

STANFORD UNIVERSITY
SCHOOL OF HYGIENE AND PHYSICAL EDUCATION

Division of Physical Education (Including Athletics)
Division of Informational Hygiene

Men Students' Health Service
University Health Service

STANFORD UNIVERSITY, CALIFORNIA

Doc:

Have been unable to get a copy of my popular course
in hygiene made for you up to the present time.
As soon as this early rush is over, I shall send it
on to you.

Early predictions seem to indicate that we shall
have a normal registration this year.

Best wishes.

J. W. Bunn.

Syllabus
for
GROUP HYGIENE
Course 153

Stanford University
California

COURSE 153 - GROUP HYGIENE

INTRODUCTORY

Modern life is dominated by group activities. The health hazards and the health safeguards involved in these relationships justify a special consideration from the standpoint of hygiene. Scientific investigation furnishes a sound foundation for the special application of the proven principles of hygiene to the group.

Objective of Course

The objective of this course is to illustrate the method of application of the principles of constructive and defensive hygiene to group life with particular reference to the family, school, and occupational groups.

Hygiene and Group Life

The evolution of present day society has led to the development of certain groups or units. Because of their vital relationships to the preservation and the improvement of the race, certain of these groups have been selected for the study of how the principles of hygiene can be adapted to the life of any group.

1. Family group
2. School group
3. Occupational group

Method of Study of the Group

The course is not primarily interested in social organization. We will, therefore, consider the organization of these groups insofar as they have a rather direct bearing on the problems of hygiene. A brief outline of certain characteristics of any group will be essential for consideration in attempting the application of the principles of hygiene to that particular group.

1. History of development.
2. Composition - numbers, age and sex, economic and social relationships.
3. Government of group - source and sanctions of group regulation.
4. Health resources of group.
5. Health liabilities of group.
6. Environment of group - physical, biological, and social.

References: Storey, T. A. - Group Hygiene, Part I.
Bogardus - Introduction to Sociology, Chaps. 1-5.
Fairchild - Foundations of Social Life, Chap. 7.
Blackman and Gillin - Outlines of Sociology, Part 2, Chaps. 4-6.
Gilletts, M. M. - The Family and Society.
Jones, T. J. - Four Essentials of Education, Chaps. 4-5.

FAMILY GROUP

The family is the most significant of our social institution. In many ways it is more important than the school, the church, the industrial order and the

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State. It is the almost universal institution through which our biological inheritance is preserved and our social heritage is passed on.

The family, more than any other inherited institution, is feeling the shock of demands for change brought about by modern conditions. The family should not be considered as a static institution. As the spirit of youth is challenging our institutions, the family cannot and should not be exempt. It is our duty, however, to explore the actual and potential social values of the family and note whether its evolution is not tending toward more perfect expression for our constructive and defensive needs.

The monogamic, private family is a priceless inheritance from the past and it should be preserved. Its inherited customs and mechanisms are gradually being modified to suit new social demands. This section of the course will be concerned with the relationships of the family group.

History of the Family

A very brief consideration of the evolution of the family is essential to an understanding of its hygienic significance.

1. Primitive family. Developed many forms and varied more than the modern family. Some of the important elements were:
 - a. Position of women
 - b. Sex relations
 - c. Marriage

2. American family. We are primarily interested in the evolution of the family in our own country.
 - a. European background
 - b. Colonial period
 - c. Frontier family
 - d. Present American family.

References: Spencer, A. G. - The Family and Its Members, Chaps. I
Groves, E. R. - Social Problems of the Family, Chaps. 1, 2, 3, 15.
Rich, M. E. - Family Life To-day, Part I, Chaps. 1-2.

Family Government

The long and changing government of the family during its evolution has had a marked influence upon the physical and mental characteristics of the individual. In the earlier forms of the family, either the father or mother was the absolute master of the fate of the members of the group. In present day development toward a democratic form, this is being exchanged for group opinion.

1. Health beliefs of the family, sources and validity.
2. Health habits of the family.
3. Health regulations of the family.
 - a. Constructive
 - b. Defensive

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- References: Spencer, A. G. - The Family and Its Members, Chaps. 1-3.
Groves and Ogburn - American Marriage and Family Relationships, Chaps. 2-4.
Sumner, W. G. - Folkways.
Groves, E. R. - The Marriage Crisis.

Health Resources of the Family Group

The family with its intimate relationships from before birth to old age has potentially the largest amount of health resources of any human institution. It affords the greatest opportunity for the application of the principles of hygiene at the most important times. These health resources are dependent upon:

1. Character of the members.
2. Economic status.
3. Social status.
4. Intelligence and education of group.
5. Ideals and practices.

Health Liabilities of the Family Group

The constant close association of the members of the family group carries with it many potential health hazards. These may be prevented or neutralized if the government of the family provides an effective program of defensive hygiene.

1. Communicable diseases
2. Food excesses and deficiencies
3. Faulty mental hygiene.

- References: Storey, T. A. - Constructive Hygiene - Book 1.
Defensive Hygiene - Book 2.

