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ABSTRACT

These two papers concentrate on criteria for judging nonprofessional jobs or new careers for the poor, steps in developing a career advancement plan, and the systems approach to manpower development in the human services. Attention is given to the need for meaningful and challenging assignments, flexibility in recruitment and program planning, appropriateness of procedures to local conditions, and consistent job descriptions. Six steps in planning are outlined: state long-term agency goals; set specific objectives; identify subsystems; define tasks; organize them into jobs; and organize jobs into career ladders. The second paper briefly discusses the nature, requirements, and uses of the systems approach itself. The document includes a typology of functions (data, people, things), levels of complexity, detailed scales of worker functions, and three scales of general educational development. (LY)

Methods for Manpower Analysis No. 3

A Systems Approach to New Careers

Two Papers

Wretha W. Wiley

and

Sidney A. Fine

THE W.E. UPJOHN INSTITUTE FOR EMPLOYMENT RESEARCH
ESTABLISHED 1945

Methods for Manpower Analysis No. 3

A SYSTEMS APPROACH TO NEW CAREERS: TWO PAPERS

Six Steps to New Careers

by

WRETHA W. WILEY

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A Systems Approach to Manpower Development in Human Services

by

SIDNEY A. FINE

November 1969

The W. E. Upjohn Institute for Employment Research
300 South Westnedge Avenue
Kalamazoo, Michigan 49007

The W. E. Upjohn Institute
for Employment Research

THE INSTITUTE, a privately sponsored nonprofit research organization, was established on July 1, 1945. It is an activity of the W. E. Upjohn Unemployment Trustee Corporation, which was formed in 1932 to administer a fund set aside by the late Dr. W. E. Upjohn for the purpose of carrying on "research into the causes and effects of unemployment and measures for the alleviation of unemployment."

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The Authors

Wretha W. Wiley joined the Institute staff as a senior staff member in April 1969 to assist in developing the Institute's training course, *A Systems Approach to Job Design and Manpower Utilization*. She is a specialist in job analysis, career design, and job training. She obtained a B.A. degree in English Literature from Hardin-Simmons University and pursued graduate work in the same field at Syracuse University.

From 1967 to 1969 Mrs. Wiley was a research analyst with the New Careers Development Center of New York University, where she applied the techniques of Functional Job Analysis to the problems of designing new entry-level, career-oriented jobs for unemployed and underemployed persons. Her duties involved analyzing work performed in the human service fields of health, education, and welfare to identify and define jobs and training for new careerists. Mrs. Wiley has written extensively on problems of career development and new careers training. She has also developed and conducted short training courses in Functional Job Analysis and career design for new careers program administrators.

Sidney A. Fine became a senior staff member of the Institute in 1967. He is a specialist in job analysis, occupational classification, and personnel management. He obtained his bachelor's and master's degrees from the City College of New York and his Ph.D. in Industrial and Counseling Psychology from The George Washington University.

From 1950 to 1959 Dr. Fine directed the development of the present occupational classification system of the United States Employment Service, which was the basis for the third edition of the *Dictionary of Occupational Titles* issued in 1965. Following his work at the Department of Labor, he was program director of rehabilitation research at St. Elizabeths Hospital in Washington and senior research scientist at Human Sciences Research, Inc. From 1965 to 1966 he was employed as a consultant by the International Labour Office in Geneva, Switzerland, to assist in the revision of the International Standard Classification of Occupations.

In 1959 the U.S. Department of Labor awarded Dr. Fine its Certificate of Merit. In the same year he received the American Personnel and Guidance Association's award for outstanding research. He is listed in *American Men of Science*.

Recent publications of Dr. Fine are concerned with the measurement of the impact of automation on skill, the design of new careers, the nature and potential of the *Dictionary of Occupational Titles*, and the nature of human performance.

Preface

The first paper in this bulletin is a revised version of a paper prepared at the request of the Office of Economic Opportunity (OEO), Community Action Program (CAP) Planning Systems Branch, while the author was associated with the New Careers Development Center of New York University. It was originally prepared to help the citizens advisory boards of Community Action Programs in understanding the implications of new careers jobs in CAP's.

The author of the first paper is especially indebted to Henry Cooke, Deputy Chief of the Planning Systems Branch of CAP, OEO; Alan Gartner, Associate Director of the New Careers Development Center; Alan Kravitz; Charles D. Hughes, Jr.; Richard E. Brenner; Chester Hartman; Myron L. Liner; and Stan Newman for their valuable discussions of the planning process. The illustrative material in the paper was based on these discussions.

The second paper was originally presented by the author at the 96th Annual Forum and Exposition Program of The National Conference on Social Welfare in New York City on May 29, 1969.

The views of the authors are not necessarily those of the W. E. Upjohn Institute for Employment Research.

Wretha W. Wiley
Sidney A. Fine

Washington, D.C.
October 1969

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Six Steps to New Careers

by

Wretha W. Wiley

Introduction

The 1967 Amendments to the Economic Opportunity Act require that *in all parts* of the Community Action Program (CAP):

> residents of the area and members of the groups to be served shall be provided maximum employment opportunity, including opportunity for further occupational training and career advancement.

Hiring poor people to serve their communities has been one of the most promising strategies that CAP's have used to end public neglect of poor neighborhoods. Not only are CAP's providing jobs for poor people, but in doing so they are showing service agencies — schools, health programs, and welfare agencies — how they can extend and improve their services by creating jobs for people who have not had the formal education and training usually required of teachers, nurses, and social workers.

Most communities, however, still have a long way to go to provide real job and career opportunities for poor people. Citizens Advisory Boards of CAP's can play an important part in seeing to it that their constituencies are provided "maximum employment opportunities" by evaluating and monitoring the jobs and careers within CAP, and by advocating the extension of career advancement to other community agencies.

In order to evaluate and advocate new careers in any agency, citizens groups must know what "career advancement" means, what it aims for, and how an agency can go about developing new careers.

Developing opportunities for workers at all levels, and especially for workers with little education and training, is not easy. It requires the commitment, time, money, know-how, and hard work of several groups of people — including CAP staff, manpower and service specialists, and citizens groups. This paper does not pretend to describe all that these people must do to put a good new careers program into operation. But it does try to point out the most important things for citizens groups to look for in evaluating career advancement plans and the most critical steps involved in designing jobs and careers.

Specifically, this paper attempts to do two things:

1. To provide people, inside and outside of Community Action Programs, with *six questions* they may ask *(six criteria* or *tests* that must be met) to determine if the staffing plan in any agency constitutes real jobs and careers for poor people.
2. To highlight some of the steps involved in developing jobs and careers which could pass these tests.

Focus: The CAP Planning Office

The total CAP operation is, of course, quite complex and involves many different jobs. It is impossible in a short paper to discuss all these jobs. This paper is focused, therefore, on only one part of a community action agency's program: the planning office.

While the planning office in many CAP's may be small compared to other work units, it is an important one to examine because:

1. It is often overlooked when jobs for target area residents are created in CAP's.
2. Planning represents a growing and increasingly important work field which is suffering from worker shortages.
3. The experience and training of neighborhood residents in CAP planning offices could lead to jobs and promotion opportunities for workers in other planning activities (such as Model Cities, community school planning, and planning for social and rehabilitation services) as well as in traditional planning offices of city government.
4. With the emphasis on citizen participation in all community programs, it is extremely important for poor communities to see to it that some of their residents are trained in the technical skills of planning in order to support and advance the "advisory" recommendations of citizens groups.

In order to determine the adequacy of career jobs in a planning office — or any other office — a Citizens Advisory Board must have some standards by which it can evaluate what it sees. The first part of this paper discusses six criteria or tests a Citizens Advisory Board may use in evaluating jobs designed for target area residents and their potential as first steps along a career advancement path. The second part of the paper outlines six steps in designing jobs and careers which can pass these tests.

Part I

Six Tests for Nonprofessional Jobs and New Careers[1]

The questions which are discussed below — and the values on which they are based — are not new. People who advocate career advancement neither invented nor discovered them. They are simply questions which point to the best we have learned about workers and jobs from long experience. In developing jobs and career advancement programs, what we have learned is too often taken for granted or ignored. These questions are stated here so that they can continually remind us what new careers programs aim for and why.

Test 1. Do Jobs in the Planning Office Really Contribute to Achieving the Purpose of the Community Action Agency?

Career advancement cannot be based on "make-work" or temporary agency needs. Simply pulling together some apparently useful tasks — which a resident of the community can perform in the planning office of a CAP, but which are not based upon essential long-term agency requirements — represents neither a real job nor a first step toward career advancement.

Unfortunately, some of the jobs which have been created in planning offices for "neighborhood workers" have not been based upon long-term agency needs. For example, a planning office in Washington, D.C., hired "new careers trainees" to do "diagnostic and structural surveys." The agency apparently did not take into account that it had no long-term needs or plans for surveys which could provide the basis for new permanent career-oriented jobs at the entry level. The only survey work which was found for the trainees to do was a simple short "summer" survey of the characteristics of a neighborhood slated for massive urban renewal. Before the summer survey got underway, and after it was over, the agency had to "find" other work — most of which turned out to be clerical — to occupy the trainees. As one observer put it, "It never seemed to occur [to the agency] that when the summer surveying period was over, the workers would still be there."

