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EIGHTH ANNUAL CONGRESS

on

INDUSTRIAL HEALTH

Sponsored by

THE COUNCIL ON INDUSTRIAL HEALTH

AMERICAN MEDICAL ASSOCIATION

CLEVELAND AUDITORIUM

CLEVELAND, OHIO

JANUARY 5-6, 1948

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A D J O U R N M E N T

CHAIRMAN BROWN: We will now go on with the third paper by Dr. W. C. Hueper on the clinical aspects. Dr. Hueper is with the Warren Institute for Therapeutic Research, New York. Dr. Hueper!

... Dr. W. C. Hueper presented his paper ...

(Applause)

CHAIRMAN BROWN: There is, of course, no need to over-emphasize the importance of the papers of the Industrial Conference on the subject of occupational cancer. I am sure that many of you will want to ask questions, so we will go into the discussion on this topic.

DR. WILLARD MACHLE (New York): Mr. Chairman, I would like to just make one comment, that is, pulmonary legion caused by beryllium is a papillatoma. It does not in any way resemble a malignant or sort of a hematoid process. To put it in that category is in the realm of pure projection and is contrary to the evaluation by every pathologist who has seen the lesion.

CHAIRMAN BROWN: Any comment?

DR. SALTER: Could I ask Dr. Machle to comment also on asbestos? I would like to hear what Dr. Machle thinks about asbestos as a carcinogenic agent in the lungs.

DR. MACHLE: My experience is too limited to offer any comment that would be valuable. I would have to rely on the

comments of others which I don't think is in keeping with a subject as important as this.

CHAIRMAN BROWN: Other comments are invited. The subject has so many angles.

DR. RUFUS P. McCORMICK (Goodrich, Cleveland): I would like to inquire about this leukemic reaction of benzol. Are you distinguishing that from the aplastic anemia or are you calling it the same thing?

DR. HUEPER: First I will answer Dr. Machle. I used the same expression^{as} Dr. Gardner, the late Dr. Gardner who had probably a very great experience in it, and he characterized these lesions a sarcomatoid, described in the literature. I, personally, just say I have not seen one, so what I have said is citing Dr. Gardner.

Concerning the benzol leukemia, naturally pachyemia and leukemia are different. They are at opposite ends of the reaction scale. In a pachyemia it is a destruction of the hemolytic tissue. The tissue just doesn't produce any cells, neither red cells nor white cells. In leukemia you have an overproduction of white cells. It is a hypoplasia which has reached the stage of a maglignant growth.

CHAIRMAN BROWN: Any other comments?

DR. ROUNTREE: (Louisville): You mentioned a

while ago that ultraviolet light and tar may cause cancer. In the case of siriasis, what about the treatment of siriasis? That is one of the treatments?

DR. HUEPER: I think there is a bundant evidence that ultraviolet rays when applied to the proper person and in the proper amounts will produce cancer of the skin. If you study the regional distribution of cancer of the skin in the United States, in Australia, in the Argentine, in southern France, you will find everywhere a highly increased incidence of cancer of the skin of the exposed parts, which is attributable in all probability and taken together with experimental evidence in animals, that is due to the ultraviolet part of the solar spectrum.

Now the treatment of siriasis with tar, the medicinal tar is usually a wood tar and not a carbon tar or mineral-oil tar. While there are a few cases reported in which the use of medicinal tar of alleged wood origin has caused cancer in men, there are very few indeed. So if we miss in the siriasis, the carcinogenic reaction upon the application of tar is probably due to that affect. I wish to point out the medicinal treatment of siriasis with arsenic is due to a large number of medicinal arsenic cancers.

CHAIRMAN BROWN: Further questions?

DR. MACHLE (New York): I would like to clear up this sarcomatoid and sarcoid. . Dr. Gardner never formally published anything on experiments which dealt with the ultraviolet.

When soluble beryllium compound is injected into the rabbits they uniformly after a period of 5 to 18 months produce sarcoma. The doses were one gram, mean particle size was three microns. That would be comparable to 70 gram dose intravenously to man. The tumors incidentally were tried on many other species of animals. No tumors were created and produced in other species.

To come back to the lung lesion which occurs with some regularity in man, the first cases that were uncovered were erroneously diagnosed as sarcoid, having in mind the multiple name "sarcoid" which for many years was thought to be an analogous reaction to tuberculosis and only recently has come to be accepted by some as a kind of or a family of the granulomatous reaction of the lung which can be produced by the tubercular bacilli and by other things and occurs sporadically in the population, and were usually disabling disease.

