UNITED STATES DEPARTMENT OF LABOR

DESCRIPTIONS OF OCCUPATIONS

MEDICINAL MANUFACTURING

PREPARED FOR THE

UNITED STATES EMPLOYMENT SERVICE

BY THE

UNITED STATES BUREAU OF LABOR STATISTICS

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DESCRIPTIONS OF OCCUPATIONS: MEDICINAL MANUFACTURING

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INTRODUCTORY STATEMENT

These descriptions of occupations are based on investigations, including private interviews and correspondence, extending over practically the entire United States.

The outstanding fact developed by these investigations is that there are few standard or generally accepted occupational names or definitions. It has been necessary, therefore, for the Bureau of Labor Statistics to define certain occupational terms and classifications and to assume the acceptance of these definitions by those using the descriptions. The bureau is fully aware of the fact that some important occupations have probably been omitted and that in some cases subdivisions may have been carried too far. These faults can be corrected only by means of suggestions and criticisms arising from the use of the descriptions in filling positions.

The users of these descriptions are urged to send to the Bureau of Labor Statistics all suggestions and criticisms as they arise, so that eventually there may be developed a national standard of occupational descriptions.

Acknowledgment

The Bureau of Labor Statistics wishes to thank all those who have contributed to the compilation of these descriptions. So many individuals and representatives of various organizations have been consulted that it is impossible to make special mention of such services.

PREFATORY STATEMENT

IMPORTANT

The objects of these descriptions are to furnish definitions of the various occupations, so that specifications for help may be made uniform, and to furnish a means by which the prospective employee may be informed as to the nature of the work he will be expected to do.

Each occupation has been described under the most generally accepted title. The descriptions have been carefully prepared with the view of stating clearly and briefly what each occupation requires in the way of performance and qualifications, so that a foreman or employment manager can readily specify the help wanted and can pick the worker best fitted to fill the position.

Without such standard definitions advertisements and appeals from the various Government departments or from a central employment agency would lose their effectiveness, especially when the recruiting is nation wide.

The statement of actual requirements under the heading of " Schooling " does not have reference to those already working, but should be interpreted to mean that no one should enter the specified position at the present time without having the equivalent of the stated schooling. " Common school " signifies the completion of the common-school course.

Directions for using descriptions and code words

INDEX: In order to find any given occupational description use the Index.

CODE WORDS: Each description has a code word which, when communicated to any other person who has access to these descriptions of occupations, will enable him to ascertain exactly what is called for by referring to the description indicated by the code word. (See Code words.)

If an employee is wanted who has training sufficient to do work in any two or more occupations described, the code words of these descriptions should be combined to indicate the combination of qualifications; for example: The code word designating an **AMPOULE FILLER** and a **CAPSULE MAKER AND FILLER** (see p. 11) would be **ADORE-CITE.**

DESCRIPTIONS OF OCCUPATIONS

ANALYTICAL CHEMIST **ACRE**

Description: The analytical chemist should be especially proficient in the analysis of medicinal chemicals and drugs.

Qualifications: Must have a thorough knowledge of general organic and inorganic chemistry, qualitative and quantitative analysis with special reference to the composition and analysis of medicinal products such as crude drugs, drug extracts, medicinal chemicals, liquid compounds, pills, tablets, digestive ferments, disinfectants, etc.; also, must possess initiative and alertness.

Schooling: Varies with the type of work required, but not less than high school and university training, leading to degrees of Ph. C., B. S., M. S., and Ph. D., or graduation from a college of pharmacy or other technical school.

BACTERIOLOGIST **BENCH**

Description: The bacteriologist should possess such qualifications as are necessary for the intelligent study of various problems involving bacteriological technique. This includes the study of pathogenic bacteria and the diseases of man and animal, as well as the study of various problems related to dairy, soil, and household bacteriology; also of hygiene and sanitation.

Qualifications: The bacteriologist must possess broad general training, experience along various practical lines, with technical training and expert knowledge along such bacteriological lines as are required for the consideration of various problems. For studies involving human diseases the bacteriologist should possess the M. D. degree in addition to special fundamental training in bacteriology depending upon graduate study and practical experience as a laboratory worker, and, if possible, as a clinician. He should, therefore, be fully equipped to take up all phases of the study of diseases of unknown etiology, such as measles and acute anterior poliomyelitis.

For the study of animal diseases, such as the investigation of the cause of, for instance, canine distemper, equine influenza, and hog cholera, and the prevention and cure of same, the worker should be a graduate veterinarian with adequate clinical and laboratory experience.