Work which is not seen as a necessary part of the ongoing operation of an agency does not become permanent, and it is demoralizing to workers. Some trainees, frustrated and disappointed that the jobs in the planning office did not meet their expectations, questioned whether even the simple survey data they were allowed to gather were ever used by the agency in any significant neighborhood planning.

If there are to be real career opportunities in a CAP planning office, every job along the advancement path must be directly related to and contribute to achieving the goal of the agency. *The workers must know it, and the agency must recognize it.*

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[1]The six tests discussed here, as well as the material on designing jobs (Part II) were developed by Dr. Sidney A. Fine, senior staff member of the Institute.

But that, of course, is not all. The worker is not just an instrument to be used only to accomplish the objectives of the agency. We also have to ask:

Test 2. Do Jobs in the Planning Office Meet the Workers' Needs for Growth and Recognition as People?

We have known for a long time that workers are not just self-starting machines who work only to further the objectives of the agency. They have objectives of their own which are not the same as those of the agency. Workers want to do interesting work that leads to personal rewards such as higher level jobs and more money. In the past when we have tried to simplify work so that it could be done by workers with little formal training and education, we have often overlooked the needs of the workers as human beings. The most extreme example, of course, is assemblyline workers who tighten nuts on bolts, hour after hour, day after day.

As planning offices begin to use workers who are not trained planners, they are likely to have similar problems. Workers may be unhappy because they are not allowed to do anything but copy maps all day or perform routine clerical tasks.

Career development requires that jobs be designed to allow the worker to grow and develop and to have his growth rewarded by increased responsibility, options, and pay. That means that each job must include (1) some variety in tasks the worker performs and (2) experiences which give the worker a chance to try his hand at some tasks which are on a higher level than those he performs as a routine part of his job.

Worker growth is encouraged in part, of course, by continuing training and education. But the idea of giving the worker a chance to stretch and test his abilities to perform at increasingly higher levels must be imbedded in the job itself.

The planning agency referred to in Test 1 had difficulties in this area also. Before and after assigning trainees to the summer survey project, the agency used them to do simple clerical tasks, such as collating and stapling reports. It was not long, however, before both the workers and the new careers staff which had placed them with the agency protested that the clerical tasks the trainees were performing would not lead to jobs and career opportunities in planning. Low-level clerical jobs did not meet the trainees' needs for growth and experience in the planning process itself. The agency, forced to take steps to correct this problem, allowed the trainees to perform some tasks that seemed to be more directly related to the planning process — without thinking through what the trainees could best do to serve agency objectives.

The agency acted somewhat like a lost man who allowed his feet to carry him down the first path he came to without thinking about how he could get his bearings and chart a course to his intended destination. Without giving enough thought to how it could use "planning aides," the agency at one point ran afoul

of the workers' expectations and needs. When the agency tried to satisfy the workers' needs — again without much thought — it ran afoul of its own needs and objectives.

These first two tests, simple and obvious as they may sound when they are stated separately, taken together can set up a tug of war between the agency's requirements for getting its work done and the workers' needs for growth and recognition. In order to accommodate both the agency's needs and the workers' needs, we must have an approach to job and career development that takes both sets of requirements into account and harmonizes them. And that seems to require a different way of seeing jobs than we are accustomed to seeing them — which leads us to the next test.

Test 3. Are Jobs in the Planning Office Seen as Fixed, Rigid "Slots" on an Organization Chart? Or Does the Agency Recognize That Jobs Are Simply Flexible Combinations of Tasks Which Can Be Arranged and Rearranged in Many Ways, Depending Upon the Objectives and Needs of the Agency and Its Workers?

All too frequently when an agency designs jobs (and a career advancement plan), someone sits down with a piece of paper and draws some lines that look like a tree — or a ladder — then draws boxes on the lines at certain points, prints the name of a "job" in each box, and finally lists "qualifications" (such as education and experience required) for each slot. Everyone knows at first that this chart doesn't adequately represent the "jobs" it identifies, but sooner or later people begin to act as if it does. And it is not long before the personnel office is simply looking for workers it can fit or squeeze into the vacant "slots."

This way of thinking about jobs as slots on an organization chart has caused some of the problems we are facing now: not enough people who match the "qualifications" for vacant slots, and too many people who don't fit any slot at all.

To break out of this pattern of thinking of jobs as fixed, rigid "slots," we must be able to see that there are many ways for an agency to pursue its objectives; that there are different ways for workers to perform the same task; and that there are optional ways to group tasks into jobs.

The maximum benefits of career development — for the agency and for the worker — can be realized only when an agency carefully states its purposes and objectives and explicitly describes what must be done and the different ways of getting it done to reach those objectives. Then the agency can begin to see different ways of arranging tasks into jobs to satisfy both the needs of the agency and the needs of its workers as people.

The grouping of tasks into jobs is reflected in *job descriptions* which are extremely important — and revealing — items for Citizens Advisory Boards to examine.

Test 4. Do Job Descriptions Use Explicit Standardized Language Which Allows a Reader To Compare Jobs and Measure Their Similarities and Differences? Can a Person in Another Agency — or Another Work Field — Read CAP Job Descriptions and See How They Relate to Work Done in His Agency?

Career advancement does not mean that a worker must stay in the same office in which he starts work in order to have a career. Some workers may choose to do that. But many workers who begin work in CAP planning offices will have to find similar jobs in other agencies in order to satisfy their career objectives. Whether a worker pursues a career by promotions within the CAP or uses his experience there to get a job in another agency, it is important that the description of his job give a clear picture of *what he does* and *how the job stacks up against other jobs* in that office. Unfortunately, many descriptions of jobs do not give the reader any idea at all of *what individual workers do.* Instead, they tend to describe in a general way *what gets done in the agency.*

For example, a planning office in a southeastern city has created a job called "urban planning assistant," which is an entry-level position for nonprofessionals. The job description says that the worker:

- Assists in the development, promotion, and coordination of local, regional, or state transportation planning programs.
- Assists in obtaining and compiling statistical data on such areas as jobs, housing, transportation, and zoning.
- Assists in reviewing and analyzing such factors as the natural resources and socioeconomic conditions of a given area or community.
- Assists in developing and preparing charts, maps, diagrams, and other graphic and illustrative materials.
- Assists with the filing and indexing of library materials and maps.

A reader cannot tell from this job description whether the worker "assists" the professional planner by bringing him coffee, sharpening his pencils, and emptying his wastebasket or by collecting, compiling, and copying specified data. There is a big difference. But this job description, using a casual word like "assists" — which can mean anything — does not tell what the worker does or how his job compares with other jobs in the office. A planner in another agency who is considering hiring a worker who had held this job would not know from the job description what the worker had actually done or how he might fit into another planning operation.

A good career advancement plan should define jobs in explicit, controlled, standardized language which can be recognized and understood across work fields. A tool which can be used in writing job descriptions has been developed for just this purpose. It is described briefly in Part II of this paper.

The next test points to another important aspect to be considered in evaluating jobs and careers.

Test 5. ***Are All the Jobs in the Career Advancement Plan Tailored To Fit Local Conditions? Do the Jobs Reflect the Nature, Size, and Structure of the Agency as a Work Organization?***

What different planners do in different offices varies a great deal depending upon what kind of office it is: what its objectives are, how big it is, and how the work is organized. Think of the differences in the tasks of a CAP planner in a two-man office which conducts operations research and cost-benefit analyses for the CAP director and the tasks of a CAP planner in a large office which stimulates and assists a variety of neighborhood groups to plan for the physical, social, and economic development of their neighborhoods. The staffing patterns for these two offices would be dramatically different. To be workable, a career advancement plan for either agency would have to take into account the nature, size, and management of the agency, as well as its objectives. This means that simplified, generalized "models" of jobs and career ladders which do not take *specific local conditions* into account may be inappropriate and misleading.

There is another aspect of this problem which must be carefully considered by CAP agencies. If a CAP intends to train neighborhood residents who will ultimately be employed by *other* planning agencies (as some CAP's are doing now), it is extremely important for its plans to be based on an accurate assessment of local conditions and of the kinds of jobs which are likely to be needed and available in other agencies in the community. Launching workers who have had little formal education and training in planning into careers outside CAP is, at best, very difficult. The CAP agency has little more to rely upon than its powers to persuade potential employers that using CAP-trained workers is a good thing. If a CAP sees itself as a "training base" for launching planning assistants in other planning agencies, it must know clearly, *in advance,* what those agencies need. If a CAP does not carefully consider where its trainees are going to get jobs, and prepare them for those jobs, it runs the risk of graduating "planning assistants" for whom no jobs — not to mention careers — exist.

Test 6. ***Can the Requirements for All the Jobs in the Career Advancement Plan Be Translated Into Human Terms Which Can Be Used in the Recruitment and Selection of Workers? Do the Job Descriptions Yield Information on the Reasoning, Language, and Mathematical Skills Required To Perform the Jobs?***

We know from hard and bitter experience that arbitrary qualifications such as a college degree or previous job experience too often screen out capable highly motivated applicants for jobs in the so-called professional fields such as planning. We also know that the number of years of schooling — and in some instances, previous experience — has little to do with whether a worker can perform many tasks involved in planning.