The only terminology I have heard applied to the beryllium lung was that of sarcoid and it is really confused with sarcomatoid and some pathologists consider it the same family of lesion but not all.

I would like to avoid the implication that there has been established any etiologic relationship between beryllium and lung tumor until such relationship has clearly been set up. There have been many thousands of men, there have been 54,000 man-years in one plant that beryllium has handled with periodic x-ray with no occurrence of anything but an occasional case of lung granuloma from beryllium. Someone may not accept as fact the occurrence of the granuloma being evidence of the pre-cancerous lesion. You have just a case like most of you have of a variety of other lung conditions caused by other things.

DR. SALTER: I should like to endorse everything Dr. Machle has said and to again repeat that in all our experimental evidence relative to the inhalation of substances that produce lesions within the lung we must not fail to remember that on the formulation of malignancies within the pulmonary tissues, that references to beryllium, although as Dr. Machle has said, it is introduced intravenous injection only in one species of animals. However, we have not yet seen any single experimental case where neoplasms have developed either within the lung or in any other part of the body.

Reference has been made also here to carcinogenic ability of other dusts and I think reference was made particularly to asbestos. Some few years ago and now about seven years, we

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reviewed all of the current literature relative to meconiosis and by that I mean all cases showing any inhalation of dust. We get biological activity such as silica or asbestos or diatomaceous earth or any of those, including also the Schneeberg mine cases, where there has been radio active substances, and we have been unable to demonstrate the fact that the inhalation of these pneumocotiotic agents have produced a malignancy of the pulmonary tissue.

There is a question in our minds relative to asbestos, but again we have failed to demonstrate a correlation between pulmonary neoplasms and inhalation of asbestos material.

Likewise, in review of clinical material we have been unable to show that there is a significant increase in the pulmonary malignancy in those individuals exposed to asbestos. So I should be very cautious in assigning to any dust a carcinogenic property unless we can prove it beyond doubt.

DR. HUEPER: You discussed asbestos. There are a total of 23 cases of asbestos cancer on record from various countries, - England, Germany, and the United States. That compared with the number of autopsies performed makes around 50 per cent. I think that is an increased incidence. Moreover, in quite recent experimental work done in Germany it has shown not relation of asbestos dust to mice produces cancer of the

lung and interestingly enough, not an alveolar cancer of the lung as normally but carcinogenic cancer, which is very suspicious of the origin.

CHAIRMAN BROWN: Any further comment?

DR. McCORMICK (Goodyear): Yes. I would still like to inquire what evidence there is for this leukemia and also for the keloid reaction of benzol. Working with rubber, I don't get the keloid reaction. One of you made the statement that it precludes keloids.

DR. HUEPER: No, leukemoids.

DR. McCORMICK: I am sorry.

DR. MACHLE: Is there statistical proof that the leukemia rate is higher in men than in other people?

DR. HUEPER: There is evidence that is rather recent and the evidence is based on the observation of leukemic reactions in workers exposed to benzol over prolonged period of time, while at the same time workers working in the same establishment showed plastic anemia reactions. Moreover, some of the workers did not show leukemic reaction but simple leukosis.

Boltz has published something on that; others have, too.

DR. MACHLE: I would like to make one point. A discussion of leukemoid action does not belong in the discussion.

Leukemoid action is a more or less normal type of reaction. It may occur after reaction, not after a number of insults. All it means is that you get the appearance of young forms in the blood in abnormal distribution. Unless that persists and is associated with permanent pathologic changes in the bone tissues and permanently as leukemia, I do not believe we can consider it properly with the malignant tumor.

MR. HUEPER: Well, we can get precancerous stage. I consider a leukemoid reaction under those particular conditions of exposure a precancerous hypoplastic reaction and if we consider carcinogens, they produce most of the benign tumors and hyperplasias and benign reactions, and moreover are malignant reactions. Simply to state that because a certain reaction occurs also under other conditions in this precancer reaction I would not accept as right. The natural course of events shows quite often in occupational cancer that it will be hypoplastic reactions, that there are reactions of benign type like warts, papillomas or let's say sarcoids, and then we get outright malignant tumors, cancers, leukemias.

CHAIRMAN BROWN: Any further comments, ladies and gentlemen? Any further questions? Any discussion?

