------|----------------|-------------------|--------------------|
| Physicians, dentists, and related practitioners | | | | | |
| 061 | Chiropractors | 2 | - | - | 27 |
| 062 | Dentists | 8 | - | - | 36 |
| 063 | Optometrists | 1 | - | - | 36 |
| 064 | Pharmacists | 1 | 1 | 4 | 34 |
| 065 | Physicians, medical and osteopathic | 28 | 4 | 6 | 36 |
| 071 | Podiatrists | 2 | - | - | 15 |
| 072 | Veterinarians | 13 | - | - | 34 |
| 073 | Health practitioners, n.e.c. | 3 | - | - | 35 |
| Nurses, dietitians and therapists | | | | | |
| 074 | Dietitians | 9 | 27 | 4 | 21 |
| 075 | Registered nurses | 15 | 57 | 11 | 33 |
| 076 | Therapists | 17 | 4 | 18 | 33 |
| Health technologists and technicians | | | | | |
| 080 | Clinical laboratory technologists and technicians | 8 | 3 | 19 | 34 |
| 081 | Dental hygienists | 1 | - | - | 36 |
| 082 | Health record technologists and technicians | 2 | 1 | 2 | 30 |
| 083 | Radiologic technologists and technicians | 3 | 1 | 2 | 36 |
| 084 | Therapy assistants | 3 | - | - | 27 |
| 085 | Health technologists and technicians, n.e.c. | 24 | 9 | 49 | 24 |
| Religious workers | | | | | |
| 086 | Clergymen | 1 | 1 | 1 | 30 |
| 090 | Religious workers, n.e.c. | 7 | - | - | 21 |
| Social scientists | | | | | |
| 091 | Economists | 4 | 5 | 60 | 29 |
| 092 | Political scientists | 1 | - | - | 19 |
| 093 | Psychologists | 10 | 7 | 40 | 30 |
| 094 | Sociologists | 1 | 1 | 3 | 28 |
| 095 | Urban and regional planners | 2 | 2 | 24 | 32 |
| 096 | Social scientists, n.e.c. | 12 | 2 | 23 | 28 |
| Social and recreation workers | | | | | |
| 100 | Social workers | 23 | 13 | 113 | 21 |
| 101 | Recreation workers | 10 | 5 | 49 | 21 |
| Teachers, college and university | | | | | |
| 102 | Agriculture teachers | 1 | - | - | 30 |
| 103 | Atmospheric, earth, marine, and space teachers | - | - | - | - |
| 104 | Biology teachers | - | - | - | - |
| 105 | Chemistry teachers | - | - | - | - |
| 110 | Physics teachers | - | - | - | - |
| 111 | Engineering teachers | - | - | - | - |
| 112 | Mathematics teachers | - | - | - | - |
| 113 | Health specialties teachers | 2 | - | - | 33 |
| 114 | Psychology teachers | - | - | - | - |
| 115 | Business and commerce teachers | - | - | - | - |
| 116 | Economics teachers | - | - | - | - |

| Occupation Code | | No. Dot Titles | No. PAQ Titles | No. PAQ Responses | Aptitude Group Nc |
|-----------------|---|----------------|----------------|-------------------|-------------------|
| 120 | History teachers | - | - | - | - |
| 121 | Sociology teachers | - | - | - | - |
| 122 | Social science teachers, n.e.c. | - | - | - | - |
| 123 | Art, drama, and music teachers | 5 | - | - | 24 |
| 124 | Coaches and physical education teachers | 3 | - | - | 27 |
| 125 | Education teachers | - | - | - | - |
| 126 | English teachers | - | - | - | - |
| 130 | Foreign language teachers | - | - | - | - |
| 131 | Home economics teachers | - | - | - | - |
| 132 | Law teachers | - | - | - | - |
| 133 | Theology teachers | - | - | - | - |
| 134 | Trade, industrial, and technical teachers | - | - | - | - |
| 135 | Miscellaneous teachers, college and university | 1 | - | - | 21 |
| 140 | Teachers, college and university, subject not specified | 3 | 2 | 15 | 30 |
| | Teachers, except college and university | | | | |
| 141 | Adult education teachers | 4 | 3 | 29 | 24 |
| 142 | Elementary school teachers | 2 | 2 | 53 | 21 |
| 143 | Prekindergarten and kindergarten teachers | 2 | 1 | 9 | 27 |
| 144 | Secondary school teachers | 4 | 2 | 9 | 33 |
| 145 | Teachers, except college and university, n.e.c. | 15 | 1 | 2 | 24 |
| | Engineering and science technicians | | | | |
| 150 | Agriculture and biological technicians, except health | 13 | 2 | 22 | 13 |
| 151 | Chemical technicians | 8 | 1 | 49 | 22 |
| 152 | Draftsmen | 47 | 19 | 379 | 34 |
| 153 | Electrical and electronic engineering technicians | 32 | 5 | 109 | 25 |
| 154 | Industrial engineering technicians | 7 | 5 | 41 | 23 |
| 155 | Mechanical engineering technicians | 5 | 3 | 46 | 25 |
| 156 | Mathematical technicians | 2 | 1 | 4 | 31 |
| 161 | Surveyors | 11 | 2 | 7 | 22 |
| 162 | Engineering and science technicians, n.e.c. | 64 | 13 | 204 | 22 |
| | Technicians, except health, and engineering and science | | | | |
| 163 | Airplane pilots | 17 | 9 | 41 | 35 |
| 164 | Air traffic controllers | 6 | 5 | 9 | 23 |
| 165 | Embalmers | 2 | - | - | 25 |
| 170 | Flight engineers | - | 1 | 3 | - |
| 171 | Radio operators | 13 | 2 | 29 | 25 |
| 172 | Tool programmers, numerical control | 1 | 1 | 1 | 19 |
| 173 | Technicians, n.e.c. | 21 | - | - | 23 |
| 174 | Vocational and educational counselors | 7 | 5 | 78 | 30 |
| | Writers, artists, and entertainers | | | | |
| 175 | Actors | 10 | - | - | 12 |

| Occu- pation Code | | No. Dot Titles | No. PAQ Titles | No. PAQ Responses | Aptitude Group No. |
|---|--|-------------------|-------------------|----------------------|-----------------------|
| 180 | Athletes and kindred workers | 29 | 3 | 8 | 14 |
| 181 | Authors | 11 | - | - | 19 |
| 182 | Dancers | 2 | - | - | 23 |
| 183 | Designers | 26 | - | - | 26 |
| 184 | Editors and reporters | 31 | 8 | 45 | 30 |
| 185 | Musicians and composers | 8 | 1 | 1 | 35 |
| 190 | Painters and sculptors | 41 | 5 | 30 | 16 |
| 191 | Photographers | 15 | 3 | 6 | 23 |
| 192 | Public relations men and publicity writers | 3 | 1 | 36 | 30 |
| 193 | Radio and television announcers | 2 | - | - | 21 |
| 194 | Writers, artists, and entertainers, n.e.c. | 35 | 2 | 22 | 15 |
| 195 | Research workers, not specified | 3 | 1 | 5 | 30 |
| MANAGERS AND ADMINISTRATORS, EXCEPT FARM | | | | | |
| 201 | Assessors, controllers, and treasurers; local public administration | 4 | 1 | 25 | 30 |
| 202 | Bank officers and financial managers | 18 | 10 | 129 | 30 |
| 203 | Buyers and shippers, farm products | 9 | - | - | 30 |
| 205 | Buyers, wholesale and retail trade | 1 | 2 | 21 | 21 |
| 210 | Credit men | 1 | 1 | 35 | 30 |
| 211 | Funeral directors | 1 | - | - | 21 |
| 212 | Health administrators | 6 | 3 | 14 | 30 |
| 213 | Construction inspectors, public administration | 5 | 3 | 47 | 20 |
| 215 | Inspectors, except construction, public administration | 31 | 2 | 7 | 20 |
| 216 | Managers and superintendents, building | 3 | 2 | 32 | 21 |
| 220 | Office managers, n.e.c. | 2 | 2 | 92 | 21 |
| 221 | Officers, pilots, and pursers; ship | 15 | - | - | 24 |
| 222 | Officials and administrators; public administration, n.e.c. | 86 | 22 | 154 | 30 |
| 223 | Officials of lodges, societies, and unions | 13 | 4 | 19 | 21 |
| 224 | Postmasters and mail superintendents | 2 | 1 | 4 | 21 |
| 225 | Purchasing agents and buyers, n.e.c. | 8 | 4 | 150 | 30 |
| 226 | Railroad conductors | 6 | 1 | 1 | 12 |
| 230 | Restaurant, cafeteria, and bar managers | 8 | 2 | 38 | 21 |
| 231 | Sales managers and department heads, retail trade | 4 | 3 | 48 | 21 |
| 233 | Sales managers, except retail trade | 3 | 1 | 1 | 21 |
| 235 | School administrators, college | 17 | 7 | 14 | 30 |
| 240 | School administrators, elementary and secondary | 9 | 5 | 24 | 30 |
| 245 | Managers and administrators, n.e.c. | 263 | 46 | 1264 | 30 |

| Occu- pation Code | | No. Dot Titles | No. PAQ Titles | No. PAQ Responses | Aptitude Group No |
|-------------------------------------|---|-------------------|-------------------|----------------------|----------------------|
| SALES WORKERS | | | | | |
| 260 | Advertising agents and salesmen | 5 | 2 | 6 | 21 |
| 261 | Auctioneers | 1 | 1 | 1 | 21 |
| 262 | Demonstrators | 5 | - | - | 15 |
| 264 | Hucksters and peddlers | 7 | 1 | 1 | 12 |
| 265 | Insurance agents, brokers, and underwriters | 7 | 4 | 273 | 30 |
| 266 | Newsboys | 1 | - | - | 12 |
| 270 | Real estate agents and brokers | 8 | 2 | 9 | 30 |
| 271 | Stock and bond salesmen | 3 | 1 | 4 | 30 |
| 280 | Salesmen and sales clerks, n.e.c. Category "280 Salesmen and sales clerks, n.e.c." was subdivided in the Census into 5 occupation groups dependent on industry. The industry codes are shown in parentheses. Code 280 not used here because redundant with codes 281 - 285. | | | | |
| 281 | Sales representatives, manufacturing industries (Ind. 107-399) Durable, nondurable | 13 | - | - | 21 |
| 282 | Sales representatives, wholesale trade (Ind. 017- 058, 507-599) agric., mining, wholesale trade | 77 | 12 | 63 | 21 |
| 283 | Sales clerks, retail trade (Ind. 608-699 except 618, 639, 649, 667, 668, 688) except auto, furniture | 51 | 10 | 58 | 15 |
| 284 | Salesmen, retail trade (Ind. 607, 618, 639, 649, 667 668, 688) auto, furniture, appliance fuel | 10 | 2 | 3 | 15 |
| 285 | Salesmen of services and construction (Ind. 067-078, 407-499, 707-947) | 35 | 5 | 68 | 21 |
| CLERICAL AND KINDRED WORKERS | | | | | |
| 301 | Bank tellers | 8 | 3 | 54 | 27 |
| 303 | Billing clerks | 8 | 5 | 179 | 13 |
| 305 | Bookkeepers | 22 | 14 | 1083 | 22 |
| 310 | Cashiers | 20 | 6 | 144 | 24 |
| 311 | Clerical assistants, social welfare | 1 | - | - | 18 |
| 312 | Clerical supervisors, n.e.c. | 37 | 20 | 188 | 21 |
| 313 | Collectors, bill and account | 7 | 2 | 52 | 12 |
| 314 | Counter clerks, except food | 15 | 2 | 67 | 12 |
| 315 | Dispatchers and starters, vehicle | 20 | 8 | 77 | 12 |
| 320 | Enumerators and interviewers | 3 | 1 | 1 | 12 |
| 321 | Estimators and investigators, n.e.c. | 46 | 18 | 259 | 20 |
| 323 | Expeditors and production controllers | 55 | 11 | 244 | 11 |
| 325 | File clerks | 13 | 5 | 305 | 14 |
| 326 | Insurance adjusters, examiners, and investigators | 3 | 4 | 227 | 21 |
| 330 | Library attendants and assistants | 10 | 5 | 113 | 11 |
| 331 | Mail carriers, post office | 4 | 1 | 3 | 14 |

| Occupation Code | | No. Dot Titles | No. PAQ Titles | No. PAQ Responses | Aptitude Group No |
|-------------------------------|---|----------------|----------------|-------------------|-------------------|
| 332 | Mail handlers, except post office | 11 | 1 | 107 | 11 |
| 333 | Messengers and office boys | 9 | 2 | 46 | 5 |
| 334 | Meter readers, utilities | 3 | 3 | 149 | 21 |
| | Office machine operators | | | | |
| 341 | Bookkeeping and billing machine operators | 6 | 5 | 68 | 25 |
| 342 | Calculating machine operators | 5 | 4 | 72 | 13 |
| 343 | Computer and peripheral equipment operators | 5 | 5 | 194 | 13 |
| 344 | Duplicating machine operators | 6 | 4 | 56 | 4 |
| 345 | Key punch operators | 3 | 3 | 315 | 13 |
| 350 | Tabulating machine operators | 3 | 1 | 16 | 13 |
| 355 | Office machine operators, n.e.c. | 24 | 6 | 74 | 4 |
| 360 | Payroll and timekeeping clerks | 6 | 3 | 135 | 23 |
| 361 | Postal clerks | 1 | 1 | 23 | 7 |
| 362 | Proofreaders | 6 | 4 | 65 | 10 |
| 363 | Real estate appraisers | 1 | 1 | 33 | 30 |
| 364 | Receptionists | 14 | 8 | 183 | 12 |
| | Secretaries | | | | |
| 370 | Secretaries, legal | 1 | 1 | 24 | 27 |
| 371 | Secretaries, medical | 1 | 1 | 4 | 27 |
| 372 | Secretaries, n.e.c. | 3 | 3 | 890 | 27 |
| 374 | Shipping and receiving clerks | 23 | 10 | 303 | 13 |
| 375 | Statistical clerks | 45 | 15 | 309 | 13 |
| 376 | Stenographers | 6 | 2 | 322 | 17 |
| 381 | Stock clerks and storekeepers | 36 | 15 | 562 | 11 |
| 382 | Teacher aides, exc. school monitors | 4 | 3 | 42 | 24 |
| 383 | Telegraph messengers | - | - | - | - |
| 384 | Telegraph operators | 8 | - | - | 15 |
| 385 | Telephone operators | 10 | 6 | 127 | 15 |
| 390 | Ticket, station, and express agents | 25 | 7 | 56 | 21 |
| 391 | Typists | 14 | 10 | 766 | 16 |
| 392 | Weighers | 23 | 4 | 75 | 4 |
| 394 | Miscellaneous clerical workers | 157 | 41 | 1589 | 14 |
| 395 | Not specified clerical workers | 11 | - | - | 11 |
| CRAFTSMEN AND KINDRED WORKERS | | | | | |
| 401 | Automobile accessories installers | 8 | - | - | 4 |
| 402 | Bakers | 18 | 1 | 3 | 4 |
| 403 | Blacksmiths | 4 | 1 | 8 | 4 |
| 404 | Boilermakers | 7 | 5 | 50 | 14 |
| 405 | Bookbinders | 11 | - | - | 4 |
| 410 | Brickmasons and stonemasons | 21 | 1 | 19 | 13 |
| 411 | Brickmasons and stonemasons, apprentices | 4 | 1 | 19 | 17 |

| Occu- pation Code | | No. Dot Titles | No. PAQ Titles | No. PAQ Responses | Aptitude Group No |
|-------------------------|--|-------------------|-------------------|----------------------|----------------------|
| 412 | Bulldozer operators | 5 | 4 | 18 | 4 |
| 413 | Cabinetmakers | 5 | - | - | 16 |
| 415 | Carpenters | 38 | 3 | 143 | 13 |
| 416 | Carpenter apprentices | 4 | - | - | 25 |
| 420 | Carpet installers | 1 | - | - | 25 |
| 421 | Cement and concrete finishers | 13 | 3 | 26 | 4 |
| 422 | Compositors and typesetters | 17 | 1 | 9 | 13 |
| 423 | Printing trades apprentices, exc. pressmen | 14 | - | - | 16 |
| 424 | Cranemen, derrickmen, and hoistmen | 49 | 5 | 64 | 4 |
| 425 | Decorators and window dressers | 3 | 2 | 6 | 25 |
| 426 | Dental laboratory technicians | 14 | 5 | 31 | 16 |
| 430 | Electricians | 19 | 10 | 512 | 17 |
| 431 | Electrician apprentices | 4 | 1 | 11 | 16 |
| 433 | Electric power linemen and cablemen | 26 | 10 | 360 | 14 |
| 434 | Electrotypers and stereotypers | 4 | 1 | 1 | 14 |
| 435 | Engravers, exc. photoengravers | 41 | 3 | 9 | 4 |
| 436 | Excavating, grading, and road machine operators; exc. bulldozer | 35 | 6 | 133 | 4 |
| 440 | Floor layers, exc. tile setters | 3 | - | - | 13 |
| 441 | Foremen, n.e.c. | 733 | 45 | 335 | 15 |
| 442 | Forgemen and hammermen | 16 | 1 | 1 | 4 |
| 443 | Furniture and wood finishers | 4 | 2 | 10 | 2 |
| 444 | Furriers | 6 | - | - | 7 |
| 445 | Glaziers | 10 | 1 | 1 | 4 |
| 446 | Heat treaters, annealers, and temperers | 18 | 2 | 7 | 4 |
| 450 | Inspectors, scalers, and graders; log and lumber | 13 | 4 | 34 | 4 |
| 452 | Inspectors, n.e.c. | 103 | 16 | 232 | 13 |
| 453 | Jewelers and watchmakers | 48 | - | - | 7 |
| 454 | Job and die setters, metal | 54 | 4 | 15 | 13 |
| 455 | Locomotive engineers | 2 | 2 | 37 | 4 |
| 456 | Locomotive firemen | 2 | - | - | 13 |
| 461 | Machinists | 13 | 7 | 168 | 25 |
| 462 | Machinist apprentices Mechanics and repairmen | 4 | 1 | 3 | 25 |
| 470 | Air conditioning, heating, and refrigeration | 13 | 2 | 20 | 13 |
| 471 | Aircraft | 22 | 3 | 9 | 16 |
| 472 | Automobile body repairmen | 9 | 2 | 11 | 13 |
| 473 | Automobile mechanics | 33 | 5 | 132 | 13 |
| 474 | Automobile mechanic apprentices | 1 | 1 | 3 | 16 |
| 475 | Data processing machine repairmen | - | - | - | - |
| 480 | Farm implement | 8 | 3 | 28 | 13 |
| 481 | Heavy equipment mechanics, incl. diesel | 81 | 21 | 439 | 16 |
| 482 | Household appliance and accessory installers and mechanics | 20 | 13 | 165 | 13 |
| 483 | Loom fixers | 6 | 1 | 4 | 4 |

| Occupation Code | | No. Dot Titles | No. PAQ Titles | No. PAQ Responses | Aptitude Group No |
|-----------------|--|----------------|----------------|-------------------|-------------------|
| 484 | Office machine | 7 | 2 | 5 | 16 |
| 485 | Radio and television | 15 | 6 | 57 | 16 |
| 486 | Railroad and car shop | 22 | 4 | 56 | 13 |
| 491 | Mechanic, exc. auto, apprentices | 10 | 3 | 37 | 25 |
| 492 | Miscellaneous mechanics and repairmen | 206 | 26 | 193 | 13 |
| 495 | Not specified mechanics and repairmen | 7 | - | - | 4 |
| 501 | Millers; grain, flour and feed | 22 | - | - | 4 |
| 502 | Millwrights | 3 | 3 | 185 | 26 |
| 503 | Molders, metal | 19 | 3 | 4 | 4 |
| 504 | Molder apprentices | 2 | - | - | 16 |
| 505 | Motion picture projectionists | 3 | - | - | 14 |
| 506 | Opticians, and lens grinders and polishers | 32 | - | - | 13 |
| 510 | Painters, construction and maintenance | 10 | 3 | 89 | 13 |
| 511 | Painter apprentices | 3 | - | - | 16 |
| 512 | Paperhangers | - | - | - | - |
| 514 | Pattern and model makers, exc. paper | 68 | 1 | 1 | 16 |
| 515 | Photoengravers and lithographers | 20 | 3 | 11 | 16 |
| 516 | Piano and organ tuners and repairmen | 13 | - | - | 13 |
| 520 | Plasterers | 6 | 1 | 2 | 13 |
| 521 | Plasterer apprentices | 1 | - | - | 13 |
| 522 | Plumbers and pipe fitters | 19 | 4 | 138 | 14 |
| 523 | Plumber and pipe fitter apprentices | 2 | 1 | 27 | 25 |
| 525 | Power station operators | 16 | 5 | 123 | 14 |
| 530 | Pressmen and plate printers, printing | 47 | 16 | 102 | 4 |
| 531 | Pressman apprentices | 8 | 1 | 2 | 13 |
| 533 | Rollers and finishers, metal | 27 | 1 | 2 | 4 |
| 534 | Roofers and slaters | 3 | - | - | 14 |
| 535 | Sheetmetal workers and tinsmiths | 13 | 3 | 45 | 13 |
| 536 | Sheetmetal apprentices | 1 | 1 | 5 | 25 |
| 540 | Shipfitters | 3 | - | - | 16 |
| 542 | Shoe repairmen | 10 | - | - | 7 |
| 543 | Sign painters and letterers | 5 | - | - | 16 |
| 545 | Stationary engineers | 48 | 17 | 318 | 13 |
| 546 | Stone cutters and stone carvers | 14 | - | - | 4 |
| 550 | Structural metal craftsmen | 16 | 5 | 69 | 13 |
| 551 | Tailors | 4 | - | - | 25 |
| 552 | Telephone installers and repairmen | 21 | 10 | 86 | 14 |
| 554 | Telephone linemen and splicers | 6 | 3 | 9 | 14 |
| 560 | Tile setters | 7 | - | - | 4 |
| 561 | Tool and die makers | 29 | 11 | 78 | 16 |
| 562 | Tool and die maker apprentices | 6 | 3 | 18 | 25 |
| 563 | Upholsterers | 25 | 1 | 1 | 4 |
| 571 | Specified craft apprentices, n.e.c. | 51 | 6 | 51 | 16 |
| 572 | Not specified apprentices | 5 | 1 | 17 | 16 |
| 575 | Craftsmen and kindred workers, n.e.c. | 44 | 1 | 7 | 13 |
| 580 | Former members of the Armed Forces | - | - | - | - |

| Occupation Code | | No. Dot Titles | No. PAQ Titles | No. PAQ Responses | Aptitude Group No |
|------------------------------|--|----------------|----------------|-------------------|-------------------|
| OPERATIVES, EXCEPT TRANSPORT | | | | | |
| 601 | Asbestos and insulation workers | 9 | 1 | 2 | 4 |
| 602 | Assemblers | 376 | 17 | 144 | 4 |
| 603 | Blasters and powdermen | 12 | - | - | 4 |
| 604 | Bottling and canning operatives | 3 | 2 | 186 | 4 |
| 605 | Chainmen, rodmen, and axmen; surveying | - | 2 | 61 | - |
| 610 | Checkers, examiners, and inspectors; manufacturing | 451 | 26 | 223 | 4 |
| 611 | Clothing ironers and pressers | 41 | 3 | 5 | 4 |
| 612 | Cutting operatives, n.e.c. | 279 | 19 | 117 | 4 |
| 613 | Dressmakers and seamstresses, except factory | 6 | - | - | 10 |
| 614 | Drillers, earth | 11 | - | - | 13 |
| 615 | Dry wall installers and lathers | 6 | - | - | 17 |
| 620 | Dyers | 41 | - | - | 4 |
| 621 | Filers, polishers, sanders, and buffers | 144 | 10 | 37 | 4 |
| 622 | Furnacemen, smeltermen, and pourers | 74 | 9 | 34 | 4 |
| 623 | Garage workers and gas station attendants | 8 | 1 | 1 | 5 |
| 624 | Graders and sorters, manufacturing | 84 | 2 | 19 | 4 |
| 625 | Produce graders and packers, except factory and farm | 13 | 2 | 17 | 4 |
| 626 | Heaters, metal | 5 | - | - | 1 |
| 630 | Laundry and dry cleaning operatives, n.e.c. | 55 | 3 | 3 | 4 |
| 631 | Meat cutters and butchers, exc. manufacturing | 6 | 2 | 7 | 7 |
| 633 | Meat cutters and butchers, manufacturing | 49 | 1 | 3 | 4 |
| 634 | Meat wrappers, retail trade | - | - | - | - |
| 635 | Metal platers | 10 | 2 | 4 | 13 |
| 636 | Milliners | 3 | - | - | 4 |
| 640 | Mine operatives, n.e.c. | 102 | 4 | 8 | 4 |
| 641 | Mixing operatives | 194 | 13 | 48 | 4 |
| 642 | Oilers and greasers, exc, auto | 9 | 1 | 52 | 4 |
| 643 | Packers and wrappers, except meat and produce | 68 | 12 | 212 | 4 |
| 644 | Painters, manufactured articles | 73 | 7 | 44 | 4 |
| 645 | Photographic process workers | 50 | 5 | 30 | 13 |
| Precision machine operatives | | | | | |
| 650 | Drill press operatives | 32 | 7 | 91 | 4 |
| 651 | Grinding machine operatives | 60 | 16 | 89 | 4 |
| 652 | Lathe and milling machine operatives | 85 | 18 | 154 | 4 |
| 653 | Precision machine operatives, n.e.c. | 26 | 13 | 78 | 4 |
| 656 | Punch and stamping press operatives | 35 | 6 | 29 | 4 |
| 660 | Riveters and fasteners | 26 | 5 | 16 | 4 |
| 661 | Sailors and deckhands | 8 | - | - | 14 |
| 662 | Sawyers | 76 | 9 | 30 | 4 |
| 663 | Sewers and stitchers | 182 | 4 | 39 | 7 |
| 664 | Shoemaking machine operatives | 142 | - | - | 4 |
| 665 | Solderers | 8 | 2 | 9 | 4 |
| 666 | Stationary firemen | 18 | 5 | 85 | 4 |

| Occu- pation Code | | No. Dot Titles | No. PAQ Titles | No. PAQ Responses | Aptitude Group No |
|--------------------------------|---|-------------------|-------------------|----------------------|----------------------|
| Textile operatives | | | | | |
| 670 | Carding, lapping, and combing operatives | 32 | 6 | 19 | 4 |
| 671 | Knitters, loopers, and toppers | 14 | - | - | 7 |
| 672 | Spinners, twistors, and winders | 61 | 8 | 48 | 4 |
| 673 | Weavers | 17 | 3 | 4 | 4 |
| 674 | Textile operatives, n.e.c. | 170 | 7 | 21 | 4 |
| 680 | Welders and flame-cutters | 44 | 8 | 140 | 4 |
| 681 | Winding operatives, n.e.c. | 66 | 8 | 102 | 4 |
| 690 | Machine operatives, miscellaneous specified | 1774 | 173 | 1302 | 4 |
| 692 | Machine operatives, not specified | 28 | 1 | 37 | 4 |
| 694 | Miscellaneous operatives | 775 | 48 | 411 | 4 |
| 695 | Not specified operatives | 30 | 5 | 112 | 4 |
| TRANSPORT EQUIPMENT OPERATIVES | | | | | |
| 701 | Boatmen and canalmen | 6 | - | - | 5 |
| 703 | Bus drivers | 4 | 1 | 1 | 15 |
| 704 | Conductors and motormen, urban rail transit | 1 | - | - | 24 |
| 705 | Deliverymen and routemen | 9 | 2 | 4 | 2 |
| 706 | Fork lift and tow motor operatives | 5 | 1 | 120 | 4 |
| 710 | Motormen; mine, factory, logging camp, etc. | 16 | 1 | 4 | 4 |
| 711 | Parking attendants | 2 | - | - | 3 |
| 712 | Railroad brakemen | 4 | 2 | 30 | 5 |
| 713 | Railroad switchmen | 3 | - | - | 4 |
| 714 | Taxicab drivers and chauffeurs | 11 | 3 | 23 | 5 |
| 715 | Truck drivers | 17 | 7 | 234 | 4 |
| LABORERS, EXCEPT FARM | | | | | |
| 740 | Animal caretakers exc. farm | 12 | 5 | 28 | 5 |
| 750 | Carpenters' helpers | 1 | - | - | 4 |
| 751 | Construction laborers, exc. carpenters' helpers | 16 | 8 | 106 | 4 |
| 752 | Fishermen and oystermen | 30 | - | - | 4 |
| 753 | Freight and material handlers | 74 | 19 | 305 | 1 |
| 754 | Garbage collectors | 3 | - | - | 5 |
| 755 | Gardeners and groundkeepers, exc. farm | 14 | 7 | 71 | 4 |
| 760 | Longshoremen and stevedores | 11 | 1 | 1 | 1 |
| 761 | Lumbermen, raftsmen, and woodchoppers | 28 | 7 | 22 | 4 |
| 762 | Stock handlers | 9 | 3 | 90 | 1 |
| 763 | Teamsters | 1 | - | - | 4 |
| 764 | Vehicle washers and equipment cleaners | 17 | 5 | 15 | 4 |
| 770 | Warehousemen, n.e.c. | - | - | - | - |
| 780 | Miscellaneous laborers | 334 | 18 | 64 | 4 |
| 785 | Not specified laborers | 6 | 1 | 4 | 4 |

| Occupation Code | | No. Dot Titles | No. PAQ Titles | No. PAQ Responses | Aptitude Group No |
|--|--|----------------|----------------|-------------------|-------------------|
| FARMERS AND FARM MANAGERS | | | | | |
| 801 | Farmers (owners and tenants) | 19 | 1 | 5 | 13 |
| 802 | Farm managers | 6 | 3 | 5 | 21 |
| FARM LABORERS AND FARM FOREMEN | | | | | |
| 821 | Farm foremen | 25 | 2 | 17 | 15 |
| 822 | Farm laborers, wage workers | 59 | 10 | 43 | 4 |
| 823 | Farm laborers, unpaid family workers | - | - | - | - |
| 824 | Farm service laborers, self-employed | 4 | - | - | 14 |
| SERVICE WORKERS, EXC. PRIVATE HOUSEHOLD | | | | | |
| Cleaning service workers | | | | | |
| 901 | Chambermaids and maids, except private household | 1 | - | - | 1 |
| 902 | Cleaners and charwomen | 8 | 5 | 180 | 1 |
| 903 | Janitors and sextons | 5 | 4 | 125 | 4 |
| Food service workers | | | | | |
| 910 | Bartenders | 3 | 1 | 2 | 11 |
| 911 | Busboys | 3 | - | - | 3 |
| 912 | Cooks, except private household | 32 | 6 | 19 | 14 |
| 913 | Dishwashers | 2 | - | - | 1 |
| 914 | Food counter and fountain workers | 8 | 3 | 11 | 6 |
| 915 | Waiters | 15 | 2 | 3 | 15 |
| 916 | Food service workers, n.e.c., except private household | 14 | 5 | 94 | 5 |
| Health service workers | | | | | |
| 921 | Dental assistants | 2 | 1 | 4 | 14 |
| 922 | Health aides, exc. nursing | 7 | 2 | 7 | 14 |
| 923 | Health trainees | - | - | - | - |
| 924 | Lay midwives | 2 | - | - | 18 |
| 925 | Nursing aides, orderlies, and attendants | 8 | 6 | 41 | 15 |
| 926 | Practical nurses | 3 | 2 | 24 | 15 |
| Personal service workers | | | | | |
| 931 | Airline stewardesses | 2 | 2 | 32 | 21 |
| 932 | Attendants, recreation and amusement | 44 | 2 | 3 | 12 |
| 933 | Attendants, personal service, n.e.c. | 44 | 3 | 10 | 3 |
| 934 | Baggage porters and bellhops | 7 | - | - | 3 |
| 935 | Barbers | 2 | 1 | 3 | 18 |
| 940 | Boarding and lodging house keepers | 3 | 1 | 1 | 12 |
| 941 | Bootblacks | 1 | - | - | 3 |
| 942 | Child care workers, exc. private household | 3 | 1 | 3 | 6 |
| 943 | Elevator operators | 3 | 1 | 2 | 3 |
| 944 | Hairdressers and cosmetologists | 11 | 1 | 3 | 18 |

| Occupation Code | | No. Dot Titles | No. PAQ Titles | No. PAQ Responses | Aptitude Group No |
|----------------------------|---------------------------------------|----------------|----------------|-------------------|-------------------|
| 945 | Personal service apprentices | 2 | - | - | 18 |
| 950 | Housekeepers, exc. private household | 17 | 1 | 49 | 12 |
| 952 | School monitors | - | - | - | - |
| 953 | Ushers, recreation and amusement | 2 | - | - | 2 |
| 954 | Welfare service aides | - | 2 | 4 | - |
| Protective service workers | | | | | |
| 960 | Crossing guards and bridge tenders | 8 | 1 | 2 | 2 |
| 961 | Firemen, fire protection | 15 | 8 | 291 | 14 |
| 962 | Guards and watchmen | 20 | 11 | 257 | 12 |
| 963 | Marshals and constables | - | - | - | - |
| 964 | Policemen and detectives | 42 | 25 | 594 | 21 |
| 965 | Sheriffs and bailiffs | 11 | 8 | 108 | 12 |
| PRIVATE HOUSEHOLD WORKERS | | | | | |
| 980 | Child care workers, private household | 4 | - | - | 3 |
| 981 | Cooks, private household | 2 | - | - | 11 |
| 982 | Housekeepers, private household | 3 | 1 | 27 | 12 |
| 983 | Laundresses, private household | 2 | - | - | 1 |
| 984 | Maids and servants, private household | 4 | - | - | 2 |

OCCUPATION NOT REPORTED

995 This code is used to identify not reported occupations in surveys where the not reported cases are not allocated.

ALLOCATION CATEGORIES

| | | |
|-----|--|-------|
| 196 | Professional, technical, and kindred workers-allocated | |
| 246 | Managers and administrators, except farm-allocated | These |
| 296 | Sales workers-allocated | codes |
| 396 | Clerical and kindred workers-allocated | |
| 586 | Craftsmen and kindred workers-allocated | were |
| 696 | Operatives, except transport-allocated | not |
| 726 | Transport equipment operatives-allocated | used |
| 796 | Laborers, except farm-allocated | |
| 806 | Farmers and farm managers-allocated | |
| 846 | Farm laborers and farm foremen-allocated | |
| 976 | Service workers, exc. private household-allocated | |
| 986 | Private household workers-allocated | |

Those returns from the Population Census which do not have an occupation entry are allocated among the major occupation groups during computer processing.