If traditional arbitrary qualification requirements are to be avoided, however, *job descriptions for career jobs must be clear enough so that the essential minimum skills required to perform the jobs can be estimated and then used as a basis for selecting workers.*

A useful tool which avoids counting "years of schooling completed" to determine the basic educational skill requirements of a job is available in the 1965 third edition of the *Dictionary of Occupational Titles*. A modified version of this tool is shown in Appendix B. Known as Scales of General Educational Development, this tool permits an agency to estimate reasoning, language, and mathematical requirements along three scales from very low to very high requirements.

If a job description clearly and explicitly states what the worker does, that is, how he functions, an agency can derive selection criteria which realistically reflect the essential skills required to perform the job and avoid the "years of schooling completed" measure which has, in the past, effectively barred many poor people from employment opportunities.

Part II

Six Steps in Developing a Career Advancement Plan

Designing jobs and careers which can pass the six tests outlined in Part I is not a simple thing. It requires more than just sitting down with the job description of a professional planner, picking out the low-level menial tasks he performs, putting them together to make an "entry" job, and drawing lines from "entry" to "intermediate" to "professional" levels. Unfortunately, that is the way most career advancement plans are developed, and in too many cases the resulting jobs do not meet any of the standards of good job and career design.

There is, however, an approach to designing jobs and careers which can meet these standards. It has been formalized in an Upjohn Institute training program entitled "A Systems Approach to Job Design and Manpower Utilization." This approach includes the six steps which are outlined in summary form below.[2] Following the summary, some of the more critical steps are discussed in greater detail, using hypothetical examples from the field of planning.

The approach to job and career design outlined here incorporates two important tools for coming to grips with the problem of defining jobs and careers:

1. *The systems approach,* which is basically a way of organizing the best available knowledge and experience to achieve an agency's purpose with maximum effectiveness.[3]
2. *Functional Job Analysis,* which provides an explicit terminology for getting at and understanding what workers do to accomplish the objectives of an agency.

Step 1. State the Overall Purpose (Long-Term Goal) of the Agency.

The systems approach to designing jobs and careers does *not* begin by examining jobs as they are performed now, yet descriptions of jobs as they are now performed are used as source materials indicating one way things may be done. The systems approach begins by examining the purpose or goal of the agency in which the jobs occur. This frequently involves arguments about values, focus, and emphasis. Nevertheless, a clear definition of purpose is essential to the approach.

The first thing we must know is what the agency wants to accomplish. In this step, we ask ourselves: In the context of the needs of the community, what is the central purpose of the agency? What do we want to accomplish?

The systems approach then works from the statement of overall purpose, step

[2]The description of this six-step approach is intended only to highlight its main features so that citizens groups can get a sense of what is involved in designing jobs and careers. As presented here, it is too simplified and limited to provide an adequate working guide for people who are actually designing jobs.

[3]The other article in this bulletin describes the systems approach in greater detail.

by step, to determine what must be done to achieve it. Often it is helpful to work backward from the goal (if it is supposed to occur at a future point in time) to the present in order to pinpoint where one has to be at successive intervals to achieve the goal. *In order to guide the system toward its long-term goal, we set specific objectives.*

Step 2. Set Specific Objectives for the Agency.

Agency purpose must face a confrontation with reality. "Reality" is the objective conditions "out there" in the environment such as time, money, manpower, geography, and consumer response. When we have stated the overall purpose or long-term goal which tells us what an agency wants to accomplish at some future point in time, we must take account of the conditions under which the agency must operate as it moves toward its purpose. Objectives, then, are a restatement of a purpose or goal in relation to the realities of a specific local situation, taking into consideration the constraints of time, money, manpower, geography, and consumer response. (See pages 11-13 for a more detailed discussion of Steps 1 and 2.) *Working from the statement of specific objectives, we can then determine what must be done to attain them. In order to meet objectives, major areas of work to be done must be identified.*

Step 3. Identify Subsystems.

In this step we block out the major areas of work which must be done to reach our objectives.

A subsystem in this case simply means a general grouping of procedures or technologies required to implement a specific objective. For example, in a planning office some subsystems might be: organizing neighborhood groups; collecting, analyzing, and evaluating data on community problems; or making a plan for social and economic development of the community.

Next, we must identify the *specific tasks* which need to be done to accomplish the objective of each subsystem.

Step 4. Define Tasks.

Each task should be stated so as to reveal precisely and concretely:

1. *What gets done* (that is, the procedures, methods, and processes with which the worker is engaged as he performs a task).
2. *What the worker does* (that is, the physical, mental, and interpersonal involvement of the worker as he carries out procedures and processes).

In order to determine what the worker does, we use a tool, the Scales of Worker Functions, to identify functional levels.[4] (See pages 13-14 for a discussion of this step.) This step also includes specifying performance standards, training required, general educational development, and worker instructions for each task. Upon completion of this step, we have the basic raw material from which to begin to organize jobs.

[4]See Appendix A.

Step 5. Organize Tasks Into Jobs.

In this step an agency can sort out tasks on the basis of the information generated in Step 4 and group them into jobs. Many tasks in different subsystems will have similar functional levels, performance standards, and skill requirements. Many options will be available for organizing these tasks into jobs, depending upon the objectives of the agency, its size, program priorities, and available manpower.

Step 6. Organize Jobs Into Career Ladders/Lattices.

The worker functions or levels by which tasks are organized into jobs in Step 5 provide the framework for defining a career ladder or lattice. The jobs will fall, according to the Worker Functions Scale, into a hierarchy — or ladder — which runs from jobs at the lowest (simplest) level of functioning, through intermediate levels, to the highest (most complex) level of functioning. The organization of jobs may also result in parallel ladders or lattices with some overlap of tasks and/or requirements between jobs more or less on the same level in each ladder. A latticelike staffing pattern makes greater mobility possible for the individual (more job options) and provides greater flexibility for managers in getting work done. It also makes possible the development of "core" curricula for training in the urban planning field.

This outline, in a very sketchy way, suggests an approach incorporating two available analytic tools which an agency can use to design jobs and careers.

Some steps in this approach are sufficiently complex to require more elaboration. Stating overall purpose and specific objectives (Steps 1 and 2) and defining tasks (Step 4) are perhaps the most critical steps for good job and career design and the most difficult to carry out. The following discussion may be helpful in describing in more detail what is involved in these steps.

More on Steps 1 and 2. Setting Overall Purpose and Specific Objectives

As we noted in Test 1, good jobs and careers cannot be "make-work." Career jobs in planning must be designed so that they share in and contribute to the agency purpose. Therefore, we must start with a clear understanding of:

1. What an agency wants to accomplish in the long run (its overall purpose).
2. How it intends to move toward its purpose within certain limitations of time, money, manpower, geography, and consumer response (its specific objectives).

The overall purpose and specific objectives are as important to the planning operation as the brain is to the human body. They give order and direction to planning activities. They keep all parts of the operation oriented toward and working for the same end. In effect, the purpose and objectives send the message to the feet, hands, fingers, and toes of the operation that the agency has a specific destination which it must reach under certain conditions or constraints and that all units must help it get there.

Each planning office must state for itself what its overall purpose and specific objectives are, taking into account the goals of the CAP and the needs of the community. Although all CAP planning offices have some things in common, their stated purposes and objectives may be different.

Planning Office *A*, for example, may decide that its overall purpose (what it wants to achieve in, say, 10 to 15 years) is:

> To have in operation a comprehensive, systematically organized *network of service programs,* including schools, health agencies, employment services, and welfare programs, accessible to all residents of a specified target area.

Specific objectives (a restatement of purpose within the limitations placed upon it by time, money, manpower, geography, and consumer response) might include:

- To obtain, within one year, the agreement of existing service agencies in the target community to participate in a coordinated service structure.
- To obtain, within one year, from an appropriate authority in the city government (e.g., the mayor or the head of the city council) a mandate and an appropriation for developing a comprehensive service plan.
- To gather, within one year, information concerning the service needs of the target community, the resources represented by the existing service agencies, and the gaps between needed services and available resources.
- To prepare, within one year, a preliminary report outlining (1) the service needs of the community ranked in priority order and (2) alternative ways of meeting these needs and their consequences to serve as the basis for setting up a coordinated structure for community services.

Planning Office *B*, on the other hand, may decide that its long-term goal is:

> To promote the political power of the residents of the target community so that they can control the social and economic development of their community.

Specific objectives which might flow from this goal are:

- To stimulate the organization of independent, issue-oriented groups of area residents to attack problems in specific areas (for example, schools, employment, housing, and welfare).
- To develop leaders in representative local organizations who can effectively participate in the governing bodies of community institutions.

- To provide, for leaders of community organizations, training in techniques of organizing, planning, managing finances, and dealing with leaders of other segments of the community.