Various general problems in bacteriology, for illustration, the study of nitrogen-gathering bacteria, germicidal assay, and the standardization of various antisera, require the services of broadly trained bacteriologists possessing expert knowledge along the lines of work under their individual direction. Regardless of the line of bacteriological work involved, the research bacteriologist must possess such qualifications as will enable him to diligently and intelligently prosecute difficult bacteriological problems, executive ability in order to properly direct, and sufficient literary ability to report the data in a satisfactory manner and submit scientific articles for publication.

Schooling: Practically covered by the description; depends upon the man and the position which he occupies. College education and professional training necessary.

BIOLOGICAL CHEMIST **BERRY**

Description: The biological chemist is a chemist dealing with the chemical aspect of nutrition, physiology, and pathology, as relates to plant, animal, and bacterial life.

Qualifications: A biological chemist must be thoroughly trained in general inorganic and organic chemistry, qualitative and quantitative analytical procedure, physical and physiological chemistry, elementary biology, bacteriology, microbiology, and zymology.

Schooling: College education and professional training.

BIOLOGIST **BERTH**

Description: The biologist, either man or woman, should possess broad educational training and should be capable of taking charge of various departments in connection with the manufacture of biological products and of conducting different lines of research under proper direction, such as bacteriology, chemistry, physiology, pharmacology, and parasitology.

Qualifications: Should have general knowledge of pure and applied science, including chemistry, botany, zoology, physics, physiology, and expert knowledge along certain lines, depending upon the work involved, such as organic, physiological, biological, or nutritional chemistry, bacteriology (pathogenic, dairy, soil, or sanitary), physiology, pathology, histology, anatomy, pharmacology, or parasitology. Depending upon the line of work involved, it is necessary that the biologist should have a thorough knowledge of the special line of technique involved, whether it be bacteriological, histological, biological, physiological, or chemical. Frequently several lines of technique are involved in carrying out the manufacturing processes necessary for the completion of some one biological product or the investigation of some particular research problem. After acquiring broad, fundamental training in college and university, many biological workers must depend upon practical experience in picking up knowledge applicable to the line of work in which they are engaged.

Schooling: College education.

CHEMICAL ENGINEER **CHASE**

Description: The chemical engineer has a special training in the handling of chemical apparatus and machinery on a large scale in technical processes of chemical manufacture.

Qualifications: He must have a thorough general training in organic and inorganic chemistry, electrochemistry, considerable knowledge of mechanical engineering, and particularly the effect of various materials for apparatus and containers on medicinal substances, all with reference to the production of inorganic and organic medicinal chemicals, drug products, and compounds; the proper disposal and handling of apparatus such as percolators, stills, vacuum pans, vacuum driers, extraction and filtration apparatus, temperature and moisture control, etc. He must have executive ability and initiative.

Schooling: Varies with the type of work required, but not less than high-school and university training, leading to degrees of Ph. C., B. S., M. S., and Ph. D.

CHEMICAL WORKER **CHAT**

Description: The chemical worker is one who, by experience, has acquired the ability to carry out a great many different types of chemical work.

Qualifications: He should have a knowledge of the handling of the various chemical apparatus, such as centrifugal machines, filter press, steam pan, vacuum pan, vacuum still; should understand the reading of temperatures, press gauges, and something about the character of the various chemicals used. He should have good eyesight and hearing; mental alertness and dependability.

Schooling: Necessary schooling varies with the aptitude of the employee, preferably, at least, a common school and some high school training.

Note.—In specifying a chemical worker under this group it will be necessary to use the code word indicating the particular type of work to be done, as given in the following list. If the code word for "chemical worker" is used, it is understood that the employer will give the necessary training for the particular occupation to which he is assigned:

CENTRIFUGAL MACHINE TENDER	**CHAW**
FILTER-PRESS TENDER	**FATAL**
STEAM-PAN TENDER	**SHAG**
VACUUM-PAN TENDER	**VAIN**
VACUUM-STILL TENDER	**VALE**

CHEMIST. (*See* **Analytical chemist; Biological chemist; Nutritional chemist; Pharmaceutical chemist; Physiological chemist; Research chemist.**)

ENGINEER, CHEMICAL. (*See* **Chemical engineer.**)

FINISHING WORKER **FEINT**

Description: The finishing worker is one who handles the measuring, bottling, corking, labeling, and packing of all products.

Qualifications: A great variety of operations are required on account of the variety and character of the output. Entirely different manipulations are required for the handling of such products as serum, fluid extracts, pills, tablets, and ampoules. He should have average ability and good health. Women are very largely employed as finishing operators.

Schooling: Common school.

NOTE.—When a specification is placed under the general code word for finishing worker it is understood that the employer is prepared to, and expects to, give the necessary training for the work to be assigned.