Appendix D

Selected Results from the Gilman Study of Job
Requirements for three types of Work and Thirteen Specific Occupations

Tables D-1 through D-14 are based on data described elsewhere (Gottfredson, Finucci, & Childs, 1982)

Table D-1 tests for the significance of differences (for each of 37 worker traits required by jobs) among three major types of work and then between four specific occupations for which there were a substantial number of cases.

Tables D-2 through D-14 present results for 13 specific occupations for which there were five or more cases. The results are organized to show which traits are most critical and least critical in each occupation. The following chart shows to which census category and to which Skills Map Aptitude Group each occupation was assigned.

Occupations Represented in Tables D-2 to D-14

| Table No. | Aptitude Group No. | Census Category | ^a (N) | Title |
|-----------|--------------------|-----------------|---------------------|---------------------------|
| D-2 | 21 | 142 | (5) | Elementary School Teacher |
| D-3 | 30 | 31 | (47) | Lawyer |
| D-4 | 30 | 184 | (7) | Editor/reporter |
| D-5 | 30 | 202 | (19) | Bank officer |
| D-6 | 30 | 240 | (5) | School administrator |
| D-7 | 30 | 245 | (14) | Vice president |
| D-8 | 30 | 245 | (18) | President/CEO |
| D-9 | 30 | 265 | (10) | Insurance agent |
| D-10 | 30 | 271 | (10) | Stock and bond salesman |
| D-11 | 31,32 | 006-014,023 | (10) | Engineer |
| D-12 | 32 | 002 | (6) | Architect |
| D-13 | 33 | 144 | (9) | Secondary teacher |
| D-14 | 36 | 065 | (35) | Physician |

^aN's sometimes vary slightly from trait to trait in the tables because of missing data.

Table D-1

Percentages of GILMAN Men Aged 26-55 Rating 37 Job-Related Abilities or Traits as Critical for Doing their Own Jobs Well:
For Major Occupational Groups and Several Specific Occupations

| Job-Related Abilities or Traits | Major Occupational Groups | | | | Specific Occupations | | | | Sign. Level |
|--|---------------------------|------------|-----------|----------------|----------------------|-----------|-------------|------------------|----------------|
| | Professional | Managerial | Sales | Sign. Level | Lawyer | Physician | VP/Pres/CEO | Other Manager | |
| Get information by talking with people | <u>68</u> | <u>70</u> | <u>61</u> | .659 | <u>71</u> | <u>89</u> | <u>58</u> | <u>81</u> | .020 |
| Give information by talking with people | <u>66</u> | <u>63</u> | <u>71</u> | .666 | <u>68</u> | <u>81</u> | <u>71</u> | <u>66</u> | .479 |
| Have integrity | <u>62</u> | <u>61</u> | <u>77</u> | .233 | <u>71</u> | <u>78</u> | <u>62</u> | <u>53</u> | .134 |
| Get information by reading | <u>61</u> | <u>30</u> | <u>36</u> | .000 | <u>77</u> | <u>60</u> | <u>25</u> | <u>34</u> | .000 |
| Think logically and analytically | <u>59</u> | <u>46</u> | <u>38</u> | .026 | <u>76</u> | <u>54</u> | <u>38</u> | <u>66</u> | .006 |
| Pay attention to details | <u>53</u> | <u>40</u> | <u>56</u> | .046 | <u>73</u> | <u>54</u> | <u>22</u> | <u>47</u> | .000 |
| Be dedicated and conscientious | <u>51</u> | <u>44</u> | <u>59</u> | .224 | <u>48</u> | <u>65</u> | <u>45</u> | <u>56</u> | .323 |
| Handle several tasks at one time | <u>51</u> | <u>67</u> | <u>36</u> | .002 | <u>58</u> | <u>54</u> | <u>66</u> | <u>66</u> | .696 |
| Have higher degree or credential | <u>45</u> | 3 | 0 | .000 | <u>69</u> | <u>67</u> | 0 | 0 | .000 |
| Plan ahead and anticipate problems | <u>44</u> | <u>53</u> | <u>38</u> | .203 | <u>43</u> | <u>51</u> | <u>62</u> | <u>62</u> | .223 |
| Give information by writing reports, memos, etc. | <u>42</u> | <u>29</u> | <u>19</u> | .008 | <u>57</u> | <u>32</u> | <u>12</u> | <u>38</u> | .001 |
| Spot and tackle problems quickly | <u>38</u> | <u>48</u> | <u>38</u> | .221 | <u>45</u> | <u>51</u> | <u>50</u> | <u>59</u> | .651 |
| Take initiative and responsibility | <u>37</u> | <u>61</u> | <u>31</u> | .000 | <u>35</u> | <u>27</u> | <u>58</u> | <u>69</u> | .001 |
| Learn quickly | <u>35</u> | <u>29</u> | <u>19</u> | .175 | <u>36</u> | <u>40</u> | <u>31</u> | <u>31</u> | .821 |
| Concentrate in distracting or stressful situations | <u>34</u> | <u>29</u> | <u>25</u> | .408 | <u>41</u> | <u>51</u> | <u>22</u> | <u>32</u> | .074 |
| Be fair and impartial | <u>34</u> | <u>30</u> | <u>12</u> | .050 | <u>26</u> | <u>22</u> | <u>25</u> | <u>34</u> | .712 |
| Visualize things before completion | <u>32</u> | <u>35</u> | <u>22</u> | .364 | <u>31</u> | <u>30</u> | <u>41</u> | <u>50</u> | .240 |
| Coordinate and schedule activities | <u>30</u> | <u>40</u> | <u>41</u> | .221 | <u>29</u> | <u>22</u> | <u>25</u> | <u>53</u> | .024 |
| Be persuasive and motivating | <u>26</u> | <u>44</u> | <u>56</u> | .000 | <u>45</u> | <u>16</u> | <u>62</u> | <u>41</u> | .001 |
| Think of new approaches to problems | <u>26</u> | <u>32</u> | <u>16</u> | .182 | <u>29</u> | <u>22</u> | <u>31</u> | <u>38</u> | .540 |
| Make decisions quickly | <u>25</u> | <u>32</u> | <u>19</u> | .198 | <u>18</u> | <u>51</u> | <u>25</u> | <u>41</u> | .007 |
| Evaluate, discipline, praise others | <u>24</u> | <u>46</u> | <u>36</u> | .000 | <u>6</u> | <u>16</u> | <u>56</u> | <u>34</u> | .000 |
| Have a good memory | <u>22</u> | <u>17</u> | <u>19</u> | .512 | <u>20</u> | <u>30</u> | <u>12</u> | <u>16</u> | .296 |
| Represent company well to the public | <u>22</u> | <u>38</u> | <u>50</u> | .001 | <u>23</u> | <u>16</u> | <u>38</u> | <u>34</u> | .152 |
| Have poise | <u>21</u> | <u>25</u> | <u>34</u> | .257 | <u>28</u> | <u>22</u> | <u>19</u> | <u>31</u> | .662 |
| Cooperate with co-workers | <u>21</u> | <u>29</u> | <u>12</u> | .087 | <u>8</u> | <u>16</u> | <u>22</u> | <u>34</u> | .031 |
| Be tactful and considerate | <u>20</u> | <u>19</u> | <u>31</u> | .325 | <u>8</u> | <u>35</u> | <u>16</u> | <u>19</u> | .018 |
| Have a lot of ideas | <u>18</u> | <u>16</u> | <u>28</u> | .270 | <u>16</u> | <u>8</u> | <u>16</u> | <u>19</u> | .609 |
| Be competitive | <u>14</u> | <u>23</u> | <u>47</u> | .000 | <u>21</u> | <u>11</u> | <u>25</u> | <u>25</u> | .430 |
| Have good contacts | <u>14</u> | <u>18</u> | <u>31</u> | .046 | <u>12</u> | <u>11</u> | <u>38</u> | <u>6</u> | .002 |
| Have manual dexterity | <u>10</u> | <u>4</u> | <u>0</u> | .034 | <u>0</u> | <u>35</u> | <u>0</u> | <u>6</u> | .000 |
| Be good at math | <u>9</u> | <u>18</u> | <u>10</u> | .063 | <u>0</u> | <u>0</u> | <u>19</u> | <u>19</u> | .001 |
| Have physical coordination | <u>6</u> | <u>4</u> | <u>0</u> | .244 | <u>0</u> | <u>22</u> | <u>0</u> | <u>9</u> | .000 |
| Follow orders and support company policies | <u>4</u> | <u>12</u> | <u>16</u> | .011 | <u>2</u> | <u>0</u> | <u>13</u> | <u>9</u> | .057 |
| Be attractive and well groomed | <u>3</u> | <u>5</u> | <u>22</u> | .000 | <u>6</u> | <u>3</u> | <u>9</u> | <u>0</u> | .294 |
| Have attended the right college | <u>3</u> | <u>1</u> | <u>3</u> | .492 | <u>2</u> | <u>3</u> | <u>0</u> | <u>0</u> | .662 |
| Have physical strength and endurance | <u>2</u> | <u>6</u> | <u>0</u> | .111 | <u>0</u> | <u>5</u> | <u>3</u> | <u>9</u> | .195 |
| (N) | (175) | (114) | (32) | | (47) | (37) | (32) | (32) | |

Table D-1 cont.

All Percentages ≥ 40 are underlined for major occupational groups; all percentages ≥ 50 are underlined for specific occupations. Professionals include job titles from the 1970 census major group Professional, Technical, and Kindred Workers; managers are job titles from the census major group of Managers and Administrators, except Farm, and from the group Farmers and Farm Managers; salesmen include job titles from the census major group Sales Workers. The specific occupations are also included in the results for the major groups: lawyers and physicians are Professionals and the two other titles are from the group of managers. The "other manager" category includes all job titles in 1970 census code 245, excluding vice Presidents, presidents, and CEOs. One judge is included with the lawyers, one dentist with the physicians, and 3 farmers with the managers. Significance levels of differences were determined with F-tests.

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D-4
Table D-2

Elementary Teacher

| Trait | % respondents rating trait as: | | |
|---|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as CRITICAL by at least 50% of respondents</u> | | | |
| Have integrity | 100 | 0 | 0 |
| Be fair and impartial | 100 | 0 | 0 |
| Take initiative and responsibility | 100 | 0 | 0 |
| Evaluate, discipline, and praise others | 80 | 100 | 100 |
| Be dedicated and conscientious | 80 | 100 | 100 |
| Handle several tasks at one time | 60 | 100 | 100 |
| Plan ahead and anticipate problems | 60 | 100 | 100 |
| Concentrate in distracting or stressful situations | 60 | 100 | 100 |
| Be persuasive and motivating | 60 | 100 | 100 |
| Coordinate and schedule activities | 60 | 100 | 100 |
| Get information by reading | 60 | 80 | 100 |
| <u>Rated as VERY HELPFUL OR CRITICAL by at least 67% of respondents</u> | | | |
| Give information by talking with people | 40 | 100 | 100 |
| Spot and tackle problems quickly | 40 | 100 | 100 |
| Have a lot of ideas | 40 | 100 | 100 |
| Be tactful and considerate | 40 | 100 | 100 |
| Cooperate with coworkers | 40 | 80 | 100 |
| Pay attention to details | 40 | 80 | 100 |
| Get information by talking with people | 20 | 100 | 100 |
| Learn quickly | 20 | 100 | 100 |
| Think of new approaches to problems | 20 | 100 | 100 |
| Think logically and analytically | 20 | 100 | 100 |
| Have a good memory | 20 | 100 | 100 |
| Visualize things before completion | 20 | 80 | 100 |
| Be good at math | 0 | 80 | 100 |
| <u>Rated at least SOMEWHAT HELPFUL by at least 80% of respondents</u> | | | |
| Represent company well to the public | 40 | 40 | 80 |
| Have poise | 20 | 60 | 100 |
| Make decisions quickly | 20 | 60 | 80 |
| Have higher degree or credential | 20 | 40 | 100 |
| Be attractive and well groomed | 20 | 40 | 80 |
| Follow orders and support company policies | 20 | 40 | 80 |
| Give information by writing reports, memos, etc. | 20 | 20 | 80 |
| Have physical coordination | 0 | 40 | 100 |
| Have manual dexterity | 0 | 40 | 80 |

Table D-2 - Cont.

| Trait | % respondents rating trait as: | | |
|--|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as making NO DIFFERENCE by more than 20% of respondents</u> | | | |
| Be competitive | 20 | 20 | 60 |
| Have physical strength and endurance | 0 | 40 | 60 |
| Have attended the right college | 0 | 20 | 20 |
| Have good contacts | 0 | 0 | 60 |

U-0
Table D-3

Lawyer

| Trait | % respondents rating trait as: | | |
|--|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as CRITICAL by at least 50% of respondents</u> | | | |
| Think logically and analytically | 77 | 100 | 100 |
| Get information by reading | 77 | 96 | 100 |
| Pay attention to details | 72 | 98 | 100 |
| Give information by talking with people | 70 | 94 | 100 |
| Get information by talking with people | 70 | 93 | 100 |
| Have integrity | 70 | 93 | 100 |
| Have higher degree or credential | 68 | 80 | 89 |
| Handle several tasks at one time | 60 | 94 | 100 |
| Give information by writing reports, memos, etc. | 57 | 92 | 100 |
| <u>Rated as VERY HELPFUL OR CRITICAL by at least 67% of respondents</u> | | | |
| Be dedicated and conscientious | 49 | 96 | 100 |
| Spot and tackle problems quickly | 46 | 94 | 98 |
| Be persuasive and motivating | 46 | 90 | 100 |
| Plan ahead and anticipate problems | 44 | 94 | 98 |
| Concentrate in distracting or stressful situations | 40 | 96 | 100 |
| Learn quickly | 35 | 100 | 100 |
| Take initiative and responsibility | 35 | 94 | 98 |
| Visualize things before completion | 31 | 71 | 90 |
| Think of <u>new</u> approaches to problems | 29 | 83 | 98 |
| Coordinate and schedule activities | 29 | 79 | 98 |
| Have poise | 28 | 89 | 98 |
| Be fair and impartial | 25 | 67 | 88 |
| Represent company well to the public | 23 | 68 | 89 |
| Be tactful and considerate | 8 | 68 | 100 |
| Have a good memory | 21 | 90 | 100 |
| Be competitive | 21 | 68 | 92 |
| Make decisions quickly | 17 | 69 | 96 |
| <u>Rated as at least SOMEWHAT HELPFUL by at least 80% of respondents</u> | | | |
| Have a <u>lot</u> of ideas | 17 | 54 | 98 |
| Have good contacts | 12 | 55 | 92 |
| Cooperate with coworkers | 9 | 64 | 98 |
| Be attractive and well groomed | 6 | 50 | 94 |
| Evaluate, discipline, and praise others | 4 | 40 | 94 |

Table D-3 - Cont.

| Trait | % respondents rating trait as: | | |
|--|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as making NO DIFFERENCE by more than 20% of respondents</u> | | | |
| Follow orders and support company policies | 2 | 35 | 73 |
| Have attended the right college | 2 | 6 | 59 |
| Be good at math | 0 | 20 | 64 |
| Have physical strength and endurance | 0 | 17 | 44 |
| Have physical coordination | 0 | 0 | 15 |
| Have manual dexterity | 0 | 0 | 11 |

Table D-4

Editor and Reporter

| Trait | % respondents rating trait as: | | |
|--|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as CRITICAL by at least 50% of respondents</u> | | | |
| Get information by talking with people | 86 | 100 | 100 |
| Pay attention to details | 71 | 100 | 100 |
| Get information by reading | 71 | 86 | 100 |
| Have good contacts | 71 | 86 | 100 |
| Be dedicated and conscientious | 67 | 100 | 100 |
| Have integrity | 57 | 100 | 100 |
| Think logically and analytically | 57 | 100 | 100 |
| Take initiative and responsibility | 57 | 86 | 100 |
| Give information by writing reports, memos, etc. | 57 | 86 | 100 |
| Be fair and impartial | 57 | 86 | 86 |
| Have a good memory | 50 | 67 | 83 |
| <u>Rated as VERY HELPFUL OR CRITICAL by at least 67% of respondents</u> | | | |
| Learn quickly | 43 | 86 | 100 |
| Plan ahead and anticipate problems | 43 | 86 | 100 |
| Have a <u>lot</u> of ideas | 43 | 86 | 100 |
| Concentrate in distracting or stressful situations | 43 | 71 | 100 |
| Be competitive | 43 | 71 | 71 |
| Handle several tasks at one time | 29 | 100 | 100 |
| Spot and tackle problems quickly | 29 | 86 | 100 |
| Cooperate with coworkers | 29 | 71 | 100 |
| Make decisions quickly | 29 | 71 | 86 |
| <u>Rated as at least SOMEWHAT HELPFUL by at least 80% of respondents</u> | | | |
| Visualize things before completion | 29 | 57 | 86 |
| Give information by talking with people | 14 | 57 | 86 |
| Think of <u>new</u> approaches to problems | 14 | 43 | 86 |
| Evaluate, discipline, and praise others | 14 | 29 | 86 |
| Represent company well to the public | 0 | 29 | 100 |
| Follow orders and support company policies | 0 | 0 | 86 |

Table D-4 - Cont.

| Trait | % respondents rating trait as: | | |
|--|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as making NO DIFFERENCE by more than 20% of respondents (If not listed above)</u> | | | |
| Be persuasive and motivating | 14 | 43 | 71 |
| Be tactful and considerate | 14 | 29 | 57 |
| Coordinate and schedule activities | 14 | 29 | 57 |
| Have poise | 0 | 29 | 71 |
| Have physical strength and endurance | 0 | 17 | 33 |
| Have higher degree or credential | 0 | 14 | 57 |
| Be good at math | 0 | 14 | 43 |
| Have attended the right college | 0 | 14 | 29 |
| Have manual dexterity | 0 | 14 | 29 |
| Be attractive and well groomed | 0 | 0 | 71 |
| Have physical coordination | 0 | 0 | 14 |

Table D-5
Bank Officer

| Trait | % respondents rating trait as: | | |
|--|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as CRITICAL by at least 50% of respondents</u> | | | |
| Get information by talking with people | 84 | 100 | 100 |
| Have integrity | 84 | 100 | 100 |
| Give information by talking with people | 79 | 100 | 100 |
| Handle several tasks at one time | 68 | 100 | 100 |
| Represent company well to the public | 58 | 90 | 95 |
| Take initiative and responsibility | 53 | 95 | 95 |
| Give information by writing reports, memos, etc. | 53 | 90 | 100 |
| Get information by reading | 53 | 90 | 95 |
| <u>Rated as VERY HELPFUL OR CRITICAL by at least 67% of respondents</u> | | | |
| Think logically and analytically | 42 | 95 | 100 |
| Plan ahead and anticipate problems | 42 | 90 | 100 |
| Spot and tackle problems quickly | 37 | 95 | 100 |
| Coordinate and schedule activities | 37 | 95 | 100 |
| Be dedicated and conscientious | 37 | 90 | 100 |
| Pay attention to details | 37 | 90 | 100 |
| Evaluate, discipline, and praise others | 37 | 74 | 84 |
| Be persuasive and motivating | 26 | 100 | 100 |
| Learn quickly | 26 | 95 | 100 |
| Be competitive | 26 | 84 | 95 |
| Concentrate in stressful or distracting situations | 22 | 78 | 96 |
| Make decisions quickly | 21 | 79 | 90 |
| Think of <u>new</u> approaches to problems | 21 | 74 | 90 |
| Have poise | 16 | 100 | 100 |
| Be tactful and considerate | 16 | 84 | 100 |
| Cooperate with coworkers | 16 | 74 | 95 |
| Visualize things before completion | 16 | 74 | 95 |
| Have a good memory | 10 | 68 | 95 |
| Have good contacts | 5 | 84 | 100 |
| <u>Rated as at least SOMEWHAT HELPFUL by at least 80% of respondents</u> | | | |
| Be fair and impartial | 26 | 63 | 94 |
| Be good at math | 11 | 61 | 100 |
| Have a <u>lot</u> of ideas | 10 | 58 | 95 |
| Follow orders and support company policies | 5 | 63 | 95 |
| Be attractive and well groomed | 5 | 42 | 100 |

Table D-5 - Cont.

| Trait | % respondents rating trait as: | | |
|--|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as making NO DIFFERENCE by more than 20% of respondents</u> | | | |
| Have higher degree or credential | 0 | 37 | 79 |
| Have attended the right college | 0 | 5 | 63 |
| Have physical strength and endurance | 0 | 5 | 42 |
| Have physical coordination | 0 | 0 | 10 |
| Have manual dexterity | 0 | 0 | 5 |

Table D-6

School Administrator

| Trait | % respondents rating trait as: | | |
|--|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as CRITICAL by at least 50% of respondents</u> | | | |
| Evaluate, discipline, and praise others | 100 | 100 | 100 |
| Take initiative and responsibility | 100 | 100 | 100 |
| Handle several tasks at one time | 80 | 100 | 100 |
| Get information by talking with people | 80 | 100 | 100 |
| Give information by talking with people | 80 | 100 | 100 |
| Have integrity | 80 | 100 | 100 |
| Plan ahead and anticipate problems | 80 | 100 | 100 |
| Cooperate with coworkers | 80 | 100 | 100 |
| Concentrate in distracting or stressful situations | 80 | 100 | 100 |
| Be persuasive and motivating | 80 | 100 | 100 |
| Coordinate and schedule activities | 80 | 100 | 100 |
| Be dedicated and conscientious | 60 | 100 | 100 |
| Spot and tackle problems quickly | 60 | 100 | 100 |
| Be fair and impartial | 60 | 80 | 100 |
| Think logically and analytically | 60 | 80 | 100 |
| <u>Rated as VERY HELPFUL OR CRITICAL by at least 67% of respondents</u> | | | |
| Learn quickly | 40 | 100 | 100 |
| Pay attention to details | 40 | 100 | 100 |
| Think of <u>new</u> approaches to problems | 40 | 100 | 100 |
| Have poise | 40 | 100 | 100 |
| Be tactful and considerate | 40 | 100 | 100 |
| Make decisions quickly | 40 | 100 | 100 |
| Have a <u>lot</u> of ideas | 40 | 80 | 100 |
| Visualize things before completion | 40 | 80 | 80 |
| Represent company well to the public | 20 | 100 | 100 |
| Have a good memory | 20 | 100 | 100 |
| Get information by reading | 20 | 80 | 100 |
| Be attractive and well groomed | 0 | 80 | 100 |
| <u>Rated as at least SOMEWHAT HELPFUL by at least 80% of respondents</u> | | | |
| Give information by writing reports, memos, etc. | 20 | 60 | 100 |
| Follow orders and support company policies | 20 | 60 | 100 |
| Have higher degree or credential | 20 | 60 | 80 |
| Have good contacts | 20 | 0 | 80 |
| Be good at math | 0 | 40 | 100 |
| Be competitive | 0 | 20 | 80 |

Table D-6 - Cont.

| Trait | <u>% respondents rating trait as:</u> | | |
|--|---------------------------------------|-------------------------------------|--------------------------------------|
| | <u>Critical</u> | <u>Very Helpful or Critical</u> | <u>At Least Somewhat Helpful</u> |
| <u>Rated as making NO DIFFERENCE by more than 20% of respondents</u> | | | |
| Have attended the right college | 20 | 40 | 60 |
| Have physical strength and endurance | 0 | 60 | 60 |
| Have physical coordination | 0 | 0 | 20 |
| Have manual dexterity | 0 | 0 | 0 |

Table D-7

Vice President

| Trait | % respondents rating trait as: | | |
|--|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as CRITICAL by at least 50% of respondents</u> | | | |
| Have integrity | 71 | 85 | 93 |
| Handle several tasks at one time | 57 | 86 | 100 |
| Evaluate, discipline, and praise others | 57 | 86 | 100 |
| Be persuasive and motivating | 57 | 86 | 100 |
| Give information by talking with people | 54 | 77 | 100 |
| Take initiative and responsibility | 50 | 93 | 100 |
| Plan ahead and anticipate problems | 50 | 86 | 100 |
| <u>Rated as VERY HELPFUL or CRITICAL by at least 67% of respondents</u> | | | |
| Get information by talking with people | 38 | 92 | 100 |
| Spot and tackle problems quickly | 36 | 79 | 100 |
| Visualize things before completion | 36 | 79 | 93 |
| Be dedicated and conscientious | 29 | 93 | 100 |
| Represent company well to the public | 21 | 86 | 100 |
| Have poise | 15 | 69 | 100 |
| Pay attention to details | 14 | 93 | 100 |
| Think logically and analytically | 14 | 79 | 100 |
| Cooperate with coworkers | 14 | 79 | 93 |
| Coordinate and schedule activities | 14 | 79 | 86 |
| Be fair and impartial | 14 | 71 | 93 |
| Be competitive | 14 | 71 | 93 |
| Make decisions quickly | 14 | 71 | 93 |
| Think of <u>new</u> approaches to problems | 7 | 86 | 100 |
| <u>Rated as at least SOMEWHAT HELPFUL by at least 80% of respondents</u> | | | |
| Have good contacts | 36 | 65 | 93 |
| Concentrate in distracting or stressful situations | 21 | 65 | 86 |
| Learn quickly | 21 | 57 | 100 |
| Be attractive and well groomed | 14 | 50 | 86 |
| Have a <u>lot</u> of ideas | 14 | 43 | 86 |
| Get information by reading | 14 | 35 | 86 |
| Give information by writing reports, memos, etc. | 14 | 35 | 88 |
| Be tactful and considerate | 7 | 64 | 93 |
| Be good at math | 7 | 50 | 100 |
| Have a good memory | 0 | 57 | 86 |

Table D-7 - Cont.

| Trait | % respondents rating trait as: | | |
|--|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as making NO DIFFERENCE by more than 20% of respondents</u> | | | |
| Follow orders and support company policies | 15 | 46 | 77 |
| Have physical strength and endurance | 0 | 36 | 65 |
| Have manual dexterity | 0 | 21 | 42 |
| Have higher degree or credential | 0 | 21 | 42 |
| Have physical coordination | 0 | 21 | 35 |
| Have attended the right college | 0 | 0 | 29 |

Table D-8
President/CEO

| Trait | % respondents rating trait as: | | |
|--|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as CRITICAL by at least 50% of respondents</u> | | | |
| Give information by talking with people | 83 | 94 | 100 |
| Get information by talking with people | 72 | 100 | 100 |
| Plan ahead and anticipate problems | 72 | 100 | 100 |
| Handle several tasks at one time | 72 | 94 | 100 |
| Be persuasive and motivating | 67 | 95 | 100 |
| Take initiative and responsibility | 65 | 100 | 100 |
| Spot and tackle problems quickly | 61 | 94 | 100 |
| Be dedicated and conscientious | 59 | 94 | 100 |
| Think logically and analytically | 56 | 100 | 100 |
| Have integrity | 56 | 89 | 100 |
| Evaluate, discipline, and praise others | 56 | 89 | 100 |
| Represent company well to the public | 50 | 89 | 100 |
| Think of <u>new</u> approaches to problems | 50 | 83 | 94 |
| <u>Rated as VERY HELPFUL or CRITICAL by at least 67% of respondents</u> | | | |
| Visualize things before completion | 44 | 89 | 100 |
| Learn quickly | 39 | 94 | 100 |
| Have good contacts | 39 | 72 | 100 |
| Coordinate and schedule activities | 33 | 94 | 100 |
| Be fair and impartial | 33 | 89 | 94 |
| Be competitive | 33 | 89 | 94 |
| Make decisions quickly | 33 | 83 | 100 |
| Get information by reading | 33 | 67 | 100 |
| Be good at math | 28 | 67 | 100 |
| Pay attention to details | 28 | 100 | 100 |
| Cooperate with coworkers | 28 | 72 | 89 |
| Have a good memory | 22 | 100 | 100 |
| Concentrate in distracting or stressful situations | 22 | 83 | 94 |
| Be tactful and considerate | 22 | 72 | 89 |
| Have poise | 26 | 67 | 94 |
| Have a <u>lot</u> of ideas | 17 | 72 | 83 |
| <u>Rated as at least SOMEWHAT HELPFUL by at least 80% of respondents</u> | | | |
| Follow orders and support company policies | 11 | 55 | 83 |
| Give information by writing reports, memos, etc. | 11 | 50 | 89 |

Table D-8 - Cont.

| Trait | % respondents rating trait as: | | |
|--|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as making NO DIFFERENCE by more than 20% of respondents</u> | | | |
| Be attractive and well groomed | 6 | 44 | 72 |
| Have physical strength and endurance | 6 | 28 | 78 |
| Have manual dexterity | 0 | 17 | 67 |
| Have higher degree or credential | 0 | 6 | 56 |
| Have attended the right college | 0 | 6 | 33 |
| Have physical coordination | 0 | 0 | 61 |

Insurance Agent

| Trait | % respondents rating trait as: | | |
|--|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as CRITICAL by at least 50% of respondents</u> | | | |
| Have integrity | 90 | 100 | 100 |
| Give information by talking with people | 60 | 100 | 100 |
| Get information by talking with people | 50 | 100 | 100 |
| Pay attention to details | 50 | 100 | 100 |
| Be dedicated and conscientious | 50 | 80 | 100 |
| Represent company well to the public | 50 | 70 | 100 |
| <u>Rated as VERY HELPFUL OR CRITICAL by at least 67% of respondents</u> | | | |
| Be persuasive and motivating | 40 | 90 | 100 |
| Plan ahead and anticipate problems | 40 | 70 | 100 |
| Think logically and analytically | 30 | 90 | 100 |
| Be competitive | 30 | 80 | 100 |
| Coordinate and schedule activities | 30 | 80 | 100 |
| Have poise | 20 | 100 | 100 |
| Get information by reading | 20 | 90 | 100 |
| Be tactful and considerate | 20 | 90 | 100 |
| Be fair and impartial | 20 | 80 | 90 |
| Spot and tackle problems quickly | 20 | 70 | 90 |
| Visualize things before completion | 20 | 70 | 90 |
| Be attractive and well groomed | 20 | 70 | 90 |
| Cooperate with coworkers | 10 | 90 | 100 |
| Learn quickly | 10 | 80 | 100 |
| Take initiative and responsibility | 10 | 80 | 100 |
| Have a good memory | 0 | 80 | 100 |
| <u>Rated as at least SOMEWHAT HELPFUL by at least 80% of respondents</u> | | | |
| Give information by writing reports, memos, etc. | 20 | 60 | 90 |
| Think of <u>new</u> approaches to problems | 10 | 60 | 100 |
| Follow orders and support company policies | 10 | 60 | 100 |
| Concentrate in distracting or stressful situations | 10 | 60 | 80 |
| Evaluate, discipline, and praise others | 10 | 50 | 80 |
| Make decisions quickly | 10 | 40 | 90 |
| Have good contacts | 10 | 40 | 80 |
| Have a <u>lot</u> of ideas | 10 | 40 | 80 |
| Be good at math | 0 | 60 | 100 |
| Handle several tasks at one time | 0 | 60 | 80 |

Table D-9 - Cont.

| Trait | % respondents rating trait as: | | |
|--|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as making NO DIFFERENCE by more than 20% of respondents</u> | | | |
| Have higher degree or credential | 0 | 10 | 70 |
| Have physical strength and endurance | 0 | 10 | 30 |
| Have attended the right college | 0 | 0 | 30 |
| Have physical coordination | 0 | 0 | 22 |
| Have manual dexterity | 0 | 0 | 20 |

D-20
Table D-10

Stock and Bond Salesman

| Trait | % respondents rating trait as: | | |
|--|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as CRITICAL by at least 50% of respondents</u> | | | |
| Give information by talking with people | 100 | 100 | 100 |
| Get information by talking with people | 89 | 100 | 100 |
| Have integrity | 89 | 100 | 100 |
| Be dedicated and conscientious | 80 | 100 | 100 |
| Get information by reading | 78 | 78 | 100 |
| Be competitive | 70 | 90 | 100 |
| Have poise | 70 | 90 | 100 |
| Handle several tasks at one time | 67 | 78 | 100 |
| Spot and tackle problems quickly | 60 | 100 | 100 |
| Think logically and analytically | 60 | 100 | 100 |
| Have a <u>lot</u> of ideas | 60 | 100 | 100 |
| Pay attention to details | 60 | 90 | 100 |
| Concentrate in distracting or stressful situations | 60 | 80 | 100 |
| Have good contacts | 50 | 100 | 100 |
| Plan ahead and anticipate problems | 50 | 100 | 100 |
| Take initiative and responsibility | 50 | 100 | 100 |
| Represent company well to the public | 50 | 90 | 100 |
| Have a good memory | 50 | 90 | 100 |
| Make decisions quickly | 50 | 90 | 100 |
| Coordinate and schedule activities | 50 | 90 | 100 |
| Be persuasive and motivating | 50 | 90 | 90 |
| <u>Rated as VERY HELPFUL OR CRITICAL by at least 67% of respondents</u> | | | |
| Learn quickly | 44 | 100 | 100 |
| Be tactful and considerate | 40 | 100 | 100 |
| Think of <u>new</u> approaches to problems | 30 | 90 | 100 |
| Be attractive and well groomed | 30 | 80 | 100 |
| Visualize things before completion | 30 | 70 | 100 |
| Be good at math | 22 | 89 | 100 |
| Cooperate with coworkers | 10 | 80 | 100 |
| <u>Rated as at least SOMEWHAT HELPFUL by at least 80% of respondents</u> | | | |
| Follow orders and company policies | 20 | 50 | 80 |
| Evaluate, discipline, and praise others | 10 | 40 | 80 |
| Give information by writing reports, memos, etc. | 10 | 30 | 90 |
| Be fair and impartial | 0 | 60 | 100 |