It is extremely important to have a clear understanding of the goal and objectives of planning *before* beginning to design career jobs. The jobs and careers created in Planning Office *A* would be quite different from the jobs and careers created in Planning Office *B*. The purpose and objectives of Office *A* place emphasis on jobs which are oriented toward data collection and analysis and negotiation. The purpose and objectives of Office *B* place emphasis on jobs which are oriented toward organizing and training area residents to deal with the power and influence complex of the larger community.

In the approach outlined here, the goal and objectives of the agency become the determining reference point in designing jobs and staffing patterns within the agency.

More on Step 4. Defining Tasks

After we have specified the goal of the agency, translated that goal into specific operating objectives, and then defined the tasks that must be performed, we have a pretty good idea of what is going on in the agency — or what should be going on. We have an understanding of *what is getting done;* that is, the tasks, procedures, and processes by which the agency is trying to get where it wants to go.

But in order to design jobs, we must also be able to specify and understand *what workers do* in language whose meaning remains constant and which can be understood beyond the specific agency. A tool of Functional Job Analysis through which we can do this is the Scales of Worker Functions.[5]

The Scales of Worker Functions require that we see the difference between *what gets done* and *what workers do.* Too often we confuse the two. If we ask ourselves, for example, what a bus driver does, our first response might be, "He carries passengers." Well, he doesn't really. What he does is execute a series of movements and procedures *to drive and control* a vehicle and to collect fares. Technology has become so much a part of our lives that we no longer clearly distinguish between what hardware or equipment does and what human beings do in relation to it. The Scales of Worker Functions help us to make this distinction.

What workers do can be described by their behavior in relation to *data, people,* and *things.* All jobs involve the worker with *data, people,* and *things* to some degree. The following illustrations demonstrate the application of the scales.

- Accounting jobs which are primarily involved with *data* (information and ideas) include some involvement with *things* (adding machines, pencil, paper, etc.).

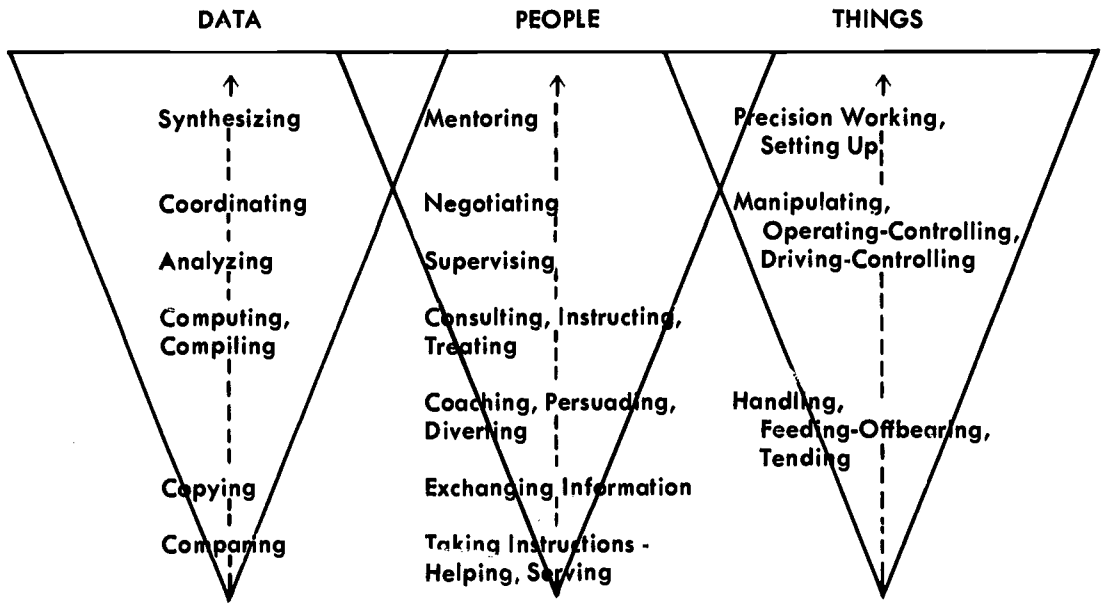
[5]See Appendix A.

- Social service jobs which are primarily involved with *people* (clients, coworkers, etc.) also involve some *data* (information on clients, etc.) and *things* (vehicles, telephones, recreation equipment, etc.).
- Machinist jobs which are primarily involved with *things* (tools, equipment, or hardware) still involve a relationship with *people* (supervisors and coworkers).

The functions in the *data,* the *people,* and the *things* areas are arranged in hierarchies — or series of steps — which run from the simplest function at the bottom to the most complex function at the top. Figure 1 is a summary chart illustrating this.

Figure 1

Scales of Worker Functions Summary Chart



Note:

Each successive function reading down usually or typically involves all those that follow it.

The functions separated by a comma are separate functions on the same level separately defined. They are on the same level because empirical evidence does not make a hierarchical distinction clear.

The hyphenated functions Taking Instructions-Helping, Operating-Controlling, and Driving-Controlling are single functions.

Setting Up, Operating-Controlling, Driving-Controlling, Feeding-Offbearing, and Tending are special cases involving machines and equipment of Precision Working, Manipulating, and Handling, respectively, and hence are indented under them.

By arranging the functions according to a threefold breakdown of complexity, as shown in Figure 2, it is possible to describe a task as "simple, low-level" or "complex, high-level."

Figure 2

Level of Complexity of Worker Functions

LEVEL OF COMPLEXITY	DATA	PEOPLE	THINGS
High	Synthesizing Coordinating	Mentoring Negotiating	Precision Working, Setting Up
Medium	Analyzing Computing, Compiling	Supervising Consulting, Instructing, Treating Coaching, Persuading, Diverting	Manipulating, Operating-Controlling, Driving-Controlling
Low	Copying Comparing	Exchanging Information Taking Instructions - Helping, Serving	Handling, Feeding-Offbearing, Tending

Note:

The note under Figure 1 is applicable to this figure also.

* * * * *

Using this chart, a planning office can describe the tasks which must be performed in its own words (which may not be understood outside the agency) and then select the appropriate worker functions for each task. The worker functions, then, provide the controlled, explicit language (which can be understood outside the agency) to describe what workers are doing and at what levels. In addition to providing a standardized vocabulary for describing jobs, the use of the worker functions chart makes it necessary that an agency understand clearly the tasks which must be performed. In order to specify a clear functional level, the agency must first specify a clear task.

For example, one set of tasks that may be performed in a planning office is interviewing target area residents to obtain their preferences among several alternative plans proposed for the neighborhood. "Interviewing area residents" is *what is getting done.*

Using the Scales of Worker Functions and the definitions of the functions (see Appendix A), we must clarify *what the worker does* in the interviewing process.

In relation to *data* (information or ideas), if he is using an interview form on which he simply has to place a check mark in the appropriate column, he is *comparing* (a low-level function). If, however, the interview form requires that he gather and classify various kinds of information about the person being interviewed, he is *compiling* (a medium-level function).

In relation to *people*, he could be simply *exchanging information* (a low-level function). But if he is expected to get reticent or hostile residents to agree to be interviewed, he is *persuading* (a medium-level function).

In relation to *things*, if he is simply using a pencil and paper during the interview, he is *handling*. If, however, he is using a tape recorder, he is *tending*.

It is important for us, in designing jobs, to know whether the worker, an interviewer, is primarily *exchanging information* with residents or *persuading* them; whether he is *comparing* data or *compiling* it; whether he is *handling* pencil and paper or *tending* a tape recorder. We need to know at which of these levels he is expected to perform because different levels call for different selection criteria, performance standards, training and education, and worker instructions (supervision).

Once an agency begins to see its jobs in terms of worker functions, it can structure and reorganize tasks into new jobs at low or intermediate levels. It can begin to see various options for using workers with different levels of training and education to accomplish its objectives. And it can begin to see jobs as a ladder or lattice which runs from the lowest level of skill to the highest and to understand what training, education, and experience workers need to be promoted from one level to the next.

Summary

Designing good subprofessional jobs and careers is not easy but neither is it impossible. The benefits that would accrue to the agency and to the workers from an approach like the one described here are well worth the effort. A systems approach to job design helps the agency:

1. To clarify and state its overall purpose and specific objectives.
2. To explore different ways of achieving its objectives.
3. To understand *what gets done* in accomplishing its objectives.
4. To understand *what workers do* and the range of functions performed by workers.
5. To state worker qualifications based on the requirements of tasks and functions.
6. To understand the training and general education needed for various jobs.
7. To organize tasks into jobs which can meet both the agency's needs and the workers' needs.
8. To construct legitimate ladders or lattices for promotion which really reflect and reward increased skill and responsibility.

Appendix A

SCALES OF WORKER FUNCTIONS[1]

Data Functions Scale

Data should be understood to mean information, ideas, facts, and statistics. Where data are not involved in a major way, note that they are at least present in the details of the job instruction.