IMMUNOLOGIST **IDYL**

Description: The immunologist is a biologist specializing in the prevention of contagious and infectious diseases.

Qualifications: He should have special training along the line of the production of immunity against the various specific infections of men and animals, and have expert knowledge of serum reaction and various technical procedures necessary for the successful prosecution of research work in this line. He should have initiative and a willingness to accept responsibility.

INSPECTOR **INKY**

Description: The inspector has charge of the inspection of manufacturing operations and finished products.

Qualifications: An inspector in medicinal manufacturing must have a training as analytical chemist, pharmacist, or biologist (see these classifications), except in the case of a finishing inspector, who must be familiar with all the details of packaging, labelling, and packing, and whose duty it is to insure proper appearance and accurate filling and labeling of all packages.

The chemical, pharmaceutical, biological, or finishing inspector must have qualifications as given under analytical chemist, pharmacist, biologist, or finishing worker.

Note.—If an inspector for any one of these special classes of work is desired, the name of the particular class of inspection should be added to the code word for inspector.

Schooling: High school and college of pharmacy training, a degree as chemist, or equivalent experience.

NUTRITIONAL CHEMIST **NAY**

Description: A nutritional chemist is a chemist dealing specifically with the nutritional aspects of animal life.

Qualifications: A nutritional chemist must have a good knowledge of inorganic and organic chemistry, qualitative and quantitative analytical methods, and fundamental training in animal husbandry.

Schooling: College education and professional training necessary.

PARASITOLOGIST **PENNY**

Description: The parasitologist is one engaged in parasitological research.

Qualifications: He should be able to conduct the study of parasitical organisms, especially that branch of medical science that relates to parasites, their origin, nature, and pathological effects on the human system. He should have initiative, executive ability, alertness, and ability to accept responsibility.

Schooling: He should be a college graduate with professional training.

PATHOLOGIST AND CYTOLOGIST **PEONY**

Description: The pathologist is one learned or skilled in pathology or the study of abnormal tissues and disease processes as relates to the production of abnormal tissues.

Qualifications: The pathologist and cytologist should possess the M. D. degree or the degree of veterinary medicine, in case he is engaged as comparative pathologist, which involves the study of pathological processes resulting from animal diseases. The pathologist should be familiar with gross pathology, including the study of gross tissue, and should have adequate experience in histological study involving both normal and pathological tissues. He should be able to perform post mortems, and possess a working knowledge of specific infectious diseases from the clinical point of view, in order that there may be no difficulty in intelligently planning and executing the work involved in the study of broad, difficult problems, such as that of cancer, syphilis, or other relatively obscure and partially understood diseases.

PATHOLOGIST AND CYTOLOGIST—Continued.

Schooling: He should have the M. D. degree or degree of veterinary medicine in addition to the bachelor's degree, and a certain amount of graduate work; should be experienced along such lines of research as will enable him to carry on successfully such work as involves the study of cancer.

PHARMACEUTICAL BOTANIST **POLO**

Description: The duties of the pharmaceutical botanist are to identify different herbs and to prepare them for pharmaceutical compounds.

Qualifications: He must be a graduate pharmacist who has specialized on the botany of medicinal plants.

Schooling: College graduate in pharmacy.

PHARMACEUTICAL CHEMIST **PERCH**

Description: The pharmaceutical chemist is one having a special training in pharmacy, both as regards manufacture and analysis.

Qualifications: He should have initiative; executive ability; alertness; ability to accept responsibility.

Schooling: Varies with the type of work required, but not less than high school and university training, leading to degrees of Ph. C., B. S., M. S., and Ph. D., or graduation from a college of pharmacy or other technical school.

PHARMACEUTICAL WORKER **PIE**

General statement: The pharmaceutical worker is one without specialized education in pharmacy but who, from experience, is able to handle various pharmaceutical apparatus and processes; for example, running drug mills, vacuum pans and stills; who understands the packing and working of drug percolators, the use of mixing machinery, and something of the characteristics of the various products frequently used. Pharmaceutical workers should have good eyesight and hearing, mental alertness, and dependability.

This class embraces persons who have had special training in a great variety of manufacturing operations. Many of the subdivisions of pharmaceutical workers could very properly be classed as entirely distinct classes, for example:

AMPOULE FILLER (filler of special shaped flasks or bottles) **ADORE**

These employees are experienced in the use of steam and hot-air sterilizers, ampoule filling and sealing apparatus, germ-proof filters, etc.

CAPSULE MAKER AND FILLER **CITE**

These workers understand the making of gelatin solutions; control of the temperatures; handling of molding, drying, and cutting machinery; inspecting; filling by hand or machines.