Table D-10 - Cont.

| Trait | % respondents rating trait as: | | |
|--|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as making NO DIFFERENCE by more than 20% of respondents</u> | | | |
| Have attended the right college | 0 | 30 | 60 |
| Have higher degree or credential | 0 | 10 | 70 |
| Have physical coordination | 0 | 10 | 30 |
| Have physical strength and endurance | 0 | 0 | 30 |
| Have manual dexterity | 0 | 0 | 20 |

Table D-11

Engineer

| Trait | <u>% respondents rating trait as:</u> | | |
|---|---------------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as CRITICAL by at least 50% of respondents</u> | | | |
| Think logically and analytically | 70 | 100 | 100 |
| <u>Give</u> information by talking with people | 60 | 90 | 100 |
| Give information by writing reports, memos, etc. | 60 | 90 | 100 |
| Coordinate and schedule activities | 60 | 90 | 100 |
| <u>Get</u> information by talking with people | 50 | 100 | 100 |
| Plan ahead and anticipate problems | 50 | 90 | 100 |
| Pay attention to details | 50 | 90 | 100 |
| <u>Rated as VERY HELPFUL or CRITICAL by at least 67% of respondents</u> | | | |
| Visualize things before completion | 40 | 100 | 100 |
| Handle several tasks at one time | 40 | 90 | 100 |
| Think of <u>new</u> approaches to problems | 40 | 90 | 100 |
| Learn quickly | 30 | 90 | 100 |
| Cooperate with coworkers | 30 | 90 | 100 |
| Be good at math | 30 | 80 | 100 |
| Evaluate, discipline, and praise others | 30 | 70 | 100 |
| Take initiative and responsibility | 30 | 70 | 100 |
| Spot and tackle problems quickly | 20 | 90 | 100 |
| Be persuasive and motivating | 20 | 90 | 100 |
| Have integrity | 20 | 80 | 100 |
| Get information by reading | 10 | 90 | 100 |
| Have a <u>lot</u> of ideas | 10 | 70 | 100 |
| Be dedicated and conscientious | 0 | 90 | 100 |
| <u>Rated as at least SOMEWHAT HELPFUL by a least 80% of respondents</u> | | | |
| Be fair and impartial | 30 | 60 | 90 |
| Be tactful and considerate | 10 | 50 | 90 |
| Have good contacts | 10 | 40 | 90 |
| Be competitive | 10 | 40 | 80 |
| Have poise | 0 | 60 | 90 |
| Make decisions quickly | 0 | 50 | 100 |
| Concentrate in distracting or stressful situations | 0 | 50 | 90 |
| Have a good memory | 0 | 50 | 80 |
| Follow orders and support company policies | 0 | 40 | 80 |

Table D-11 - Cont.

| Trait | <u>% respondents rating trait as:</u> | | |
|--|---------------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as making NO DIFFERENCE by more than 20% of respondents</u> | | | |
| Represent company well to the public | 10 | 40 | 70 |
| Have higher degree or credential | 0 | 30 | 60 |
| Be attractive and well groomed | 0 | 11 | 56 |
| Have manual dexterity | 0 | 10 | 20 |
| Have physical strength and endurance | 0 | 10 | 20 |
| Have physical coordination | 0 | 0 | 30 |
| Have attended the right college | 0 | 0 | 20 |

D-24
Table D-12
Architect

| Trait | % respondents rating trait as: | | |
|--|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as CRITICAL by at least 50% of respondents</u> | | | |
| Pay attention to details | 83 | 100 | 100 |
| Get information by talking with people | 67 | 100 | 100 |
| Visualize things before completion | 67 | 100 | 100 |
| Plan ahead and anticipate problems | 67 | 83 | 100 |
| Handle several tasks at one time | 50 | 100 | 100 |
| Think logically and analytically | 50 | 100 | 100 |
| Coordinate and schedule activities | 50 | 83 | 100 |
| Evaluate, discipline, and praise others | 50 | 67 | 100 |
| <u>Rated as VERY HELPFUL OR CRITICAL by at least 67% of respondents</u> | | | |
| Give information by talking with people | 33 | 100 | 100 |
| Be dedicated and conscientious | 33 | 100 | 100 |
| Take initiative and responsibility | 33 | 83 | 100 |
| Get information by reading | 33 | 67 | 100 |
| Think of <u>new</u> approaches to problems | 33 | 67 | 100 |
| Have a <u>lot</u> of ideas | 33 | 67 | 100 |
| Have poise | 33 | 67 | 83 |
| Learn quickly | 17 | 100 | 100 |
| Have good contacts | 17 | 83 | 100 |
| Spot and tackle problems quickly | 17 | 83 | 100 |
| Have integrity | 17 | 67 | 100 |
| Have a good memory | 17 | 67 | 100 |
| Be persuasive and motivating | 17 | 67 | 100 |
| Give information by writing reports, memos, etc. | 17 | 67 | 83 |
| <u>Rated as at least SOMEWHAT HELPFUL by at least 80% of respondents</u> | | | |
| Represent company well to the public | 33 | 50 | 100 |
| Make decisions quickly | 17 | 50 | 100 |
| Be good at math | 17 | 50 | 83 |
| Be competitive | 17 | 50 | 83 |
| Have higher degree or credential | 17 | 33 | 100 |
| Cooperate with coworkers | 0 | 100 | 100 |
| Be tactful and considerate | 0 | 50 | 100 |
| Concentrate in distracting or stressful situations | 0 | 50 | 100 |
| Be fair and impartial | 0 | 50 | 83 |
| Be attractive and well groomed | 0 | 33 | 83 |
| Follow orders and support company policies | 0 | 17 | 83 |

Table D-12 - Cont.

| Trait | % respondents rating trait as: | | |
|--|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as making NO DIFFERENCE by more than 20% of respondents</u> | | | |
| Have attended the right college | 17 | 0 | 33 |
| Have manual dexterity | 0 | 33 | 50 |
| Have physical coordination | 0 | 0 | 17 |
| Have physical strength and endurance | 0 | 0 | 17 |

Table D-13
Secondary Teacher

| Trait | % respondents rating trait as: | | |
|---|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as CRITICAL by at least 50% of respondents</u> | | | |
| Be fair and impartial | 89 | 100 | 100 |
| Have integrity | 78 | 100 | 100 |
| Get information by reading | 78 | 100 | 100 |
| Evaluate, discipline, and praise others | 78 | 100 | 100 |
| Be dedicated and conscientious | 78 | 100 | 100 |
| Give information by talking with people | 67 | 100 | 100 |
| Plan ahead and anticipate problems | 67 | 100 | 100 |
| Have poise | 56 | 100 | 100 |
| Take initiative and responsibility | 56 | 89 | 100 |
| Coordinate and schedule activities | 56 | 89 | 100 |
| <u>Rated as VERY HELPFUL OR CRITICAL by at least 67% of respondents</u> | | | |
| Think logically and analytically | 44 | 100 | 100 |
| Have a <u>lot</u> of ideas | 44 | 100 | 100 |
| Be tactful and considerate | 44 | 100 | 100 |
| Be persuasive and motivating | 44 | 100 | 100 |
| Spot and tackle problems quickly | 44 | 89 | 100 |
| Learn quickly | 44 | 78 | 100 |
| Have a good memory | 44 | 78 | 100 |
| Handle several tasks at one time | 44 | 78 | 89 |
| Think of <u>new</u> approaches to problems | 33 | 89 | 100 |
| Concentrate in distracting or stressful situations | 33 | 78 | 100 |
| Cooperate with coworkers | 33 | 67 | 100 |
| Make decisions quickly | 33 | 67 | 100 |
| Represent company well to the public | 33 | 67 | 89 |
| Get information by talking with people | 22 | 89 | 100 |
| Have higher degree or credential | 11 | 67 | 100 |
| Follow orders and support company policies | 11 | 67 | 100 |
| Pay attention to details | 0 | 78 | 100 |
| Be attractive and well groomed | 0 | 67 | 89 |
| <u>Rated as SOMEWHAT HELPFUL by at least 80% of respondents</u> | | | |
| Give information by writing reports, memos, etc. | 33 | 55 | 100 |
| Visualize things before completion | 33 | 55 | 89 |

Table D-13 - Cont.

| Trait | % respondents rating trait as: | | |
|--|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as making NO DIFFERENCE by more than 20% of respondents</u> | | | |
| Be good at math | 11 | 44 | 78 |
| Have good contacts | 11 | 33 | 67 |
| Have physical coordination | 0 | 33 | 56 |
| Have manual dexterity | 0 | 22 | 44 |
| Be competitive | 0 | 11 | 67 |
| Have physical strength and endurance | 0 | 11 | 67 |
| Have attended the right college | 0 | 0 | 44 |

U-20
Table U-14

Physician

| Trait | % respondents rating trait as: | | |
|--|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as CRITICAL by at least 50% of respondents</u> | | | |
| Get information by talking with people | 89 | 100 | 100 |
| Give information by talking with people | 80 | 97 | 100 |
| Have integrity | 77 | 97 | 100 |
| Have higher degree or credential | 71 | 88 | 94 |
| Get information by reading | 63 | 97 | 100 |
| Be dedicated and conscientious | 63 | 97 | 100 |
| Think logically and analytically | 57 | 97 | 100 |
| Pay attention to details | 57 | 94 | 100 |
| Handle several tasks at one time | 57 | 86 | 97 |
| Make decisions quickly | 54 | 89 | 100 |
| Plan ahead and anticipate problems | 54 | 86 | 97 |
| Spot and tackle problems quickly | 51 | 94 | 100 |
| <u>Rated as VERY HELPFUL OR CRITICAL by at least 67% of respondents</u> | | | |
| Concentrate in distracting or stressful situations | 49 | 89 | 98 |
| Learn quickly | 43 | 91 | 100 |
| Be tactful and considerate | 34 | 89 | 100 |
| Give information by writing reports, memos, etc. | 34 | 71 | 86 |
| Have a good memory | 31 | 91 | 100 |
| Have manual dexterity | 31 | 68 | 82 |
| Take initiative and responsibility | 29 | 86 | 100 |
| Visualize things before completion | 29 | 71 | 91 |
| Have poise | 23 | 80 | 100 |
| Think of <u>new</u> approaches to problems | 23 | 68 | 97 |
| Coordinate and schedule activities | 20 | 71 | 94 |
| Cooperate with coworkers | 17 | 77 | 100 |
| <u>Rated as at least SOMEWHAT HELPFUL by at least 80% of respondents</u> | | | |
| Be fair and impartial | 24 | 56 | 94 |
| Be persuasive and motivating | 14 | 60 | 91 |
| Evaluate, discipline, and praise others | 14 | 57 | 83 |
| Have good contacts | 11 | 46 | 89 |
| Have a <u>lot</u> of ideas | 9 | 49 | 89 |
| Be attractive and well groomed | 0 | 51 | 94 |
| Be good at math | 0 | 40 | 83 |

Table D-14 - Cont.

| Trait | % respondents rating trait as: | | |
|---|--------------------------------|-----------------------------|------------------------------|
| | Critical | Very Helpful or Critical | At Least Somewhat Helpful |
| <u>Rated as making NO DIFFERENCE by at least 20% of respondents</u> | | | |
| Have physical coordination | 20 | 49 | 71 |
| Be competitive | 12 | 41 | 74 |
| Represent company well to the public | 11 | 31 | 62 |
| Have physical strength and endurance | 6 | 34 | 57 |
| Have attended the right college | 3 | 14 | 63 |
| Follow orders and support company policies | 0 | 21 | 53 |

Appendix E

Occupations Included in Each of the OAP Clusters

This appendix shows occupations included in each of the eleven clusters. The lists of titles were taken from the OAP Manual (U.S. Department of Labor, 1979b) but have been reorganized here according to their cluster membership. The criteria for the inclusion of these 2,556 titles (out of all 12,099) are given in the Manual (p.10).

The GOE interest areas represented in each cluster are also shown.

Cluster A

Researching, Designing, and Modifying Physical Systems

Interest Areas Included

- 2 -- Scientific
 5 -- Mechanical
 11 -- Humanitarian

Occupations Included**Occupations in
Physical Sciences**

(GOE p. 38)

| | |
|--|-------------|
| Astronomer | 021.067-010 |
| Chemist | 022.061-010 |
| Computer-Applications Engineer | 020.062-010 |
| Environmental Analyst | 029.081-010 |
| Geodesist | 024.061-014 |
| Geographer | 029.067-010 |
| Geographer, Physical | 029.067-014 |
| Geologist | 024.061-018 |
| Geophysical Prospector | 024.061-026 |
| Geophysicist | 024.061-030 |
| Hydrologist | 024.061-034 |
| Mathematician | 020.067-014 |
| Metallurgist, Physical | 011.061-022 |
| Meteorologist | 025.062-010 |
| Mineralogist | 024.061-038 |
| Petrologist | 024.061-046 |
| Physicist | 023.061-014 |
| Physicist, Theoretical | 023.067-010 |
| Project Manager, Environmental Research | 029.167-014 |
| Seismologist | 024.061-050 |
| Stratigrapher | 024.061-054 |

Occupations in Life Sciences

(GOE p. 41)

| | |
|--------------------------|-------------|
| Agronomist | 040.061-010 |
| Anatomist | 041.061-010 |
| Animal Scientist | 040.061-014 |
| Anthropologist, Physical | 055.067-014 |
| Aquatic Biologist | 041.061-022 |
| Biochemist | 041.061-026 |
| Biologist | 041.061-030 |
| Biomedical Engineer | 019.061-010 |
| Biophysicist | 041.061-034 |
| Botanist | 041.061-038 |
| Chemist, Food | 022.061-014 |
| Dairy Technologist | 040.061-022 |
| Dietitian, Research | 077.061-010 |
| Entomologist | 041.061-046 |
| Food Technologist | 041.081-010 |
| Geneticist | 041.061-050 |
| Histopathologist | 041.061-054 |
| Horticulturist | 040.061-038 |
| Microbiologist | 041.061-058 |
| Mycologist | 041.061-062 |
| Parasitologist | 041.061-070 |
| Pathologist | 070.061-010 |
| Pharmacologist | 041.061-074 |
| Physiologist | 041.061-078 |
| Plant Pathologist | 041.061-086 |
| Range Manager | 040.061-046 |
| Soil Conservationist | 040.061-054 |
| Soil Scientist | 040.061-058 |
| Veterinary Anatomist | 073.061-014 |
| WoodTechnologist | 040.061-062 |
| Zoologist | 041.061-090 |

Occupations in Medical Sciences (GOE p. 43)

| | |
|-------------------------|-------------|
| Anesthesiologist | 070.101-010 |
| Audiologist | 076.101-010 |
| Chiropractor | 079.101-010 |
| Dentist | 072.101-010 |
| Dermatologist | 070.101-018 |
| General Practitioner | 070.101-022 |
| Gynecologist | 070.101-034 |
| Intern | 070.101-038 |
| Internist | 070.101-042 |
| Medical Officer | 070.101-046 |
| Obstetrician | 070.101-054 |
| Ophthalmologist | 070.101-058 |
| Optometrist | 079.101-018 |
| Oral Pathologist | 072.061-010 |
| Oral Surgeon | 072.101-018 |
| Orthodontist | 072.101-022 |
| Osteopathic Physician | 071.101-010 |
| Pediatrician | 070.101-066 |
| Pedodontist | 072.101-026 |
| Periodontist | 072.101-030 |
| Physiatrist | 070.101-070 |
| Physician, Head | 070.101-074 |
| Physician, Occupational | 070.101-078 |
| Podiatrist | 079.101-022 |
| Prosthodontist | 072.101-034 |
| Psychiatrist | 070.107-014 |
| Radiologist | 070.101-090 |
| Speech Pathologist | 076.107-010 |
| Surgeon 1 | 070.101-094 |
| Urologist | 070.101-098 |
| Veterinarian | 073.101-010 |

(GOE p. 285)

Occupations in Mathematics and Statistics

| | |
|---|-------------|
| Actuary | 020.167-010 |
| Consultant | 189.167-010 |
| Engineering Analyst | 020.067-010 |
| Financial Analyst | 020.167-014 |
| Manager, Electronic Data Processing | 169.167-030 |
| Mathematical Technician | 020.162-010 |
| Operations-Research Analyst | 020.067-018 |
| Programmer, Business | 020.162-014 |
| Programmer, Chief, Business | 020.167-018 |
| Programmer, Engineering and Scientific | 020.167-022 |
| Statistician, Applied | 020.167-026 |
| Statistician, Mathematical | 020.067-022 |
| Systems Analyst, Electronic Data Processing | 012.167-066 |

(GOE p. 72) Occupations in Engineering

| | |
|--|-------------|
| Aerodynamist | 002.061-010 |
| Aeronautical-Design Engineer | 002.061-022 |
| Aeronautical Engineer | 002.061-014 |
| Aeronautical-Research Engineer | 002.061-026 |
| Aeronautical Test Engineer | 002.061-018 |
| Agricultural Engineer | 013.061-010 |
| Architect | 001.061-010 |
| Architect, Marine | 001.061-014 |
| Automotive Engineer | 007.061-010 |
| Ceramic Engineer | 006.061-014 |
| Chemical Engineer | 008.061-018 |
| Civil Engineer | 005.061-014 |
| Configuration Management Analyst | 012.167-010 |
| Director, Research and Development | 189.117-014 |
| Electrical Engineer | 003.061-010 |
| Electrical Engineer, Power System | 003.167-018 |
| Electrical-Research Engineer | 003.061-026 |
| Electrical Technician | 003.161-010 |
| Electrical Test Engineer | 003.061-014 |
| Electronics Engineer | 003.061-030 |
| Electronics Technician | 003.161-014 |
| Electronics-Test Engineer | 003.061-042 |
| Engineer-in-Charge, Transmitter | 003.167-034 |
| Fire-Protection Engineer | 012.167-026 |
| Forest Engineer | 005.167-018 |
| Health Physicist | 079.021-010 |
| Illuminating Engineer | 003.061-046 |
| Industrial Engineer | 012.167-030 |
| Landscape Architect | 001.061-018 |
| Laser Technician | 019.181-010 |
| Logistics Engineer | 019.167-010 |
| Manufacturing Engineer | 012.167-042 |
| Marine Engineer | 014.061-014 |
| Mechanical-Design Engineer, Products | 007.061-022 |
| Mechanical Engineer | 007.061-014 |
| Mechanical-Engineering Technician | 007.161-026 |
| Metallurgist, Extractive | 011.061-018 |
| Mining Engineer | 010.061-014 |
| Nuclear Engineer | 015.061-014 |
| Optical Engineer | 019.061-018 |
| Optomechanical Technician | 007.161-030 |
| Ordnance Engineer | 019.061-022 |
| Petroleum Engineer | 010.061-018 |
| Planning Engineer, Central Office Facilities | 003.061-050 |
| Plant Engineer | 007.167-014 |
| Pollution-Control Engineer | 019.081-018 |
| Production Engineer | 012.167-046 |
| Production Planner | 012.167-050 |
| Product-Safety Engineer | 012.061-010 |
| Quality-Control Engineer | 012.167-054 |
| Railroad Engineer | 005.061-026 |
| Safety Engineer | 012.061-014 |
| Safety Engineer, Mines | 010.061-026 |

| | |
|-------------------------------------|-------------|
| Sales Engineer. | |
| Aeronautical Products | 002.151-010 |
| Sales-Engineer. | |
| Electrical Products | 003.151-010 |
| Sales Engineer. | |
| Mechanical Equipment | 007.151-010 |
| Sales Engineer, Mining-and-Oil-Well | |
| Equipment and Service | 010.151-010 |
| Sanitary Engineer | 005.061-030 |
| Structural Engineer | 005.061-034 |
| Systems Engineer. | |
| Electronic Data Processing | 003.167-062 |
| Time-Study Engineer | 012.167-070 |
| Tool Designer | 007.061-026 |
| Tool Planner | 012.167-074 |
| Tool Programmer. | |
| Numerical Control | 007.167-018 |
| Transportation Engineer | 005.061-038 |
| Welding Engineer | 011.061-026 |

Cluster B

Operating and Testing Physical Systems

Interest Areas Included

- 2 -- Scientific
- 3 -- Plants and Animals
- 5 -- Mechanical

Occupations Included

Occupations in Managerial Work: Mechanical

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| | |
|---|-------------|
| Appliance-Service Supervisor | 187.167-010 |
| Director, Quality Control | 012.167-014 |
| Dispatcher, Chief 1 | 184.167-038 |
| General Supervisor | 183.167-022 |
| Maintenance Supervisor | 184.167-050 |
| Manager, Bulk Plant | 181.117-010 |
| Manager, Customer Technical Services | 189.117-018 |
| Manager, Food Processing Plant | 183.167-026 |
| Mine Superintendent | 181.117-014 |
| Production Superintendent | 183.117-014 |
| Representative, Personal Service | 236.252-010 |
| Superintendent, Building | 187.167-190 |
| Superintendent, Concrete-Mixing Plant | 182.167-022 |
| Superintendent, Construction | 182.167-026 |
| Superintendent, Electric Power | 184.167-162 |
| Superintendent, Drilling and Production | 181.167-014 |
| Superintendent, Maintenance | 184.167-170 |
| Superintendent, Maintenance | 184.167-174 |
| Superintendent, Maintenance | 189.167-046 |
| Superintendent, Oil-Well Services | 010.167-018 |
| Superintendent, Sanitation | 188.167-098 |
| Superintendent, Water-and-Sewer Systems | 184.161-014 |
| Supervisor of Communications | 184.167-230 |
| Supervisor, Mine | 181.167-018 |
| Supervisor, Sewer System | 184.167-238 |
| Supervisor, Waterworks | 184.167-246 |
| Tooling Coordinator, Production Engineering | 169.167-054 |

Occupations in Engineering Technology

(GOE p. 81)

| | |
|---|-------------|
| Air Traffic Control Specialist, Station | 193.162-014 |
| Air-Traffic-Control Specialist, Tower | 193.162-018 |
| Chief Drafter | 007.261-010 |
| Chief of Party | 018.167-010 |
| Construction Inspector | 182.267-010 |
| Detailer | 017.261-018 |
| Die-Drawing Checker | 007.167-010 |
| Dispatcher | 912.167-010 |
| Drafter, Aeronautical | 002.261-010 |
| Drafter, Architectural | 001.261-010 |
| Drafter, Assistant | 017.281-018 |
| Drafter, Automotive Design | 017.281-022 |
| Drafter, Automotive Design Lay-Out | 017.281-026 |
| Drafter, Cartographic | 018.261-010 |
| Drafter, Civil | 005.281-010 |
| Drafter, Commercial | 017.261-026 |
| Drafter, Electrical | 003.281-010 |
| Drafter, Electronic | 003.281-014 |
| Drafter, Geological | 010.281-014 |
| Drafter, Heating and Ventilating | 017.261-034 |
| Drafter, Marine | 014.281-010 |
| Drafter, Mechanical | 007.281-010 |
| Drafter, Oil and Gas | 017.281-030 |
| Drafter, Structural | 005.281-014 |
| Engineering Assistant, Mechanical Equipment | 007.161-018 |
| Estimator | 160.267-018 |
| Estimator | 166.261-018 |
| Field Engineer | 193.262-018 |
| Flight Engineer | 621.261-018 |
| Industrial Engineering Technician | 012.267-010 |
| Inspector, Building | 168.167-030 |
| Inspector, Quality Assurance | 168.287-014 |
| Land Surveyor | 018.167-018 |
| Material Scheduler | 012.187-010 |
| Observer, Seismic Prospecting | 010.161-018 |
| Packaging Engineer | 019.187-010 |
| Potogrammetrist | 018.261-026 |
| Pollution-Control Technician | 029.261-014 |
| Radiation Monitor | 199.167-010 |

| | |
|---------------------------------|-------------|
| Radiotelephone Operator | 193.262-034 |
| Specification Writer | 019.267-010 |
| Surveyor Assistant, Instruments | 018.167-034 |
| Surveyor, Geodetic | 018.167-038 |
| Surveyor, Marine | 018.167-046 |
| Surveyor, Mine | 018.167-050 |
| Technical Illustrator | 017.281-034 |
| Tool-Drawing Checker | 007.167-022 |
| Traffic Technician | 199.267-030 |
| Transmitter Operator | 193.262-038 |
| Video Operator | 194.282-010 |

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Occupations in Air and Water Vehicle Operation

| | |
|----------------------------|-------------|
| Airplane Pilot | 196.263-010 |
| Airplane Pilot, Commercial | 196.263-014 |
| Check Pilot | 196.263-022 |
| Helicopter Pilot | 196.263-038 |
| Instructor, Flying 1 | 196.223-010 |
| Master, Ship | 197.167-010 |
| Test Pilot | 196.263-042 |

(GOE p. 46)

Occupations in Laboratory Technology

| | |
|--------------------------------|-------------|
| Assayer | 022.281-010 |
| Biological Aide | 049.384-010 |
| Cephalometric Analyst | 078.384-010 |
| Chemical-Laboratory Technician | 022.261-010 |
| Chemistry Technologist | 078.261-010 |
| Criminalist | 029.281-010 |
| Cytotechnologist | 078.281-010 |
| Decontaminator | 199.384-010 |
| Embalmer | 338.371-014 |
| Film Laboratory Technician 1 | 976.381-010 |
| Fingerprint Classifier | 375.387-010 |
| Food Tester | 029.361-014 |
| Laboratory Tester | 022.281-018 |
| Laboratory Tester | 029.261-010 |
| Medical-Laboratory Assistant | 078.381-010 |
| Medical-Laboratory Technician | 078.381-014 |
| Medical Technologist | 078.361-014 |
| Metallurgical Technician | 011.261-010 |
| Pilot-Control Operator | 559-382-046 |
| Quality-Control Technician | 012.261-014 |
| Scientific Helper | 199.364-014 |
| Tester | 011.361-010 |
| Tester | 029.261-022 |
| Tissue Technologist | 078.361-030 |
| Ultrasound Technologist | 078.364-010 |
| Weather Observer | 025.267-014 |

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Occupations in Managerial Work: Plants and Animals

| | |
|---------------------------------------|-------------|
| Animal Breeder | 410.161-010 |
| Beekeeper | 413.161-010 |
| Cruiser | 459.378-010 |
| Farmer, Cash Grain | 401.161-010 |
| Farmer, Diversified Crops | 407.161-010 |
| Farmer, Field Crop | 404.161-010 |
| Farmer, General | 421.161-010 |
| Farmer, Tree-Fruit-and-Nut Crops | 403.161-010 |
| Farmer, Vegetable | 402.161-010 |
| Field Contractor | 162.117-022 |
| Fish Farmer | 446.161-010 |
| Forester Aide | 452.364-010 |
| Fur Farmer | 410.161-014 |
| Game-Bird Farmer | 412.161-010 |
| General Manager, Farm | 180.167-018 |
| Horticultural-Specialty Grower, Field | 405.161-014 |
| Landscape Contractor | 182.167-014 |
| Landscape Gardener | 408.161-010 |
| Livestock Rancher | 410.161-018 |
| Manager, Dairy Farm | 180.167-026 |
| Manager, Fish Hatchery | 180.167-030 |
| Manager, Nursery | 180.167-042 |
| Poultry Farmer | 411.161-018 |
| Superintendent, Production | 180.167-058 |
| Tree Surgeon | 408.181-010 |
| Wildlife Control Agent | 379.267.010 |

Cluster C

Crafting, Assembling, Repairing, Inspecting,
Setting Up or Operating Equipment

Interest Areas Included

- 1 -- Artistic
- 3 -- Plants and Animals
- 5 -- Mechanical
- 6 -- Industrial
- 9 -- Accommodating

Occupations Included

Sub-cluster C-1: Spatial orientation

(GOE p. 104)

Occupations in Quality Control

| | |
|---|-------------|
| Airplane Inspector | 621.261-010 |
| Automobile-Repair-Service Estimator | 620.261-018 |
| Bridge Inspector | 869.287-010 |
| Electrical Inspector | 168.167-034 |
| Elevator Examiner-and-Adjuster | 825.261-014 |
| Gravel Inspector | 859.281-010 |
| Inspector, Aircraft Launching and Arresting System | 806.264-014 |
| Inspector, Tool | 601.281-022 |
| Outside Production Inspector | 806.281-046 |
| Test Driver 2 | 806.283-010 |

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Occupations in Production Technology

| | |
|--|-------------|
| Boring-Machine Set-Up Operator, Jig | 606.280-010 |
| Boring-Mill Set-Up Operator, Horizontal | 606.280-014 |
| Diesel-Engine Tester | 625.261-010 |
| Grinder Operator, External, Tool | 603.280-010 |
| Grinder Operator, Tool | 603.280-018 |
| Grinder Set-Up Operator, Internal 1 | 603.280-022 |
| Inspector | 612.261-010 |
| Inspector, Aircraft Accessories | 709.261-010 |
| Inspector, Assemblies and Installations | 806.281-022 |
| Inspector, Gage and Instrument | 601.281-018 |
| Inspector, Metal Fabricating | 619.261-010 |
| Knitting-Machine Fixer | 689.280-014 |
| Loom Fixer | 683.260-018 |
| Machine Fixer | 689.260-010 |
| Machine Setter | 692.260-010 |
| Refinery Operator | 549.260-010 |
| Taster | 529.281-010 |
| Tester, Motors and Controls | 721.281-030 |
| Tool-Grinder Operator | 603.280-038 |
| Turret-Lathe Set-Up Operator, Tool | 604.280-022 |
| Watch Repairer | 715.281-010 |

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Occupations in Craft Arts

| | |
|------------------------------|-------------|
| Airbrush Artist | 970.281-010 |
| Carver, Hand | 761.281-010 |
| Decorator | 298.381-010 |
| Decorator | 524.381-014 |
| Engraver, Hand, Soft Metals | 704.381-030 |
| Etcher | 704.684-010 |
| Etcher, Photoengraving | 971.381-014 |
| Form Designer | 970.361-010 |
| Glass Bender | 772.381-010 |
| Jeweler | 700.281-010 |
| Letterer | 970.661-014 |
| Lithographic Plate Maker | 972.381-010 |
| Milliner | 784.261-010 |
| Model Maker | 709.381-018 |
| Museum Technician | 102.381-010 |
| Painter, Hand | 970.381-022 |
| Painter, Sign | 970.381-026 |
| Photoengraver | 971.381-022 |
| Photoengraving Finisher | 971.381-030 |
| Photoengraving Printer | 971.381-034 |
| Photographer, Lithographic | 972.382-014 |
| Photographer, Photoengraving | 971.382-014 |
| Photograph Retoucher | 970.281-018 |
| Picture Framer | 739.684-146 |
| Process Artist | 972.281-010 |
| Sign Writer, Hand | 970.281-022 |
| Silversmith | 700.281-022 |
| Sound Cutter | 962.382-014 |
| Stripper | 971.381-050 |
| Taxidermist | 199.261-010 |
| Transferrer | 972.381-026 |
| Wig Dresser | 332.361-010 |