DR. SALTER: I might just add that the leukemic end result of bensol exposure has been destroyed pretty well by

Tracy Mallory and Francis Hunter about 10 years ago. One case I remember, who sat for a photographer, who each night mounted his pictures, using a tube of benzol containing muscilage and another case was that of the upholsterer who denied any exposure of benzol until 18 hours before he died when he called the interne over and said, "Doctor, I thought I should tell you I have been lying here thinking. Each night I go back to my room in my shop when the other workmen are gone and I make my formula up. It contains 20 per cent benzol." Those two cases popped into my head out of that Mallory series. They were subtle, long-continued, mild exposures as compared with the overwhelming heavy exposure which produces a plastic anemia and there is the ironical condition there. The fellow who is often careless has a chance to live because he gets so sick first he has to quit, whereas the fellow who is only a little careless may be wounded.

DR. LAMB (Broad Oak): The question of estrogens was mentioned by Dr. Salter. This isn't especially industrial. In injecting estrogens in women, it has been known to cause carcinoma in woman.

DR. SALTER: Of course, that is a very hot subject at the present time. The best answer is I don't know. In animals, certainly one can precipitate cancer of the breast and cancer

of the uterus by the use of estrogen. A little estrogen doesn't do, nor does a lot of estrogen do. Heavy estrogen suppresses microtic. One must have precisely the right range of concentration in order to produce the effect. In the cosmetic industry that thing raised a great fuss, the food and health and all the rest, because they didn't have the evidence. I think the answer is that we don't have the evidence in hand. The evidence is strong in animals, particularly in pedigreed mice, that are cancer susceptible. That I think is as far as I can go. Perhaps Dr. Hueper can pick up from there.

DR. HUEPER: There is an industrial aspect to that. The English reported recently, that is in the last two or three years, in their sebestrol workers they observed hyperplasia of the breast in males, and I understand our American factories have the same trouble and have our type accordingly.

We may see after a few years cancer of the male breast if estrogen is carcinogenic and then we would have definite proof because naturally, cancer of the breast in male is relatively rare and we would have the counterpart to Fammil's experience with male mice, which usually, naturally, don't develop cancer of the breast, who gave them estrogens and they developed cancer of the breast under the stimulus of the estrogen. That would be an analogous case. Whether it will develop or not

develop, I don't know but it is worth while watching.

CHAIRMAN BROWN: That is a very interesting discussion and questions.

We have arrived at the close of the session. I would like to stress the appreciation of the Council for these valuable papers of Dr. Salter and Dr. Hueper.

... The session adjourned at 4:00 o'clock ...

ADJOURNMENT

Here follow the

Remainder of the
conference proceedings,
starting at page 1
through 254.

MONDAY MORNING SESSION

January 5, 1948

The first session of the Eighth Annual Congress on Industrial Health sponsored by the Council on Industrial Health, American Medical Association, convened at 10:15 o'clock, a.m., in the Ballroom of the Cleveland Auditorium, Cleveland, Ohio. Dr. George F. Sykes presiding.

CHAIRMAN SYKES: It is with a great deal of pleasure, as chairman of the local sponsoring committee in Cleveland, sponsoring this meeting, that I call this Eighth Annual Congress to order.

This meeting is being sponsored, locally, by the Academy of Medicine, of Cleveland, and also by the Cleveland Chamber of Commerce. Our committee has included representatives of allied organizations such as the Industrial Nurses Association, Public Health Officials of the County and City, The Public Safety Officials, Cleveland Safety Council, Ohio Safety Council, and various other organizations interested in the field of Industrial Medicine.

During the course of these meetings some of these organizations will be represented by their members and we welcome them to this meeting.

Our first speaker today needs no introduction from

me. He is a very hard-working and genial gentleman from Chicago. He is the Secretary of the Council on Industrial Health and in his travels throughout the country I am sure you have all become acquainted with him.

It is with a great deal of pleasure that I now call on Dr. Carl M. Peterson, Secretary of the Council on Industrial Health.

DR. PETERSON: Dr. Sykes and friends: It has been our custom, at these Congresses, to present a short account of significant happenings since last we convened and by so doing to try to chart a course for the immediate period ahead.

This has usually been the responsibility of the Chairman of the Council, but since we have been without a Chairman for the last several months it has fallen to mylot to fill in in this capacity at this time.

For those of you who are attending the Congress for the first time, it might be well to note that the Council on Industrial Health is a standing committee of the Board of Trustees of the American Medical Association. It is our function to assimilate all information relating to the health of employed groups, to make this information widely available to the profession, and to interpret the objectives of industrial health, not only in the medicines but also in relation to all other

aspects of community medical hospital and health services.