LEVEL	DEFINITION
1	COMPARING Selects, sorts, or arranges data, people, or things, judging whether their readily observable, functional, structural, or compositional characteristics are similar to or different from prescribed standards.
2	COPYING Transcribes, enters, and/or posts data. Follows exactly a step-by-step schematic or plan to assemble or make things.
3A	COMPUTING Performs arithmetic operations and makes reports and/or carries out a prescribed action in relation to them.
3B	COMPILING Gathers, collates, or classifies information about data, people, or things.
4	ANALYZING Examines and evaluates data (about things, data, or people) with reference to the criteria, standards, and/or requirements of a particular discipline, art, technique, or craft to determine interaction effects (consequences) and to consider alternatives.
5	COORDINATING Decides time, place, and sequence of operations of a process, system, or organization, and/or the need for revision of goals, policies (boundary conditions), or procedures, on the basis of analysis of data and of performance review of pertinent objectives and requirements. Includes executing decisions and/or reporting on events.

[1]These scales have been modified and adapted by Dr. Sidney A. Fine of the Institute from "Explanation of Relationships Within Data, People, Things Hierarchies," in third edition, *Dictionary of Occupational Titles,* Vol. II (Washington: 1965), pp. 649-50.

LEVEL	DEFINITION
6	SYNTHESIZING Takes off in new directions on the basis of personal intuitions, feelings, and ideas with or without regard for tradition, experience, and existing parameters, to conceive new approaches to or statements of problems and the development of system, operational, or aesthetic "solutions" or "resolutions" of them.

SCALES OF WORKER FUNCTIONS

People Functions Scale

In jobs where people are not involved in a major way, note that they are at least present in supervision.

LEVEL	DEFINITION
1A	TAKING INSTRUCTIONS — HELPING Attends to the work assignment, instructions, or orders of supervisor. No immediate response or verbal exchange is required unless clarification of instruction is needed.
1B	SERVING Attends to the needs or requests of people or animals, or to the expressed or implicit wishes of people. Immediate response is involved.
2	EXCHANGING INFORMATION Talks to, converses with, and/or signals people to convey or obtain information, or to clarify and work out details of an assignment, within the framework of well-established procedures.
3A	COACHING Befriends and encourages individuals on a personal, caring basis by approximating a peer or family-type relationship either in a one-to-one or small group situation, and gives instruction, advice, and personal assistance concerning activities of daily living, the use of various institutional services, and participation in groups.
3B	PERSUADING Influences others in favor of a product, service, or point of view by talks or demonstrations.
3C	DIVERTING Amuses others.

LEVEL	DEFINITION
4A	CONSULTING Serves as a source of technical information and gives such information or provides ideas to define, clarify, enlarge upon, or sharpen procedures, capabilities, or product specifications.
4B	INSTRUCTING Teaches subject matter to others, or trains others, including animals, through explanation, demonstration, practice, and test.
4C	TREATING Acts on or interacts with individuals or small groups of people or animals who need help (as in sickness) to carry out specialized therapeutic or adjustment procedures. Systematically observes results of treatment within the framework of total personal behavior because unique individual reactions to prescriptions (chemical, physician's, behavioral) may not fall within the range of prediction. Motivates, supports, and instructs individuals to accept or cooperate with therapeutic adjustment procedures, when necessary.
5	SUPERVISING Determines and/or interprets work procedure for a group of workers, assigns specific duties to them (particularly those which are prescribed), maintains harmonious relations among them, evaluates performance (both prescribed and discretionary), and promotes efficiency and other organizational values. Makes decisions on procedural and technical levels.
6	NEGOTIATING Exchanges ideas, information, and opinions with others on a formal basis to formulate policies and programs on an initiating basis (e.g., contracts) and/or arrives at resolutions of problems growing out of administration of existing policies and programs, usually after a bargaining process.
7	MENTORING Deals with individuals in terms of their overall life adjustment behavior 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. Advises clients on implications of diagnostic or similar categories, courses of action open to deal with a problem, and merits of one strategy over another.

SCALES OF WORKER FUNCTIONS

Things Functions Scale

Things should be understood to refer to tangibles. In jobs where tangibles are not involved in a major way, they are at least present in the casual use of desk-top equipment (pencils, telephones, etc.) or such items as blackboards, chalk, etc. It is important to note that workers primarily involved with data or people are also involved with tangibles in this way but on a very low level.

LEVEL	DEFINITION
1A	HANDLING Works (cuts, shapes, assembles, etc.), digs, moves, or carries objects or materials where objects, materials, tools, etc., are *one* or *few* in number and are the primary involvement of the worker; *precision* requirements are *relatively gross*. Includes the use of dollies, handtrucks, and the like. Use this rating for jobs involving the casual use of tangibles.
1B	FEEDING-OFFBEARING Inserts, throws, dumps, or places materials into or removes them from machines or equipment which is automatic or tended/operated by other workers; precision requirements are built in, largely out of control of worker.
1C	TENDING Starts, stops, and monitors the functioning of machines and equipment set up by other workers where the precision of output depends on keeping one to several controls in adjustment, in response to automatic signals according to specifications. Includes workers in *all* machine situations where there is no significant setup or change of setup, where cycles are very short, alternatives to non-standard performance are few, and adjustments are highly prescribed.

LEVEL	DEFINITION
2A	MANIPULATING Works (cuts, shapes, assembles, etc.), digs, moves, guides, or places objects or materials where objects, tools, controls, etc., *are* several in number; precision requirements range from gross to fine. Includes the workers who use ordinary portable powered tools with interchangeable parts, waiting on tables, and the use of ordinary tools around the home such as kitchen equipment, garden tools, etc.
2B	OPERATING-CONTROLLING Starts, stops, controls, and adjusts machines or equipment designed to fabricate and/or process data, people, or things. The worker may be involved in activating the machine, as in typing or turning wood, or the involvement may occur primarily at start-up and stop as with semiautomatic machines. *Operating machines* involves setting up and adjusting the machine and/or material as work progresses. *Controlling equipment* involves monitoring gauges, dials, etc., and turning valves and other devices to control such items as temperature, pressure, flow of liquids, speed of pumps, and reactions of materials. *Setup* involves initial setting of several controls to achieve specified output in automatic or semiautomatic machinery. *Includes workers who operate typewriters, PBX switchboards, and other office equipment where the setup, changes of setup, and adjustments require more than cursory demonstration and checkout.*
2C	DRIVING-CONTROLLING Starts, stops, and controls the actions of machines for which a course must be steered or guided in order to fabricate, process, and/or move things or people. Actions regulating controls require continuous attention and readiness of response. Use this rating if use of vehicle required in job, even if job is concerned with people or data primarily.
3A	PRECISION WORKING Works, moves, guides, or places objects or materials according to standard practical procedures, where the number of objects, materials, tools, etc., embraces an entire craft and accuracy expected is within final finished tolerances established for the craft.
3B	SETTING UP Readies machines or equipment to perform their functions, change their performance, or restore their proper functioning if they break down by installing or altering jigs, fixtures, attachments, etc., according to job order or blueprint specifications; accuracy only partly dependent on setup — may involve one or a number of machines for other workers or for worker's own operations.

Appendix B

SCALES OF GENERAL EDUCATIONAL DEVELOPMENT[1]

Reasoning Development Scale

The Reasoning Development Scale is concerned with knowledge and ability to deal with theory versus practice, abstract versus concrete, and many versus few variables.

LEVEL	DEFINITION
1	* Have the common sense understanding to carry out simple one- or two-step instructions in the context of highly standardized situations. * Recognize unacceptable variations from the standard and take emergency action to reject inputs or stop operations.
2	* Have the common sense understanding to carry out detailed but uninvolved written or oral instructions. * Deal with problems involving a few concrete variables in or from standardized situations.
3	* Have the common sense understanding to carry out instructions furnished in written, oral, or diagrammatic form. * Deal with problems involving several concrete variables in or from standardized situations.
4	* Have knowledge of a system or interrelated procedures, such as bookkeeping, internal combustion engines, electric wiring systems, nursing, farm management, ship sailing, or machining. * Apply principles to solve practical, everyday 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.
5	* Have knowledge of a field of study (engineering, literature, history, business administration) having immediate applicability to the affairs of the world. * Define problems, collect data, establish facts, and draw valid conclusions. * Interpret an extensive variety of technical material in books, manuals, texts, etc. * Deal with some abstract but mostly concrete variables.

[1]These scales have been modified and adapted by Dr. Sidney A. Fine of the Institute from a table of "General Educational Development," in third edition, *Dictionary of Occupational Titles,* Vol. II (Washington: 1965), p. 652.

LEVEL	DEFINITION
6	* Have knowledge of a field of study of the highest abstractive order (e.g., mathematics, physics, chemistry, logic, philosophy, art criticism). * Deal with nonverbal symbols in formulas, equations, or graphs. * Understand the most difficult classes of concepts. * Deal with a large number of variables and determine a specific course of action (e.g., research, production) on the basis of need.

SCALES OF GENERAL EDUCATIONAL DEVELOPMENT

Mathematical Development Scale

The Mathematical Development Scale is concerned with knowledge and ability to deal with mathematical problems and operations from counting and simple addition to higher mathematics.