Occupations in Craft Technology

(GOE p. 88)

| | | | |
|---|-------------|--|-------------|
| Air-Conditioning Installer-Servicer, Window Unit | 637.261-010 | Electrotyper | 974.381-010 |
| Air-Conditioning Mechanic | 620.281-010 | Elevator Constructor | 825.361-010 |
| Airframe-and-Power-Plant Mechanic | 621.281-014 | Elevator Repairer | 825.281-030 |
| Alleration Tailer | 785.261-010 | Environmental-Control-System Installer-Servicer | 637.261-014 |
| Arc Cutter | 816.364-010 | Farm-Equipment Mechanic 1 | 624.281-010 |
| Assembler, Metal Building | 801.381.010 | Field Engineer | 828.261-014 |
| Automobile-Body Repairer | 807.381.010 | Field-Service Representative | 621.221-010 |
| Automatic-Equipment Technician | 822.281-010 | Fitter 1 | 801.261-014 |
| Automotive-Maintenance-Equipment Servicer | 620.281-018 | Fixture Maker | 600.380-010 |
| Automobile Mechanic | 620.261-010 | Form Builder | 693.280-010 |
| Automobile Upholsterer | 780.381-010 | Form Builder | 860.381-046 |
| Biomedical Equipment Technician | 719.261-010 | Furnace Installer-and Repairer, Hot Air | 869.281-010 |
| Blacksmith | 610.381-010 | Furniture Finisher | 763.381-010 |
| Boalbuilder, Wood | 860.381-018 | Furniture Upholsterer | 780.381-018 |
| Body Wirer | 829.684-014 | Furrier | 783.261-010 |
| Boilermaker 1 | 805.261-014 | Gas-Main Fitter | 862.361-014 |
| Boilermaker 2 | 805.381-010 | Gem Cutter | 770.281-014 |
| Bookbinder | 977.381-010 | Gemologist | 199.281-010 |
| Bricklayer | 861.381-014 | Gunsmith | 632.281-010 |
| Bricklayer | 861.381-018 | House Builder | 869.281-014 |
| Cable Installer-Repairer | 821.361-010 | Instrument Maker | 600.280-010 |
| Cable Splicer | 829.361-010 | Instrument Mechanic | 710.281-026 |
| Carpenter | 860.381-022 | Joiner | 860.381-050 |
| Carpenter, Bridge | 860.381-030 | Lay-Out Worker | 600.281-018 |
| Carpenter, Maintenance | 860.281-010 | Lay-Out Worker 1 | 809.281-010 |
| Carpenter, Rough | 860.381-042 | Line Erector | 821.361-018 |
| Carpenter, Ship | 860.281-014 | Line Installer-Repairer | 822.381-014 |
| Car Repairer | 622.381-014 | Line Maintainer | 821.261-014 |
| Cement Mason | 844.364-010 | Line Repairer | 821.361-026 |
| Central-Office Installer | 822.361-014 | Locksmith | 709.281-010 |
| Central-Office Repairer | 822.281-014 | Machine Builder | 600.281-022 |
| Construction-Equipment Mechanic | 620.261-022 | Machine Repairer, Maintenance | 626.281-010 |
| Cook | 313.361-014 | Machinist | 600.280-022 |
| Dairy-Equipment Repairer | 629.281-018 | Machinist, Experimental | 600.280-038 |
| Die Maker, Bench, Slamping | 601.281-010 | Machinist, Marine Engine | 623.281-026 |
| Dental-Laboratory Technician | 712.381-018 | Machinist, Wood | 669.380-014 |
| Diesel Mechanic | 625.281-010 | Maintenance Machinist | 600.280-042 |
| Die Sinker | 601.280-022 | Maintenance Mechanic | 620.281-046 |
| Diver | 899.261-010 | Maintenance Mechanic, Telephone | 822.281-018 |
| Dressmaker | 785.361-010 | Manufacturer's Service Representative | 638.261-018 |
| Drill-Press Set-Up Operator, Single Spindle | 606.682-018 | Marble Setter | 861.381-030 |
| Electrical-Appliance Servicer | 827.261-010 | Mechanical-Test Technician | 869.261-014 |
| Electrical Repairer | 829.281-014 | Mechanic, Industrial Truck | 620.281-050 |
| Electrician | 824.261-010 | Metal Fabricator | 619.360-014 |
| Electrician | 825.281-014 | Millwright | 638.281-018 |
| Electrician | 825.381-030 | Mold Maker, Die-Casting and Plastic Molding | 601-280-030 |
| Electrician, Airplane | 825.281-018 | Monument Setter | 861.361-014 |
| Electrician, Automotive | 825.281-022 | Motorboat Mechanic | 623.281-038 |
| Electrician, Locomotive | 825.281-026 | Motorcycle Repairer | 620.281-054 |
| Electrician, Powerhouse | 820.261-014 | Office-Machine Servicer | 633.281-018 |
| Electric-Meter Repairer | 729.281-014 | Offset-Press Operator 1 | 651.482-010 |
| Electric-Motor Repairer | 721.281-018 | Oil-Burner-Servicer-and-Installer | 862.281-018 |
| Electronic-Organ Technician | 828.261-010 | Oil-Field Equipment Mechanic | 629.381-014 |
| Electronic Assembler, Developmental | 726.261-010 | Optician | 716.280-008 |
| Electronics Mechanic | 828.281-010 | Optician | 716.280-014 |
| | | Optician, Dispensing 1 | 713.361-014 |
| | | Ornamental-Iron Worker | 809.381-022 |
| | | Orthotist | 078.261-018 |

| | |
|---|-------------|
| Paperhanger | 841.381-010 |
| Parts Salvager | 638.281-026 |
| Patternmaker, Metal | 600.280-050 |
| Patternmaker, Metal, Bench | 693.281-018 |
| Patternmaker, Wood | 661.281-022 |
| Piano Technician | 730.281-038 |
| Piano Tuner | 730.361-010 |
| Pinsetter Adjuster, Automatic | 829.381-010 |
| Pipe Fitter | 862.261-010 |
| Pipe Fitter | 862.381-018 |
| Pipe Fitter, Diesel Engine 1 | 862.361-018 |
| Pipe-Organ Tuner and Repairer | 730.361-014 |
| Plasterer | 842.361-018 |
| Plumber | 862.381-030 |
| Press Maintainer | 627.281-010 |
| Private-Branch-Exchange Repairer | 822.281-022 |
| Proof-Press Operator | 651.582-010 |
| Prosthetist | 078.261-022 |
| Prosthetics Technician | 712.381-038 |
| Public-Address Servicer | 823.261-010 |
| Pump Servicer | 630.281-018 |
| Radio Mechanic | 823.261-018 |
| Refrigeration Mechanic | 637.261-026 |
| Reinforcing-Metal Worker | 801.684-026 |
| Repairer, Heavy | 620.381.022 |
| Rigger | 806.261-014 |
| Rocket-Engine-Component Mechanic | 621.281-030 |
| Rug Repairer | 782.381-018 |
| Sample Stitcher | 785.361-018 |
| Saw Filer | 701.381-014 |
| Scientific Glass Blower | 006.261-010 |
| Service Mechanic, Compressed Gas Equipment | 630.281-034 |
| Sheet-Metal Worker | 804.281-010 |
| Shipfitter | 806.381-046 |
| Shipwright | 860.381-058 |
| Shoe Repairer | 365.361-014 |
| Shop Tailor | 785.361-022 |
| Signal Maintainer | 822.281-026 |
| Small-Engine Mechanic | 625.281-034 |
| Statistical-Machine Servicer | 633.281-030 |
| Station Installer-and-Repairer | 822.261-022 |
| Steeple Jack | 869.381-030 |
| Stereotyper | 974.382-014 |
| Stonecutter, Hand | 771.381-014 |
| Stonemason | 861.381-038 |
| Street-Light Servicer | 824.381-010 |
| Structural-Steel Worker | 801.361-014 |
| Stucco Mason | 842.381-014 |
| Taximeter Repairer | 710.281-038 |
| Terrazzo Worker | 861.381-046 |
| Tile Setter | 861.381-054 |
| Timber Framer | 869.381-034 |
| Tool-and-Die Maker | 601.280-046 |
| Tool Grinder 1 | 701.381-018 |
| Tool-Machine Set-Up Operator | 601.280-054 |
| Tool Maker | 601.280-042 |
| Tool Maker, Bench | 601.281-026 |
| Tractor Mechanic | 620.281-058 |
| Trouble Shooter 2 | 821.261-026 |
| Truck-Body Builder | 807.281-010 |
| Tune-Up Mechanic | 620.281-066 |

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|----------------------|-------------|
| Upholstery Repairer | 780.684-122 |
| Variety-Saw Operator | 667.682-086 |
| Web-Press Operator | 651-362-030 |
| Welder, Arc | 810.384-014 |
| Welder-Assembler | 819.381-010 |
| Welder, Combination | 819.384-010 |
| Welder, Experimental | 819.281-022 |
| Welder-Fitter | 819.261-010 |
| Welder, Gas | 811.684-014 |

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Occupations in Land and Water Vehicle Operation

| | |
|---|-------------|
| Ambulance Driver | 913.683-010 |
| Coin Collector | 292.483-010 |
| Concrete-Mixing-Truck Driver | 900.683-010 |
| Deckhand | 911.687-022 |
| Dump-Truck Driver | 902.683-010 |
| Escort-Vehicle Driver | 919.663-022 |
| Firer, Locomotive | 910.363-010 |
| Garbage Collector Driver | 905.663-010 |
| Hostler | 909.663-010 |
| Liquid-Fertilizer Servicer | 906.683-014 |
| Locomotive Engineer | 910.363-014 |
| Motor Operator | 910.683-014 |
| Newspaper-Delivery Driver | 292.363-010 |
| Tank-Truck Driver | 903.683-018 |
| Telephone-Directory- Distribution Driver | 906.683-018 |
| Tow-Truck Operator | 919.663-026 |
| Tractor-Trailer-Truck Driver | 904.383-010 |
| Truck Driver, Heavy | 905.663-014 |
| Truck Driver, Light | 906.683-022 |
| Van Driver | 905.663-018 |
| Yard Engineer | 910.363-018 |

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Occupations in Crafts

| | |
|--------------------------------------|-------------|
| Adjuster, Electrical Contacts | 724.381-010 |
| Air-Conditioning Installer, Domestic | 827.464-010 |
| Airport Attendant | 912.364-010 |
| Attendant, Lodging Facilities | 329.467-010 |
| Audio Operator | 194.262-010 |
| Automobile-Service-Station Attendant | 915.467-010 |
| Baker | 313.381-010 |
| Baker, Pizza | 313.381-014 |
| Blaster | 859.261-010 |
| Blaster | 931.261-010 |
| Boat Outfitter | 806.484-014 |
| Brake Repairer | 620.281-026 |
| Carpet Layer | 864.381-010 |
| Casting-Machine Operator | 654.382-010 |
| Coin-Machine-Servicer Repairer | 639.281-014 |
| Color-Printer Operator | 976.382-014 |
| Conveyor-Maintenance Mechanic | 630.381-010 |
| Cook | 305.281-010 |
| Cook | 315.361-010 |

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| | |
|--|-------------|
| Cook | 315.381-010 |
| Cook, Mess | 315.371-010 |
| Cook, Pastry | 313.381-026 |
| Cook, Railroad | 315.381-018 |
| Cook, Short Order 1 | 313.361-022 |
| Cook, Specialty | 313.361-026 |
| Cook, Specialty, Foreign Food | 313.361-030 |
| Custom Ski Maker | 732.281-010 |
| Drapery Hanger | 869.484-014 |
| Electrical-Appliance Repairer | 723.381-010 |
| Electrical Repairer | 825.381-010 |
| Engraver, Pantograph 1 | 704.382-010 |
| Exterminator, Termite | 383.364-010 |
| Farm-Equipment Mechanic 2 | 624.381-014 |
| Fire-Extinguisher Repairer | 709.384-010 |
| Floor Layer | 864.481-010 |
| Formula-Room Worker | 520.487-014 |
| Front-End Mechanic | 620.281-038 |
| Gas-Appliance Servicer | 637.261-018 |
| Gas-Meter Mechanic 1 | 710.381-022 |
| Glazier | 865.381-010 |
| House Repairer | 869.381-010 |
| Lather | 842.361-010 |
| Laundry-Machine Mechanic | 629.261-010 |
| Light Technician | 962.362-014 |
| Maintenance Repairer, Building | 899.381-010 |
| Maintenance Repairer, Factory or Mill | 899.281-014 |
| Make-Up Arranger | 973.381-026 |
| Mechanic, Aircraft Accessories | 621.381-014 |
| Motion-Picture Projectionist | 960.362-010 |
| New-Car Get-Ready Mechanic | 806.361-026 |
| Optician, Dispensing 2 | 299.474-010 |
| Ordnance Artificer | 632.261-018 |
| Painter | 840.381-010 |
| Painter, Shipyard | 840.381-018 |
| Painter, Transportation Equipment | 845.381-014 |
| Parking-Meter Servicer | 710.384-026 |
| Photograph Finisher | 976.487-010 |
| Pinsetter Mechanic, Automatic | 638.261-022 |
| Radio Repairer | 720.281-010 |
| Recording Engineer | 194.362-010 |
| Repairer, Manufactured Buildings | 869.384-010 |
| Repeat Chief | 970.361-014 |
| Reproduction Technician | 976.361-010 |
| Roofer | 866.381-010 |
| Salad Maker | 317.384-010 |
| Second Cook and Baker | 315.381-026 |
| Section-Plotter Operator | 194.382-010 |
| Service Manager | 185.167-058 |
| Sewing-Machine Repairer | 639.281-018 |
| Shooter | 931.361-014 |
| Telecine Operator | 194.362-018 |
| Television Installer | 823.361-010 |
| Television-and-Radio Repairer | 720.281-018 |
| Thermal Cutter, Hand 1 | 816.464-010 |
| Tile Conduit Layer | 861.381-062 |
| Transmission Mechanic | 620.281-062 |
| Trouble Shooter 1 | 952.364-010 |
| Valve Repairer | 630.381-030 |

Occupations in Equipment Operation

| | |
|--|-------------|
| Asphalt-Paving-Machine Operator | 853.663-010 |
| Auxiliary-Equipment Tender | 869.665-010 |
| Bridge-or Gantry-Crane Operator | 921.663-010 |
| Bulldozer Operator 1 | 850.683-010 |
| Coke Loader | 921.563-010 |
| Concrete-Paving-Machine Operator | 853.663-014 |
| Continuous-Mining- Machine Operator | 930.683-010 |
| Conveyor Operator | 921.683-026 |
| Cutter-Operator | 930.683-014 |
| Derrick Operator | 921.663-022 |
| Dinkey Operator | 919.663-014 |
| Dragline Operator | 850.683-018 |
| Drilling Machine Operator | 930.482-010 |
| Dump Operator | 921.685-038 |
| Earth-Boring-Machine Operator | 859.682-010 |
| Hoisting Engineer | 921.663-030 |
| Loading-Machine Operator | 932.683-014 |
| Locomotive-Crane Operator | 921.663-038 |
| Long-Wall-Mining-Machine Tender | 930.665-010 |
| Miner | 850.381-010 |
| Miner 1 | 939.281-010 |
| Motor-Grader Operator | 850.663-022 |
| Operating Engineer | 859.683-010 |
| Perforator Operator, Oil Well | 931.382-010 |
| Pile-Driver Operator | 859.683-018 |
| Power-Shovel Operator | 850.683-030 |
| Prospecting Driller | 930.362-018 |
| Rigger | 921.260-010 |
| Road-Roller Operator | 859.683-030 |
| Roof Bolter | 930.683-026 |
| Rotary Derrick Operator | 930.382-022 |
| Rotary Driller | 930.382-026 |
| Sanitary Landfill Operator | 955.463-010 |
| Scraper Operator | 850.683-038 |
| Septic-Tank Installer | 851.663-010 |
| Shuttle-Car Operator | 932.682-022 |
| Stevedore 1 | 911.663-014 |
| Street-Sweeper Operator | 919.683-022 |
| Tractor-Crane Operator | 921.663-058 |
| Tractor Operator | 929.683-014 |
| Truck-Crane Operator | 921.663-062 |
| Utility-Tractor Operator | 850.683-046 |
| Well-Driller Operator | 859.362-010 |
| Well Puller | 930.382-030 |
| Yarding Engineer | 921.663-066 |

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Occupations in Production Technology

| | |
|---|-------------|
| Assembler | 710.681-010 |
| Assembler | 722.381-010 |
| Assembler, Aircraft, Structures and Surfaces | 806.381-026 |
| Assembler, Gold Frame | 713.384-010 |
| Bench Hand | 735.381-010 |
| Calibrator | 710.681-014 |
| Canvas Worker | 739.381-010 |
| Card Grinder | 680.380-010 |
| Cheese Blender | 520.487-010 |
| Chemical Operator 3 | 559.382-018 |
| Cook, Kettle | 526.381-026 |
| Coremaker | 518.381-014 |
| Die Setter | 612.360-010 |
| Drill-Press Set-Up Operator, Radial | 606.380-014 |
| Electronics Inspector 1 | 726.381-010 |
| Engine-Lathe Set-Up Operator | 604.380-018 |
| Glass Blower | 772.681-010 |
| Grinder Machine Setter | 603.380-010 |
| Inspector | 559.381-010 |
| Inspector, Fabrication | 806.361-022 |
| Inspector, Mechanical and Electrical | 710.381-038 |
| Inspector, Motors and Generators | 721.361-010 |
| Job Setter | 600.380-014 |
| Machine Operator | 616.360-018 |
| Machine Set-Up Operator | 600.380-018 |
| Machine Set-Up Operator, Paper Goods | 649.380-010 |
| Machine Setter | 616.360-022 |
| Metal Sprayer, Machined Parts | 505.380-010 |
| Milling-Machine Operator, Numerical Control | 605.380-010 |
| Molder | 518.361-010 |
| Nail-Making-Machine Setter | 616.460-010 |
| Optical-Instrument Assembler | 711.381-010 |
| Process Inspector | 736.381-018 |
| Role-Tube Setter | 613.360-014 |
| Rolling-Mill Operator | 613.462-018 |
| Router Set-Up Operator, Numerical Control | 605.360-010 |
| Rubber-Goods Cutter-Finisher | 690.680-010 |
| Skin Fitter | 806.381-054 |
| Solderer | 700.381-050 |
| Storage Battery Inspector and Tester | 727.381-022 |
| Transformer Assembler | 820.381-014 |
| Tube Assembler, Electron | 725.384-010 |
| Turret-Lathe Set-Up Operator | 604.380-026 |

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Occupations in Barber and Beauty Services

| | |
|---------------|-------------|
| Barber | 330.371-010 |
| Cosmetologist | 332.271-010 |
| Hair Stylist | 332.271-018 |

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Occupations in Passenger Services

| | |
|---------------------|-------------|
| Bus Driver | 912.463-010 |
| Chauffeur | 359.673-010 |
| Chauffeur | 913.663-010 |
| Instructor, Driving | 099.223-010 |
| Taxi Driver | 913.463-018 |

Sub-cluster C-2: Quick, accurate manipulation

Occupations in Crafts (GOE p. 115)

| | |
|--|-------------|
| Airframe-and-Power-Plant-Mechanic Helper | 621.684-010 |
| Appliance Repairer | 723.584-010 |
| Bicycle Repairer | 639.681-010 |
| Blueprinting-Machine Operator | 979.682-014 |
| Butcher, Chicken and Fish | 316.684-010 |
| Butcher, Meat | 316.681-010 |
| Carpet-Layer Helper | 864.687-010 |
| Construction Worker 1 | 869.664-014 |
| Cook, Short Order 2 | 313.671-010 |
| Developer | 976.681-010 |
| Dry-Wall Applicator | 842.681-010 |
| Exterminator | 389.684-010 |
| Fence Erector | 869.684-022 |
| Finish Patcher | 763.684-034 |
| Frame Wirer | 822.684-010 |
| Glass Installer | 865.684-010 |
| Household-Appliance Installer | 827.661-010 |
| Maintenance-Repairer Helper, Factory or Mill | 899.684-022 |
| Meat Cutter | 316.684-018 |
| Muffler Installer | 807.664-010 |
| Net Repairer | 449.664-010 |
| Offset-Duplicating-Machine Operator | 207.682-018 |
| Offset-Duplicating-Machine Operator | 651.682-041 |
| Painter, Spray 1 | 741.684-026 |
| Pantry Goods Maker | 317.684-014 |
| Pipeliners | 899.684-026 |
| Pot Liner | 519.664-014 |
| Printer Operator, Black-and-White | 976.682-014 |
| Repairer, Assembled Wood Products | 769.684-038 |
| Riveter | 800.684-010 |
| Riveter, Pneumatic | 800.684-014 |
| Roustabout | 869.684-046 |
| Sider | 863.684-014 |
| Sign Erector 2 | 869.684-054 |
| Sports-Equipment Repairer | 732.684-122 |
| Stopping Builder | 869.684-058 |
| Swimming-Pool Servicer | 891.684-018 |
| Taper | 842.664-010 |
| Typesetter-Machine Tender | 650.685-010 |
| Used-Car Renovator | 620.684-034 |
| Water-Softener Service-and-Installer | 862.684-034 |
| Welder, Tack | 810.684-010 |

Occupations in Production Work (GOE p. 147)

| | |
|---------------------------------------|-------------|
| Annealer | 504.682-010 |
| Anodizer | 500.682-010 |
| Appliance Assembler, Line | 827.684-010 |
| Assembler | 706.684-014 |
| Assembler | 710.381-010 |
| Assembler | 869.684-010 |
| Assembler 1 | 723.684-014 |
| Assembler, Aircraft Power Plant | 806.381-022 |
| Assembler, Electric Accessories 2 | 729.384-010 |
| Assembler, Electrical Wire Group | 728.384-010 |
| Assembler-Installer, General | 806.361-014 |
| Assembler, Internal Combustion Engine | 806.481-014 |
| Assembler, Product | 706.684-018 |
| Assembler, Subassembly | 806.484-010 |
| Assembler, Unit | 809.681-010 |
| Back Tender, Paper Machine | 534.662-010 |
| Balloon Maker | 752.684-010 |
| Beater Engineer | 530.662-010 |
| Bench Hand | 520.384-010 |
| Bleacher, Pulp | 533.362-010 |
| Blender | 540.462-010 |
| Blower and Compressor Assembler | 801.361-010 |
| Book-Sewing-Machine Operator 2 | 653.682-010 |
| Box Maker, Wood | 760.684-014 |
| Box Printer | 652.682-010 |
| Brazer, Assembler | 813.684-010 |
| Bumper Operator | 617.682-014 |
| Buttermaker | 529.362-010 |
| Cabinet Assembler | 763.684-014 |
| Cable Maker | 728.684-010 |
| Candy Maker | 529.361-014 |
| Carpet Weaver | 683.682-010 |
| Casket Assembler | 739.481-010 |
| Casket Liner | 780.684-030 |
| Caster | 502.482-010 |
| Casting Operator | 514.662-010 |
| Cigarette Making-Machine Operator | 529.685-066 |
| Clicking-Machine Operator | 789.382-010 |
| Coal Washer | 541.382-010 |
| Cobbler | 788.381-010 |
| Coil Connector | 721.684-018 |
| Compression-Molding-Machine Operator | 556.682-014 |
| Compressor | 556.382-010 |
| Concrete-Stone Fabricator | 575.461-010 |
| Corrugator Operator | 641.562-010 |
| Cracker-and-Cooky-Machine Operator | 520.482-010 |
| Cupola Tender | 512.662-010 |
| Cut-Off-Saw Operator | 667.682-022 |
| Cut-Off-Saw Operator, Metal | 607.682-010 |
| Cutter, Hand 1 | 781.584-014 |
| Cutter, Machine 1 | 781.684-014 |
| Cutter Operator | 699.682-018 |
| Cutting-Machine Operator | 640.682-015 |
| Cylinder-Machine Operator | 539.362-010 |

| | | | |
|--------------------------------------|-------------|----------------------------------|-------------|
| Dairy-Processing-Equipment Operator | 529.382-018 | Plater, Production | 500.365-010 |
| Die Cutter | 699.682-022 | Polishing-Machine Operator | 603.682-026 |
| Dipper | 774.684-014 | Pony Edger | 667.682-050 |
| Doughnut Maker | 526.684-010 | Powder Worker, TNT | 737.684-030 |
| Draper Operator | 787.682-018 | Precision Assembler, Bench | 706.681-010 |
| Drawer-In, Hand | 683.684-014 | Press Operator, Heavy Duty | 617.260-010 |
| Drawing-In-Machine Tender | 683.682-018 | Printer-Slotter Operator | 659.662-010 |
| Drill-Press Operator | 606.682-014 | Punch-Press Operator 3 | 615.682-014 |
| Dry Cleaner | 362.382-014 | Ripsaw Operator | 667.682-066 |
| Electrical-Control Assembler | 729.684-026 | Rotor Casting-Machine Operator | 502.482.018 |
| Electric-Motor Winder | 721.484-010 | Rougher Operator | 613.662-014 |
| Electronics Assembler | 726.384-010 | Router | 979.682-026 |
| Electronics Assembler | 726.684-018 | Rug Cleaner, Hand | 369.384-014 |
| Embroiderer, Hand | 782.684-018 | Sander, Machine | 761.682-014 |
| Embroidery-Machine Operator | 787.682-022 | Scalper Operator | 605.682-022 |
| Extruder Operator | 557.382-010 | Screen Printer | 979.684-030 |
| Fabricator-Assembler, Metal Products | 809.381-010 | Screen-Printing-Machine Operator | 652.682-018 |
| Film-Casting Operator | 559.682-022 | Sewing-Machine Operator | 787.682-046 |
| Fitter 2 | 706.684-054 | Shaper, Hand | 761.684-038 |
| Folding-Machine Operator | 649.685-046 | Shear Operator 1 | 615.482-034 |
| Fourdrinier-Machine Tender | 539.362-014 | Sign Writer, Machine | 659.682-026 |
| Frame-Table Operator | 669.662-014 | Slasher Tender | 582.562-010 |
| Fur Cutter | 783.381-010 | Slitting-Machine Operator 2 | 615.662-010 |
| Fur Finisher | 782.381-014 | Smash Hand | 683.684-026 |
| Fur Machine Operator | 783.682-010 | Solderer-Assembler | 813.684-014 |
| Fur Nailer | 783.684-014 | Spaghetti-Machine Operator | 690.682-074 |
| Furnace Operator | 512.362-014 | Spotter | 362.381-010 |
| Furniture Assembler | 763.684-038 | Springer | 780.684-106 |
| Gang Sawyer, Stone | 670.362-010 | Steel Pourer | 502.664-014 |
| Glass Cutter | 775.684-022 | Steel-Pourer Helper | 502.664-018 |
| Glass-Lathe Operator | 674.382-010 | Sticher, Special Machine | 690.682-078 |
| Granulator-Machine Operator | 559.382-026 | Still-Pump Operator | 549.362-010 |
| Grinder Operator, Production | 603.685-062 | Straightening-Press Operator | 617.482-026 |
| Grinder Set-Up Operator, Thread | 603.482-026 | Stranding-Machine Operator | 616.682-034 |
| Heading-Saw Operator | 667.682-038 | Stone Polisher, Machine | 673.382-018 |
| Heater | 619.682-022 | Supercalender Operator | 534.682-038 |
| Heat Treater 2 | 504.682-018 | Tanning Drum Operator | 582.482-018 |
| Heavy Forger | 612.361-010 | Tester, Motor | 806.384-026 |
| Hosiery Mender | 782.684-030 | Threader | 685.680-010 |
| Injection-Molding-Machine Operator | 556.382-014 | Tire Builder, Automobile | 750.384-010 |
| Installer | 869.684-026 | Tool Grinder | 603.664-010 |
| Jig Fitter | 801.684-010 | Trailer Assembler | 806.381-058 |
| Ladle Liner | 519.684-010 | Trimmer Sawyer | 667.482-022 |
| Lay-Out Worker 2 | 809.381-014 | Trophy Assembler | 735.684-018 |
| Leather Worker | 783.684-026 | Tube Bender, Hand 1 | 709.684-090 |
| Machine Assembler | 638.361-010 | Tuber-Machine Operator | 690.662-014 |
| Machine Molder | 518.682-010 | Upholsterer | 869.684-070 |
| Manipulator | 613.682-010 | Upholsterer, Inside | 780.681-010 |
| Marker 1 | 781.384-014 | Upsetter | 611.462-010 |
| Mattress Maker | 780.684-074 | Valve Grinder | 706.684-098 |
| Mender | 782.684-042 | Vending-Machine Assembler | 706.684-102 |
| Mender | 787.682-030 | Warp-Knitting-Machine Operator | 685.665-018 |
| Metal Hanger | 809.684-030 | Weaver | 683.682-034 |
| Oven Tender | 526.685-030 | Weaver, Hand | 782.684-062 |
| Oxygen-Plant Operator | 552.362-014 | Weaver, Needle Loom | 683.665-010 |
| Paper-Novelty Maker | 794.684-022 | Welding-Machine Operator, Arc | 810.382-010 |
| Plastics Fabricator | 754.684-042 | Welding-Machine Tender | 819.685-010 |
| Plater | 500.380-010 | | |

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Occupations in Quality Control

| | | | |
|---------------------------------|-------------|---------------------|-------------|
| Assembler | 369.687-010 | Tablet Tester | 559.667-010 |
| Ampoule Examiner | 559.687-010 | Tire Inspector | 750.687-018 |
| Burler | 689.684-010 | Transmission Tester | 806.684-134 |
| Casting Inspector | 514.687-010 | Veneer Grader | 569.587-010 |
| Cloth Examiner, Hand | 781.687-014 | Weigher, Alloy | 509.687-022 |
| Cloth Inspector | 685.687-010 | Yarn Sorter | 589.687-086 |
| Cloth Tester, Quality | 689.384-010 | | |
| Egg Candler | 529.687-074 | | |
| Electronics Inspector 2 | 726.684-022 | | |
| Electronics Tester 2 | 726.684-026 | | |
| Final Inspector | 806.687-018 | | |
| Finished-Stock Inspector | 763.687-029 | | |
| Garment Inspector | 789.687-070 | | |
| Garment Sorter | 222.687-014 | | |
| Grader | 669.587-010 | | |
| Grader, Dressed Poultry | 529.687-102 | | |
| Grader, Meat | 525.387-010 | | |
| Inspector | 369.687-022 | | |
| Inspector | 590.367-010 | | |
| Inspector | 619.381-010 | | |
| Inspector | 732.364-010 | | |
| Inspector | 739.687-110 | | |
| Inspector | 769.687-026 | | |
| Inspector | 776.667-010 | | |
| Inspector | 788.384-010 | | |
| Inspector 1 | 619.364-010 | | |
| Inspector 1 | 729.387-022 | | |
| Inspector 3 | 737.367-010 | | |
| Inspector and Sorter | 589.387-010 | | |
| Inspector, Eyeglass Frames | 713.687-022 | | |
| Inspector, Fabric | 789.587-014 | | |
| Inspector, General | 609.684-010 | | |
| Inspector, Grain Mill Products | 529.387-026 | | |
| Inspector, Metal Can | 709.367-010 | | |
| Inspector, Packaging Materials | 920.387-010 | | |
| Inspector, Paper Products | 649.367-010 | | |
| Inspector, Slide Fasteners | 734.687-062 | | |
| Inspector, Surgical Instruments | 712.687-026 | | |
| Inspector, Type | 706.687-026 | | |
| Inspector, Wire | 691.367-010 | | |
| Laboratory Tester | 689.384-014 | | |
| Lumber Sorter | 922.687-074 | | |
| Machine Tester | 706.387-014 | | |
| Mailing Machine Operator | 208.462-010 | | |
| Marker | 369.687-026 | | |
| Motorcycle Tester | 620.384-010 | | |
| Nut Sorter | 521.687-086 | | |
| Paier | 684.687-010 | | |
| Paper Sorter and Counter | 649.687-010 | | |
| Photo Checker and Assembler | 976.687-014 | | |
| Pulp-and-Paper Tester | 539.364-010 | | |
| Quality-Control Inspector | 579.367-010 | | |
| Quality-Control Inspector | 725.687-026 | | |
| Quality-Control Technician | 529.387-030 | | |
| Roller-Bearing Inspector | 706.687-034 | | |
| Selector | 579.687-030 | | |
| Shade Matcher | 582.687-022 | | |
| Shipping-and-Receiving Weigher | 222.367-058 | | |
| Stocking Inspector | 684.684-010 | | |

Cluster D

Tending (Machines, Buildings, Plants, Animals)
and Attending (Workers, the Public)

Interest Areas Included

- 3 -- Plants and Animals
- 5 -- Mechanical
- 6 -- Industrial
- 8 -- Selling
- 9 -- Accommodating

Occupations Included

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Occupations in Elemental Work: Industrial

| | | | |
|---------------------------------------|-------------|---|-------------|
| Ampoule Filler | 559.685-018 | Buffer | 690.685-046 |
| Artificial-Flower Maker | 739.684-014 | Buffer 1 | 705.684-014 |
| Assembler | 723.684-010 | Burnisher | 690.685-058 |
| Assembler | 754.684-010 | Buttner | 782.687-014 |
| Assembler 2 | 723.684-018 | Cannery Worker | 529.686-014 |
| Assembler, Automobile | 806.684-010 | Carder | 920.685-034 |
| Assembler, Cards and Announcements | 794.687-010 | Card Tender | 680.685-018 |
| Assembler, Electrical Accessories 1 | 729.687-010 | Carton-Forming-Machine Operator | 641.685-022 |
| Assembler, Production | 706.687-010 | Carton-Packaging-Machine Operator | 920.665-010 |
| Assembler, Production Line | 809.684-010 | Casing Cleaner | 525.686-010 |
| Assembler, Small Parts | 706.684-022 | Casing Tier | 529.687-034 |
| Assembler, Small Products | 739.687-030 | Cementer, Hand | 788.687-030 |
| Back Tender, Insulation Board | 532.685-010 | Cementer, Machine Applicator | 690.686-018 |
| Baker Helper | 526.686-010 | Chemical Operator 2 | 558.585-014 |
| Bakery Worker | 929.686-010 | Chipper | 564.685-014 |
| Bagger | 920.687-018 | Cigarette-Making-Machine Catcher | 529.666-014 |
| Bag-Machine Tender or Operator | 649.685-014 | Cigar Maker | 790.684-014 |
| Baler | 690.685-022 | Classifier | 361.687-014 |
| Baling-Machine Tender | 920.685-010 | Cleaner and Polisher | 709.687-010 |
| Band-Sawing-Machine Operator | 690.485-010 | Cloth Doffer | 689.586-010 |
| Basket Assembler 1 | 669.685-014 | Cloth Folder, Hand | 589.687-014 |
| Batter Mixer | 520.685-010 | Cloth Winder | 689.685-046 |
| Battery-Parts Assembler | 727.687-038 | Coiler | 613.685-010 |
| Beamer | 681.585-010 | Coil Winder | 724.684-026 |
| Beam-Warper Tender, Automatic | 681.685-018 | Collator, Hand | 977.687-010 |
| Bearingnizer | 603.685-018 | Comber Tender | 680.665-010 |
| Beater-Engineer Helper | 530.665-010 | Compounder | 550.685-050 |
| Bellows Assembler | 710.687-010 | Concrete-Pipe-Making- Machine Operator | 575.665-010 |
| Bench Grinder | 705.684-010 | Condenser-Tube Tender | 511.685-018 |
| Beveler | 673.685-018 | Conditioner-Tumbler Operator | 361.685-010 |
| Bindery Worker | 649.685-018 | Container Washer, Machine | 529.685-074 |
| Bindery Worker | 653.685-010 | Cook, Fry, Deep Fat | 526.685-014 |
| Blast-Furnace-Keeper Helper | 502.687-010 | Cooler Room Worker | 525.687-022 |
| Block-Making-Machine Operator | 575.685-014 | Coremaker, Machine 1 | 518.685-014 |
| Boarding-Machine Operator | 589.685-010 | Coremaker, Pipe | 518.684-014 |
| Boner, Meat | 525.684-010 | Core-Oven Tender | 518.685-010 |
| Boring-Machine Operator, Production | 606.685-010 | Core Setter | 518.684-010 |
| Box Maker, Paperboard | 794.684-014 | Corrugated-Fastener Driver | 669.685-042 |
| Brine Maker | 551.687-014 | Creeler | 689.687-030 |