DIGESTIVE FERMENTS WORKER (pepsin, pancreatin, diastase, etc.) **DEAR**

These workers require a knowledge of much of the apparatus mentioned under fluid preparations, as well as special training in handling the animal glands from which pepsin and pancreatin are produced, and of the very special type of apparatus connected with their manufacture.

PHARMACEUTICAL WORKER—Continued.

ELIXIRS, SIRUPS, AND MISCELLANEOUS FLUID PHARMACEUTICAL WORKER **ELBOW**

The requirements of these workers are similar to those of fluid extract and tincture manufacture.

FLUID EXTRACT AND TINCTURE WORKER **FELL**

These are employees who understand drug mills, vacuum machines, mixers, percolators, and the packing of drugs in percolators; also the handling of compressed-air syphons, electrical cranes of moderate size, and filter presses. Both men and women are employed in this group of workers.

HYPODERMIC TABLET MAKER **HAPLY**

The process is entirely different from the manufacture of compressed tablets and requires special training.

PILL MAKER **PERIL**

These are workers with special training and experience in the mixing of powdered materials, working up pill mass, and the handling of pill-making machinery.

SOLID AND POWDERED EXTRACT WORKER **SHAH**

These workers have experience in the use of open steam evaporating pans, vacuum pans, vacuum stills, vacuum mixers, etc.

TABLET AND PILL COATER **TERSE**

These are workers who do a highly specialized type of work, much of which is similar to coating of nuts with sugar in candy factories.

TABLET MAKER **TEST**

The tablet maker is a worker having special training and experience in the making of granulation and the compressing of tablets.

Schooling: They should have at least a common school, and preferably a high school education.

Note.—In specifying a pharmaceutical worker under this group, it will be necessary to use the code word indicating the particular type of work to be done, as specified under the different individual workers. If the code word for "pharmaceutical worker" is used, it is understood that the employer will give the necessary training for the particular work to which the worker is to be assigned.

PHARMACIST **PERK**

Description: A pharmacist is one who has had special training in pharmacy, being a graduate of a recognized pharmaceutical college, as well as having had considerable experience in retail and manufacturing pharmacy.

Qualifications: He must have special knowledge of medicinal drugs, chemicals, and compounds, derivation, doses, uses, and incompatibilities; must understand methods of preparing mixtures and compounds of all kinds, as for example: Fluid and solid extracts, elixirs, sirups, pills, tablets, capsules, ampoules, etc. He should be able to supervise and direct such manufacturing work, make proper inspection of materials and finished products, and must be alert and dependable.

Schooling: A graduate of a recognized pharmaceutical college.

PHYSIOLOGICAL CHEMIST **PERT**

Description: The physiological chemist is one having a special training in the chemistry of physiological processes, the physiological testing of drugs, and the investigation of medicinal action of various substances.

Qualifications: The physiological chemist must have a knowledge of general inorganic and organic chemistry, general physiology, and the specific analytic chemical methods employed in physical chemistry and physiological research.

Schooling: Varies with the type of work required, but not less than high school and university training leading to degrees of Ph. C., B. S., M. S., and Ph. D.

PLASTER MAKER **POND**

Description: The plaster maker grinds rubber, mixes and incorporates with it other ingredients, and spreads it on cloth with the aid of a calender.

Qualifications: The plaster maker should have a general knowledge of the physical properties of the materials he is handling and be thoroughly familiar with the operation of the machinery used in plaster manufacturing. He should have good eyesight and hearing.

Schooling: He should have at least common-school training.

RESEARCH CHEMIST **RAT**

Description: The research chemist is one having special training in chemical research, especially along organic lines, and the synthesis of new compounds.

Qualifications: The research chemist must have an extended and thorough knowledge of general chemistry, especially organic. He should be acquainted, to some extent, with physiological effects of drugs, be a reasonably expert analyst, and particularly have a knowledge of the relation between chemical constitution and physiological action of medicinal substances. Must have a high degree of initiative, be accurate and painstaking in work, and have had previous experience in carrying out original, individual investigations.

Schooling: Varies with the type of work required, but not less than high school and university training leading to degrees of Ph. C., B. S., M. S., and Ph. D.

VETERINARY HOSPITAL ATTENDANT **VALET**

Description: The veterinary hospital attendant is one who is qualified to care for animals when under treatment for disease or injury, and for the production of serums.

Qualifications: He should be proficient and experienced in the care of animals; capable of assisting in minor operations; and be able to become thoroughly proficient in such routine work as the injection and bleeding of horses. Should have ability and training to act as attendant in experimental stables, and to assist intelligently in carrying out animal experiments.

Schooling: Common school.

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