Establishment of a Family

There is a widespread skepticism regarding matrimony and the establishment of a family. In the changing situation in which we found ourselves, it would seem wise to try and separate the major from the minor, and the fundamental from the trivial in this matter. After due consideration of all the conflicting opinions, it would appear to be a fundamental privilege and duty for the individual to seek a proper mate and establish a family.

The reasons why people marry may be controlled by certain instinctive urges, but there are more obvious motives which seem to be operative; such as:

1. For social standing
2. For money
3. For support by mate
4. For labor of mate
5. For custom
6. For sensuous satisfaction
7. For children and home building
8. For spiritual satisfaction.

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Preparation for Home Building

The establishment of a home and family is a complex, delicate undertaking. It requires for its successful accomplishment a preparation that touches every aspect of human life and knowledge. This preparation should be an essential part of the education of every American young man and young woman. For purposes of our discussion, we will consider some of the basic preparations necessary to meet modern conditions.

1. Economic preparation. While it may appear materialistic to begin with the economic side of the home, it is surely practical.

a. Cost of home keeping. The first step in a sound preparation for home-keeping is an accurate intelligent understanding of the actual cost involved in a well-organized, well-conducted home. This means a working knowledge of budgets and budget making with particular reference to relative evaluation. One of the separate projects of this course will be the construction and criticism of budgets for various planes of living.

b. Support of the home. A consideration of the preparation of one or both mates to produce a sufficient income seems obvious. It means forethought in choosing and securing the necessary education and experience to attain the level of income desired.

References: Bossard, J. H. S. - The Problems of Social Well-Being, Chaps. 2-6.
Groves, E. R. - Social Problems of the Family, Chap. 5.
Rich, M. E. - Family Life Today, Part I, Chap. 7.
Abel, M. H. - Successful Family Life.

2. Educational preparation. The scope of the educational preparation is a broad one. It may be divided for purposes of discussion into general and special.

a. General preparation. The health information necessary for the wise administration of a home which has been presented to you in the courses on Constructive, Defensive, and Individual Hygiene may be outlined here as:

(1) Constructive hygiene, with its information with reference to the anatomy and physiology of the cell; relation of heredity to health; and the determining powers of nutrition, excretion, exercise, rest, and play.

(2) Defensive hygiene, with its information of the injuries that can come to health by excesses and deficiencies; by mechanical means; by physical means; through living micro-organisms and the remedies and methods of prevention which science has provided for them.

(3) Individual hygiene. To the above may be added the basic facts about the individual, including an understanding of the sources of his health practice;

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where to secure reliable guides to health through literature and health advisers; the value of a periodic health examination and the hygiene of the special organs.

References: Storey, T. A. - Constructive Hygiene, Book I.
Defensive Hygiene, Book II
Individual Hygiene, Book III.

b. Special preparation. The intimate, complex relationships of the family make it desirable to consider some special types of preparation which are important for those who would attain the highest form of married life.

(1) Qualifications for marriage. These should include the assurance on the part of both mates that there is:

- (a) Physical health
- (b) Mental health and stability
- (c) Social status in keeping with group.

(2) Selection of a mate. While the selection of a mate has behind it strong instinctive urges, these are not alone safe guides for successful mating. The implications and responsibilities involved need all of the intelligence and discriminating judgment that the individual can secure.

- (a) Courtship is not an emotional joy-ride. It can and should be a period of frank facing of facts of personality, disposition, tastes, adaptability, for if it results in marriage it is for a lifetime.

References: Groves, E. - Wholesome Marriage, Chaps. 3-4.
Popenoe, P. - The Conservation of the Family, Part I.
Galloway, T. - Love and Marriage.

(3) Marriage and parenthood. Marriage completes the first step toward establishment of the family with the potential responsibilities of parenthood. The adjustments necessary to a happy marriage and the intelligent rearing of children require sound basic information, plus unusual skill.

- (a) Proper conception of marriage.
- (b) Physical and mental adjustments.
- (c) Sound information and guidance for parenthood.

References: Groves, E. - Wholesome Marriage, Chaps. 5-12.
Popenoe, P. - Modern Marriage
Popenoe, P. - Conservation of the Family, Part 2.
Rich, M. - Family Life To-day, Part 2, Chap. 4.
Groves, E. - The Marriage Crisis.
March, N. H. - Towards Racial Health, Chaps. 9-10.
Von Gruber - Hygiene of Sex

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- (4) Preparation for the care of children. All too frequently we have assumed that it was only necessary for the mother to have a knowledge of the growth and development of children. Every father should be thoroughly familiar with principal facts of both physical and mental hygiene of children. The intelligent team-work of both parents pays large dividends in healthier, happier children.