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|----------------------------|-------------|----------------------------------|-------------|
| Crossband Layer | 762.687-026 | Heat-Treater Helper | 504.685-018 |
| Crusher Tender | 570.685-022 | Hot-Plate-Plywood-Press Operator | 569.685-054 |
| Cushion Builder | 780.684-050 | Icer, Hand | 524.684-022 |
| Cushion Maker 1 | 780.684-054 | Icer, Machine | 524.685-034 |
| Cutter, Hand 2 | 781.687-026 | Icing Mixer | 520.685-114 |
| Cutter, Hand 3 | 781.687-030 | Industrial-Truck Operator | 921.683-050 |
| Cutter Helper | 781.687-022 | Injection-Molding-Machine Tender | 556.685-038 |
| Cutter, Machine 2 | 699.685-014 | Interlacer | 788.684-070 |
| Cutting-Machine Tender | 690.685-122 | Jet Handler | 557.684-010 |
| Cylinder Batcher | 582.665-010 | Jogger | 659.686-010 |
| Dairy Helper | 529.686-026 | Knitter, Full-Fashioned Garment | 685.665-010 |
| Deburrer, Machine | 715.685-018 | Knitting-Machine Operator | 685.665-014 |
| Dipper | 599.685-026 | Knitting-Machine Operator | 685.685-010 |
| Distillery Worker, General | 529.687-066 | Laborer | 529.687-130 |
| Dividing-Machine Operator | 520.685-086 | Laborer | 559.686-022 |
| Doffer | 689.686-022 | Laborer, Boot and Shoe | 788.687-066 |
| Drawer-In-Helper, Hand | 683.687-010 | Laborer, Chemical Processing | 559.687-050 |
| Draw-Frame Tender | 680.685-034 | Laborer, Cheesemaking | 529.686-050 |
| Drilling-Machine Operator. | | Laborer, Concrete Plant | 579.686-010 |
| Automatic | 606.685-030 | Laborer, General | 509.686-010 |
| Dry Cleaner | 589.685-038 | Laborer, General | 518.687-026 |
| Dry-Cleaner Helper | 362.686-010 | Laborer, General | 519.686-010 |
| Dyer Helper | 364.687-010 | Laborer, General | 559.685-110 |
| Dye-Tub Operator | 582.585-014 | Laborer, General | 579.667-010 |
| Dye Weigher | 550.684-014 | Laborer, General | 589.686-026 |
| Electric-Motor Assembler | 721.684-022 | Laborer, General | 609.684-014 |
| Embossing-Press Operator | 652.685-030 | Laborer, General | 754.687-010 |
| Enameler | 509.684-010 | Laborer, Grinding and Polishing | 705.687-014 |
| Envelope-Machine Operator | 649.685-042 | Laborer, Hot-Plate Plywood Press | 569.686-026 |
| Etcher, Printed Circuits | 590.685-030 | Laborer, Rags | 539.587-010 |
| Extractor Operator | 581.685-036 | Laborer, Salvage | 929.687-022 |
| Eyelet-Machine Operator | 699.685-018 | Laborer, Tin Can | 609.686-010 |
| Feed Mixer | 520.685-098 | Lacer 1 | 788.687-070 |
| Feed Weigher | 920.685-058 | Lathe Operator, Production | 604.685-026 |
| Filler | 739.687-090 | Launderer, Hand | 361.684-010 |
| Film Spooler | 692.685-082 | Laundry Laborer | 361.687-018 |
| Fish Cleaner | 525.684-030 | Laundry Operator | 369.684-014 |
| Flatwork Finisher | 363.686-010 | Laundry Worker 2 | 361.685-018 |
| Floor Attendant | 579.687-018 | Lead Former | 691.685-018 |
| Fly Tier | 732.684-074 | Leasing-Machine Tender | 681.685-054 |
| Folder | 369.687-018 | Leather Finisher | 363.682-010 |
| Folder, Hand | 794.687-022 | Light-Bulb Assembler | 692.685-118 |
| Folding-Machine Feeder | 653.686-014 | Log Roller | 677.687-010 |
| Folding-Machine Operator | 583.685-042 | Loom-Winder Tender | 681.685-062 |
| Forge Helper | 619.666-010 | Machine Cleaner | 699.687-014 |
| Forging-Press Operator 2 | 611.685-010 | Machine Feeder | 819.686-010 |
| Foundry Worker, General | 519.687-022 | Machine Helper | 619.687-014 |
| Fruit-Press Operator | 521.685-146 | Machine Operator 2 | 619.685-062 |
| Furnace Tender | 512.685-010 | Marker 2 | 920.687-126 |
| Garment Folder | 789.687-066 | Marker, Machine | 690.685-282 |
| Gear-Cutting-Machine | | Metal-Cleaner, Immersion | 503.685-030 |
| Operator, Production | 602.685-010 | Metal-Fabricating-Shop Helper | 619.686-022 |
| General Helper | 529.687-094 | Metal Finisher | 705.684-034 |
| Glass Installer | 865.684-014 | Mexican Food Maker, Hand | 520.687-046 |
| Gluer | 762.687-034 | Milling-Machine Operator, | |
| Gluer | 795.687-014 | Production | 605.685-030 |
| Glue Spreader, Veneer | 569.685-042 | Mill Operator | 599.685-058 |
| Golf-Club Assembler | 732.684-078 | Mirror Specialist | 779.684-038 |
| Grinder 1 | 705.684-026 | Mixer | 550.685-078 |
| Grinder-Chipper 2 | 809.684-026 | Mixer Operator | 520.685-146 |
| Grip Wrapper | 732.684-082 | Mixer Operator | 550.685-082 |
| Hacker | 573.686-022 | Mold-Fitting Operator | 556.684-018 |
| Hand Sewer, Shoes | 788.684-054 | Molding Cutter | 663.685-018 |
| Hardware Assembler | 763.684-042 | Mold Worker | 514.567-010 |

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| Mounter, Automatic | 976.685-022 | Sealing-Machine Operator | 692.685-162 |
| Multi-Operation-Forming-Machine Operator 2 | 616.685-042 | Seed-Cleaner Operator | 599.665-010 |
| Nailer, Hand | 762.684-050 | Sewer, Hand | 782.684-058 |
| Nailing-Machine Operator | 669.682-058 | Sewing-Machine Operator, Semi-Automatic | 786.685-030 |
| Nailing-Machine Operator, Automatic | 669.685-066 | Shear Operator 2 | 615.685-034 |
| Offset-Press Operator 2 | 651.685-018 | Shellfish-Processing-Machine Tender | 529.685-214 |
| Packager, Hand | 920.587-018 | Shellfish Shucker | 521.687-122 |
| Packager, Machine | 920.685-078 | Shirt Presser | 363.685-026 |
| Package Sealer, Machine | 920.685-074 | Shoe Cleaner | 788.687-122 |
| Painter, Brush | 740.684-022 | Shoe Packer | 920.687-166 |
| Painter, Spray 2 | 741.687-018 | Silk-Screen Printer | 726.687-018 |
| Painting-Machine Operator | 599.685-074 | Sinter-Machine Operator | 510.685-026 |
| Paint-Line Operator | 599.685-066 | Skein-Yarn Dyer | 582.685-130 |
| Paint Mixer, Machine | 550.485-018 | Skiver, Blockers | 585.685-110 |
| Panel-Machine Operator | 640.685-038 | Skiver, Machine | 690.685-378 |
| Pipe Finisher | 779.684-042 | Slasher Operator | 667.685-054 |
| Plate-Take-Out Worker | 500.687-010 | Slicing Machine Operator | 521.685-306 |
| Plumbing-Hardware Assembler | 706.684-086 | Slitting-Machine-Operator Helper 1 | 699.587-010 |
| Polisher | 700.687-058 | Slubber Tender | 680.685-098 |
| Polisher | 705.684-058 | Smoked Meat Preparer | 525.587-014 |
| Potato-Chip Frier | 526.685-046 | Smoking-Pipe Liner | 739.687-170 |
| Pot Tender | 512.685-018 | Sock Boarder | 589.686-042 |
| Poultry Boner | 525.687-066 | Solderer, Production Line | 813.684-022 |
| Poultry Dresser | 525.687-070 | Spice Cleaner | 521.685-322 |
| Poultry-Dressing Worker | 525.687-082 | Spinner | 557.685-026 |
| Poultry Eviscerator | 525.687-074 | Spinner, Frame | 682.695-010 |
| Poultry Hanger | 525.687-078 | Splicer | 759.684-058 |
| Pourer, Metal | 514.684-022 | Spooler Operator, Automatic | 681.686-018 |
| Presser, All-Around | 363.682-014 | Spooling-Machine Operator | 691.685-026 |
| Presser, Automatic | 363.685-014 | Spot Cleaner | 582.684-014 |
| Presser, Form | 363.685-018 | Spreader 1 | 781.687-058 |
| Presser, Hand | 363.684-010 | Spreader, Machine | 781.685-010 |
| Presser, Machine | 363.682-018 | Spring Assembler | 780.684-098 |
| Press Feeder | 583.686-030 | Spring Coiler | 616-485-014 |
| Press Operator | 363.685-010 | Stacking-Machine Operator 2 | 739.685-038 |
| Pretzel Twister | 520.587-010 | Stainer | 742.684-014 |
| Print Developer, Automatic | 976.685-026 | Staple Cutter | 680.685-102 |
| Processor, Grain | 521.685-254 | Stapling-Machine Operator | 692.685-202 |
| Production Helper | 529.686-070 | Stenciler | 781.687-066 |
| Production-Machine Tender | 609.685-018 | Stenciler | 920.687-178 |
| Progressive Assembler and Fitter | 801.684-022 | Stone Setter | 735.687-034 |
| Pumper Helper | 549.684-010 | Stretcher-Leveler-Operator Helper | 619.686-030 |
| Punch-Press Operator 2 | 615.685-030 | Strip-Cutting-Machine Operator | 686.685-066 |
| Putty Glazer | 749.684-042 | Stuffer | 520.685-210 |
| Quiller Operator | 681.685-070 | Sweeping-Compound Blender | 550.685-110 |
| Raw-Cheese Worker | 529.686-078 | Tank-House-Operator Helper | 519.565-014 |
| Reclamation Kettle Tender, Metal | 512.685-022 | Tapper | 514.664-014 |
| Remelter | 502.685-014 | Tenter-Frame Operator | 580.585-010 |
| Record-Press Tender | 556.685-070 | Thread Cutter | 789.684-050 |
| Rewinder Operator | 640.685-058 | Thread Winder, Automatic | 681.685-122 |
| Riveter, Hand | 709.684-066 | Ticketeer | 652.685-098 |
| Riveting-Machine Operator | 616.685-058 | Trimmer, Hand | 781.687-070 |
| Roll Finisher | 920.685-090 | Trimmer, Meat | 525.584-054 |
| Rope-Laying Machine Operator | 681.685-086 | Trimming-Machine Operator | 583.685-122 |
| Rope Maker, Machine | 681.685-082 | Tumbler Operator | 599.685-110 |
| Rubber | 742.684-010 | Turner | 789.687-182 |
| Rubber-Mill Tender | 550.685-102 | Twister Tender | 681.685-130 |
| Rug Cleaner | 689.687-066 | Waler-Machine Operator | 526.685-066 |
| Sander, Hand | 761.687-010 | Washer | 599.687-030 |
| Sander, Portable Machine | 761.684-034 | Washer, Machine | 361.665-010 |
| Sausage Maker | 520.685-202 | Warp-Typing-Machine Tender | 683.685-034 |
| Screen Printer | 979.684-034 | Welder, Gun | 810.664-010 |
| Screw-Machine Operator, Production | 604.685-034 | Welder, Production Line | 819.684-010 |

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| Winder Operator, Automatic | 681.685-150 |
| Wireworker | 728.687-010 |
| Woodworking-Shop Hand | 769.687-054 |
| Wrapping Machine Operator | 641.685-098 |
| Wringer-Machine Operator | 589.685-098 |
| Yarn Winder | 681.685-154 |

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Occupations in Animal Training & Service

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|-----------------------|-------------|
| Animal Caretaker | 410.674-010 |
| Animal Keeper | 412.674-010 |
| Animal-Ride Attendant | 349.674-010 |
| Dog Bather | 418.677-010 |
| Dog Groomer | 418.674-010 |
| Horseshoer | 418.381-010 |
| Stable Attendant | 410.674-022 |

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Occupations in Elemental Work: Plants and Animals

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|--------------------------------------|-------------|
| Apple-Packing Header | 920.687-010 |
| Artificial Inseminator | 418.384-010 |
| Bucker | 454.684-010 |
| Cemetery Worker | 406.684-010 |
| Chick Sexer | 411.687-014 |
| Clam Sorter | 446.687-010 |
| Cowpuncher | 410.674-014 |
| Dog Catcher | 379.673-010 |
| Faller 1 | 454.384-010 |
| Farm Machine Operator | 409.683-010 |
| Farmworker, Dairy | 410.684-010 |
| Farmworker, Diversified Crops 1 | 407.663-010 |
| Farmworker, Fruit 1 | 403.683-010 |
| Farmworker, Fruit 2 | 403.687-010 |
| Farmworker, General 1 | 421.683-010 |
| Farmworker, General 2 | 421.687-010 |
| Farmworker, Grain 1 | 401.683-010 |
| Farmworker, Grain 2 | 401.687-010 |
| Farmworker, Livestock | 410.664-010 |
| Farmworker, Poultry | 411.584-010 |
| Farmworker, Rice | 401.683-014 |
| Farmworker, Vegetable 1 | 402.663-010 |
| Farmworker, Vegetable 2 | 402.687-010 |
| Fisher, Line | 442.684-010 |
| Fisher, Net | 441.684-010 |
| Forest-Fire Fighter | 452.687-014 |
| Forest Worker | 452.687-010 |
| Groundskeeper, Industrial-Commercial | 406.684-014 |
| Groundskeeper, Parks and Grounds | 406.687-010 |
| Growth-Nedua Mixer, Mushroom | 405.683-014 |

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| Harvest Worker, Fruit | 403.687-018 |
| Horticultural Worker 1 | 405.684-014 |
| Horticultural Worker 2 | 405.687-014 |
| Irrigator, Gravity Flow | 409.687-014 |
| Laborer, Brush Clearing | 459.687-010 |
| Laborer, Landscape | 408.687-014 |
| Laborer, Poultry Hatchery | 411.687-022 |
| Logger, All-Round | 454.684-018 |
| Log Sorter | 455.684-010 |
| Milker, Machine | 410.685-010 |
| Packer, Agricultural Produce | 920.687-134 |
| Poultry Debeaker | 411.687-026 |
| Poultry Inseminator | 411.384-010 |
| Poultry Tender | 411.364-014 |
| Shellfish-Bed Worker | 446.684-014 |
| Sorter, Agricultural Produce | 529.687-186 |
| Teamster | 919.684-010 |
| Trapper, Animal | 461.684-014 |
| Tree Cutter | 454.684-026 |
| Tree Planter | 452.687-018 |
| Tree Pruner | 408.684-018 |
| Tree Trimmer | 408.664-010 |
| Tree-Trimmer Helper | 408.667-010 |
| Yard Worker | 301.687-018 |

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Occupations in Elemental Work: Mechanical

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|--------------------------------------|-------------|
| Able Seaman | 911.364-010 |
| Addressing-Maching Operator | 208.582-010 |
| Automobile-Mechanic Helper | 620.684-014 |
| Automobile Wrecker | 620.684-010 |
| Baggage Handler | 910.687-010 |
| Baker Helper | 313.684-010 |
| Bartender Helper | 312.687-010 |
| Blacksmith Helper | 610.684-010 |
| Bottomer 1 | 932.667-010 |
| Brake Adjuster | 620.684-018 |
| Brake Coupler, Road Freight | 910.367-010 |
| Brake Holder | 932.664-010 |
| Bull-Chain Operator | 921.685-014 |
| Caretaker | 301.687-010 |
| Car-Retarder Operator | 910.382-010 |
| Central-Supply Worker | 381.687-010 |
| Chain Offbearer | 669.686-018 |
| Choke Setter | 921.687-014 |
| Cleaner 2 | 919.687-014 |
| Cleaner, Commercial or Institutional | 381.687-014 |
| Cleaner, Hospital | 323.687-010 |
| Cleaner, Housekeeping | 323.687-014 |
| Cleaner, Industrial | 381.687-018 |
| Cleaner, Laboratory Equipment | 381.687-022 |
| Cleaner, Wall | 381.687-026 |
| Cleaner, Window | 389.687-014 |
| Collator Operator | 208.685-010 |
| Company Laborer | 939.687-014 |
| Construction Worker 2 | 869.687-026 |
| Cook Helper | 317.687-010 |
| Cook Helper, Pastry | 313.687-010 |

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| Day Worker | 301.687-014 |
| Deli Cutter-Slicer | 316.684-014 |
| Dock Hand | 891.684-010 |
| Driller Helper | 930.666-010 |
| Dumper | 921.667-018 |
| Duplicating-Machine Operator 2 | 207.682-014 |
| Electrician Helper | 829.684-022 |
| Elevator Operator, Freight | 921.683-038 |
| Elevator-Repairer Helper | 825.684-014 |
| Flagger | 372.667-022 |
| Food Assembler, Kitchen | 319.484-010 |
| Furnace Cleaner | 891.687-014 |
| Garage Servicer, Industrial | 915.687-014 |
| Garbage Collector | 909.687-010 |
| Ginner | 429.685-010 |
| Heater Helper | 613.685-014 |
| Highway-Maintenance Worker | 899.684-014 |
| Housecleaner | 323.687-018 |
| House Worker, General | 301.474-010 |
| Ironer | 302.687-010 |
| Janitor | 382.664-010 |
| Key Cutter | 709.684-050 |
| Kitchen Helper | 318.687-010 |
| Laborer | 939.687-018 |
| Laborer, Airport Maintenance | 899.687-014 |
| Laborer, Construction or Leak Gang | 862.684-014 |
| Laborer, General | 909.687-014 |
| Laborer, Hoisting | 921.667-022 |
| Laborer, Petroleum Refinery | 549.687-018 |
| Laborer, Pipe Lines | 914.687-010 |
| Laborer, Shipyard | 809.687-022 |
| Laundry Worker, Domestic | 302.685-010 |
| Light-Fixture Servicer | 389.687-018 |
| Line-Service Attendant | 912.687-010 |
| Log Loader Helper | 921.687-022 |
| Lubrication Servicer | 915.687-018 |
| Lumber Handler | 922.687-070 |
| Machinist Helper, Outside | 623.687-010 |
| Maintenance-Mechanic Helper | 638.684-018 |
| Marine Oiler | 911.584-010 |
| Material Handler | 929.687-030 |
| Millwright Helper | 638.484-010 |
| Motorboat-Mechanic Helper | 623.684-010 |
| Oiler | 699.687-018 |
| Ordinary Seaman | 911.687-030 |
| Painter Helper, Automotive | 845.684-014 |
| Painter Helper, Spray | 741.687-014 |
| Photocopying-Machine Operator | 207.685-014 |
| Photographic-Machine Operator | 207.685-018 |
| Pipe-Fitter Helper | 862.684-022 |
| Pond Worker | 921.686-022 |
| Porter, Used-Car Lot | 915.687-022 |
| Produce Weigher | 299.587-010 |
| Quarry Worker | 939.667-014 |
| Repairer Helper | 630.664-010 |
| Rigging Slinger | 921.364-010 |
| Rock-Dust Sprayer | 939.687-026 |
| Rotary-Driller Helper | 930.684-026 |
| Rug-Dyer Helper | 364.687-014 |
| Sample-Taker Operator | 931.361-010 |
| Sandblaster | 503.687-010 |

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| Sandwich Maker | 317.684-018 |
| Scullion | 318.687-014 |
| Sewer-Pipe Cleaner | 899.644-014 |
| Sexton | 389.667-010 |
| Shaker Tender | 934.685-018 |
| Shipfitter Helper | 806.687-050 |
| Signal Maintainer Helper | 822.684-018 |
| Sorting-Machine Operator | 208.685-030 |
| Stevedore 2 | 922.687-090 |
| Street Cleaner | 955.687-018 |
| Surveyor Helper | 869.567-010 |
| Switch Tender | 910.667-026 |
| Tank Cleaner | 891.687-022 |
| Thermal Cutter, Hand | 816.684-018 |
| Tile Setter | 861.684-018 |
| Tire Builder | 750.684-022 |
| Tire Recapper | 750.685-014 |
| Tire Repairer | 915.684-010 |
| Toy Assembler | 731.684-018 |
| Truck-Driver Helper | 905.687-010 |
| Track Repairer | 910.682-010 |
| Van-Driver Helper | 905.687-014 |
| Wastewater-Treatment-Plant Attendant | 955.585-010 |
| Water-Filter Cleaner | 954.587-010 |
| Water Tender | 599.685-122 |
| Welder Helper | 819.687-014 |
| Yard Coupler | 910.664-010 |

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Occupations in Vending

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|--------------|-------------|
| Peddler | 291.457-018 |
| Photographer | 143.457-010 |
| Vendor | 291.457-022 |

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Occupations in Attendant Services

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|-------------------------------|-------------|
| Bagger Checker | 357.477-010 |
| Bagger | 920.687-014 |
| Bellhop | 324.677-010 |
| Caddie | 341.677-010 |
| Cafeteria Attendant | 311.677-010 |
| Caterer Helper | 319.677-010 |
| Checkroom Attendant | 358.677-010 |
| Counter Attendant, Cafeteria | 311.677-014 |
| Counter-Supply Worker | 319.687-010 |
| Dining Room Attendant | 311-677-018 |
| Doorkeeper | 324.677-014 |
| Elevator Operator | 388.663-010 |
| Food Service Worker, Hospital | 355.677-010 |
| Hospital Entrance Attendant | 355.677-014 |
| Hot-Room Attendant | 335.677-014 |
| Locker-Room Attendant | 358.677-014 |
| Manicurist | 331.674-010 |
| Mess Attendant | 350.677-010 |
| Porter | 357.677-010 |
| Racker | 340.477-010 |
| Restroom Attendant | 358.677-018 |
| Room-Service Clerk | 324.577-010 |
| Shoe Shiner | 366.677-010 |
| Ticket Taker | 344.667-010 |
| Usher | 344.677-014 |

Cluster E

Researching, Planning, and Maintaining Societal Systems

Interest Areas Included

- 10 -- Humanitarian
11 -- Leading-Influencing

Occupations Included

(GOE p. 290)

Occupations in Social Research

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|---|-------------|
| Anthropologist | 055.067-010 |
| Archeologist | 055.067-018 |
| Archivist | 101.167-010 |
| Ethnologist | 055.067-022 |
| Historian | 052.067-022 |
| Occupational Analyst | 166.067-010 |
| Political Scientist | 051.067-010 |
| Psychologist, Developmental | 045.061-010 |
| Psychologist, Educational | 045.067-010 |
| Psychologist, Engineering | 045.061-014 |
| Psychologist, Experimental | 045.061-018 |
| Psychologist, Industrial-Organizational | 045.107-030 |
| Psychologist, Social | 045.067-014 |
| Research Worker, Social Welfare | 054.067-010 |
| Scientific Linguist | 059.067-014 |
| Sociologist | 054.067-014 |
| Urban Planner | 199.167-014 |

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Occupations in Law

| | |
|---------------------|-------------|
| Arbitrator | 169.107-010 |
| District Attorney | 110.117-010 |
| Judge | 111.107-010 |
| Lawyer | 110.107-010 |
| Lawyer, Admiralty | 110.117-018 |
| Lawyer, Corporation | 110.117-022 |
| Lawyer, Criminal | 110.107-014 |
| Lawyer, Patent | 110.117-026 |
| Lawyer, Real Estate | 110.117-034 |
| Tax Attorney | 110.117-038 |

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Occupations in Finance

| | |
|-----------------------------------|-------------|
| Accountant | 160.167-010 |
| Accountant, Budget | 160.167-014 |
| Accountant, Cost | 160.167-018 |
| Accountant, Tax | 160.162-010 |
| Appraiser | 188.167-010 |
| Auditor | 160.162-014 |
| Auditor, County or City | 160.167-030 |
| Auditor, Tax | 160.167-038 |
| Broker-and-Market Operator, Grain | 162.157-010 |
| Broker's Floor Representative | 162.157-014 |
| Budget Officer | 161.117-010 |
| Controller | 186.117-014 |
| Foreign-Exchange Trader | 186.167-014 |
| Manager, Credit, and Collection | 168.167-054 |
| Market-Research Analyst 1 | 050.067-014 |
| Operations Officer | 186.167-050 |
| Reserve Officer | 186.167-054 |
| Revenue Agent | 160.167-050 |
| Risk and Insurance Manager | 186.117-066 |
| Sales Agent, Securities | 251.157-010 |
| Securities Trader 1 | 162.157-042 |
| Securities Trader 2 | 186.167-058 |
| Treasurer | 161.117-018 |
| Treasurer, Financial Institution | 186.117-070 |
| Trust Officer | 186.117-074 |
| Underwriter | 169.167-058 |

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Occupations in Social Services

| | |
|---------------------------------------|-------------|
| Case Aide | 195.367-010 |
| Caseworker | 195.107-010 |
| Christian Science Practitioner | 129.107-014 |
| Clergy Member | 120.007-010 |
| Counselor | 045.107.010 |
| Director of Counseling | 045.107-018 |
| Director of Religious Activities | 129.107-018 |
| Educational Therapist | 094.227-010 |
| Group Worker | 195.164-010 |
| Parole Officer | 195.167-030 |
| Probation Officer | 195.187-034 |
| Psychologist, Clinical | 045.107-022 |
| Psychologist, Counseling | 045.107-026 |
| Psychologist, School | 045.107-034 |
| Residence Counselor | 045.107-038 |
| Social Group Worker | 195.107-022 |
| Social Worker, Delinquency Prevention | 195.107-026 |
| Social Worker, Psychiatric | 195.107-034 |
| Social Worker, Medical | 195.107-030 |
| Social Worker, School | 195.107-038 |
| Teacher, Blind | 094.227-014 |
| Teacher, Deaf | 094.224-010 |
| Teacher, Handicapped Students | 094.227-018 |
| Teacher, Mentally Retarded | 094.227-022 |
| Veterans Contact Representative | 187.167-108 |
| Vocational-Rehabilitation Counselor | 045.107-042 |

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Occupations in Business Administration

| | |
|---|-------------|
| Administrative Assistant | 169.167-010 |
| Association Executive | 189.117-010 |
| Business Manager, College or University | 186.117-010 |
| Business Representative, Labor Union | 186.187-018 |
| Civil Preparedness Officer | 188.177-022 |
| Commissioner, Public Works | 188.117-030 |
| Dietitian, Chief | 077.117-010 |
| Director, Industrial Relations | 166.117-010 |
| Director, Operations | 184.167-018 |
| Director, Program | 184.167-030 |
| Director, Safety Council | 188.167-034 |
| Director, Service | 189.167-014 |
| Director, Sports | 184.167-034 |
| Director, Unemployment Insurance | 188.117-094 |
| District Adviser | 187.117-022 |
| Editor, Managing, Newspaper | 132.017-010 |
| Executive Chef | 187.161-010 |
| Executive Vice President, Chamber of Commerce | 187.117-030 |
| Financial-Aids Officer | 090.117-030 |
| Freight-Traffic Consultant | 184.267-010 |
| Manager, Airport | 184.117-026 |
| Manager, Benefits | 166.167-018 |
| Manager, Branch | 183.117-010 |

| | |
|---------------------------------------|-------------|
| Manager, Brokerage Office | 186.147-034 |
| Manager, City | 188.117-114 |
| Manager, Compensation | 166.167-022 |
| Manager, Credit Card Operations | 186.167-022 |
| Manager, Credit Union | 186.167-028 |
| Manager, Employment | 166.167-030 |
| Manager, Export | 163.117-014 |
| Manager, Financial Institution | 186.117-038 |
| Manager, Housing Project | 186.167-030 |
| Manager, Industrial Organization | 189.117-022 |
| Manager, Labor Relations | 166.167-034 |
| Manager, Merchandise | 185.167-034 |
| Manager, Office | 188.167-058 |
| Manager, Operations | 184.117-050 |
| Manager, Personnel | 166.117-018 |
| Manager, Procurement Services | 162.167-022 |
| Manager, Sales | 163.167-018 |
| Manager, Station | 184.117-062 |
| Manager, Traffic | 184.167-094 |
| Manager, Utility Sales and Service | 163.167-022 |
| Postmaster | 188.167-068 |
| President | 189.117-026 |
| President, Financial Institution | 186.117-054 |
| Purchasing Agent | 162.157-038 |
| Registrar, College or University | 090.167-030 |
| Security Officer | 189.167-034 |
| Superintendent, Division | 184.167-158 |
| Superintendent, Plant Protection | 189.167-050 |
| Supervisor, Terminal Operations | 184.187-242 |
| Vice President | 189.117-034 |
| Vice President, Financial Institution | 186.117-078 |
| Wholesaler 1 | 185.167-070 |

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Occupations in Services Administration

| | |
|--|-------------|
| Academic Dean | 090.117-010 |
| Administrator, Hospital | 187.117-010 |
| Administrator, Social Welfare | 195.117-010 |
| Business-Enterprise Officer | 188.117-014 |
| Community Organization Worker | 195.167-010 |
| Curator | 102.017-010 |
| Department Head, College or University | 090.167-010 |
| Director, Athletic | 090.117-022 |
| Director, Community Organization | 187.117-014 |
| Director, Educational Program | 099.117-010 |
| Director, Institution | 187.117-018 |
| Director, Instructional Material | 099.167-018 |
| Director, Nursing Service | 075.117-022 |
| Director of Admissions | 090.167-014 |
| Director, Special Education | 094.117-014 |
| District Extension Service Agent | 096.161-010 |
| Educational Specialist | 099.167-022 |
| Extension Service Specialist | 096.127-014 |
| Field Representative | 189.267-010 |
| Library Director | 100.117-010 |
| Manager, Education and Training | 168.167-026 |
| Medical-Record Administrator | 079.167-014 |

| | |
|------------------------------------|-------------|
| Park Naturalist | 049.127-010 |
| President, Educational Institution | 090.117-034 |
| Principal | 099.117-018 |
| Public Health Educator | 079.117-014 |
| Superintendent, Recreation | 187.117-054 |
| Superintendent, Schools | 099.117-022 |
| Supervisor, Education | 099.117-026 |
| Welfare Director | 188.117-126 |

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Occupations in Promotion

| | |
|---------------------------------|-------------|
| Account Executive | 164.167-010 |
| Director, Fundraising | 165.117-010 |
| Fashion Coordinator | 185.157-010 |
| Foreign-Service Officer | 188.117-106 |
| Fund Raiser 1 | 293.157-010 |
| Goodwill Ambassador | 293.357-018 |
| Lobbyist | 165.017-010 |
| Manager, Advertising | 163.167-010 |
| Manager, Advertising | 164.117-010 |
| Manager, Promotion | 163.117-018 |
| Membership Director | 189.167-026 |
| Public Relations Representative | 165.067-010 |

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Cluster F

Persuading, Informing, and Helping Individuals

Interest Areas Included

- 8 -- Selling
 10 -- Humanitarian
 11 -- Leading-Influencing

Occupations Included

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Occupations in Nursing, Therapy, and Specialized Teaching Services

| | |
|---|-------------|
| Art Therapist | 076.127-010 |
| Dental Hygienist | 078.361-010 |
| Emergency Medical Technician | 079.374-010 |
| Hypnotherapist | 079.157-010 |
| Industrial Therapist | 076.167-010 |
| Music Therapist | 076.127-014 |
| Nurse Anesthetist | 075.371-010 |
| Nurse, General Duty | 075.374-010 |
| Nurse, Head | 075.127-018 |
| Nurse, Instructor | 075.121-010 |
| Nurse, Licensed Practical | 079.374-014 |
| Nurse, Office | 075.374-014 |
| Nurse, Private Duty | 075.374-018 |
| Nurse, School | 075.124-010 |
| Nurse, Staff, Community Health | 075.124-014 |
| Nurse, Staff, Occupational Health Nursing | 075.374-022 |
| Nurse, Supervisor | 075.127-022 |
| Nurse, Supervisor, Community-Health Nursing | 075.127-026 |
| Occupational Therapist | 076.121-010 |
| Occupational Therapy Assistant | 076.364-010 |
| Orthoptist | 079.371-014 |
| Physical Therapist | 076.121-014 |
| Physical Therapist Assistant | 076.224-010 |
| Physician Assistant | 079.364-018 |
| Podiatric Assistant | 079.374-018 |
| Program Aide, Group Work | 195.227-010 |
| Radiologic Technologist | 078.362-026 |
| Recreational Therapist | 076.124-014 |
| Respiratory Therapist | 079.361-010 |
| Teacher, Kindergarten | 092.227-014 |
| Teacher, Preschool | 092.227-018 |