LEVEL	DEFINITION
1	* Counting to simple addition and subtraction; reading, copying, and/or recording of figures.
2	* Use arithmetic to add, subtract, multiply, and divide whole numbers.
3	* Make arithmetic calculations involving fractions, decimals, and percentages.
4	* Perform ordinary arithmetic, algebraic, and geometric procedures in standard practical applications.
5-6	* Have knowledge of advanced mathematical and statistical techniques such as differential and integral calculus, factor analysis, and probability determination. * Work with a wide variety of theoretical mathematical concepts. * Make original applications of mathematical procedures, as in empirical and differential equations.

SCALES OF GENERAL EDUCATIONAL DEVELOPMENT

Language Development Scale

The Language Development Scale is concerned with knowledge and ability to deal with oral or written language materials from simple instructions to complex sources of information and ideas.

LEVEL	DEFINITION
1	* Cannot read or write but can follow simple oral, "pointing-out" instructions. * Sign name and understand ordinary, routine agreements when explained, such as those relevant to leasing a house; employment (hours, wages, etc.); procuring a driver's license. * Read lists, addresses, safety warnings.
2	* Read comic books, "true confession" or "mystery" type magazines (short sentences; simple, concrete vocabulary; words that avoid complex Latin derivations). * Converse with service personnel (waiters, ushers, cashiers). * Copy verbal records precisely without error. * Keep taxi driver's trip record.
3	* Read material on level of the *Reader's Digest* and straight news reporting in popular "mass" newspapers. * Comprehend ordinary newscasting (uninvolved sentences and vocabulary with focus on events rather than on their analysis). * Copy verbal material from one record to another, catching gross errors in grammar. * Fill in report forms, such as Medicare forms, employment applications and card form for income tax. * Conduct house-to-house surveys to obtain common census-type information or market data, such as preferences for commercial products in everyday use.

LEVEL	DEFINITION
4	* Have language ability to take and transcribe dictation, make appointments, and sort, route, and file the mail according to subject. * Write routine business correspondence reflecting standard procedures. * Interview job applicants to determine work best suited for their abilities and experience; contact employers to interest them in services of agency. * Understand technical manuals and verbal instructions, as well as drawings and specifications, associated with practicing a craft. * Guide people on tours through historical or public buildings, tell relevant anecdotes, etc. * Conduct opinion research surveys involving stratified samples of the population.
5	* Report, write, or edit articles for magazines which, while popular, are of a highly literate nature (e.g., *New Yorker, Saturday Review, Scientific American*). * Prepare and deliver lectures for audiences that seek information about the arts, sciences, and humanities in an informal way. * Report news for the newspapers, radio, or TV. * Write copy for advertising. * Write instructions and specifications concerning proper use of machinery. * Write instructions for assembly of prefabricated parts into units.
6	* Report, write, or edit articles for technical and scientific journals or journals of advanced literary criticism (e.g., *Journal of Educational Sociology, Science, Physical Review, Daedalus*). * Prepare and draw up deeds, leases, wills, mortgages, and contracts. * Prepare and deliver lectures on politics, economics, education, or science to specialized students and/or professional societies. * Comprehend and apply technical engineering data for designing buildings and bridges. * Comprehend and discuss literary works of a highly symbolic nature, such as works in logic and philosophy (e.g., Kant, Whitehead, Russell).

A Systems Approach to Manpower Development in Human Services

by

Sidney A. Fine

Introduction

Most of us have some training in logic and in organization and most of us go about our work, including that of staffing and manpower planning, in a logical and organized way; that is, systematically. Our goal is usually efficiency. Being systematic, however, is not the same thing as using a systems approach to deal with a problem. A systems approach focuses on the achievement of a specific purpose or goal simultaneously seeking (a) to organize technology, manpower, and money within a specified time frame and (b) to respond to changes in the environment of the goal, including needs and values that are important to its achievement. In short, the systems approach originates in needs and values, focuses on a goal, responds to its environment, and presumes to measure progress toward that goal. Efficiency, as we characteristically think of it, is distinctly a secondary consideration.

The distinction between a systematic approach and a systems approach is important because of the popular confusion of the two semantically and the identification of the latter with hardware such as computers. The semantic confusion is unfortunate since it provides false comfort when an emphasis on and clarity about ends (not means) are truly desirable (applied to the social welfare industry in this paper). The identification of a systems approach with computers sets up unnecessary barriers for those concerned with developing improved methods of manpower utilization in human services. Computers are excellent subsystems for data storage and retrieval and thus are means in larger systems. However, there are many systems that neither use nor require computers.

Systems approaches have, of course, been used in the past. I imagine that from time immemorial a systems approach has been used in emergency situations such as fighting fires and stopping floods. Where our survival is threatened, we become extremely goal-directed; and our behavior becomes as expedient as the moment and existing facilities permit. What *is* new about a systems approach today is that it is being used to achieve important objectives where survival as such is not at stake.

For example, all of us have been impressed by the fact that we have landed men on the moon, according to a schedule announced less than 10 years ago by President Kennedy. Many of us know that the efforts which have brought this about have been organized by means of a systems approach. And so we ask, if the systems approach can put men on the moon, why can't we use it to achieve other goals such as securing competent manpower for the human services field — a problem which is far more urgent for human welfare.

Dealing with manpower problems is more complicated than putting men on the moon; in the latter case, at least the goal is clear.[1] Most of the problems ensuing from the goal of putting men on the moon become a matter of converting knowledge about conditions in the physical world into engineering and of phased testing of such knowledge by putting hardware through its paces. In the human services area, the goals rarely have such singleness of purpose. The methods and procedures involved do not have the definitive character of places and hardware, and the criteria for progress are often shrouded in vague verbiage of good intentions.

One goal of human services is to provide employment for the culturally disadvantaged, the "hard-core unemployed." But that is much too vague. Should it be just a job — any job? Or should it be employment with real opportunity and options for growth and improvement? Where are we today in coping (and let us note, quite systematically) with the employment problems of the disadvantaged? We seek simplistic answers represented by catch phrases such as "job development," "upgrading," or even "new careers"; but give little attention to the system problems implicit in the goals we have set.

A typical approach to setting up new careers programs, for example, has been to conceive and plan from a list of the pieces that are believed to make up new careers. Individual staff members have been assigned separate responsibility for job descriptions, selection criteria, career ladders, training, supervision, and education. But generally, the result has been that these separate parts have not meshed and programs have not produced real career opportunities. Rather, the following situations have typically resulted:

1. Entry job descriptions have been developed which represent in most cases only simple or menial duties culled out of professional jobs. Frequently, the purpose of the job and of the tasks has not been clearly described. What is equally important, there has been no indication of what experience can lead to job promotion.
2. Selection criteria for nonprofessional workers have been developed which do not accurately reflect the essential minimum skills required to perform new entry and intermediate jobs. The most common criterion has been the questionable "years of schooling completed" — often set far above what is necessary for the level of the tasks to be performed.
3. Career ladders have been designed which, for the most part, were forced into a three-step mold to meet the requirements of new careers guidelines suggested by certain legislation. Rarely, if at all, have they been well-thought-out staffing patterns designed to meet both an agency's needs to

[1]It is not my intention to minimize the complexity of the space program or to make it appear that its problems are all easily and smoothly solved. Rather, my purpose is to suggest that it is relatively less complicated than problems involving human services. On the day of the Apollo 11 moon shot, the NASA administrator, Dr. Thomas O. Paine, confronted by Reverend Ralph D. Abernathy, president of the Southern Christian Leadership Conference, said: "It will be a lot harder to solve the problems of hunger and poverty than it is to send men to the moon." (In *The Washington Post,* July 16, 1969, p. 1.)

deliver more and better services and workers' needs for growth and promotion opportunities.

4. Agency training programs have been developed which are not based on a clear understanding of what the worker does and needs to know: (1) to perform the entry job and (2) to be promoted to the next level. Supervision patterns, for the most part, are only an extension of or an appendage to procedures which were designed for more highly trained or professional staff.
5. Appropriate accreditation for on-the-job training or on-the-job experience has not been provided for. This can hardly be wondered at, considering the fact that there has been an inadequate grasp of what the worker is doing, what he needs to know, and how these factors contribute to successive levels of performance. Many of the courses developed for new careers are nothing more than watered-down versions of current academic offerings.

These are the conditions in human services manpower that we need to focus on as we review some of the major features of a systems approach and their applicability to the design of careers and the development of people.

The major features of a systems approach to be considered are: system purpose; system environment or constraints; system resources; components of the system; and maintenance of the system.[2]

The System Purpose

A system is dominated by a master purpose. While hardware systems are frequently initiated upon the assertion of a purpose, systems involving human beings rarely, if ever, are thus initiated. [3] For example, the determination "to put men safely on the moon by 1970" or "to produce a good (marketable, profitable) 10-cent cigar" can be the master purpose on the basis of which the system can be initiated from scratch. However, the purpose "to provide adequate (?) medical care for every man, woman, and child in the United States" must be imposed upon existing agglomerates of activity in order to initiate a systems approach. The same is true of most manpower and welfare undertakings. Prior to their endowment with a master purpose, manpower and welfare organizational structures are a collection of processes lacking in deliberate, clear-cut orientation and effective interconnection. In these instances, system definition becomes an important creative organizational and management act. It is primarily these potential or latent systems that we have in mind in this paper.