- (a) Pre-natal period
- (b) Natal period
- (c) Pre-school period
- (d) Adolescent period
- (e) School period

References: Rich, M. - Family Life Today, Chap. 9.
Lucas, W. P. - The Runabout Child.
Groves, E & G. - Wholesome Childhood.
Richardson, F. H. - Parenthood and the Newer Psychology.
Spencer, A. G. - The Family and Its Members, Chaps. 8-11
O'Shea - The Child, His Nature, and His Needs.

Location and Maintenance of Home.

The physical surroundings of the family has a very definite influence upon the health levels of the group. Consequently, the parents should be capable of judging the values of:

- | | |
|----------------------------|---------------------------|
| 1. Environment of house | 4. Water supply |
| 2. Construction | 5. Sewage disposal |
| 3. Heating and ventilation | 6. Household conveniences |

References: Broadhurst, Jean - Home and Community Hygiene
Taber, C. W. - The Business of the Household
Balderston, R. - Housewifery.

Health Service for the Family

The influence of health and sickness upon the integrity and happiness of the family is coming to be seen more clearly as a matter repaying forethought and planning. In common with the advances in other lines of professional service, the medical sciences have developed rapidly to meet the needs and problems of modern life. With our increased knowledge of health and disease, there has emerged a number of groups of health advisers, who are capable not only of treating disease but also of preventing. More important, they are rapidly changing the objectives of the services to the promotion of health. This applies particularly to the physician, dentist, and nurse. Every well informed person should understand how to select and how to use such advisers both as an individual and as a responsible member of the family group.

1. Selection of health advisers. The efficiency of the health service of the family will depend largely upon whether discrimination has been exercised in the selection of health advisers for the family. It will be impossible to exercise this discrimination unless you have some standards by which to judge the individuals.

Some of the accepted standards will be outlined for the selection of a family physician, but the same principles apply to all sorts of health advisers.

2. Selection of a family physician. In the selection of a family physician, you should take advantage of all of the standards and safeguards that are available. The State has done much to protect you along this line. Your own ability to judge the character of individuals must be brought into play. Some of the important points may be outlined:

- a. Legal registration by the State.
- b. Character of medical college from which graduated.
- c. Character and amount of experience.
- d. Membership and standing in Medical Association.
- e. Hospital connections.
- f. Personality, character, and ethical standards.

The application of these standards can be accomplished by seeking the aid of the nearest Class A medical school, secretary of the County Medical Society, and educated, well-informed friends.

3. Character of health service. The health service of the present day family should be in accord with modern scientific knowledge and practice. This means that we should take the term "health service" literally. Such a service should include health supervision as well as sickness service.

- a. Health supervision. This includes continuous health supervision based on periodic health examinations. In such a supervision, the physician becomes a health counselor.
- b. Sickness service. Proper sickness service is also vital to a sound health service. It should be properly integrated with the health supervision of the family. It should include adequate nursing and hospital care.

4. Economics of health service. The financial problem of securing an adequate health service is a very real one. While it manifestly costs money, if it is high grade, it is a sound investment.

The solution of this problem should preserve the fine idealism and traditions of the professions involved. A nationwide study is now being made by a committee of which the President of Stanford is chairman. In the meantime, it should be possible for individual families to secure group health service from individual physicians.

A discussion of some attempts to secure health service by group action will be discussed with the consideration of the Occupational Group.

- References: Storey, T. A. - Individual Hygiene, Chaps. 6-10.
Cabot, R. - Layman's Handbook of Medicine.
Williams, J. F. - Personal Hygiene Applied, Chap. 5.
Fisk, E. L. - Health Building and Life Extension,
Cabot, R. - What Men Live By.

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HYGIENE OF THE SCHOOL GROUP

Time will not allow, nor is this the place for a discussion of the history of our school group. For the purposes of this course it will suffice for us to have in mind the fact that the schools are one of the five basic inherited social institutions; that they cannot and should not be static institutions but responsive to the changing conditions and increasing knowledge of modern life.

The purpose of this section is to present the hygienic potentialities of the schools with a view to familiarizing the student with the fundamentals of a sound school health program. It is hoped that a study of this subject will prepare him to intelligently participate in securing for his children the kind of health training and health instruction that will minister to, rather than lower their health levels.

School Population and School Costs

The very size and cost of the public school system would classify it as an important matter even if it did not have many other important social relationships.

In 1926, the U. S. Bureau of Education reports that the child population between 5-17 years was 30 millions, of which 24 millions were enrolled in the public schools. We employed 314,000 teachers and paid them in salaries over one billion dollars and added another billion for running expenses. If we now state that the school properties are worth over four billion and a half, we need no further statistics to realize the size of the school problem. These figures do not include the private schools, colleges, and universities.

From these statistics, it is evident that America believes in education. It believes in it so strongly that we have adopted almost universal compulsory education. This provision in our modern life has brought about a radical change in the physical and mental environment of children. Much evidence has been accumulating that unless care is used the health and vigor of children can be injured by their school experience. It is no skepticism of the wisdom of universal education to insist that education must not be bought at the price of health. This is the negative side of the picture.