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Occupations in Sales Technology

| | |
|---|-------------|
| Business-Opportunity and Property-Investment Broker | 189.157-010 |
| Buyer | 162.157-018 |
| Buyer, Assistant | 162.157-022 |
| Buyer, Grain | 162.167-010 |
| Commission Agent, Livestock | 162.157-026 |
| Comparison Shopper | 296.367-014 |
| Field-Contact Technician | 162.117-026 |
| Pawnbroker | 191.157-010 |
| Pharmaceutical Detailer | 262.157-010 |
| Sales Agent, Financial Services | 251.257-010 |
| Sales Agent, Insurance | 250.257-010 |
| Sales Representative, Advertising | 254.357-014 |
| Sales Representative, Aircraft Equipment and Parts | 273.357-010 |
| Sales Representative, Building Equipment and Supplies | 274.357-018 |
| Sales Representative, Chemicals and Drugs | 262.357-010 |
| Sales Representative, Construction Machinery | 274.357-022 |
| Sales Representative, Dental and Medical Equipment | 276.257-010 |
| Sales Representative, Education Courses | 259.257-010 |
| Sales Representative, Electronics Parts | 271.357-010 |
| Sales Representative, Foundry and Machine Shop Products | 274.257-010 |
| Sales Representative, Hotel Services | 259.157-014 |
| Sales Representative, Industrial Machinery | 274.357-038 |
| Sales Representative, Livestock | 260.257-010 |
| Sales Representative, Metals | 274.357-054 |
| Sales Representative, Oilfield Supplies and Equipment | 274.357-058 |
| Sales Representative, Public Utilities | 253.357-010 |
| Sales Representative, Printing | 254.357-018 |
| Sales Representative, Radio and Television Time | 259.357-018 |
| Sales Representative, Telephone Services | 253.257-010 |
| Tobacco-Warehouse Agent | 259.357-038 |

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Occupations in Educational and Library Services

| | |
|---------------------------------------|-------------|
| Acquisition Librarian | 100.267-010 |
| Bookmobile Librarian | 100.167-014 |
| Children's Librarian | 100.167-018 |
| Community Dietitian | 077.127-010 |
| Counselor | 045.107-010 |
| County-Agricultural Agent | 096.127-010 |
| County Home Demonstration Agent | 096.121-010 |
| Dean of Students 1 | 090.117-010 |
| Dean of Students 2 | 091.107-010 |
| Dietitian, Teaching | 077.127-022 |
| Director, Religious Education | 129.107-022 |
| Faculty Member, College or University | 090.227-010 |
| Four-H Club Agent | 096.127-022 |
| Home Economist | 096.121-014 |
| Instructor, Correspondence School | 099.227-014 |
| Instructor, Extension Work | 090.227-018 |
| Instructor, Physical Education | 099.224-010 |
| Instructor, Vocational Training | 097.227-014 |
| Librarian | 100.127-014 |
| Librarian, Special Collections | 100.267-014 |
| Librarian, Special Library | 100.167-026 |
| Media Specialist, School Library | 100.167-030 |
| Teacher, Adult Education | 099.277-030 |
| Teacher, Elementary School | 092.227-010 |
| Teacher, Industrial Arts | 091.221-010 |
| Teacher, Secondary School | 091.227-010 |
| Training Representative | 166.227-010 |
| Tutor | 099.227-034 |
| Young-Adult Librarian | 100.167-034 |

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Occupations in Social Research

| | |
|-------------------------------------|-------------|
| City Planning Aide | 199.364-010 |
| Employment Interviewer | 166.267-010 |
| Intelligence Specialist | 059.267-010 |
| Job Analyst | 166.267-018 |
| Prisoner-Classification Interviewer | 166.267-022 |
| Research Assistant | 109.267-010 |

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Occupations in Law

| | |
|---------------------|-------------|
| Abstractor | 119.267-010 |
| Conciliator | 169.207-010 |
| Legal Investigator | 119.267-022 |
| Paralegal Assistant | 119.267-026 |
| Appeals Referee | 119.267-014 |

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Occupations in Communications

| | |
|--------------------------------|-------------|
| Columnist/Commentator | 131.067-010 |
| Director, News | 184.167-014 |
| Editorial Assistant | 132.267-014 |
| Editor, Dictionary | 132.067-018 |
| Editor, News | 132.067-026 |
| Editor, Newspaper | 132.017-014 |
| Interpreter | 137.267-010 |
| Newscaster | 131.267-010 |
| Newswriter | 131.267-014 |
| Reporter | 131.267-018 |
| Residence Supervisor | 187.167-186 |
| Translator | 137.267-018 |
| Writer, Technical Publications | 131.267-026 |

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Occupations in Business Management

| | |
|--|-------------|
| Commissary Manager | 185.167-010 |
| Conductor, Passenger Car | 198.167-010 |
| Conductor, Road Freight | 198.167-018 |
| Director, Camp | 195.167-018 |
| Director, Food Services | 187.167-026 |
| Director, Funeral | 187.167-030 |
| Director, Recreation Center | 195.167-026 |
| Executive Housekeeper | 187.167-046 |
| Manager, Apartment House | 186.167-018 |
| Manager, Automobile Service Station | 185.167-014 |
| Manager, Barber or Beauty Shop | 187.167-058 |
| Manager, Bus Transportation | 184.167-054 |
| Manager, Cemetery | 187.167-074 |
| Manager, Distribution Warehouse | 185.167-018 |
| Manager, Food Service | 187.167-106 |
| Manager, Golf Club | 187.167-114 |
| Manager, Hotel or Motel | 187.117-038 |
| Manager, Insurance Office | 186.167-034 |
| Manager, Liquor Establishment | 157.167-126 |
| Manager, Machinery-or-Equipment Rental and Leasing | 185.167-026 |
| Manager, Meat Sales and Storage | 185.167-030 |
| Manager, Parts | 185.167-038 |
| Manager, Property | 186.167-046 |
| Manager, Recreation Establishment | 187.117-042 |
| Manager, Retail Store | 185.167-046 |
| Manager, Sales | 187.167-138 |
| Manager, Service Department | 187.167-142 |
| Manager, Skating Rink | 187.167-146 |
| Manager, Station | 184.167-082 |
| Manager, Storage Garage | 187.167-150 |
| Manager, Theater | 187.167-154 |
| Manager, Tobacco Warehouse | 185.167-054 |
| Manager, Traffic | 184.117-066 |
| Manager, Truck Terminal | 184.167-110 |
| Manager, Vehicle Leasing and Rental | 187.167-162 |
| Manager, Warehouse | 184.167-114 |
| Purser | 197.167-014 |

| | |
|---|-------------|
| Superintendent, Laundry | 187.167-194 |
| Superintendent, Maintenance of Equipment | 184.167-178 |
| Superintendent, Terminal | 184.167-214 |
| Yard Manager | 184.167-278 |

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Occupations in Contracts and Claims

| | |
|---|-------------|
| Appraiser, Automobile Damage | 241.267-014 |
| Artist's Manager | 191.117-010 |
| Booking Manager | 191.117-014 |
| Claim Adjuster | 241-217-010 |
| Claim Examiner | 241.267-018 |
| Contract Administrator | 162.117-014 |
| Contract Specialist | 162.117-018 |
| Contractor | 182.167-010 |
| Escrow Officer | 119.367-010 |
| Lease Buyer | 191.117-030 |
| Literary Agent | 191.117-034 |
| Manager, Customer Service | 168.167-058 |
| Property-Utilization Officer | 188.117-122 |
| Real-Estate Agent | 186.117-058 |
| Rental Manager, Public Events Facilities | 186.117-062 |
| Right-of-Way Agent | 191.117-046 |
| Right-of-Way Supervisor | 191.117-050 |

Cluster G

Serving and Caring for Individuals

Interest Areas Included

- 3 -- Plants and Animals
 4 -- Protective
 9 -- Accommodating

Occupations Included

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Occupations in Hospitality Services

| | |
|---------------------------|-------------|
| Airplane-Flight Attendant | 352.367-010 |
| Braker, Passenger Train | 910.364-010 |
| Counselor, Camp | 159.124-010 |
| Guide | 353.367-014 |
| Guide, Establishment | 353.367-014 |
| Host/Hostess | 352.667-010 |
| Host/Hostess, Dance Hall | 349.667-010 |
| Recreation Leader | 195.227-014 |
| Steward/Stewardess | 350.677-022 |

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Occupations in Child and Adult Care

| | |
|--------------------------------------|-------------|
| Ambulance Attendant | 355.374-010 |
| Attendant, Children's Institution | 359.677-010 |
| Birth Attendant | 354.377-010 |
| Child-Care Attendant, School | 355.674-010 |
| Child Monitor | 301.677-010 |
| Children's Tutor | 099.277-010 |
| Companion | 309.677-010 |
| Dental Assistant | 079.371-010 |
| Electrocardiograph Technician | 078.362-018 |
| Electroencephalographic Technologist | 078.362-022 |
| Foster Parent | 309.677-014 |
| Guard, School-Crossing | 371.567-010 |
| Home Attendant | 354.377-014 |
| Medical Assistant | 079.367-010 |
| Nurse Aide | 355.674-014 |
| Nurse, Practical | 354.374-010 |
| Nursery School Attendant | 359.677-018 |
| Occupational Therapy Aide | 355.377-010 |
| Orderly | 355.674-018 |
| Physical Therapy Aide | 355.354-010 |
| Playroom Attendant | 359.677-026 |
| Psychiatric Aide | 355.377-014 |
| Surgical Technician | 079.374-022 |

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Occupations in Security Services

| | |
|------------------|-------------|
| Border Guard | 375.363-010 |
| Detective 1 | 376.367-014 |
| Fire Inspector | 373.367-010 |
| Fire Ranger | 452.367-014 |
| Park Ranger | 169.167-042 |
| Police Officer 2 | 375.367-010 |

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Occupations in Animal Training and Service

| | |
|---------------------|-------------|
| Animal Trainer | 159.224-010 |
| Racehorse Trainer | 153.224-014 |
| Animal-Ride Manager | 349.224-010 |

Cluster H

Maintaining Bureaucratic Rules, Records, and Transactions

Interest Areas Included

- 4 -- Protective
- 5 -- Mechanical
- 7 -- Business Detail
- 8 -- Selling
- 11 -- Leading-Influencing

Occupations Included

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Occupations in Regulations Enforcement

| | |
|-------------------------------------|-------------|
| Animal Treatment Investigator | 379.263-010 |
| Customs Inspector | 168.267-022 |
| Deputy Insurance Commissioner | 186.117-022 |
| Director, Consumer Affairs | 188.117-050 |
| Equal-Opportunity Representative | 168.167-014 |
| Fire Inspector | 373.267-010 |
| Food and Drug Inspector | 168.267-042 |
| Health Officer, Field | 168.167-018 |
| Immigration Inspector | 168.167-022 |
| Industrial Hygienist | 079.161-010 |
| Inspector, Agricultural Commodities | 168.287-010 |
| Investigator | 168.267-062 |
| Mine Inspector | 168.267-074 |
| Revenue Officer | 188.167-074 |
| Safety Coordinator | 909.127-010 |
| Safety Inspector | 168.167-078 |
| Safety Inspector | 168.264-014 |
| Sanitarian | 079.117-018 |
| Shopping Investigator | 376.267-022 |

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Occupations in Safety and Law Enforcement

| | |
|-------------------------------|-------------|
| Detective | 375.267-010 |
| Detective Chief | 375.167-022 |
| Detective, Narcotics and Vice | 375.267-014 |
| Fire Chief | 373.117-010 |
| Fire Marshal | 373.167-018 |
| Fish and Game Warden | 379.167-010 |
| Guard, Chief | 372.167-014 |
| Harbor Master | 375.167-026 |
| Investigator, Private | 376.267-018 |
| Park Superintendent | 188.167-062 |
| Police Chief | 375.117-010 |
| Police Officer 1 | 375.263-014 |
| Sheriff, Deputy | 377.263-010 |
| Special Agent | 375.167-042 |
| Special Agent-in-Charge | 376.167-010 |
| State-Highway Police Officer | 375.263-018 |

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Occupations in Administrative Detail

| | |
|---------------------------------------|-------------|
| Admissions Evaluator | 205.367-010 |
| Administrative Clerk | 219.362-010 |
| Administrative Secretary | 169.167-014 |
| Attendance Officer | 168.367-010 |
| Bond Clerk | 216.362-010 |
| Budget Clerk | 216.382-022 |
| Contract Clerk | 119.267-018 |
| Court Clerk | 243.362-010 |
| Driver's License Examiner | 168.267-034 |
| Eligibility-and-Occupancy Interviewer | 168.267-038 |
| Hospital-Insurance Representative | 166.267-014 |
| Insurance Clerk 1 | 219.362-034 |
| Legal Secretary | 201.362-010 |
| Loan Counselor | 186.267-014 |
| Manager, Office | 169.167-034 |
| Manager, Traffic 1 | 184.167-098 |
| Manager, Traffic 1 | 184.167-102 |
| Medical Secretary | 201.362-014 |
| Mortgage Clerk | 249.382-010 |
| Procurement Clerk | 249.367-066 |
| Real-Estate Clerk | 219.362-046 |
| Relocation Commissioner | 188.167-070 |
| School Secretary | 201.362-022 |
| Secretary | 201.362-030 |
| Securities Clerk | 219.362-054 |
| Social Secretary | 201.162-010 |
| Test Technician | 249.367-078 |
| Title Examiner | 119.287-010 |
| Town Clerk | 243.367-018 |

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Occupations in Mathematical Detail

| | |
|-----------------------------------|-------------|
| Account Analyst | 214.382-010 |
| Accounting Clerk | 216.482-010 |
| Accounting Clerk, Data Processing | 216.382-010 |
| Audit Clerk | 210.382-010 |
| Billing-Control Clerk | 214.387-010 |
| Billing Typist | 214.382-014 |
| Bookkeeper 1 | 210.382-014 |
| Bookkeeper 2 | 210.382-018 |
| Bookkeeping-Machine Operator 1 | 210.382-022 |
| Bookkeeping-Machine Operator 2 | 210.382-026 |
| brokerage Clerk 2 | 219.362-018 |
| Calculating-Machine Operator | 216.482-022 |
| Claim Examiner | 168.267-014 |
| Collection Clerk | 216.362-014 |
| Cost Clerk | 216.382-034 |
| Credit-Card Clerk | 210.382-038 |
| Demurrage Clerk | 214.362-010 |
| Documentation-Billing Clerk | 214.362-014 |
| Exchange Clerk | 216.362-018 |
| Food-and-Beverage Controller | 216.362-022 |
| Foreign Clerk | 214.467-010 |
| Insurance Clerk | 214.362-022 |
| Interest Clerk | 216.382-038 |
| Invoice-Control Clerk | 214.362-026 |
| Margin Clerk 2 | 216.382-046 |
| Mortgage-Accounting Clerk | 216.362-026 |
| Payroll Clerk | 215.482-010 |
| Posting Clerk | 216.587-014 |
| Probate Clerk | 216.362-030 |
| Rater | 214.482-022 |
| Receipt-and-Report Clerk | 216.382-054 |
| Statement Clerk | 219.362-058 |
| Statistical Clerk | 216.382-062 |
| Stock-Transfer Clerk | 216.382-070 |
| Teller, Collection and Exchange | 211.362-022 |
| Timekeeper | 215.367-022 |
| Traffic Clerk | 214.587-014 |
| Traffic-Rate Clerk | 214.362-038 |
| Trust-Vault Clerk | 216.367-014 |

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Occupations in Financial Detail

| | |
|-------------------------|-------------|
| Auction Clerk | 294.567-010 |
| Cashier 1 | 211.362-010 |
| Cashier 2 | 211.462-010 |
| Cashier-Checker | 211.462-014 |
| Cashier, Gambling | 211.462-022 |
| Collector | 241.367-010 |
| Coupon-Redemption Clerk | 290.477-010 |
| Post-Office Clerk | 243.367-014 |
| Teller | 211.362-018 |
| Teller | 211.462-034 |
| Teller, Note | 211.362-026 |
| Ticket Agent | 238.367-026 |
| Ticket Seller | 211.467-030 |

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Occupations in General Sales

| | |
|---|-------------|
| Auctioneer | 294.257-010 |
| Building Consultant | 250.357-010 |
| Demonstrator | 297.354-010 |
| Demonstrator, Sewing Techniques | 297.454-010 |
| Driver, Sales Route | 292.353-010 |
| Driver Helper, Sales Route | 292.667-010 |
| Manufacturers' Representative | 279.157-010 |
| Sales Agent, Business Services | 251.357-010 |
| Sales Agent, Pest Control Service | 251.357-018 |
| Sales Agent, Real Estate | 250.357-018 |
| Salesperson, Automobile Accessories | 273.357-030 |
| Salesperson, Automobiles | 273.353-010 |
| Salesperson, Books | 277.357-034 |
| Salesperson, Burial Needs | 279.357-042 |
| Salesperson, China and Silverware | 279.357-018 |
| Salesperson, Corsets | 261.354-010 |
| Salesperson, Cosmetics and Toiletries | 262.357-018 |
| Salesperson, Curtains and Draperies | 270.357-022 |
| Salesperson-Demonstrator, Party Plan | 279.357-038 |
| Salesperson, Floor Coverings | 270.357-026 |
| Salesperson, Florist Supplies | 275.357-054 |
| Salesperson, Flowers | 260.357-026 |
| Salesperson, Flying Squad | 279.357-046 |
| Salesperson, Furniture | 270.357-030 |
| Salesperson, General Hardware | 279.357-050 |
| Salesperson, General Merchandise | 279.357-054 |
| Salesperson, Hearing Aids | 276.354-010 |
| Salesperson, Horticultural and Nursery Products | 272.357-022 |
| Salesperson, Household Appliances | 270.357-034 |
| Salesperson, Infants' and Children's Wear | 261.357-046 |
| Salesperson, Jewelry | 279.357-058 |
| Salesperson, Men's and Boys' Clothing | 261.357-050 |
| Salesperson, Men's Furnishings | 261.357-054 |
| Salesperson, Millinery | 261.357-058 |
| Salesperson, Musical Instruments and Accessories | 277.357-038 |
| Salesperson, Parts | 279.357-062 |
| Salesperson, Pets and Pet Supplies | 277.357-042 |
| Salesperson, Photographic Supplies and Equipment | 277.357-050 |
| Salesperson, Shoes | 261.357-062 |
| Salesperson, Sporting Goods | 277.357-058 |
| Salesperson, Stereo Equipment | 270.357-038 |
| Salesperson, Trailers and Motor Homes | 273.357-034 |
| Salesperson, Women's Apparel and Accessories | 261.357-066 |
| Salesperson, Yard Goods | 261.357-070 |
| Sales Representative, Apparel Trimmings | 261.357-010 |
| Sales Representative, Architectural and Engineering | 276.357-010 |
| Sales Representative, Barber and Beauty Equipment | 275.357-010 |
| Sales Representative, Bottles and Bottling Equipment | 274.357-014 |

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| | |
|---|-------------|
| Sales Representative, Canvas Products | 261.357-014 |
| Sales Representative, Commercial Equipment and Supplies | 275.357-018 |
| Sales Representative, Door-to-Door | 291.357-010 |
| Sales Representative, Farm and Garden Equipment | 272.357-014 |
| Sales Representative, Food Products | 260.357-014 |
| Sales Representative, Footwear | 261.357-018 |
| Sales Representative, General Merchandise | 279.357-014 |
| Sales Representative, Hardware Supplies | 274.357-034 |
| Sales Representative, Hobbies and Crafts | 277.357-010 |
| Sales Representative, Home Furnishings | 270.357-010 |
| Sales Representative, Hotel and Restaurant Equipment | 275.357-026 |
| Sales Representative, Household Appliances | 270.357-014 |
| Sales Representative, Industrial Rubber Goods | 274.357-042 |
| Sales Representative, Jewelry | 279.357-018 |
| Sales Representative, Material-Handling Equipment | 274.357-050 |
| Sales Representative, Men's and Boys' Apparel | 261.357-022 |
| Sales Representative, Motor Vehicles and Supplies | 273.357-022 |
| Sales Representative, Musical Instruments and Accessories | 277.357-014 |
| Sales Representative, Novelties | 277.357-018 |
| Sales Representative, Paper and Paper Products | 279.357-026 |
| Sales Representative, Petroleum Products | 269.357-014 |
| Sales Representative, Plastic Products | 279.357-030 |
| Sales Representative, Publications | 277.357-022 |
| Sales Representative, Recreation and Sporting Goods | 277.357-026 |
| Sales Representative, School Equipment and Supplies | 275.357-042 |
| Sales Representative, Textile Designs | 274.357-066 |
| Sales Representative, Tobacco Products and Smoking | 260.357-022 |
| Sales Representative, Toilet Preparations | 262.357-014 |
| Sales Representative, Upholstery and Furniture | 259.357-026 |
| Sales Representative, Women's and Girls' Apparel | 261.357-038 |
| Superintendent, Sales | 250.157-010 |
| Telephone Solicitor | 299.357-014 |
| Travel Agent | 252.157-010 |
| Wedding Consultant | 299.357-018 |

Occupations in Materials Control

| | |
|----------------------------------|-------------|
| Cargo Checker | 222.367-010 |
| Complaint Clerk | 221.387-014 |
| Custodian, Athletic Equipment | 969.367-010 |
| Electronics Utility Worker | 726.361-010 |
| Estimator, Printing | 221.367-014 |
| Inventory Clerk | 222.387-026 |
| Job Tracer | 221.387-034 |
| Laundry Worker 3 | 369.387-010 |
| Linen-Room Attendant | 222.387-030 |
| Material Clerk | 222.387-034 |
| Material Coordinator | 221.167-014 |
| Material Expediter | 221.367-042 |
| Order Detailer | 221.387-046 |
| Order Filler | 222.487-014 |
| Parts-Order-and-Stock Clerk | 249.367-058 |
| Pharmacy Helper | 074.387-010 |
| Production Coordinator | 221.167-018 |
| Sales Correspondent | 221.367-062 |
| Shipping and Receiving Clerk | 222.387-050 |
| Sorter-Pricer | 222.387-054 |
| Stock Clerk | 222.387-058 |
| Stock, Clerk, Self-Service Store | 299.367-014 |
| Tool-Crib Attendant | 222.367-062 |

| | |
|-----------------------------------|-------------|
| Proofreader | 209.387-030 |
| Property Clerk | 222.367-054 |
| Reservation Clerk | 238.362-014 |
| Reservation Clerk | 238.367-014 |
| Route-Delivery Clerk | 222.587-034 |
| Scheduler, Maintenance | 221.367-066 |
| Shipping-Ordering Clerk | 219.367-030 |
| Shorthand Reporter | 202.362-010 |
| Stenographer | 202.362-014 |
| Stenotype Operator | 202.362-022 |
| Stock-Control Clerk | 219.367-034 |
| Tape Librarian | 206.387-030 |
| Title Searcher | 209.367-046 |
| Traffic Clerk | 221.367-078 |
| Train Clerk | 219.462-014 |
| Transportation Agent | 912.367-014 |
| Travel Counselor, Automobile Club | 238.167-014 |
| Yard Clerk | 209.367-054 |

(GOE p. 287)

Occupations in Educational and Library Services

| | |
|----------------------------|-------------|
| Catalog Librarian | 100.387-010 |
| Classifier | 100.367-014 |
| Film-or-Tape Librarian | 222.367-026 |
| Homemaker | 309.354-010 |
| Library Assistant | 249.367-046 |
| Music Librarian | 100.367-022 |
| Teacher Aide 1 | 099.327-034 |
| Bibliographer | 100.367-010 |
| Career-Guidance Technician | 249.367-014 |
| Film Rental Clerk | 295.367-018 |

Cluster J

Manipulating Records

Interest Areas Included

- 5 -- Mechanical
7 -- Business Detail

Occupations Included

(GOE p. 245)

Occupations in Clerical Machine Operation

| | |
|--|-------------|
| Adding-Machine Operator | 216.482-014 |
| Billing-Machine Operator | 214.482-010 |
| Clerk-Typist | 203.362-010 |
| Computer Operator | 213.362-010 |
| Computer-Peripheral-Equipment Operator | 213.382-010 |
| Data Typist | 203.582-022 |
| Food Checker | 211.482-014 |
| Keypunch Operator | 203.582-030 |
| Linotype Operator | 650.582-010 |
| Magnetic-Tape-Typewriter Operator | 203.582-034 |
| Monotype-Keyboards Operator | 650.582-014 |
| Phototypesetter Operator | 650.582-022 |
| Proof-Machine Operator | 217.382-010 |
| Tabulating-Machine Operator | 213.682-010 |
| Telegraphic-Typewriter Operator | 203.582-050 |
| Transcribing-Machine Operator | 203.582-058 |
| Transit Clerk | 217.382-014 |
| Typesetter-Perforator Operator | 203.582-062 |
| Typist | 203.582-066 |
| Varitype Operator | 203.382-026 |
| Verifier Operator | 203.582-070 |

(GOE p. 247)

Occupations in Clerical Handling

| | |
|----------------------------------|-------------|
| Addresser | 209.587-010 |
| Advertising-Material Distributor | 230.687-010 |
| Checker 1 | 222.687-010 |
| Clerk, General | 209.562-010 |
| Collator | 653.687-010 |
| Deliverer, Outside | 230.667-010 |
| Distributing Clerk | 222.587-018 |
| File Clerk 1 | 206.362-010 |
| Messenger, Copy | 239.677-010 |
| Office Helper | 239.567-010 |
| Page | 249.687-014 |
| Routing Clerk | 222-687-022 |
| Sorter | 209.687-022 |
| Teacher Aide 2 | 249.367-074 |

(GOE p. 110)

Occupations in Materials Control

| | |
|------------------|-------------|
| Chart Changer | 221.584-010 |
| Kitchen Clerk | 222.587-022 |
| Laboratory Clerk | 222.587-026 |
| Mailer | 222.587-030 |
| Marker | 209.587-034 |
| Meter Reader | 209.567-010 |
| Tallier | 221.587-030 |
| Ticketeer | 229.587-018 |

Cluster K

Performing

Interest Areas Included

1 -- Artistic

Occupations Included

Sub-cluster K-1: Verbal arts

**Occupations in (GOE p. 23)
Performing Arts: Music**

| | |
|------------------------|-------------|
| Arranger | 152.067-101 |
| Choral Director | 152.047-010 |
| Conductor, Orchestra | 152.047-014 |
| Composer | 152.067-014 |
| Musician, Instrumental | 152.041-010 |
| Singer | 152.047-022 |
| Teacher, Music | 152.021-010 |

(GOE p. 16)

Occupations in Literary Arts

| | |
|---------------------------------------|-------------|
| Copy Writer | 131.067-014 |
| Critic | 131.067-018 |
| Editor, Book | 132.067-014 |
| Editorial Writer | 131.067-022 |
| Playwright | 131.067-038 |
| Writer, Prose, Fiction and Nonfiction | 131.067-046 |

**Occupations in (GOE p. 21)
Performing Arts: Drama**

| | |
|--------------------------|-------------|
| Actor | 150.047-010 |
| Announcer | 159.147-010 |
| Comedian | 159.047-014 |
| Director, Motion Picture | 159.067-010 |
| Director, Stage | 150.067-010 |
| Disk Jockey | 159.147-014 |
| Dramatic Coach | 150.027-010 |
| Producer | 159.117-010 |
| Teacher, Drama | 150.027-014 |

Sub-cluster K-2: Spatial arts

**(GOE p. 18)
Occupations in Visual Arts**

| | |
|-------------------------------------|-------------|
| Audiovisual Production Specialist | 149.061-010 |
| Cartoonist | 141.061-010 |
| Cloth Designer | 142.061-014 |
| Clothes Designer | 142.061-018 |
| Commercial Designer | 141.081-014 |
| Creative Director | 141.067-010 |
| Display, Merchandise | 298.081-010 |
| Fashion Artist | 141.061-014 |
| Floral Designer | 142.081-010 |
| Fur Designer | 142.081-014 |
| Graphic Designer | 141.061-018 |
| Illustrator | 141.061-022 |
| Illustrator, Medical and Scientific | 141.061-026 |
| Industrial Designer | 142.061-026 |
| Interior Designer | 142.051-014 |
| Memorial Designer | 142.061-030 |
| Painter | 144.061-010 |
| Photographer Helper | 976.667-010 |
| Photographer, Motion Picture | 143.062-022 |
| Photographer, Still | 143.062-030 |
| Photojournalist | 143.062-034 |
| Sculptor | 144.061-018 |
| Set Decorator | 142.061-042 |
| Set Designer | 142.061-050 |
| Teacher, Art | 149.021-010 |

**Occupations in (GOE p. 26)
Performing Arts: Dance**

| | |
|---------------------|-------------|
| Choreographer | 151.027-010 |
| Dancer | 151.047-010 |
| Instructor, Dancing | 151.027-014 |

Appendix F

Specific Aptitude Test Batteries (SATBs)

This appendix shows the SATBs published by the Employment Service (U.S. Department of Labor, 1980b). The occupations have been reordered according to the OAP cluster to which they were assigned in the present report (using the GOE code in the last column together with Table 5).

See the foregoing reference for additional information about SATBs.