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[2]The sequence and organization of this discussion have been adapted from C. West Churchman, *The Systems Approach* (New York: Delacorte Press, 1968), pp. 28-47. I am also greatly in debt to discussions with my colleague, Irving H. Siegel, and with Jean Szaloczi, Chief, Social Welfare Manpower Research Unit, Social and Rehabilitation Service, U.S. Department of Health, Education, and Welfare, for many of the formulations in this section of the paper, for which, nevertheless, I take full responsibility.

[3]Systems can be classified as human systems or natural systems such as the solar system, an uncontrolled natural system. The "purposes" of natural systems have been an eternal subject of religious and metaphysical discourse.

Why is a master purpose so important to the initiation of a systems approach? The answer is multifaceted. To begin with, the determination of a purpose is a decision about values. A purpose emerges from many values and needs, which are more or less in competition with one another. A decision to go one way rather than another is an assertion about priorities which provides a framework for selecting among options to get the job done. Second, the purpose is indicative of the scope of the conception, including both the subsystems that make it up and the larger system of which it is a part. Third, purpose generates the criteria according to which the progress of the system toward its goal is continuously evaluated. Consider what must follow in defining "adequate" in the purpose noted above. Specification of the organizational purpose makes it possible to penetrate to what an organization actually does, rather than to accept on the verbal descriptive level what it says it does.

The character of a system is determined, for the most part, by its origin and hence its origin is critical. Is it the result of a seduction, of a very narrow view of immediate returns, or is it the result of a betrothal in which the selection of purpose was well examined from the standpoint of consequences? Would some of our current transportation systems have been so easily and widely embraced because of the jobs and conveniences they provide if their consequences in air and water pollution, crowding, traffic jams, and thousands of deaths on the highways had been considered as the price we were to pay? Systems cannot be viewed in isolation, but must be seen in relation to other systems in their ground and surround. This is crucial, because systems created by man do not have an existence apart from the values and needs which spawn them and the marshaling of technologies to implement them.

Anyone who has tried to make a clear statement of the purpose of his agency, or of the purpose of the activity in which he is already engaged, will know that this is not a simple matter. Herein perhaps lies the latent fear of workers in human service agencies concerning the use of a systems approach. Applied to people, will not the systems approach tend to fragment the perception of the total person and his needs? Will it not seek short-term results to the detriment of longer term benefits to human growth and development? In setting definite purposes for an agency, unit, or job will not these purposes be set at something less than the aspired goals for clients? Will not the process of specification, proceduralization, and implementation create barriers between people and erode true human contact? This is clearly a legitimate fear since, understood in this way, a systems approach would seem to be the antithesis of the goals and values of human services.

Unfortunately, these dangers are not offset by neglecting to state a purpose or by stating it in vague, obscure, uncertain terms. A vacuum cannot exist in this respect. It is important to remember that there are always two entities in a system involving humans: the organization and the individual. When there is a lack of clear purpose for the agency, unit, or job to which the individual contributes, then the purposes the individual worker seeks to fulfill for himself, conscious

or latent, take over. Obscurity of organizational purpose means that workers will project their own purposes into the emptiness and follow their own ends. The end result can well be the occurrence of the very dangers that human service workers would like to avoid — camouflaged by rationalizations and mystique because the reality is too painful to face. Where client rehabilitation has not been clearly stated as the goal of public assistance and where the achievement of this goal has not been clearly related to services, human interactions, etc., then cutting costs, the principal concern of legislators, and individual opportunism of administrators have most certainly taken over. As one supervisor is quoted as saying "Fight the System and you get steam-rollered. You have to get in step, flow with it and then you'll find room for maneuvering."[4]

How does one avoid the pitfalls of narrow specification and achievement in using the systems approach? There is no sure way, but an effective approach involves realization (1) that any system has been abstracted from a total environment of systems (see below); (2) that the measurement implicit in a systems approach must be pursued in terms of proximate (short-term), medial, and ultimate (long-term) criteria and (3) that technologies introduced into systems to produce immediate benefits require very close scrutiny for their long-term effects.

In concluding the discussion of the role of purpose in a systems approach, let me emphasize that purpose is the *sine qua non* of a system. Without it you *cannot* have a system. You might indulge in the terminology and you might be systematic and efficient, but you will not have a system.

The System Environment

Systems are accomplished in environments, i.e., in a world of other ongoing competing systems. Once a system purpose has been established, it is necessary to examine the environment in which the system is to be achieved and implemented. You must ask such questions as: In what context or complex of systems is a particular system embedded or from what context has it been abstracted? Or, what can a system do about what is "outside"? Our rockets to the moon must deal with such salient factors as vacuums, temperature, atmospheric pressure, and speed. Human service systems must deal with such realities in the environment as geographic areas, time periods, budgets, size of populations, and available manpower. In effect, when you explore the environment in which you propose to pursue a purpose, you are determining the boundary conditions — the constraints — the limitations in relation to which your system must be implemented.

Having explored what these boundary conditions are in such terms as area, time, money, and manpower, it is then possible to state the objectives of the system. The objectives are a positive formulation of the way in which you are going to deal with the constraints.

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[4]Frank Gell, *The Black Badge: Confessions of a Caseworker* (Harper and Row), 226 pp. Quoted in a review by Jack Graham in *Book World,* September 28, 1969.

Suppose your purpose is to provide for the well-being of all children through the medium of the family. One subsystem necessary to accomplish this would be a system to provide families for children who do not have them. But your funds are limited; therefore, your objective must be formulated in terms of the number of children of specified ages that you can handle within a specified environment over a specified period of time at specified quality levels. You have some leeway as to how you may work within these constraints to obtain what you consider the best results, but these constraints nevertheless are the boundaries within which you will pursue your goal. Positively stated as objectives, the constraints become the criteria against which to measure progress in achieving the purpose.

It is during the consideration of the constraints and the formulation of objectives that values are often most severely tested, particularly in the human services area. The reason is simple: here occurs the confrontation of purpose and reality. There are seldom enough resources or knowledge to achieve the system purpose as stated. And so one must often choose, for example, between: (1) reaching as many individuals in the client population as possible with some service or (2) reaching that optimum number to whom a telling, meaningful service can be given. The answer is never one or the other. A common pitfall in this area is to try to have one's cake and eat it, too.

System Resources

In setting the objectives, you no doubt have already given some consideration to the state of the art available to implement your system, that is, the procedures and methods that are known to be helpful and useful to achieve your objectives. Likewise, you are concerned with the ways that are available to funnel all the information that can be helpful and useful into your system. This information, as well as your explorations into the state of the art must now be organized in terms of the options that are available to realize the objectives.

During your examination of system purpose and objectives, your considerations were focused on needs and values; now they are concerned with methods, expedients, and time limits. This is the "nitty-gritty" area of technical decisions. Some methods and procedures available in the state of the art may be out of your reach because of the limitations represented by your objectives. In addition, when you start considering the methods and procedures that are available, you may find that you need to move in new directions because of the inadequacies that your information system reveals concerning them. Here you may consider such options as: Shall we put some of our resources into research or shall we start modifying, altering, or adapting existing methods and procedures to serve our needs? Decisions will of course be made in terms of costs and short-term and long-term effects as represented in the objectives. A key method here is trade-off — the same method that is used by baseball managers to build better teams.

Components of the System

Most systems are really subsystems. Therefore, in carrying out a system purpose, we usually need to consider the purpose of each component of the system. This is necessary to organize activity in an effective manner; that is, to make sure that there is effective meshing of component elements of the system on one hand and that there is a minimization of random activity on the other. In order to achieve a purpose, usually a whole series of events must be coordinated. The vehicle for our explorations into space had to include propulsion, guidance, stabilization, and retrieval subsystems — all designed, built, and tested to be ready at the same time. In addition, it was also necessary to design the clothing the astronauts would wear, the food they would eat, and the apparatus for feeding them, as well as the training necessary to equip them with the skills to function in their highly constrained environment.

Similarly, the determination of manpower needs in the social welfare industry is merely the starting point from which the training curricula and facilities and the trainers must be readied before we can begin to recruit the trainees. Months and even years may elapse before the needed manpower can be delivered. Many different activities must be carried on simultaneously, and the output of these activities must mesh precisely in order for the objectives of the system to be realized. Note that each subsystem has its own purpose, input, and output, and that these must be measured and coordinated with those of the overall system's inputs and outputs and ultimately be evaluated according to the objectives of the overall system.

An inadequate concept of the complex of systems in which any specific system is embedded is often the cause of a poorly functioning system. Applying the concepts of ecology to systems (especially in the field of human services) is particularly useful in this respect. For example, in the automobile and airplane we have represented extremely efficient transportation subsystems; however, our failure to consider them as subsystems of an overall transportation system — and transportation itself as a subsystem in an environmental ecology in which wholesome human life is primary — has rapidly led to the despoliation of our environment, significant failures in our transportation system, and the reduction of the excellence of our planes and autos to exercises in mechanics.