The positive side of the picture presents the possibilities of health building in the schools. With the recognition of the importance of vigorous health by the educator, we are gradually having instituted in the schools more well-rounded health programs. The educators need the intelligent, understanding support of parents to back them up in this aspect of education.

References: Jones, T. J. - Four Essentials of Education, Chap. 1.
Wood, Thomas - The Child in School.

Government of School Group

The government of the school group has been delegated to the elective members of school boards or committees. It is self-evident that the quality of the schools, including the health program, is dependent upon the character of the individuals elected to office. We should select the members of the Board of Education with great care. They are responsible for our most valuable "billion dollar corporation."

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The health regulations and health conditions in the school system is entirely in the hands of the local boards of education. They must meet certain minimum standards established by the State Board of Education. Familiarize yourself with the health sections of your state school laws.

References: State and Local Educational Codes.

Health Resources of the School Group

The schools by their very nature and function can marshal great resources for the prevention of disease and the correction of physical defects. More important are their possibilities for health building.

1. Health instruction
2. Health training
3. Health service.

Health Liabilities of School Group

By the very nature of the composition of the school group, it involves certain health hazards. These can be neutralized if they are recognized and proper provision is made.

1. Communicable diseases
2. Unsanitary environment.

Environment of the School Group

The necessity for a child to spend such a large portion of his life during the growth period in the school renders attention to this aspect of school life of great importance.

1. Physical environment influences the health levels of the child at many points.

- | | |
|-----------------|---------------------|
| a. Lighting | e. Sewage disposal |
| b. Ventilation | f. Food supervision |
| c. Seating | g. Play space |
| d. Water supply | |

2. Social environment. The mental as well as physical effects of the social environment is one of the real health factors in the school group.

References: Egbert, S. - Hygiene and Sanitation
Newmayer, S. - Medical Inspection of Schools.

Health Service for School Group

The objective of the school health work should be normal, robust children free from defects and disease, with wholesome ideals built upon a groundwork of healthful habits.

1. Scope of school health work.

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- a. Health training and instruction. This means a training in health habits, acquisition of health knowledge and the formation of health ideals tending to promote personal and community health.
- b. Physical education as it is related to health.
- c. Health supervision of teachers and pupils.
 - (1) Health inspection daily for the detection of communicable diseases.
 - (2) Health examinations to chart the physical and mental condition of the child.
 - (3) Health correction includes all the necessary steps to secure the correction or alleviation of all the defects of the child.
- d. Hygienic administration of school program.
 - (1) Length and arrangement of school day.
 - (2) Length of periods, recesses, etc.
 - (3) Examinations and tests.
 - (4) Discipline.
- e. Mental hygiene.
 - (1) Training in normal mental hygiene
 - (2) Mental tests
 - (3) Discovery and training of mentally subnormal.
- f. Hygiene of the school plant.
 - (1) Construction and equipment of school buildings.
 - (2) Adequate, sanitary toilet facilities.
 - (3) Hygienic operation of school plant.
 - (a) Heating and ventilation
 - (b) Sanitary cleaning of building
 - (c) Lighting
 - (d) Adjustment of furniture.
- g. Cost of school health work. The importance of school health work justifies a sufficient budget to provide adequate, trained personnel. While exact figures can only be based on the individual school, it has been demonstrated that it requires from \$2.75 to \$5.00 per child per school year to provide for a well-rounded program.

References: Baker, S. - Child Hygiene, Chaps. 10-13.
N. Y. Ventilation Commission - Report on Ventilation
Bureau of Education - Health for School Children (Pamphlet in Document Room).
Wood and Rowell - Health through Prevention and Control of Disease.

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The Home and the School Health Program

No health program can possibly reach its highest usefulness that is not intimately linked up with the home. This is particularly true because it involves:

1. Training in practice of health habits
2. Medical and nursing supervision

This relationship between the home and school is now being accomplished in many communities through the medium of such organizations as the Parent-Teachers Association.

HYGIENE OF THE OCCUPATIONAL GROUP

By the time this point is reached, there should be no need to point out the importance of the hygiene of the occupational group. Frequently where this subject is considered, it is interpreted to mean only the industrial worker. In this course it is proposed to point out the application of the principles of hygiene to all employed persons—industrial, commercial, and professional. It will not be possible to consider in detail each of the sub-groups. We will use the method of typical examples.

History of Groups

Only the very briefest mention can be made of the history and development of industry, commerce, and the professions. The interested student will be curious to trace their evolution in their relationship to present day health resources and liabilities of the various groups.

1. Industrial group. Forms the largest single group of occupied persons.
 - a. Prehistoric period. "Shall mounds and flint heaps" were really primitive factories for the manufacture of implements of offense and defense.
 - b. Domestic period. Covered the time that industry was in and for the house out of raw materials furnished by the house.
 - c. Handicraft period. Carried on in or outside of the house, usually by free workers. Always works for the consumer.
 - d. Modern factory system. Supplies the economic wants of persons, communities, and nations by wholesale production in especially constructed plants operated by wage earners.
2. Commercial group. This group is not so large as some other occupational groups, but the rapid growth of cities has increased both its size and relative importance from a health point of view.