Aptitudes used in SATBs

- G - Intelligence
- V - Verbal aptitude
- N - Numerical aptitude
- S - Spatial aptitude
- P - Form perception
- Q - Clerical perception
- K - Motor coordination
- F - Finger dexterity
- M - Manual dexterity

Cluster A: Researching, designing, and modifying physical systems

| SATB # | OCCUPATIONAL TITLE | DOT CODE | R | MINIMUM APTITUDE SCORES, b 1002 | | | | | | | | | GOE CODE | |
|--------|---|-------------|---|---------------------------------|-----|-----|-----|-----|-----|---|-----|----|----------|----------|
| | | | | G | V | N | S | P | Q | K | F | M | | |
| 213 | MATHEMATICIAN | 020.067-014 | X | 130 | | 120 | 120 | | | | | | | 02.01.01 |
| 283 | BIOLOGIST | 041.061-030 | X | | | 110 | 105 | | 110 | | | | | 02.02.03 |
| 039 | GENERAL PRACTITIONER | 070.101-022 | X | 125 | 115 | 110 | 110 | | | | | | | 02.03.01 |
| 399 | OSTEOPATHIC PHYSICIAN | 071.101-010 | X | 105 | 110 | 110 | | | | | | | | 02.03.01 |
| 049 | DENTIST | 072.101-010 | X | 115 | | | 110 | 100 | | | | 85 | | 02.03.02 |
| 058 | VETERINARIAN | 073.101-010 | X | 110 | | | 105 | | | | 100 | | | 02.03.03 |
| 315 | SYSTEMS ANALYST. ELECTRONIC DATA PROCESSING | 012.167-066 | X | 120 | 105 | 110 | 105 | | | | | | | 11.01.01 |
| 314 | PROGRAMER. BUSINESS | 020.162-014 | X | 115 | 105 | 110 | 105 | | | | | | | 11.01.01 |
| 316 | PROGRAMER. ENGINEERING AND SCIENTIFIC | 020.167-022 | X | 125 | 110 | 110 | 105 | | | | | | | 11.01.01 |
| 322 | ELECTRICAL TECHNICIAN | 003.161-010 | X | 115 | 100 | 95 | 110 | | | | | | | 05.01.01 |
| 373R | ELECTRICAL TECHNICIAN | 003.161-010 | X | | | 90 | 115 | 95 | | | | | | 05.01.01 |
| 373R | ELECTRONICS TECHNICIAN | 003.161-014 | X | | | 90 | 115 | 95 | | | | | | 05.01.01 |
| 293R | ELECTRONICS TECHNICIAN | 003.161-014 | X | | | 105 | 100 | 90 | | | | | | 05.01.01 |
| 373R | MECHANICAL-ENGINEERING TECHNICIAN | 007.161-026 | X | | | 90 | 115 | 95 | | | | | | 05.01.01 |
| 431 | TOOL PROGRAMER. NUMERICAL CONTROL | 007.167-018 | X | 105 | 105 | 100 | | | | | | | | 05.01.06 |
| 036 | CIVIL ENGINEER | 005.061-014 | X | 125 | | 115 | 115 | | | | | | | 05.01.07 |
| 036 | CHEMICAL ENGINEER | 008.061-018 | X | 125 | | 115 | 115 | | | | | | | 05.01.07 |
| 036 | ELECTRICAL ENGINEER | 003.061-010 | X | 125 | | 115 | 115 | | | | | | | 05.01.08 |
| 036 | MECHANICAL ENGINEER | 007.061-014 | X | 125 | | 115 | 115 | | | | | | | 05.01.08 |

F-2

Cluster B: Operating and testing physical systems

| SATB # | OCCUPATIONAL TITLE | OBT CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | GOE CODE | |
|--------|--|-------------|---|---------------------------------|-----|-----|-----|-----|-----|----|----|----|----------|----------|
| | | | | G | V | N | S | P | Q | K | F | M | | |
| 339 | CHIEF OF PARTY | 018.167-010 | X | | | 110 | 100 | | | 95 | 80 | | | 05.03.01 |
| 266R74 | DRAFTER, CIVIL | 005.281-010 | | 85 | | 100 | 100 | | | 90 | | | | 05.03.02 |
| 266R74 | DRAFTER, STRUCTURAL | 005.281-014 | | 85 | | 100 | 100 | | | 90 | | | | 05.03.02 |
| 266R74 | DRAFTER, MECHANICAL | 007.281-010 | | 85 | | 100 | 100 | | | 90 | | | | 05.03.02 |
| 373R | ENGINEERING ASSISTANT, MECHANICAL EQUIPMENT | 007.161-018 | X | | | 90 | 115 | 95 | | | | | | 05.03.02 |
| 266R74 | DRAFTER, GEOLOGICAL | 010.281-014 | | 85 | | 100 | 100 | | | 90 | | | | 05.03.02 |
| 256 | AIR-TRAFFIC-CONTROL SPECIALIST, TOWER | 193.162-018 | X | 110 | 100 | 110 | | 85 | | | | | | 05.03.03 |
| 324 | METALLURGICAL TECHNICIAN | 011.261-010 | X | 115 | | 110 | 100 | | | | | | | 02.04.01 |
| 378 | METALLURGICAL TECHNICIAN | 011-261 010 | X | | 95 | 105 | 95 | | | | | | | 02.04.01 |
| 327R78 | PSYCHIATRIC TECHNICIAN | 079.367-022 | | | | | 70 | | | 85 | 80 | 70 | | 02.04.01 |
| 387 | PHARMACY TECHNICIAN | 079.377-010 | X | | 100 | 105 | | 100 | 105 | | | | | 02.04.01 |
| 156 | MEDICAL TECHNOLOGIST | 078.361-014 | X | 110 | 110 | | | 105 | 110 | | | | | 02.04.02 |
| 384 | MEDICAL-LABORATORY TECHNICIAN | 078.381-014 | X | | | 100 | 110 | | 110 | | | | | 02.04.02 |
| 093 | EMBALMER | 338.371-014 | X | 100 | 95 | 105 | | | | | | | | 02.04.02 |

F-3

Cluster C: Crafting, assembling, repairing, inspecting, and setting up or operating equipment (Sub-cluster C-1: Spatial orientation)

| SATB # | OCCUPATIONAL TITLE | DOT CODE | R | MINIMUM APTITUDE SCORES, D-1002 | | | | | | | | | GOE CODE |
|--------|--|-------------|---|---------------------------------|----|----|-----|-----|----|----|----|-----|----------|
| | | | | G | V | N | S | P | Q | K | F | M | |
| 390 | LOG SCALER | 455.487-010 | X | | | 90 | | 80 | | | 75 | | 05.07.06 |
| 367 | GUIDE SETTER | 613.361-010 | | | | | | 95 | | | 80 | 105 | 06.01.02 |
| 370R75 | MULTI-OPERATION-FORMING-MACHINE SETTER | 616.260-014 | | | | 75 | 75 | | | | | 80 | 06.01.02 |
| 406 | MACHINE SETTER | 616.360-022 | | | | | | 80 | 90 | | | 90 | 06.01.02 |
| 394 | ENVELOPE-FOLDING-MACHINE ADJUSTER | 641.680-010 | | | | | 75 | 85 | | | 80 | | 06.01.02 |
| 370R75 | MACHINE SET-UP OPERATOR, PAPER GOODS | 649.380-010 | | | | 75 | 75 | | | | | 80 | 06.01.02 |
| 153 | LOOM FIXER | 683.260-018 | X | | | 70 | | 75 | | | | 75 | 06.01.02 |
| 091R | KNITTING-MACHINE FIXER | 689.280-014 | X | | | 75 | 80 | | | | | 75 | 06.01.02 |
| 133 | FIRESETTER | 692.360-018 | X | 80 | | | | | | | 80 | 90 | 06.01.02 |
| 140R | STRIPPER | 971.381-050 | | | | 85 | 90 | 95 | | | | | 01.06.01 |
| 222R | PROCESS ARTIST | 972.281-010 | | | | | 90 | | 95 | 80 | | | 01.06.01 |
| 224R | LITHOGRAPHIC PLATE MAKER | 972.381-010 | X | | | | 100 | | 90 | | | | 01.06.01 |
| 223R | PHOTOGRAPHER, LITHOGRAPHIC | 972.382-014 | | | | 90 | 85 | 95 | | 85 | | | 01.06.01 |
| 215R | CEMENT MASON | 844.364-010 | | | | 70 | 70 | | | | | 85 | 05.05.01 |
| 107R | BRICKLAYER | 861.381-018 | | | | 85 | 90 | 90 | | | 85 | | 05.05.01 |
| 011R | CARPENTER | 860.381-022 | X | | | 80 | 85 | | | | 70 | 80 | 05.05.02 |
| 061R78 | PIPE FITTER | 862.381-018 | | | | 90 | | 95 | | | | 85 | 05.05.03 |
| 061R78 | PLUMBER | 862.381-030 | | | | 90 | | 95 | | | | 85 | 05.05.03 |
| 240 | PLASTERER | 842.361-018 | | | | 80 | | 85 | | | | 100 | 06.05.04 |
| 154R | LINE REPAIRER | 821.361-026 | | | | | 90 | | | | 70 | | 06.05.05 |
| 074R77 | CENTRAL-OFFICE REPAIRER | 822.281-014 | | | | 90 | 95 | 85 | | | 85 | | 05.05.05 |
| 189 | MAINTENANCE MECHANIC, TELEPHONE | 822.281-018 | X | | 80 | | | 100 | | | | 75 | 05.05.05 |
| 072R77 | ELECTRICIAN | 824.261-010 | | 90 | | 85 | 95 | | | | | 100 | 05.05.05 |
| 069R | ELECTRICIAN, AIRPLANE | 825.281-018 | X | | | 85 | 80 | | | | 75 | | 05.05.05 |

E-4

Cluster C-1 -- cont.

| SATB # | OCCUPATIONAL TITLE | DOT CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | GOE CODE | |
|--------|-----------------------------------|-------------|---|---------------------------------|---|----|-----|----|----|----|---|----|----------|----------|
| | | | | G | V | N | S | P | Q | K | F | M | | |
| 235 | METAL FABRICATOR | 619.360-014 | X | | | | 90 | 70 | | | | 70 | 85 | 05.05.06 |
| 177R | MILLWRIGHT | 638.281-018 | X | | | 70 | 85 | | | | | | 75 | 05.05.06 |
| 307R | DIE MAKER | 739.381-018 | X | | | 80 | 90 | | | | | | 90 | 05.05.06 |
| 280 | STRUCTURAL-STEEL WORKER | 801.361-014 | X | | | | 85 | 80 | 90 | | | | 85 | 05.05.06 |
| 082R | SHEET-METAL WORKER | 804.281-010 | X | | | | 90 | | 80 | 75 | | | 95 | 05.05.06 |
| 262R | BOILERMAKER I | 805.261.014 | | | | 70 | 80 | | 70 | | | | 70 | 05.05.06 |
| 045R | SHIPFITTER | 808.381-046 | X | | | | 105 | 75 | | | | | 85 | 05.05.06 |
| 313 | AUTOMOBILE-BODY REPAIRER | 807.381-010 | X | | | | 85 | 90 | | | | | 90 | 05.05.06 |
| 344R | LAY-OUT WORKER I | 809.281-010 | X | | | | 100 | 95 | 90 | | | | | 05.05.06 |
| 280 | ORNAMENTAL-IRON WORKER | 809.381-022 | X | | | | 85 | 80 | 90 | | | | 85 | 05.05.06 |
| 207 | WELDER, ARC | 810.384-014 | X | 70 | | | 80 | 80 | | | | | | 05.05.06 |
| 211 | WELDER, ARC | 810.384-014 | X | | | | 85 | | | | | | 85 | 05.05.06 |
| 126 | WELDER, COMBINATION | 819.384-010 | | | | | 85 | | | | | 85 | 80 | 05.05.06 |
| 012R | MACHINIST | 600.280-022 | X | | | 80 | 80 | | | | | | 80 | 05.05.07 |
| 132 | PATTERNMAKER, METAL | 600.280-050 | X | | | 90 | 100 | 80 | | | | | | 05.05.07 |
| 212R | TOOL-AND-DIE MAKER | 601.280-046 | X | | | 95 | 100 | 90 | | | | | | 05.05.07 |
| 448 | MODEL MAKER | 693.361-010 | X | | | | 90 | 75 | | | | | 90 | 05.05.07 |
| 100R | CABINETMAKER | 660.280-010 | X | | | 85 | 105 | | | | | | 85 | 05.05.08 |
| 132 | PATTERNMAKER, WOOD | 661.281-022 | X | | | 90 | 100 | 80 | | | | | | 05.05.08 |
| 144R76 | MACHINIST, WOOD | 669.380-014 | | 75 | | | 75 | | | | | | 75 | 05.05.08 |
| 043R | AUTOMOBILE MECHANIC | 620.261-010 | X | | | 75 | 95 | | | | | | 90 | 05.05.09 |
| 380 | AUTOMOBILE MECHANIC | 620.261-010 | X | | | | 90 | 80 | | | | 80 | | 05.05.09 |
| 201R | CONSTRUCTION-EQUIPMENT MECHANIC | 620.261.022 | X | | | 75 | 85 | | | | | 75 | | 05.05.09 |
| 455 | CONSTRUCTION-EQUIPMENT MECHANIC | 620.261-022 | | | | | 70 | | 90 | | | | 80 | 05.05.09 |
| 111R | AIRFRAME-AND-POWER-PLANT MECHANIC | 621.281-014 | X | | | 90 | 100 | | | | | 85 | | 05.05.09 |

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Cluster C-1 -- cont.

| SATB # | OCCUPATIONAL TITLE | DOT CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | GOE CODE | |
|--------|--|-------------|---|---------------------------------|----|-----|-----|----|---|----|----|----|----------|----------|
| | | | | G | V | N | S | P | Q | K | F | M | | |
| 423R | DIESEL MECHANIC | 625 281-010 | X | | | 95 | 105 | | | | 90 | | 100 | 05.05.09 |
| 331 | SMALL-ENGINE MECHANIC | 625.281-034 | X | | | 85 | 95 | | | | | 80 | | 05.05.09 |
| 234 | CASH-REGISTER SERVICER | 633.281-010 | X | | | | 90 | 85 | | | 80 | | 85 | 05.05.09 |
| 234 | OFFICE-MACHINE SERVICER | 633.281-018 | X | | | | 90 | 85 | | | 80 | | 85 | 05.05.09 |
| 413R | ENVIRONMENTAL-CONTROL-SYSTEM INSTALLER-SERVICER | 637 261-014 | X | | | 100 | | | | 95 | | | 85 | 05.05.09 |
| 445 | MACHINERY ERECTOR | 638 261-014 | X | | | 75 | 90 | | | | | | 75 | 05.05.09 |
| 177R | MANUFACTURER'S SERVICE REPRESENTATIVE | 638.261-018 | X | | | 70 | 85 | | | | | | 75 | 05.05.09 |
| 183 | MANUFACTURER'S SERVICE REPRESENTATIVE | 638.261-018 | X | 95 | | | 85 | | | | | | 85 | 05.05.09 |
| 157R | MAINTENANCE MECHANIC | 638.281-014 | X | | | | 70 | | | | 80 | 90 | 100 | 05.05.09 |
| 370R75 | MAINTENANCE MECHANIC | 638 281-014 | | | | 75 | 75 | | | | | 80 | | 05.05.09 |
| 439R | MAINTENANCE MECHANIC | 638.281-014 | X | | | | 85 | 70 | | | | | 90 | 05.05.09 |
| 318R | INSTRUMENT MECHANIC | 710.281-026 | X | | | 85 | 100 | 80 | | | | | | 05.05.10 |
| 103R | ELECTRONICS MECHANIC | 828.281.010 | X | | | | 105 | 90 | | | | | 70 | 05.05.10 |
| 415 | ELECTRONICS MECHANIC | 828.281-010 | X | 110 | | 95 | 100 | | | | | | | 05.05.10 |
| 463 | ELECTRONICS MECHANIC | 828.281-010 | X | | | 95 | 100 | | | | | 75 | 100 | 05.05.10 |
| 285 | DENTAL-LABORATORY TECHNICIAN | 712.381-018 | X | | | | 80 | 80 | | | 80 | | 85 | 05.05.11 |
| 418 | DENTAL CERAMIST, ASSISTANT | 712.664-020 | | | | | | 70 | | 95 | | | 75 | 05.05.11 |
| 430 | FINISHER, DENTURE | 712.681-018 | X | | | 85 | | 95 | | | | | 85 | 05.05.11 |
| 151 | WATCH REPAIRER | 715.281-010 | X | | | | 85 | 90 | | | | 90 | | 05.05.11 |
| 333 | EXPERIMENTAL ASSEMBLER | 739.381-026 | X | | 85 | | | 75 | | | 75 | 80 | | 05.05.11 |
| 345 | GLASS BLOWER, LABORATORY APPARATUS | 772 281-010 | X | | | | 95 | 95 | | | | | 95 | 05.05.11 |
| 354 | WEB-PRESS OPERATOR | 651.362-030 | | | | | | | | 80 | 85 | | 70 | 05.05.13 |
| 040R | OFFSET-PRESS OPERATOR I | 651.482-010 | | | | 85 | 85 | 85 | | | | | | 05.05.13 |
| 059 | DRESSMAKER | 785.361-010 | | | | | 85 | 90 | | | | 85 | | 05.05.15 |
| 238R | COOK | 313 361-014 | X | | | | 85 | 90 | | | | 70 | 70 | 05.05.17 |

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E-6

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Cluster C-1 -- cont.

| SATB # | OCCUPATIONAL TITLE | DOT CODE | R | MINIMUM APTITUDE SCORES, D-1002 | | | | | | | | | GOE CODE |
|--------|--|-------------|---|---------------------------------|----|----|-----|-----|-----|----|----|----|----------|
| | | | | G | V | N | S | P | Q | K | F | M | |
| 124 | TANK-TRUCK DRIVER | 903.683-018 | X | 85 | 80 | 90 | | | | 80 | | | 05.08.01 |
| 124 | TRACTOR-TRAILER-TRUCK DRIVER | 904.383-010 | X | 85 | 80 | 90 | | | | 80 | | | 05.08.01 |
| 375R | LATHER | 842.361-010 | | | | 80 | 85 | | | | | 75 | 05.10.01 |
| 185 | CARPET LAYER | 864.381-010 | | | | 85 | 95 | | | | | 80 | 05.10.01 |
| 185 | FLOOR LAYER | 864.481-010 | | | | 85 | 95 | | | | | 80 | 05.10.01 |
| 171R | GLAZIER | 865.381-010 | | | | 80 | 105 | 75 | | | | | 05.10.01 |
| 241 | ROOFER | 866.381-010 | | | | | | 70 | | 70 | | 80 | 05.10.01 |
| 208 | GAS-APPLIANCE SERVICER | 637.261-018 | X | 90 | | 80 | | 70 | | | | | 05.10.02 |
| 319R | SEWING-MACHINE REPAIRER | 639.281-018 | X | | | | 70 | | | | | 85 | 05.10.02 |
| 076R | AIRCRAFT MECHANIC, PLUMBING AND HYDRAULICS | 862.381-010 | | | | | 70 | 70 | | | 80 | 90 | 05.10.02 |
| 113R | RADIO REPAIRER | 720.281-010 | X | | | 80 | 95 | | | | 80 | | 05.10.03 |
| 113R | TELEVISION-AND-RADIO REPAIRER | 720.281-018 | X | | | 80 | 95 | | | | 80 | | 05.10.03 |
| 284 | PINSETTER MECHANIC, AUTOMATIC | 638.261-022 | X | | | 85 | 85 | | | | 80 | | 05.10.04 |
| 362 | THERMAL CUTTER, HAND I | 816.464-010 | | | | | | 105 | | | | 95 | 05.10.04 |
| 363R | MAINTENANCE REPAIRER, FACTORY OR MILL | 899.281-014 | | | | | 80 | | 90 | | | 85 | 05.10.04 |
| 444 | PHOTOGRAPH FINISHER | 976.487-010 | X | | 90 | | | 75 | | | | | 05.10.05 |
| 203 | PAINTER | 840.381-010 | | | | 90 | 100 | | | | 80 | 80 | 05.10.07 |
| 402 | PAINTER, TRANSPORTATION EQUIPMENT | 845.381-014 | X | | | | 80 | | | 90 | | 80 | 05.10.07 |
| 343R | OPERATING ENGINEER | 859.683-010 | | | | 75 | 80 | | | 75 | | | 05.11.01 |
| 368 | STRAIGHTENING-PRESS OPERATOR | 617.482-026 | X | | | 90 | | | 100 | | | 95 | 05.11.04 |
| 068 | REFINERY OPERATOR | 549.260-010 | X | 85 | | | | 65 | | 70 | | 65 | 06.01.03 |
| 330R | CHEMICAL OPERATOR III | 559.382-018 | X | | | 75 | 75 | | | | 85 | | 06.01.03 |
| 033 | TURRET-LATHE SET-UP OPERATOR, TOOL | 604.280-022 | X | 80 | | | 80 | 85 | | | | 80 | 06.01.03 |
| 453 | SCREW-MACHINE SET-UP OPERATOR, PRODUCTION | 604.380-022 | X | | | 80 | 90 | | | | | 75 | 06.01.03 |

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F-7

Cluster C-1 -- cont.

| SATB # | OCCUPATIONAL TITLE | OBT CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | GOE CODE | |
|--------|--|-------------|---|---------------------------------|---|-----|-----|-----|----|----|-----|----|----------|----------|
| | | | | G | V | N | S | P | Q | K | F | M | | |
| 098 | ROLLING-MILL OPERATOR | 613.462-018 | | | | | 80 | 80 | | | | 85 | 85 | 06.01.03 |
| 257 | MULTI-OPERATION-FORMING-MACHINE OPERATOR I | 616.360-026 | | | | | 75 | 70 | | | | 75 | | 06.01.03 |
| 366 | MOLDER | 518.361-010 | X | | | 90 | | 100 | | | | | 85 | 06.01.04 |
| 143 | RING MAKER | 700.381-042 | | | | | | 80 | | | | | 75 | 06.01.04 |
| 081 | ASSEMBLER | 710.681-010 | | | | | | | | | 85 | 80 | 85 | 06.01.04 |
| 129 | ASSEMBLER | 710.681-010 | | | | | 90 | | | | | 95 | 90 | 06.01.04 |
| 253 | ASSEMBLER | 710.681-010 | | | | | 80 | | | | | 95 | 85 | 06.01.04 |
| 151 | BANKING PIN ADJUSTER | 715.381-018 | X | | | | 85 | 90 | | | | 90 | | 06.01.04 |
| 008 | TUBE ASSEMBLER, ELECTRON | 725.384-010 | | | | | | 85 | | | 85 | 85 | 80 | 06.01.04 |
| 117 | TUBE ASSEMBLER, ELECTRON | 725.384-010 | | | | | | 90 | | | | 85 | 100 | 06.01.04 |
| 392 | TUBE ASSEMBLER, ELECTRON | 725.384-010 | X | 75 | | | | | | | 100 | 90 | 80 | 06.01.04 |
| 069R | AIRCRAFT MECHANIC, ARMAMENT | 806.381-010 | X | | | 85 | 80 | | | | 75 | | | 06.01.04 |
| 076R | AIRCRAFT MECHANIC, RIGGING AND CONTROLS | 806.381-018 | | | | | 70 | 70 | | | | 80 | 90 | 06.01.04 |
| 076R | ASSEMBLER, AIRCRAFT, STRUCTURES AND SURFACES | 806.381-026 | | | | | 70 | 70 | | | | 80 | 90 | 06.01.04 |
| 461 | ASSEMBLER AND WIEH. INDUSTRIAL EQUIPMENT | 826.361-010 | | | | | | 75 | | | 85 | 80 | 80 | 06.01.04 |
| 355 | INSPECTOR, MECHANICAL AND ELECTRICAL | 710.381-038 | X | | | 95 | 90 | | | | | | 80 | 06.01.05 |
| 151 | INSPECTOR, HAIRSPRING I | 715.381-066 | X | | | | 85 | 90 | | | | 90 | | 06.01.05 |
| 151 | INSPECTOR, WATCH TRAIN | 715.381-074 | X | | | | 85 | 90 | | | | 90 | | 06.01.05 |
| 149 | FINAL INSPECTOR, MOVEMENT ASSEMBLY | 715.684-094 | | | | | | | | | 95 | 85 | 90 | 06.01.05 |
| 151 | INSPECTOR, TIMING | 715.685-034 | X | | | | 85 | 90 | | | | 90 | | 06.01.05 |
| 277 | PROCESS INSPECTOR | 736.381-018 | X | | | 100 | 100 | 95 | | | | | | 06.01.05 |
| 404 | INSPECTOR, ASSEMBLIES AND INSTALLATIONS | 806.281-022 | X | 100 | | | | | | 95 | 80 | | | 06.01.05 |
| 071R | COSMETOLOGIST | 332.271-010 | X | | | | 90 | 80 | 95 | | | | 75 | 09.02.01 |
| 252R | BARBER | 330.371-010 | | | | | | 80 | | | 85 | 90 | | 09.02.02 |

E-3

Sub-cluster C-2: Quick, accurate manipulation

| SATB # | OCCUPATIONAL TITLE | DOT CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | | GOE CODE |
|--------|--------------------------------------|-------------|---|---------------------------------|---|----|----|----|----|-----|----|----|-----|----------|
| | | | | G | V | N | S | P | Q | K | F | M | | |
| 358R | OFFSET-DUPLICATING-MACHINE OPERATOR | 207.682-018 | | | | | | 75 | | | | 80 | 90 | 05.10.05 |
| 086 | PRINTER OPERATOR, BLACK-AND-WHITE | 976.682-014 | | | | | | 85 | | 90 | | | 100 | 05.10.05 |
| 152 | BURRER. MACHINE | 603.685-046 | | | | | 85 | 90 | | 80 | | | 75 | 06.02.02 |
| 257 | CUT-OFF-SAW OPERATOR. METAL | 607.682-010 | | | | | 75 | 70 | | | | 75 | | 06.02.02 |
| 367 | SCREWDOWN OPERATOR | 613.382-018 | | | | | | 95 | | 80 | | | 105 | 06.02.02 |
| 257 | STRAIGHTENING-ROLL OPERATOR | 613.462-022 | | | | | 75 | 70 | | | | 75 | | 06.02.02 |
| 044 | PUNCH-PRESS OPERATOR I | 615.482-022 | | | | | | 75 | | | | | 90 | 06.02.02 |
| 098 | SLITTING-MACHINE OPERATOR II | 615.662-010 | | | | | 80 | 80 | | | | 85 | 85 | 06.02.02 |
| 368 | BRIDGE-OR-GANTRY-CRANE OPERATOR | 921.663-010 | X | | | 90 | | | | 100 | | | 95 | 06.02.02 |
| 152 | DRILLING-MACHINE OPERATOR, AUTOMATIC | 606.685-030 | | | | | 85 | 90 | | 80 | | | 75 | 06.02.03 |
| 300R | CYLINDER-DIE-MACHINE OPERATOR | 649.682-014 | X | | | 70 | 90 | 70 | | | | | | 06.02.04 |
| 073 | FOLDING-MACHINE OPERATOR | 649.685-046 | | | | | 90 | | 85 | 80 | 75 | | | 06.02.04 |
| 172 | FOLOING-MACHINE OPERATOR | 653.382-010 | | 85 | | 90 | | | 85 | | | | | 06.02.04 |
| 369 | PRINTER-SLOTTER OPERATOR | 659.662-010 | | | | | | 75 | | | 80 | 85 | | 06.02.04 |
| 159 | STITCHER. STANDARD MACHINE | 690.682.082 | | | | | | 80 | | 80 | | 85 | | 06.02.05 |
| 289 | STITCHER. STANDARD MACHINE | 690.682-082 | | | | | | | 85 | 95 | 70 | | | 06.02.05 |
| 004 | GLOVE SEWER | 784.682-010 | | | | | | 75 | | 75 | 80 | 75 | | 06.02.05 |
| 004 | HAT-AND-CAP SEWER | 784.682-014 | | | | | | 75 | | 75 | 80 | 75 | | 06.02.05 |
| 078 | SEWING-MACHINE OPERATOR | 787.682-074 | | | | | | 80 | | 90 | 80 | 80 | | 06.02.05 |
| 405 | LEVERS-LACE MACHINE OPERATOR | 683.682-026 | | | | | | 85 | | 80 | | 90 | | 06.02.06 |
| 115R76 | WEAVER | 683.682-038 | | | | | | 75 | | | | 95 | | 06.02.06 |

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Cluster C-2 -- cont.

| SATB # | OCCUPATIONAL TITLE | DOT CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | GOE CODE | |
|--------|---------------------------------|-------------|---|---------------------------------|---|-----|----|----|----|----|----|-----|----------|----------|
| | | | | G | V | N | S | P | Q | K | F | M | | |
| 125 | SEAMLESS-HOSIERY KNITTER | 684 685-010 | | | | | 70 | | | | | 90 | 75 | 06.02.06 |
| 442 | WARP-KNITTING-MACHINE OPERATOR | 685 665-018 | | | | | | 70 | | | | 70 | 85 | 06.02.06 |
| 119 | LOOPER | 689.682-010 | X | | | | 75 | | | | | 85 | 75 | 06.02.06 |
| 190 | LOOPER | 689 682-010 | | | | | | | | | 95 | 105 | 95 | 06.02.06 |
| 334 | PRECISION-LENS GRINDER | 716.382-018 | X | | | | 95 | 80 | | | | | 75 | 06.02.08 |
| 371R | FLEXOGRAPHIC-PRESS OPERATOR | 651 682-010 | | | | | 90 | 70 | | | | | 90 | 06.02.09 |
| 335R76 | EXTRUDING-MACHINE OPERATOR | 691.382-010 | | | | | | 80 | 85 | | | 85 | | 06.02.09 |
| 308 | INSULATING-MACHINE OPERATOR | 691.682-018 | | | | | | 80 | | | 85 | | 80 | 06.02.09 |
| 123 | DIE CUTTER | 699.682-022 | | | | | 75 | | | | | | 80 | 06.02.09 |
| 401 | HEAT TREATER I | 504.382-014 | | | | | | 80 | 90 | | | | 70 | 06.02.10 |
| 401 | HEAT TREATER II | 504.682-018 | | | | | | 80 | 90 | | | | 70 | 06.02.10 |
| 098 | COLO-MILL OPERATOR | 613.462-010 | | | | | 80 | 80 | | | | 85 | 85 | 06.02.10 |
| 367 | MANIPULATOR | 613.682-010 | | | | | | 95 | | | 80 | | 105 | 06.02.10 |
| 214 | WIRE DRAWER | 614.382-014 | | | | | | 85 | 95 | | | | 80 | 06.02.10 |
| 342R | WATER-TREATMENT-PLANT OPERATOR | 551 485-010 | X | 90 | | 85 | | | | 80 | | | | 06.02.11 |
| 396 | BLOW-MOLDING-MACHINE OPERATOR | 556 682-010 | X | 85 | | | | 85 | 95 | | | | | 06.02.13 |
| 221 | EXTRUDER OPERATOR | 557 382-010 | | | | | | | 90 | 85 | | | 100 | 06.02.13 |
| 170 | FORMING-MACHINE OPERATOR | 575.382-014 | X | 90 | | 100 | | | | | | 70 | 95 | 06.02.13 |
| 428 | BACK TENDER, PAPER MACHINE | 534.662-010 | X | | | 80 | 75 | | 95 | | | | | 06.02.14 |
| 428 | FOURDRINIER-MACHINE TENDER | 539 362-014 | X | | | 80 | 75 | | 95 | | | | | 06.02.14 |
| 085R | BAKER | 526 381-010 | X | | | | 70 | | 80 | | | 75 | | 06.02.15 |
| 076R | ASSEMBLER, AIRCRAFT POWER PLANT | 806 381-022 | | | | | 70 | 70 | | | | 80 | 90 | 06.02.22 |

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Cluster C-2 -- cont.

| SATB # | OCCUPATIONAL TITLE | DOT CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | GOE CODE |
|--------|---------------------------------------|-------------|---|---------------------------------|---|----|----|-----|-----|-----|----|-----|----------|
| | | | | G | V | N | S | P | Q | K | F | M | |
| 288 | TRAILER ASSEMBLER | 806 381-058 | X | 80 | | | 75 | 70 | | | | | 06.02 22 |
| 013 | ASSEMBLER, INTERNAL COMBUSTION ENGINE | 806 481-014 | | | | | | 80 | | 75 | 75 | 85 | 06.02 22 |
| 408 | CABLE SWAGER | 806 684-042 | X | 75 | | | | | | 95 | | 85 | 06.02 22 |
| 102 | APPLIANCE ASSEMBLER, LINE | 827 684-010 | X | 85 | | | | | | | | 75 | 06.02 22 |
| 151 | BALANCE ASSEMBLER | 715 384-010 | X | | | | 85 | 90 | | | 90 | | 06.02 23 |
| 149 | DIALER | 715 684-086 | | | | | | | | 95 | 85 | 90 | 06.02 23 |
| 150 | PUT-IN-BEAT ADJUSTER | 715 684-174 | | | | | 90 | | | | 85 | 85 | 06.02 23 |
| 191 | ASSEMBLER I | 723 684-014 | | | | | | 80 | | | 85 | 100 | 06.02 23 |
| 173 | ELECTRONICS ASSEMBLER | 726 684-018 | | | | | | 100 | 100 | 105 | | | 06.02 23 |
| 229 | ELECTRONICS ASSEMBLER | 726 684-018 | | | | | | | 85 | | 90 | 110 | 06.02 23 |
| 245 | ELECTRONICS ASSEMBLER | 726 684-018 | | | | | | | | 100 | 95 | 110 | 06.02 23 |
| 281R | ELECTRONICS ASSEMBLER | 726 684-018 | X | | | 80 | | | | 95 | 75 | | 06.02 23 |
| 304 | ELECTRONICS ASSEMBLER | 726 684-018 | X | 70 | | | 85 | | | | 90 | | 06.02 23 |
| 310R74 | ELECTRONICS ASSEMBLER | 726 684-018 | | | | | 70 | 90 | 95 | | | 90 | 06.02 23 |
| 381R76 | ELECTRONICS ASSEMBLER | 726 684.018 | | | | | | 75 | 95 | 100 | | | 06.02 23 |
| 467R78 | ELECTRONICS ASSEMBLER | 726 684-018 | | | | | | | 75 | | 85 | 90 | 06.02 23 |
| 024 | FUSE ASSEMBLER | 737 684-022 | | | | | | 95 | | 85 | 80 | 80 | 06.02 23 |
| 152 | BURRER | 715 684-042 | | | | | 85 | 90 | | 80 | | 75 | 06.02 24 |
| 057 | UPHOLSTERER, INSIDE | 780 681-010 | X | | | | 80 | | | 75 | 75 | 85 | 06.02 27 |
| 075 | MENDER | 782 684-042 | | | | | | 85 | | 90 | 75 | 85 | 06.02 27 |
| 267R | TIRE BUILDER, AUTOMOBILE | 750.384-010 | X | | | | 95 | 80 | | | | 80 | 06.02 29 |
| 279 | PROCESSOR, SOLID PROPELLANT | 590.464-010 | | | | | | 70 | 80 | | | 85 | 06.02 32 |

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Cluster C-2 -- cont.

| SATB # | OCCUPATIONAL TITLE | DOT CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | GOE CODE |
|--------|-------------------------------|-------------|---|---------------------------------|---|----|----|-----|----|----|----|-----|----------|
| | | | | G | V | N | S | P | Q | K | F | M | |
| 160 | CABLE MAKER | 728.684-010 | X | 90 | | | | 85 | 90 | | 80 | | 06.02.32 |
| 407 | QUALITY-CONTROL TECHNICIAN | 529.387-030 | X | | | 95 | | 110 | | | 90 | | 06.03.01 |
| 118 | EGG CANDLER | 529.687-074 | | | | | | 80 | | 85 | | 100 | 06.03.01 |
| 097 | INSPECTOR | 619.381-010 | X | 75 | | 75 | 85 | | | | | 80 | 06.03.01 |
| 258 | INSPECTOR | 774.364-010 | | | | | | 75 | | 85 | | 75 | 06.03.01 |
| 260 | ASSEMBLER | 369.687-010 | | | | | | | | 80 | | 80 | 06.03.02 |
| 468R78 | CIGARETTE INSPECTOR | 529.567-010 | | | | | | 80 | 80 | | 70 | | 06.03.02 |
| 112 | TILE SORTER | 573.687-038 | | | | | | 70 | | | 70 | 80 | 06.03.02 |
| 178 | SELECTOR | 579.687-030 | | | | | | 75 | 95 | 80 | | | 06.03.02 |
| 192 | SELECTOR | 579.687-030 | | | | | | | 75 | 80 | | 100 | 06.03.02 |
| 104 | PAPER SORTER AND COUNTER | 649.687-010 | | | | | | 80 | | 90 | 75 | 80 | 06.03.02 |
| 065 | STOCKING INSPECTOR | 684.684-010 | | | | | | | 90 | 90 | | 85 | 06.03.02 |
| 060 | PAIRER | 684.687-010 | | | | | | 90 | | | 90 | 75 | 06.03.02 |
| 075 | BURLER | 689.684-010 | | | | | | 85 | | 90 | 75 | 85 | 06.03.02 |
| 412 | TOOTH INSPECTOR | 712.687-038 | | | | | 75 | 85 | | 90 | | | 06.03.02 |
| 149 | INSPECTOR, CASING | 715.687-062 | | | | | | | | 95 | 85 | 90 | 06.03.02 |
| 443 | RUBBER-GOODS INSPECTOR-TESTER | 759.564-010 | | | | | | | 90 | 85 | | 85 | 06.03.02 |
| 464 | TAPER | 842.664-010 | | | | | | 80 | | | 70 | 75 | 05.10.01 |
| 364 | CONSTRUCTION WORKER I | 869.664-014 | | | | | | 95 | | | 75 | 85 | 05.10.01 |
| 432R | CONSTRUCTION WORKER I | 869.664-014 | | | | 75 | | | | | | 85 | 05.10.01 |
| 349R | MEAT CUTTER | 316.684-018 | X | | | | 85 | 80 | | | | 85 | 05.10.08 |