System Maintenance

Finally, there is the problem of system maintenance. Only three aspects of maintenance will be discussed here: feedback, redundancy, and system correction.

Feedback is concerned with designing the system so that at critical points in the system — for example, where the output of one subsystem is the input of another — there are controls which quickly tell you that the system is doing what it is supposed to do. Are assistance payments to welfare clients, which have been set up to meet certain cost-of-living standards, achieving their purpose? The control might be a survey of selected welfare recipients or indepen-

dent periodic checks under simulated conditions. Are Medicare costs consistent with estimates? Selected patients, doctors, hospitals, and insurance agencies should be used in making periodic sample surveys of charges, services, and methods of distributing services. Thus, in human services systems, it would appear to be essential to set up controls such as built-in samples for survey purposes in order to check continuously on the adequacy of original assumptions. Such controls would signal in advance creeping inflation or widespread fraud in public assistance which would cause unnecessary suffering for recipients and threaten the system itself. This is the meaning of those panels of warning lights on complex hardware systems. They are built-in controls. When they light up, they immediately signal that something is wrong with the system and that something must be done, such as switching to redundant equipment.

Redundancy provides back-up at critical points so that the system can keep going — so that the show can go on if indeed it must go on. Thus, actors have understudies, emergency wards have doctors on call as well as those on duty, caseworkers have junior caseworkers or casework aides, and teachers have substitutes. It is especially important in a highly institutionalized society such as ours that redundancy of manpower for direct human services be a considered, integral part of the system and regarded as an essential cost. The new careers concept applied to the human services areas is one of the best ways, particularly from the standpoint of cost, for dealing with this problem of redundancy. In effect it provides for a steady back-up of highly experienced senior workers with several levels of less experienced workers below them in continuous training to move into positions of greater responsibility.

Finally, there is the matter of system correction. While it is necessary in system design, particularly of a hardware system, to cut off planning on a specified date, it is also essential to provide for periodic review of system performance in order that the system can be revised and brought up to date. This includes providing for ways and means to accumulate the results of feedback controls, field tests, and new developments in methods and procedures in order that all of these may serve as inputs in redesigning the system. In fact, redesigning must be provided for — must begin the moment a system goes into production or operation. By their very nature, all systems, in both hardware and human services, start to obsolesce the moment they are born.

Systems Criteria Applied to Jobs

Human services systems are implemented through people on jobs. The following are six criteria that jobs must fulfill in order to satisfy both the agency system and the human system. They are stated in the form of questions.

1. Does the job purpose clearly contribute to achieving the purpose of the agency system? Are the tasks, the ultimate units designed to effect the system purpose, so organized in the job that they are consistent with the overall job purpose? Insofar as the worker is to function as an instru-

ment, does he clearly see his role — his contribution to the overall purpose of the system?

2. Does the job meet the worker's needs for growth and development as a person? A job is the ultimate unit where organizational purpose and individual purpose meet. A job should not be designed for a person in which he is considered *only* as an instrument of the organization. In designing a job we must recognize that the person is seeking opportunities and an environment compatible with his needs and aspirations. The worker must be able to see that there are possibilities for personal growth and that the environment can be adapted to him as well as he can adapt to it. The individual, of course, is free *not* to pursue any of these opportunities, but the opportunities must be designed into the system.

3. Is the job conceived of as a flexible combination of tasks which can be arranged and rearranged in many ways, depending upon the objectives of the agency, the methods and procedures used, the manpower available, and the needs of individual workers? Or is it conceived of as a fixed, rigid slot on an organization chart? When an organization communicates this latter view, it is usually through its insistence that workers stick to prescribed tasks and perform others only at the discretion of the organization. This in turn often leads to a worker refusing to perform certain tasks because "they are not in my job description." Thus, they become, in Laurence J. Peter's phrase,[5] "clots in slots." When this happens, the very existence of a system is in danger since the human elements are functioning primarily in relation to themselves and not in relation to the need of the system for human beings.

4. Are the job descriptions written in explicit standardized language so that: (1) comparisons can be made of their similarities and differences, (2) relative difficulty and complexity can be determined, and (3) prescribed and discretionary areas of performance are clearly delineated? Together, these three objectives make it possible to see how jobs fit into the organizational and human systems. Since there is an infinite number of ways in which job tasks can be described and understood, controls must be instituted in the language used for this purpose. Functional Job Analysis, for example, has developed scales expressed by active verbs which indicate what workers do and which provide a means for interpreting verb usage in a standardized way. It thus becomes possible to describe rather precisely what a worker's contribution is to each task.

5. Are the jobs being tailored to fit local conditions? Do the jobs reflect the nature, size, and structure of the agency as a work organization? These questions point to the fact that standardized descriptions of jobs such as

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[5]"The Peter Principle — A Clot for Every Slot," presented at American Society for Personnel Administration 21st Annual Conference, May 26-28, 1969, Atlanta, Georgia.

are established in merit systems must be adapted to local conditions if the local system's purposes and objectives are to be attained. All job descriptions must be translated and converted into the specific system's purpose and objectives; otherwise there is no way of communicating to individuals how they fit into the system. It is folly, for example, to think that all psychiatric aides perform the duties of a merit system description when within a single mental hospital their duties can vary enormously.

6. Can the requirements for the jobs be translated into human traits, that is, into qualifications which can be used in recruitment and selection of workers? In order for workers to be able to fulfill their aspirations and seek the opportunities appropriate to their capacities, we must be able to relate them as individuals to opportunity situations represented by particular jobs. The descriptions of jobs and their requirements must be translatable into educational levels such as reasoning ability, mathematical ability, and language ability (if necessary); or into aptitudes, temperaments, and interests, where these components are pertinent. This is another reason for a standardized language for job descriptions. Using standardized language, we begin to meet the needs of individuals as well as the needs of the system.

Jobs designed to satisfy these six criteria are jobs that satisfy the needs of a system and help achieve the system purpose. At the same time, they give individuals the opportunity to achieve their personal goals, their system needs. Whatever method of job analysis is used (whether it's a questionnaire, a checklist, the critical incidents technique, or Functional Job Analysis), unless the method can satisfy these criteria, it will not satisfy the requirements of a systems approach. Note that these criteria have not been arranged in any particular order of priority. They are all necessary conditions in the design of jobs and careers if they are to achieve the purpose of a system.

What a Systems Approach Is Not and Is

Since the term "systems approach" is used rather loosely in connection with new careers and job descriptions in human services, it may be helpful to conclude by enumerating what a systems approach *is not* and by reiterating what it *is*.

First, a systems approach is not an ideology, nor is it a panacea: as described here, it is basically a management tool — one that places its emphasis on goals rather than efficiency, on ends rather than means.[6] Some people would have us think that a systems approach is peculiar to a particular group of people, such as missile or military specialists. This is not true. It has no ideological signifi-

[6] It is a cousin to management by objectives. See George Odiorne, *Management by Objectives* (New York: Pitman Publishing Company, 1965).

cance. Anyone and everyone can use it, whether they are capitalists or Communists, software or hardware people, social workers or engineers. A systems approach helps to marshal energies and materials and to increase the chances of success in achieving a goal. It provides for the evaluation of various ways of doing things in order that the system designer will have options to meet different situations. This is an important notion: a systems approach allows for the use of alternative procedures, techniques, and skills.

Second, a systems approach is not a package that comes ready-made off a shelf. It involves participation; it must be worked at. A systems approach for any particular field — whether it is social welfare, education, library services, or whatever — must engage the knowledge, the energies, and the thinking of the learned, the experienced, and the wise in each of these fields; and they must really work at developing the separate components of the system for their specific situation. It would also be extremely helpful to have on the team the child who could not see the emperor's new clothes.

Third, a systems approach is not a substitute for knowledge. A systems approach is a user and a demander of knowledge. It is absolutely ruthless in the value it places on the knowledge that's available to fulfill a purpose, and in doing so, it reveals gaps — it reveals and anticipates places where we must stop and think and perhaps carry out research to generate new knowledge to fill those gaps. When there is no time to develop new knowledge, it compels efforts to modify, alter, or adapt what is available. In this same context, it is important to realize that a systems approach is not to be equated with scientific developments or scientific methods. Scientists explore basic premises, basic propositions, and basic assumptions about the world and design experiments or other research in order to test these out and extend the boundaries of our knowledge. A systems approach utilizes scientific knowledge and may stimulate scientific research; however, it should not be equated with science.

Fourth, a systems approach in and of itself is not an agent of change. By itself it does not ensure change. It can help bring about change by helping us to do better whatever it is we want to do. It does this by organizing our energies, by focusing on that which is relevant and useful, and by helping select a shorter route to a goal. The major change it may bring about in an organization is the clear determination of major purpose and the order of priority for other purposes.

Fifth, a systems approach does not require that we scrap what exists and start from scratch. It is a challenge to reexamine things *in medias res,* that is, starting where we are in the middle of things to extract and focus on the real social purpose of our agencies and their capacity to meet the urgent needs of the people whom they are supposed to serve. This often requires that we cut away deadwood and that we summon up the courage to relegate status, tradition, and vested interests to the lesser place they deserve.