The evolution of our commercial groups does not stand out in periods quite so clearly as is the case with the industrial groups. During the past 50 years, with growth of cities the health problems of the commercial groups have assumed more definite form.

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3. Professional groups. The evolution of the various professional groups has inevitably brought in its train some specialized problems to each one of the various groups. Examples of these problems will be discussed.

References: Kober and Hayhurst - Industrial Health, Preface
Rich, M. E. - The Family To-day, Chap. 6.
Rice, T. - Race Hygiene, Chap. 15.

Composition of Occupied Groups

The relative importance of the various occupational groups is readily accepted but we seldom realize what a large percentage of our population in U. S. is gainfully employed. Further attention should be called as to how rapidly this group has increased during the last half century.

An examination of the Federal statistics from 1880 to 1920 reveals the fact that the number of individuals over 10 years gainfully employed has increased from approximately 17 million in 1880 (34% of total population) to 41 million in 1920 (39% of population). Of this latter number, 8,540,000 are females. This sub-group increased by 2 millions from 1910 to 1920.

A look at the distribution of workers in U.S. by occupation in 1920 will be of practical importance.

	<u>Number</u>	<u>%</u>
All occupations, both sexes - - -	41,614,248	100.0
Agriculture, forestry and animal industry - - - - -	10,953,158	26.3
Extraction of minerals - - - - -	1,090,223	2.6
Manufacturing and mechanical industries - - - - -	12,818,524	30.8
Transportation - - - - -	3,063,582	7.4
Trade - - - - -	4,242,979	10.2
Public service - - - - -	770,460	1.9
Professional service - - - - -	2,143,889	5.2
Domestic and personal service - -	3,404,892	8.2
Clerical occupations - - - - -	3,126,541	7.5

Health Government of the Groups

The extent of the health problems within the various groups are influenced definitely by the character of health knowledge and practices of the group. These in turn are largely controlled by the regulations gradually made and enforced by or within the groups.

Health and Disease in the Occupational Group

The consideration of the health status of the occupational group should be based upon complete and accurate statistics of both morbidity and mortality. Unfortunately, our morbidity reports are quite incomplete though rapidly improving because of the activities of:

1. Bureau of Census, U. S. Dept. of Commerce
2. Industrial Accident Boards (State).
3. Insurance Companies.
4. Highway Commissions.

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5. Automobile Associations
6. Safety Organizations.

Character of Health Liabilities.

1. Accidents. One of the enormous costs of our modern machine age has been the frightful toll of accidents. Our record in America during the past 50 years is not one of which we can be proud. This problem has been discussed in Course 151.
2. Sickness. We need to repeat here the burden of our sickness rates that causes over 2% of our wage earners to be constantly too ill to be at their employment.
3. Economic cost of sickness and accidents. The enormous estimated cost of two billion dollars is what we pay annually for failure to provide and enforce proper defensive hygiene programs.

References: Kober and Hayhurst - Industrial Health, Chaps. 5 and 14.
Dublin, L. J. - Health and Wealth.
Rosenau, M. I. - Preventive Medicine, Section 14.
Lauck and Sydenstricker - Conditions of Labor in American Industries.
Bossard, J. H. L. - The Problems of Social Well-Being, Chaps. 19-20.

Occupational Environment

The influence of the environment of the factory, store, or office upon the health of the worker has been demonstrated beyond any doubt. These influences may be classified as: (a) direct - such as industrial poisons, and (b) indirect such as the standards of sanitation.

1. Direct. The problems of chemical poisons remain an important factor in the health of workers as was pointed out in Course 151.
2. Indirect.
 - a. Water supply, both for washing and drinking purposes.
 - b. Sewage disposal, adequacy and efficiency.
 - c. Lighting.
 - d. Heating and ventilation.
 - e. Rest and lunch rooms.

Personal Hygiene of the Worker

The state of health of the worker is largely conditioned by his own health habits. Any worthwhile occupational hygiene program will give consideration to the state of health knowledge and health practices of the group. Such a program should be made available for the group through a proper co-operative plan. It should include:

1. Periodic health examination. A careful, scientific health examination is the only sound basis for a personal hygiene program. At the present time, it is required in many factories for the primary purpose of rejecting unsatisfactory individuals. The more

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modern progress uses it for classification of employees, and as a basis for a group hygiene program.

2. Sickness and accident service. The second of these is now practically required and the first should be made available.
3. Control of communicable diseases. There is no possible excuse for the failure to provide this service for any group.
4. Health information service. This kind of service should be conducted through every modern means--lectures, personal talks, bulletins, posters, etc. It should cover:

- | | |
|---------------------|---|
| a. Personal hygiene | e. Recreation |
| b. Proper clothing | f. Prevention of communicable diseases and accidents. |
| c. Food | |
| d. Rest | |

Combined Industrial and Home Health Service

The intimate relationship of the home of the worker to his efficiency and health has led to a number of experiments in attempting by co-operation to secure the advantage of group resources in meeting the total health problem of the worker.