F-12

Cluster D: Tending (machines, buildings, plants, animals) and attending (workers, the public)

| SATB # | OCCUPATIONAL TITLE | DOT CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | GOE CODE | |
|--------|----------------------------------|-------------|---|---------------------------------|---|---|----|-----|----|----|----|----|----------|----------|
| | | | | G | V | N | S | P | Q | K | F | M | | |
| 135R76 | PRODUCTION-MACHINE TENOER | 609 685-018 | | 75 | | | | | | | | 75 | 80 | 06.04.02 |
| 257 | TUBE ORAWER | 614 685-022 | | | | | 75 | 70 | | | | 75 | | 06.04.02 |
| 233 | MACHINE OPERATOR II | 619 685-062 | | | | | | | | | 90 | 85 | 95 | 06.04.02 |
| 429 | REWINDER OPERATOR | 640 685-058 | | | | | 70 | 90 | | | | | 80 | 06.04.04 |
| 306 | CARTON-FORMING-MACHINE OPERATOR | 641 685-022 | | | | | 80 | 70 | | | | | 70 | 06.04.04 |
| 137 | BAG-MACHINE OPERATOR | 649 685-014 | | | | | 80 | 70 | | | | | 75 | 06.04.04 |
| 034R | BINDERY WORKER | 653 685-010 | | | | | 70 | | 80 | 95 | 75 | | | 06.04.04 |
| 146 | PRESSER, MACHINE | 363 682-018 | | | | | | | | 80 | 70 | 80 | | 06.04.05 |
| 409 | PRESSER, MACHINE | 363 682-018 | | | | | | 80 | 95 | | | | 85 | 06.04.05 |
| 459 | V-BELT COVERER | 690 685-450 | | | | | | 80 | | 90 | 90 | | | 06.04.05 |
| 295 | BALLING-MACHINE OPERATOR | 681 685-014 | | | | | | 80 | | 85 | | | 80 | 06.04.06 |
| 452 | TWISTER TENOER | 681 685-130 | | | | | | 105 | 95 | 85 | | | | 06.04.06 |
| 360 | YARN WINOER | 681 685-154 | | | | | | | | 80 | 70 | 95 | | 06.04.06 |
| 427 | SPOOLER OPERATOR, AUTOMATIC | 681 686-018 | X | | | | 65 | 65 | 85 | | | | | 06.04.06 |
| 053 | SPINNER, FRAME | 682 685-010 | | | | | | 70 | | 80 | 75 | 85 | | 06.04.06 |
| 216 | BRAIING-MACHINE OPERATOR | 683 685-010 | | | | | | | | 70 | 75 | 80 | | 06.04.06 |
| 336 | KNIT TING-MACHINE OPERATOR | 685 665-014 | X | 75 | | | 75 | | | | 90 | | | 06.04.06 |
| 365 | SANO-SLINGER OPERATOR | 518 683-010 | | | | | | 90 | | 85 | | | 100 | 06.04.08 |
| 308 | PAIRING-MACHINE OPERATOR | 691 685-022 | | | | | | 80 | | 85 | | | 80 | 06.04.09 |
| 356 | SECONO HELPER | 512 684-010 | | | | | | 95 | | 80 | | | 90 | 06.04.10 |
| 166 | DIE-CASTING-MACHINE OPERATOR II | 514 685-018 | | | | | 80 | 75 | | | 75 | | | 06.04.10 |
| 228R75 | INJECTION-MOLDING-MACHINE TENOER | 556 685-038 | | | | | | 75 | 85 | 85 | | | 85 | 06.04.10 |
| 469R78 | CHEMICAL OPERATOR II | 558 585-014 | | | | | 75 | | 90 | 95 | | | | 06.04.11 |

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Cluster D -- cont.

| SATB # | OCCUPATIONAL TITLE | DOT CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | SOE CODE | |
|--------|------------------------------------|-------------|---|---------------------------------|---|---|----|----|---|----|----|----|----------|----------|
| | | | | G | V | N | S | P | Q | K | F | M | | |
| 218 | COMPRESSION-MOLDING MACHINE TENDER | 556.685-022 | | | | | | | | | 75 | 85 | 85 | 06.04.13 |
| 017R | PRESS TENDER | 556.685-066 | | | | | | 80 | | | | | 85 | 06.04.13 |
| 046 | RECORD-PRESS TENDER | 556.685-070 | | | | | | 90 | | | | | 100 | 06.04.13 |
| 067 | STEMMER, MACHINE | 521.685-334 | | | | | | | | | 80 | 70 | 70 | 06.04.15 |
| 092 | CANNERY WORKER | 529.686-014 | | | | | | | | | | 75 | 75 | 06.04.15 |
| 121 | CANNERY WORKER | 529.686-014 | | | | | | | | | 75 | 75 | 75 | 06.04.15 |
| 122 | CANNERY WORKER | 529.686-014 | | | | | | | | | 85 | 75 | 80 | 06.04.15 |
| 041 | BOARDING-MACHINE OPERATOR | 589.685-010 | | | | | | | | | 75 | 70 | 85 | 06.04.16 |
| 168 | YARN-TEXTURING-MACHINE OPERATOR | 589.685-102 | | | | | | 80 | | | 95 | | 90 | 06.04.16 |
| 112 | KILN PLACER | 573.686-026 | | | | | | 70 | | | | 70 | 80 | 06.04.17 |
| 027 | LIGHT-BULB ASSEMBLER | 692.685-118 | | | | | | | | | 75 | 85 | 80 | 06.04.20 |
| 161 | MOUNTER, AUTOMATIC | 976.685-022 | X | 75 | | | | 70 | | | | 75 | 80 | 06.04.20 |
| 194 | ASSEMBLER, METAL FURNITURE | 709.684-014 | | | | | | | | | 80 | 80 | 90 | 06.04.22 |
| 187 | VENETIAN-BLIND ASSEMBLER | 739.684-166 | | | | | | | | | 85 | 85 | 85 | 06.04.22 |
| 101R77 | ASSEMBLER, AUTOMOBILE | 806.684-010 | | | | | | | | 90 | | 80 | 90 | 06.04.22 |
| 136 | ASSEMBLER, SMALL PARTS | 706.684-022 | | | | | | | | | 80 | 85 | 80 | 06.04.23 |
| 141 | BENCH ASSEMBLER | 706.684-042 | X | 100 | | | 85 | 85 | | | | | 80 | 06.04.23 |
| 149 | CASER | 715.684-054 | | | | | | | | | 95 | 85 | 90 | 06.04.23 |
| 149 | HANDS ASSEMBLER | 715.684-110 | | | | | | | | | 95 | 85 | 90 | 06.04.23 |
| 151 | MECHANISM ASSEMBLER | 715.684-142 | X | | | | 85 | 90 | | | | 90 | | 06.04.23 |
| 152 | STAKER | 715.684-182 | | | | | 85 | 90 | | | 80 | | 75 | 06.04.23 |
| 021 | ELECTRIC-MOTOR ASSEMBLER | 721.684-022 | | | | | | | | | 90 | 80 | 80 | 06.04.23 |

7-14

Cluster D -- cont.

| SATB # | OCCUPATIONAL TITLE | DOT CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | GOE CODE | |
|--------|-------------------------------------|-------------|---|---------------------------------|---|---|----|-----|----|----|-----|-----|----------|----------|
| | | | | G | V | N | S | P | Q | K | F | M | | |
| 169 | COIL WINDER | 724.684-026 | | | | | 80 | | 90 | | 80 | | 06.04.23 | |
| 220 | COIL WINDER | 724.684-026 | | | | | | 80 | 90 | | 85 | 85 | 06.04.23 | |
| 227 | COIL WINDER | 724.684-026 | X | 85 | | | | | | | 100 | 110 | 06.04.23 | |
| 244 | PLUG WIRER | 726.687-014 | | | | | | | | | 90 | 85 | 100 | 06.04.23 |
| 066 | ASSEMBLER, DRY CELL AND BATTERY | 727.687-022 | | | | | | | | | 80 | 80 | 80 | 06.04.23 |
| 414R77 | ASSEMBLER, ELECTRICAL ACCESSORIES I | 729.687-010 | | | | | | | 80 | | 95 | 85 | 06.04.23 | |
| 290 | FINISHER, HAND | 731.587-010 | | | | | | | 85 | 85 | | 85 | 06.04.23 | |
| 134 | TOY ASSEMBLER | 731.687-034 | | | | | | | | | 80 | 90 | 100 | 06.04.23 |
| 290 | TOY ASSEMBLER | 731.687-034 | | | | | | | 85 | 85 | | 85 | 06.04.23 | |
| 079R | FISHING-ROD ASSEMBLER | 732.684-066 | | | | | | | | | 80 | 85 | 06.04.23 | |
| 052 | FIREWORKS ASSEMBLER | 737.587-014 | | | | | | | | | 95 | 95 | 06.04.23 | |
| 456 | ASSEMBLER, SMALL PRODUCTS | 739.687-030 | | | | | | | 85 | 85 | 75 | 90 | 06.04.23 | |
| 246 | FINISHER, HAND | 754.684-030 | | | | | | 90 | | | 80 | 95 | 06.04.24 | |
| 362 | CHIPPER II | 809.684-026 | | | | | | 105 | | | | 95 | 06.04.24 | |
| 174 | CASE FINISHER | 739.684-034 | | | | | 80 | | | | 90 | 90 | 95 | 06.04.27 |
| 346 | HAND SEWER, SHOES | 788.684-064 | | | | | 80 | | | | 75 | 90 | 06.04.27 | |
| 112 | PASTER | 773.684-014 | | | | | | 70 | | | 70 | 80 | 06.04.30 | |
| 142 | SOLDERER, PRODUCTION LINE | 813.684-022 | | | | | | 90 | | | 85 | 85 | 06.04.31 | |
| 447 | WELDER, PRODUCTION LINE | 819.684-010 | | | | | | 70 | | | | 75 | 06.04.31 | |
| 089 | MACHINE FEEDER | 819.686-010 | | | | | | | | | 80 | 85 | 75 | 06.04.31 |
| 365 | FOUNDRY WORKER, GENERAL | 519.687-022 | | | | | | 90 | | | 85 | | 100 | 06.04.32 |
| 151 | OILER | 715.684-146 | X | | | | 85 | 90 | | | | 90 | | 06.04.33 |
| 094 | GLUER | 795.687-014 | | | | | | 75 | | | | 80 | 70 | 06.04.34 |

353

354

Cluster D -- cont.

| SATB # | OCCUPATIONAL TITLE | DOT CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | GOE CODE | |
|--------|------------------------------|-------------|---|---------------------------------|----|----|----|----|---|----|----|----|----------|----------|
| | | | | G | V | N | S | P | Q | K | F | M | | |
| 138 | SILK FINISHER | 363.681-010 | | | | | | | | 80 | 80 | 75 | 90 | 06.04.35 |
| 138 | PRESSER, HAND | 363.684-018 | | | | | | | | 80 | 80 | 75 | 90 | 06.04.35 |
| 260 | FLATWORK FINISHER | 363.686-010 | | | | | | | | | 80 | | 80 | 06.04.35 |
| 219 | MARKER II | 920.687-126 | X | 75 | | | 75 | | | | 85 | 90 | | 06.04.37 |
| 376 | MAILING-MACHINE OPERATOR | 208.462-010 | | | | | | 90 | | | 95 | | 90 | 06.04.38 |
| 026 | POULTRY-DRESSING WORKER | 525.687-062 | | | | | | | | | 80 | 80 | | 06.04.38 |
| 050 | CARDING-MACHINE OPERATOR | 681.885-030 | | | | | | | | | 90 | | 85 | 06.04.38 |
| 359 | ASSEMBLER, HOSPITAL SUPPLIES | 712.687-010 | | | | | | | | | 85 | 90 | 115 | 06.04.38 |
| 016 | PACKAGER, HAND | 920.587-018 | | | | | | | | | 90 | 85 | 90 | 06.04.38 |
| 028 | PACKAGER, HAND | 920.587-018 | | | | | | | | | 95 | 90 | 90 | 06.04.38 |
| 095 | PACKAGER, HAND | 920.587-018 | | | | | | | | | | 85 | 80 | 06.04.38 |
| 165 | PACKAGER, HAND | 920.587-018 | X | | | 70 | | | | 85 | | 70 | 85 | 06.04.38 |
| 193 | PACKAGER, HAND | 920.587-018 | | | | | | | | | 80 | 80 | 85 | 06.04.38 |
| 258 | PACKAGER, HAND | 920.587-018 | | | | | | 75 | | | 85 | | 75 | 06.04.38 |
| 361 | PACKAGER, HAND | 920.587-018 | X | 80 | 85 | 85 | | | | 80 | | | | 06.04.38 |
| 099 | PACKAGER, MACHINE | 920.685-078 | | | | | | 75 | | | | 90 | 80 | 06.04.38 |
| 242 | PACKAGER, MACHINE | 920.685-078 | | | | | | | | | 90 | 75 | 75 | 06.04.38 |
| 301 | PACKAGER, MACHINE | 920.685-078 | X | 80 | | | | | | | | 80 | 90 | 06.04.38 |
| 341 | PACKAGER, MACHINE | 920.685-078 | X | 80 | | | | 80 | | | | 80 | | 06.04.38 |
| 359 | PACKAGER, MACHINE | 920.685-078 | | | | | | | | | 85 | 90 | 115 | 06.04.38 |
| 372 | PACKAGER, MACHINE | 920.685-078 | | | | | | | | 85 | | 90 | 90 | 06.04.38 |
| 434 | PACKAGER, MACHINE | 920.685-078 | | | | | 85 | | | | | 70 | 95 | 06.04.38 |

F-16

Cluster D -- cont.

| SATB # | OCCUPATIONAL TITLE | DOT CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | GOE CODE |
|--------|-------------------------------|-------------|---|---------------------------------|---|---|----|-----|----|-----|----|----|----------|
| | | | | G | V | N | S | P | Q | K | F | M | |
| 296 | BAKERY WORKER | 929.686-010 | X | 80 | | | | 80 | | 100 | | | 06.04.38 |
| 362 | METAL CLEANER, IMMERSION | 503.685-030 | | | | | | 105 | | | | 95 | 06.04.39 |
| 083 | SCRAPPER | 794.687-050 | | | | | | 95 | | | | 85 | 06.04.39 |
| 247 | LABORER, GENERAL | 509.686-010 | X | 65 | | | 75 | | | | | 75 | 06.04.40 |
| 265 | LABORER, SHELLFISH PROCESSING | 529.686-058 | | | | | | | | 85 | | 85 | 06.04.40 |
| 131R74 | INOUSTRIAL-TRUCK OPERATOR | 921.683-050 | | | | | 70 | | | 80 | | | 06.04.40 |
| 351 | HARVEST WORKER, FRUIT | 403.687-018 | | | | | | 75 | | 70 | | 70 | 03.04.01 |
| 416 | FARMWORKER, OAIKY | 410.684-010 | | | | | 75 | | | 70 | | 75 | 03.04.01 |
| 116 | SORTER, AGRICULTURAL PROOUCE | 529.687-186 | | | | | | 70 | | | 70 | 70 | 03.04.01 |
| 294 | SORTER, AGRICULTURAL PROOUCE | 529.687-186 | | | | | | 85 | | 85 | 95 | | 03.04.01 |
| 302 | SORTER, AGRICULTURAL PROOUCE | 529.687-186 | | | | | | | | 75 | 70 | 70 | 03.04.01 |
| 374 | SORTER, AGRICULTURAL PROOUCE | 529.687-186 | | | | | | | | 95 | | 95 | 03.04.01 |
| 116 | PACKER, AGRICULTURAL PROOUCE | 920.687-134 | | | | | | 70 | | | 70 | 70 | 03.04.01 |
| 070 | ARTIFICIAL INSEMINATOR | 418.384-010 | X | 90 | | | | | | | | 80 | 03.04.05 |
| 328 | ROTARY-ORILLER HELPER | 930.684-026 | | | | | 85 | 95 | | | | 85 | 05.12.02 |
| 084 | MATERIAL HANOLER | 929.687-030 | | | | | | 95 | | | | 85 | 05.12.03 |
| 260 | MATERIAL HANOLER | 929.687-030 | | | | | | | | 80 | | 80 | 05.12.03 |
| 364 | MATERIAL HANOLER | 929.687-030 | | | | | | 95 | | | 75 | 85 | 05.12.03 |
| 454 | MATERIAL HANOLER | 929.687-030 | | | | | | | | | 65 | 80 | 05.12.03 |
| 466 | MATERIAL HANOLER | 929.687-030 | | | | | | 85 | 95 | | | 70 | 05.12.03 |
| 274 | FOOO-SERVICE WORKER, HOSPITAL | 355.677-010 | | | | | | | 70 | | 70 | 85 | 09.05.02 |
| 436 | FOOD-SERVICE WORKER, HOSPITAL | 355.677-010 | X | 70 | | | | 75 | | | | 70 | 09.05.02 |

F-11

Cluster E: Researching, planning, and maintaining societal systems

| SATB # | OCCUPATIONAL TITLE | DOT CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | GOE CODE |
|--------|----------------------------------|-------------|---|---------------------------------|-----|-----|-----|---|---|-----|---|---|----------|
| | | | | G | V | N | S | P | Q | K | F | M | |
| 114 | AUDITOR | 160.162-014 | X | 105 | | 115 | | | | | | | 11.06.01 |
| 114 | ACCOUNTANT | 160.167-010 | X | 105 | | 115 | | | | | | | 11.06.01 |
| 014 | UNDERWRITER | 169.167-058 | X | 120 | | 115 | | | | 105 | | | 11.06.03 |
| 175 | CASEWORKER | 195.107-010 | X | 105 | 105 | 105 | | | | | | | 10.01.02 |
| 158 | MANAGER, INDUSTRIAL ORGANIZATION | 189.117-022 | X | 95 | 100 | | 100 | | | | | | 11.05.01 |
| 055 | DIETITIAN, CHIEF | 077.117-010 | X | 105 | 105 | 110 | | | | | | | 11.05.02 |
| 023 | MANAGER, CIRCULATION | 163.167-014 | X | 95 | | 110 | | | | 100 | | | 11.05.04 |
| 254 | SOCIOLOGIST | 054.067-014 | X | 115 | 110 | | | | | | | | 11.03.02 |

E-18

Cluster F: Persuading, informing, and helping individuals

| SATB # | OCCUPATIONAL TITLE | DOT CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | GOE CODE | |
|--------|--|-------------|---|---------------------------------|-----|-----|-----|-----|-----|-----|-----|----|----------|----------|
| | | | | G | V | N | S | P | Q | K | F | M | | |
| 271R | NURSE, GENERAL DUTY | 075.374-010 | X | 100 | | 95 | | | | 100 | 95 | | | 10.02.01 |
| 270R75 | NURSE, LICENSED PRACTICAL | 079.374-014 | | | 75 | | | | | 80 | 90 | | 85 | 10.02.01 |
| 352R | OCCUPATIONAL THERAPIST | 076.121-010 | X | | 110 | | | | | | | 95 | 95 | 10.02.02 |
| 347 | PHYSICAL THERAPIST | 076.121-014 | X | 105 | 105 | | 90 | | | | | | | 10.02.02 |
| 272R | OCCUPATIONAL THERAPY ASSISTANT | 076.364-010 | X | | 95 | | | 75 | 95 | | | | 80 | 10.02.02 |
| 054 | DENTAL HYGIENIST | 078.361-010 | X | 100 | | | 95 | 110 | | | | | | 10.02.02 |
| 080 | RADIOLOGIC TECHNOLOGIST | 078.362-026 | X | 95 | 95 | | 80 | | | | | | | 10.02.02 |
| 326R | RESPIRATORY THERAPIST | 079.361-010 | X | | 100 | | 85 | | | 90 | | | | 10.02.02 |
| 210A | SALES REPRESENTATIVE, CONSTRUCTION MACHINERY | 274.357-022 | X | 100 | 95 | | 105 | | | | | | | 08.01.01 |
| 204 | DIRECTOR, FOOD SERVICES | 187.187-026 | X | 80 | 80 | | | | | 80 | | | | 11.11.04 |
| 093 | DIRECTOR, FUNERAL | 187.167-030 | X | 100 | 95 | 105 | | | | | | | | 11.11.04 |
| 048 | MANAGER, BARBER OR BEAUTY SHOP | 187.167-058 | X | 75 | | | | 80 | 95 | 95 | | | | 11.11.04 |
| 298 | MANAGER, AUTOMOBILE SERVICE STATION | 185.167-014 | X | 95 | | 85 | | | | 85 | | | | 11.11.05 |
| 225 | MANAGER, RETAIL STORE | 185.167-041 | X | 105 | | | | 95 | 100 | | | | | 11.11.05 |
| 186 | CLAIM ADJUSTER | 241.217-010 | X | 95 | 100 | 95 | | | | 105 | | | | 11.12.01 |
| 299 | LIBRARIAN | 100.127-014 | X | 110 | | 100 | | | | 110 | 100 | | | 11.02.04 |

F-19



Cluster G: Serving and caring for individuals

| SATB # | OCCUPATIONAL TITLE | DOT CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | GOE CODE | |
|--------|---------------------------|-------------|---|---------------------------------|-----|----|----|----|---|-----|---|----|----------|----------|
| | | | | G | V | N | S | P | Q | K | F | M | | |
| 209 | COUNSELOR, CAMP | 159.124-010 | X | 100 | 95 | | | | | 105 | | | | 09.01.01 |
| 433 | AIRPLANE-FLIGHT ATTENDANT | 352.367-010 | X | 100 | 90 | 85 | | | | 100 | | | | 09.01.04 |
| 237 | MEDICAL ASSISTANT | 079.367-010 | X | 85 | 105 | 80 | | | | 95 | | | | 10.03.02 |
| 202 | DENTAL ASSISTANT | 079.371-010 | X | 90 | | | 90 | | | 95 | | 90 | | 10.03.02 |
| 231 | SURGICAL TECHNICIAN | 079.374-022 | X | 85 | | | 80 | | | | | | 90 | 10.03.02 |
| 287 | PSYCHIATRIC AIDE | 355.377-014 | X | 85 | 75 | | | | | 80 | | | | 10.03.02 |
| 282R75 | NURSE AIDE | 355.674-014 | | 80 | | | | 70 | | 80 | | | | 10.03.02 |
| 047 | NURSERY SCHOOL ATTENDANT | 359.677-018 | X | 100 | 105 | | | | | | | | | 10.03.03 |
| 120 | FIRE FIGHTER | 373.364-010 | X | 90 | | | 90 | 95 | | | | | 90 | 04.02.04 |

F-20

Cluster II: Maintaining bureaucratic rules, records, and transactions

| SATB # | OCCUPATIONAL TITLE | DOT CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | GOE CODE | |
|--------|----------------------------------|-------------|---|---------------------------------|-----|-----|----|-----|---|-----|-----|----|----------|----------|
| | | | | G | V | N | S | P | Q | K | F | M | | |
| 188 | INSPECTOR, MOTOR VEHICLES | 168.267-058 | X | 75 | 75 | 80 | | | | 80 | | | | 11.10.03 |
| 263 | FISH AND GAME WARDEN | 379.167-010 | X | | 90 | | 85 | | | 85 | 70 | | | 04.01.02 |
| 329R74 | ADMINISTRATIVE CLERK | 219.362-010 | | 90 | | 95 | | | | 110 | | | | 07.01.02 |
| 032 | COURT CLERK | 243.362-010 | X | | | 80 | | | | 105 | 100 | | | 07.01.02 |
| 398R74 | TEACHER AIDE II | 249.367-074 | | | 80 | 80 | | | | 100 | 105 | | | 07.01.02 |
| 199 | AUDIT CLERK | 210.382-010 | | | | | | | | 105 | 100 | 80 | | 07.02.01 |
| 184 | BOOKKEEPER I | 210.382-014 | X | 105 | 90 | 95 | | | | | | | | 07.02.01 |
| 005 | BOOKKEEPING-MACHINE OPERATOR I | 210.382-022 | X | | | 95 | | 100 | | 110 | | 90 | | 07.02.01 |
| 090 | CALCULATING-MACHINE OPERATOR | 216.482-022 | X | | | 95 | | 100 | | 105 | 95 | | | 07.02.02 |
| 259R75 | TELLER | 211.362-018 | | | | 85 | | 105 | | 110 | | | | 07.03.01 |
| 145R76 | CASHIER-CHECKER | 211.462-014 | | | | 85 | | | | | 90 | | 95 | 07.03.01 |
| 200 | TICKET AGENT | 238.367-026 | X | 95 | 105 | 90 | | | | | | | | 07.03.01 |
| 276R77 | SALESPERSON, GENERAL MERCHANDISE | 279.357-054 | | | | | 75 | | | 90 | 80 | | | 08.02.03 |
| 249 | SALES AGENT, REAL ESTATE | 250.357-018 | X | 110 | 100 | 95 | | | | 90 | | | | 08.02.04 |
| 195 | DRIVER, SALES ROUTE | 292.353-010 | X | 85 | | 105 | | | | 80 | | | | 08.02.07 |
| 196 | DRIVER, SALES ROUTE | 292.353-010 | X | 95 | | 110 | | | | 85 | | | | 08.02.07 |
| 064 | MATERIAL EXPEDITER | 221.367-042 | X | 75 | | 70 | | | | 80 | | | | 05.09.02 |

F-21



Cluster I: Processing information

| SATB # | OCCUPATIONAL TITLE | DOT CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | GOE CODE | |
|--------|---------------------------|-------------|---|---------------------------------|-----|-----|---|---|-----|-----|-----|---|----------|----------|
| | | | | G | V | N | S | P | Q | K | F | M | | |
| 105 | EMPLOYMENT CLERK | 205.362-014 | X | 85 | 100 | 90 | | | | 95 | | | | 07.04.01 |
| 393 | HOSPITAL-ADMITTING CLERK | 205.362-018 | X | 95 | 90 | | | | | 90 | | | | 07.04.01 |
| 006 | SURVEY WORKER | 205.367-054 | X | 105 | 110 | 95 | | | | 95 | | | | 07.04.01 |
| 332 | HOTEL CLERK | 238.362-010 | X | 95 | | 100 | | | | 100 | | | | 07.04.03 |
| 00911 | CENTRAL-OFFICE OPERATOR | 235.462-019 | | | 80 | | | | | 90 | 85 | | 90 | 07.04.06 |
| 251 | DISPATCHER, MOTOR VEHICLE | 249.167-014 | X | 115 | 100 | 100 | | | | | | | | 07.05.01 |
| 379 | TRANSPORTATION AGENT | 912.367-014 | X | | | 85 | | | | 85 | | | 80 | 07.05.01 |
| 108 | PROOFREADER | 209.387-030 | | 85 | 100 | | | | 95 | 100 | | | | 07.05.02 |
| 010 | STENOGRAPHER | 202.362-014 | X | 95 | | | | | 100 | 100 | 100 | | | 07.05.03 |
| 239174 | WARD CLERK | 245.362-014 | | 75 | | 75 | | | | 95 | 85 | | | 07.05.03 |
| 162 | MAIL HANDLER | 209.687-014 | X | 90 | | | | | | 85 | 85 | | | 07.05.04 |

E-22

Cluster J: Manipulating records

| SATB # | OCCUPATIONAL TITLE | DOT CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | COE CODE |
|--------|-----------------------------|-------------|---|---------------------------------|----|-----|----|-----|-----|-----|---|----|----------|
| | | | | G | V | N | S | P | O | K | F | M | |
| 286 | COMPUTER OPERATOR | 213.382-010 | X | 110 | 95 | 100 | | | | | | | 07.06.01 |
| 042 | TABULATING-MACHINE OPERATOR | 213.682-010 | X | 95 | | 95 | 85 | | 100 | | | | 07.06.01 |
| 010 | CLERK-TYPIST | 203.362-010 | X | 95 | | | | 100 | 100 | 100 | | | 07.06.02 |
| 180R74 | KEYPUNCH OPERATOR | 203.582-030 | | 75 | | | | | 110 | | | 75 | 07.06.02 |
| 010 | TYPIST | 203.582-066 | X | 95 | | | | 100 | 100 | 100 | | | 07.06.02 |
| 217R75 | PROOF-MACHINE OPERATOR | 217.382-010 | | | | 70 | | | 115 | 95 | | | 07.06.02 |
| 309R77 | PROOF-MACHINE OPERATOR | 217.382-010 | | | | 90 | | | 100 | | | 85 | 07.06.02 |

F-23

370

369

Cluster K: Performing

Sub-cluster K-1: Verbal arts

none

Sub-cluster K-2: Spatial orientation

| SATB # | OCCUPATIONAL TITLE | OOC CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | GOE CODE |
|--------|--------------------|-------------|---|---------------------------------|---|---|-----|-----|---|---|----|---|----------|
| | | | | G | V | N | S | P | Q | K | F | M | |
| 088 | CLOTHES DESIGNER | 142.061-018 | X | 100 | | | 100 | 100 | | | 95 | | 01.02.03 |

F-24

371

372

Occupations for which OAPs not available

| SATB # | OCCUPATIONAL TITLE | OQT CODE | R | MINIMUM APTITUDE SCORES, B-1002 | | | | | | | | | GOE CODE | |
|--------|---|-------------|---|---------------------------------|-----|-----|----|----|-----|-----|----|----|----------|----------|
| | | | | G | V | N | S | P | Q | K | F | M | | |
| 438 | FORESTER AIDE | 452.364-010 | X | | 90 | 95 | | | | 90 | | 90 | 03.02.02 | |
| 312R | SUBSTATION OPERATOR | 952.362-026 | X | | | 80 | | | | 90 | | 70 | 05.06.01 | |
| 312R | SWITCHBOARD OPERATOR | 952.362-034 | X | | | 80 | | | | 90 | | 70 | 05.06.01 | |
| 312R | TURBINE OPERATOR | 952.362-042 | X | | | 80 | | | | 90 | | 70 | 05.06.01 | |
| 446 | ENGINEER | 197.130-010 | X | 95 | | | | | | 100 | | 85 | 05.06.02 | |
| 340R | STATIONARY ENGINEER | 950.382-026 | X | | | 85 | 85 | | | 85 | 75 | | 05.06.02 | |
| 357R | STATIONARY ENGINEER | 950.382-026 | | | | 80 | 90 | | | 75 | 80 | | 05.06.02 | |
| 342R | WATER-TREATMENT-PLANT OPERATOR | 954.382-014 | X | 90 | | 85 | | | | 80 | | | 05.06.04 | |
| 179 | WAITER/WAITRESS, INFORMAL | 311.477.030 | X | | | 85 | | | | | | 85 | 09.04.01 | |
| 164 | COUNTER ATTENDANT, LUNCHROOM OR COFFEE SHOP | 311.477-014 | | | | | | | 85 | | 75 | 75 | 75 | 09.04.01 |
| 311 | FOUNTAIN SERVER | 319.474-010 | | | | | | | 75 | | | 85 | 85 | 09.04.01 |
| 278 | SALES CLERK | 290.477-014 | X | | 85 | 80 | | | | | | 85 | | 09.04.02 |
| 037R | PHARMACIST | 074.161-010 | X | 110 | | 120 | | | | 115 | | | | 02.04.01 |
| 348R | CORRECTION OFFICER | 372.667-018 | X | | 95 | 95 | | | 85 | 100 | | | | 04.02.01 |
| 437 | PARKING ENFORCEMENT OFFICER | 375.587-010 | X | 75 | 80 | | | | | 105 | | | | 04.02.02 |
| 325 | CHEMICAL-ENGINEERING TECHNICIAN | 008.261-010 | X | 115 | 105 | | | | 105 | | | | | 05.01.08 |
| 378 | CHEMICAL-ENGINEERING TECHNICIAN | 008.261-010 | X | | 95 | 105 | 95 | | | | | | | 05.01.08 |
| 391 | RADIOGRAPHER | 199.361-010 | | | | | | | 85 | 95 | | 80 | | 05.03.05 |
| 040R | WEB-PRESS OPERATOR | 651.362-030 | | | | 85 | 85 | 85 | | | | | | 05.03.13 |
| 292 | LINEN-SUPPLY LOAD-BUILDER | 920.687-118 | | | | | | | | 90 | | | 80 | 05.09.01 |
| 182 | LABORER, STORES | 922.687-058 | | | | | | | | 95 | 80 | 85 | | 05.09.01 |

F-25

Occupations for which OAPs not available --- cont.

| | | | | | | | | | | | | |
|-----|-------------------------|-------------|---|-----|----|----|----|----|-----|-----|-----|----------|
| 353 | SUPERVISOR, ELECTRONICS | 726 130-010 | X | 105 | 90 | | | | | | 100 | 06.01.01 |
| 450 | PROGRAMER, DETAIL | 219 367-026 | X | | | 95 | 85 | | | 85 | | 11.01.01 |
| 320 | CREDIT ANALYST | 191.267-014 | X | | 90 | | | | 110 | 100 | | 11.06.03 |
| 420 | MANAGER, DEPARTMENT | 299.137-010 | X | | | 80 | | 85 | 90 | | | 11.11.05 |