This particular meeting is something of an experiment. As you know, the interim sessions of the House of Delegates are taking place in Cleveland at this same time, and on Wednesday and Thursday of this week there will be the interim scientific sessions of the Council on Scientific Assembly. These will all be in this building. Also, as a feature of the interim sessions and of this Congress, you have probably noticed both the commercial and scientific exhibits on the lower floors.

Now, several events stand out in my mind as milestones in industrial medical progress during the past year. I think one, and probably the most important, is the approval of residency and fellowships in occupational medicine by the Council on Medical Education in the American Medical Association.

I don't mean to stress the importance of that approval acceptance to physicians in the audience. Others, of course, who are not familiar with the sequential nature of medical education will need to be told that residencies are the essential framework for training in limited fields in medicine, and over a longer or shorter period of training one qualifies for a specialty in medicine.

Now, this first step, I may say, has been an imperfect one since there are already some questions which have arisen

about the actual implementation of this type of training under our current approval of programs. It will be necessary, then, for us to assimilate a considerable body of experience, and adjustments will have to be made from time to time in the type and character of the training, itself, and the facilities necessary for that kind of training.

In its simplest form it will supply a year of guidance and experience in occupational medicine. Under the current program we shall use hospital laboratories and plant facilities for the provision of that kind of training. In its more expanded form it becomes the basis for a certifying program in conformity with practices in other specialty fields.

The second in chronology, but not in importance, is the revised United Mine Workers of America Welfare and Retirement Fund, and I speak from fairly close association with that activity. I think the important development in that section is the appointment of a Medical Advisory Board. No other comparable group has a more important assignment, and, certainly, no other group is being scrutinized more closely or is being looked to for greater medical leadership.

One can be sure that the patterns of medical service laid down here are representative of joint planning by labor and management. Medicine will find many imitators, and here is

a fruitful opportunity to test the practicability of bridging the gaps between curative and occupational medicine which we, in industrial health, have so long advocated.

Finally, it seems to many of us that the post-war period, and I assume we are still in the post-war period, represents a transition. This is a time when both individuals and organizations are seeking to restate objectives, to re-evaluate techniques and procedures, and to re-establish our sense of professional responsibility and solidarity.

There is so much to do and so many people are trying to do the same thing. I can, with confidence, assure you that the Council on Industrial Health is constantly aware of the necessity of over-all blueprinting and planning. Given the right sense of direction I feel, and I do not hesitate to predict, that occupational health will be second to no other field of medicine in importance economically, clinically, or scientifically.

This sense of transition is all the more keenly felt on our part because of our recent change in leadership. Dr. Stanley Sieger, who has been Chairman of the Council on Industrial Health during our entire existence, has found it necessary to retire.

He came to us from Wisconsin where he had distinguished

himself as a surgeon, as an eminent medical leader, and as a statesman. He is singularly endowed with those attributes of organization and genius which characterize the true medical administrator. Almost every phase of our current activity is an expression of his original conception of our real functions. I am happy to report that he is to hold the position of member emeritus on the Council on Industrial Health, and from that point of vantage we may expect to profit from his wide experience and wise counsel for many years to come.

This, then, gives me the opportunity to introduce our new Chairman. He is known to all of you. His career recapitulates the growth of Industrial Health from its meager beginning to its gradual emergence as a specialty in its own right.

I take great pleasure and pride in calling on Dr. Anthony J. Lanza as the new Chairman of the Council on Industrial Health in the American Medical Society. (Applause)

DR. A. J. LANZA: Mr. Chairman, Dr. Peterson, ladies and gentlemen: I am deeply sensible of not only the honor but of the opportunities and responsibilities that go with the Chairmanship of the Council.

I can say that all the members of the Council appreciate the fact that at this time the developments of the

industrial medicines, the applications of the principles of preventative medicine to the industrial scene, are second in importance to no other phase of medicine today. We are confident that we will keep pace with both these responsibilities and the opportunities that they represent. (Applause)

CHAIRMAN SYKES: I now take pleasure in calling on Dr. Arthur J. Vorwald who will present the first scientific paper of the morning. Dr. Vorwald is from Saranac Lake, New York, and he is the Director of Research at the Edward L. Trudeau Foundation. He will speak to you on the Essential Correlations Between Medicine and Industrial Research.