1. Endicott Johnson Shoe Co. Plan. This company has approximately 15,000 workers, receiving an average wage of \$1441 annually. The factory owner by adding a few cents to wholesale price of each pair of shoes furnishes a complete health service for both its employees and their families, including:

- a. Health examinations
- b. Sickness and accident service
- c. Nursing service
- d. Dental service
- e. Pre-natal and obstetrical care
- f. Social relief
 - (1) Retirement pension
 - (2) Widow's pension
 - (3) Social relief
- g. Cost \$52.60 per capita annually, or $2\frac{1}{2}$ cents on each pair of shoes.

- References: Fisk, E. L. - Health Building and Life Extension
Emmons, A. B. - Health Control in Mercantile Life
Rosenau, J. I. - Preventive Medicine, Section 14.
O'Neil, D. G. - Medical Service for the Industrial Worker,
Journal of American Med. Assn., Nov. 17, 1928,
page 1516 (Magazine room).
Kober and Hayhurst - Industrial Health, Chap. 8.

CONSTRUCTIVE HYGIENE

Syllabus
for
Course 150

School of Hygiene and Physical Education

STANFORD UNIVERSITY

Revised - December 1931

I. INTRODUCTORY: (Note: These introductory remarks apply to the entire series of Informational Hygiene Courses.)

Every educated person should have some measure of ordered knowledge of each of the main fields of human interest. This can best be attained by securing some degree of mastery in the physical sciences, the social sciences, and the arts. Hygiene, growing out of the biological sciences, is in part physical and part social. The application of its principles may well be considered an art. The study and practice of hygiene should, therefore, form an important part of the student's general education. The objectives of the courses in hygiene are to offer the student an opportunity to understand the basic facts that determine physical and mental health and of the application of those facts for the benefit of the individual, his group, and society.

A. OBJECTIVES OF COURSES IN HYGIENE.

The immediate objectives of the courses in hygiene may be indicated under two heads:

1. The cultivation of discriminating judgment in matters that pertain to health advice, health service, health literature, and health practices. The enormous social and economic waste due to unnecessary sickness and death has been shown in a large percentage of cases to be due to lack of such judgment in the use of modern scientific means and of avoiding such misfortunes. Modern medicine and hygiene are based upon scientific facts. Sound judgment can only be exercised by those who are familiar with these facts.
2. The practice of a rational health program as a means of testing the above mentioned facts and of acquiring lasting habits of constructive hygiene. All of the scientific knowledge in the world will not guarantee either mental or physical health. To be of real value it must be personally tested and accepted as a part of your every day health practices. Your hygiene courses are for your use in your college life here and now. They are practical as well as informational.

B. OUTCOME OF COURSES

The student who desires to acquire a reasonable mastery of the field of hygiene as a basis for efficient living, should acquire a working knowledge of certain basic principles of hygiene and out of them construct for himself a health program.

Doctor Livingston Farrand, President of Cornell University, has summed up for us what he considers the minimum knowledge about hygiene that should be in the possession of every educated individual.

1. You should have a knowledge of the physiological basis for sound health habits, such as regular and sufficient hours of sleep, right posture, suitable exercise, and proper elimination.
2. You should know the types and amounts and proportions of the various food elements essential to the proper nurture of your body.
3. You should have an acquaintance with the principles of normal mental action and the conditions underlying the more common variations from normal state of mind.

4. You should have a general understanding of the sex instinct in man-- its stages of development, its normal expression, and the values and penalties attached to it.
5. You should have a knowledge of the factors determining infection and resistance and the principles of artificial immunization in the case of certain of the common infectious diseases.
6. You should have a knowledge of the causes and prevention of the degenerative diseases to offer a prospect of passing through middle life without a breakdown.
7. You should know and therefore be armed against health hazards lurking in the environment, such as polluted water and milk supply, congestion in housing, poisonous dusts of certain industries, infected soil, etc.
8. You should appreciate the necessity for frequent medical and dental examination.
9. You should have an intelligent basis for choosing wisely your medical and dental advisers, and for realizing that the modern practice of medicine is grounded on science, and not on mystery, fancy, and tradition.
10. You should have a knowledge of the important health problems facing the community, of the methods of attacking these problems, and of the results to be expected from intelligent community action in the public health field.

The student may have all of the knowledge outlined by Farrand, yet be on the way to chronic ill health and inefficiency. Health facts must be translated into health practices. This will be done only when the individual has a health program based upon sound knowledge built up by practice in the use of discriminating judgment. Such an objective has been well expressed by Smiley:

1. To be able to carry out during each day a program of activity with great zest and without undue fatigue, nervousness, worry, or loss of weight.
2. To be able to eat three well-balanced meals a day with enjoyment and without fear of digestive disturbance.
3. To be able to sleep soundly eight hours a night.
4. To be able to enjoy at least one hour's vigorous exercise.
5. To be able to enjoy the society of others without irritability, boredom, or undue self-consciousness.
6. To be able to enjoy legitimate escape into the world of unreality for at least two hours a day of literature, art, music, drama, hobbies, or games without eyestrain, nervousness, or boredom.
7. To be generally self-confident, optimistic, enthusiastic, free of unnecessary fear, expecting success and attaining it with reasonable frequency.

8. To have sex desire, normally active and properly directed and controlled.

C. THE FIELD OF HYGIENE

Hygiene is based upon both the physical sciences and the social sciences. It has been built from the sciences of biology, anatomy, physiology, chemistry, physics, bacteriology, sociology, psychology, and statistics. The problem of hygiene is to so present such facts as a basis for rational living that they may influence the manner of life of the individual and the group in a way to prevent unnecessary disease and premature death.

The field of hygiene may be divided for purposes of discussion into several parts. Definitions of terms: General hygiene; constructive hygiene; defensive hygiene; group hygiene; societal hygiene; individual hygiene.

Applied hygiene means the application of the scientific facts of hygiene to the individual, the group, and to society in general. Some other groupings of hygiene are sometimes used, such as: Personal hygiene; school hygiene; occupational hygiene; public hygiene; sanitary science.

D. EVIDENCE OF NEED FOR A HYGIENE PROGRAM

In considering the advisability of a hygiene program for the individual, group, or community, the student should consider and weigh carefully the evidence which is available to justify the expenditure of the time and money involved in the adoption of such a program. This evidence may be considered under three heads: (1) Statistical; (2) biological; (3) economic.

1. Statistical Evidence

The statistical evidence for a hygiene program is secured through a recording, tabulating, and studying of the births, deaths, and sicknesses occurring in the various political divisions of the United States. The reports upon which these statistics are based are secured by laws requiring such reports. For greater accuracy and to secure a more complete picture the Registration Areas for Births and Deaths have been established.

These births, deaths, and sicknesses are tabulated according to a definite standardized classification. International Classification of Causes of Death is revised every ten years. For comparative purposes, the tabulations of these reports are expressed in various rates: Birth rate, crude death rate, specific death rate, standardized or adjusted death rate, infant mortality rate.

Mortality Statistics. Diseases may be classified as Communicable and Non-communicable. A large percentage of Communicable diseases can be prevented. An analysis of the mortality tables for the Registration Area of the United States since 1900 indicates some interesting and significant changes in the relative numbers of deaths from various causes. Compare the 10 most frequent causes of death in United States during the year of 1900 with those of 1926. Other causes of death of importance are: Typhoid fever, diphtheria, diabetes, syphilis, and puerperal causes.

Life Tables. One of the most valuable evidences for a health program is found in the tables constructed showing the expectation of life for the average individual. They reveal a gradually lengthening span of life. These tables are available for most of the important countries of the world. They form the basis for establishing life insurance rates.

Morbidity Statistics. Only communicable and occupational diseases are required to be reported to the health authorities. Consequently we have no accurate record of sickness. Certain sickness surveys made by private organizations and the United States Public Health Service have given us valuable information.

Physical defects have been revealed by examination of school children and by the examination of the men for military service during the World War.

2. Biological Evidence

The biological evidence bearing upon a hygiene program can be found in the state of mental normality of our population. It raises the whole question of mental deficiency. We should consider the number and character of the various mental abnormalities, particularly as to their cause and prevention.

3. Economic Evidence

One of the ways of justifying a hygiene program is to calculate the cost of sickness and death based upon the actuarial values of human life. Certain diseases are now known to be preventable by definitely known methods. With this as a basis the value of a hygiene program can be ascertained in financial terms.

REFERENCES:

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* Required reading

II. BIOLOGICAL BASIS OF HYGIENE - THE CELL

A. HISTORICAL

1. Discoveries

Recognition of the cell was one of the great fundamental discoveries in science, for it offered the key to solution of every biological problem. William Robert Hooke (1668) first applied the term "cell" and is credited with its discovery.

Realization of its significance gradually became clearer to biologists, until Schleiden and Schwann formulated the so-called "cell theory" in 1838, a major step in scientific progress.

Fourteen years later (1852), Remak and Virchow demonstrated that living matter could come only from other living matter, a revolutionary conception at that time.

Advances in this field had awaited the development of the compound microscope. Lister is credited with the achievement in 1830.

2. The Microscope

Early stages of the development of the microscope lead back to ancient Ninevah, Greece, and Rome. Application of microscope for scientific purposes is associated with a few great names:

- a. Galileo--for his work with use of lenses (1609).
- b. Kircher--first to report living micro-organisms (1646).
- c. Van Leeuwenhoek--improvement of microscope (1632-1723).
- d. Hooke--first used term "cell". (1668).

Modern period of microscopy dates from 1830. With improvements in magnification, illumination, and control, it became a perfected instrument of scientific investigation.

3. Laboratory Technique

The development of laboratory technique was of equal importance with the improvement of the microscope. Hundreds of patient, devoted, and unknown laboratory workers devised the methods for fixing, hardening, sectioning, mounting, and staining specimens, and for their study in the living state.

B. THE UNITS OF LIFE

The mystery of life is bound up in minute bodies or particles we have come to call cells. The cell is the smallest unit of living matter. Our bodies may be resolved into a vast assembly of these units. Out of them, with their great variations in structure and function, are built all of the complex organs and systems of the human body. If we are to have an intelligent understanding of our bodies as a basis for sound constructive hygiene we should be familiar with:

- a. The anatomy or structure of the cell.
- b. The physiology or functions of the cell.

1. Anatomy of the Cell. The cell is of varying shape and size in accordance with its specialized function or location. It is bounded by a protoplasmic film called the plasma membrane and it may have a non-protoplasmic, true membrane or wall. Contained within the membrane are the two important parts of the cell--cytosome and nucleus.

a. Protoplasm is that peculiar material which possesses the properties the sum total of which is L-I-F-E. Chemically it is a complex mixture of proteins, lipoids or fatty bodies, carbohydrates, inorganic salts, and water. Physically it displays the properties of a complex colloidal system and behaves as a viscid liquid, sometimes colored, but often practically colorless. The cytosome and nucleus are composed of various kinds of protoplasm. "Cytoplasm" and "nucleoplasm" express this fact.

b. Cytosome

Within this protoplasm (cytoplasm) are a number of organized, visible structures some of which participate in cell division while others are either formed anew by each cell or are inclusion bodies only.

c. Nucleus is usually surrounded by the cytosome and varies in shape. It always contains a peculiar protein material known as chromatin believed to be the specialized vehicle which transmits hereditary characteristics.

(1) Chromosomes. Within the nucleus the tiny granules of chromatin are arranged in units called chromosomes. These are the units of mechanism for the transmission of life in accordance with the laws of heredity.

(2) Function and Number of Chromosomes. The cells of various species have a characteristic and fixed number and variety of chromosomes. This number is spoken of as "diploid." The human fertilized ovum has 48 and every resultant cell has 48 chromosomes.

When a new individual is to appear, the germ cell of each parent loses one half of its chromosomes and contributes the other half to the union. By this means heredity goes back through the ages to the beginning of life.

2. Physiology of Cells.

"Physiologically, we note that, in general, all cells exhibit (a) synthetic functions, that is, anabolic or constructive functions, that are performed chiefly by or because of the nucleus; and (b) dissociative functions, that is to say, destructive or katabolic functions that are performed chiefly by the cytoplasm. Thus the nucleus is chiefly an organ of growth, construction, repair, reproduction, and heredity. The cytoplasm is chiefly an organ of power-production and dynamic service through energy transformations."--Thomas A. Storey "Principles of Hygiene."

(Note: Some types of cells undergo division by a process known as amitosis, which does not concern us here.)

- REFERENCES: *Storey--Principles of Hygiene, Chaps. 3 and 4.
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*Kirkpatrick and Huettnner--Fundamentals of Health, Pp. 16-33.

* Required reading.

III. THE NEW INDIVIDUAL

Cell division and multiplication becomes of more immediate interest when its relationship to the production of a new human being is seen. Every individual begins his existence as a single cell. This cell is formed by the union of a haploid germ cell from the father and one from the mother, a process designated as fertilization.

A. FERTILIZATION

The spermatozoon (a mature haploid male germ cell) meets and fuses with an ovum (a mature haploid female germ cell). In this fusion of sperm and ovum a new individual comes into being, or, to word it differently, conception takes place. It occurs in the Fallopian tube leading from an ovary to the uterus (womb).

Pregnancy is established if this fertilized ovum passes along the Fallopian tube and attaches itself to the wall of the uterus.

B. CLEAVAGE OF THE EGG

The process of mitosis begins in this fertilized ovum and cell division proceeds with great rapidity. This is the commencement of a long series of such divisions, lasting the 280 days of pregnancy and resulting in an increase of five million per cent.

Continued division of cells results in the formation, first, of a solid sphere which rapidly develops cavities in its interior. By means of infoldings and buddings of the cell layers, the growing embryo takes shape. Evolution of the race is recapitulated in the course of embryogenic development.

C. OUTLINE OF HUMAN EMBRYOLOGY

1. Passage of dividing egg from Fallopian tube into uterus.
2. Implantation of beginning embryo in uterine wall.
3. Formation of chorion, an outer layer of cells arising from a portion of the egg. This structure becomes highly vascular and connects with the circulatory system of the growing embryo. There is no direct connection between the blood vessels of the mother and those of the embryo, but an exchange of nutrient materials from the mother and of wastes from the embryo takes place through projections on the surface of the chorion.