...Dr. Vorwald read his prepared paper...

I will now turn the Chair over to Dr. Lanza.

DR. LANZA: Ladies and gentlemen: For a number of years there has been conducted, in New York City, a remarkable, a unique, and also a pioneering enterprise in Industrial Medicine and Industrial Health. This enterprise is known as the Union Health Center.

This organization has been going along quietly, inconspicuously, and very successfully. It owes its inception largely, I think, to its first Medical Director, Dr. George Price, father of the present Medical Director, and to the vision and unselfishness of your next speaker, Mr. Max Meyer.

Mr. Meyer, who is Chairman of the Board of Fashion Institute of Technology and Design, and Central High School of Needle Trades, and a member of the New York State Industrial Council, has been one of the mainsprings and supporters of the Union Health Center about which you will now hear.

It gives me great pleasure, ladies and gentlemen, to introduce to you, now, Mr. Max Meyer of New York City.

...Mr. Meyer read his prepared paper...

CHAIRMAN SYKES: I have had the good fortune to listen to a very stirring address.

The next speaker on this same list, Mr. Frederick F. Umhey, the Executive Secretary of the International Ladies' Garment Workers' Union, will tell you something about the machinery and methods of this organization.

It is my pleasure, ladies and gentlemen, to introduce to you Mr. Umhey.

...Mr. Umhey read his prepared paper...

We now come to the third paper in this presentation of the health work of the International Ladies' Garment Workers' Union.

I now introduce to you one of our fellow industrial physicians who is well-known to all of you, Dr. Leo Price.

...Dr. Price read his prepared paper...

DR. PRICE: I have a few slides to show you. First slide, please.

This slide shows the building that was originally constructed for manufacturing in the garment industry. This building was originally constructed for the manufacturing of garments and most of the lofts were occupied by manufacturers.

The Union Health Center, after it got to a point where it gave thirty thousand services a year, moved to this twenty-fifth floor and it took about twelve thousand square feet. We had to expand very rapidly and within a couple of years another half floor was taken.

As you have already heard, after the Health and Welfare Funds were acquired, through collective bargaining, the demand for services increased greatly. The only way in which the expansion program was possible was through the purchase of this building. We are now located on the five upper floors, and we have the entire ground floor.

In the lobby we take care of the pharmacy, allergy departments, and reception area, where we have three or four hundred patients within a three-hour period.

We also have our appointment-system operated there, and on the other side, there, construction is going on now for a mass radiographic survey space where we intend to examine all

the new patients, the post sick list cases, with seven millimeter film.

Next slide, please. This is one of the recently constructed floors showing the lobby where the patients are being received and sent on to the registration group which you see in the far corner.

There are about fourteen examining rooms on one side of this floor, and twenty physiotherapeutic rooms on the other side.

Next slide, please. This is the lobby reception room where the patients are waiting for allergy treatment. The pharmacy, there, takes care of something like six to eight thousand prescriptions a month.

Now that medical care is no longer restricted to the individual's ability to pay, certain shifts in emphasis have been noticed in the character of the work done. Between 1942 and 1947 a 483% increase was noted in the number of diagnostic services performed at the Center.

Just to give you an idea of the amount of service increases we are doing, - at the present time we are doing about sixty thousand, and in the mental specialties about eighty thousand, in the diagnostic about fifty thousand services.

Twelve thousand x-rays are taken annually, and this

is very hard to keep down. I predict, without any question, that it will be eighteen thousand next year.

Laboratory services, not counting urine, thirty thousand. Electrocardiograms, about thirty-two hundred. Physiotherapy, as I already mentioned, has had an unprecedented increase. In this we have more than tripled the number of services done a year.

I think we will just be limited to the number of rooms we have available.

Superannuated workers who have all sorts of arthritis and need therapy, - that has gone up. We have physiotherapy, injection therapy, sick benefits, and general medicine.

Sick benefits have increased considerably because a great many more youths have had the opportunity to initiate sickness insurance programs which they did not have before.

Next slide, please. That shows the average number of medical visits per thousand members, and it shows you the growth from 1942 to 1943, - a growth of four hundred services per thousand members.

In 1944, when we got under-way with some attempt at an expansion program, it increased again. Just notice that now, in 1947, we have eleven hundred and seventy-two services per thousand members.

That, in itself, may not look great, but fortunately we are restricted to our facilities and the fact that there are a hundred and ninety thousand workers that have it, some free and some have to pay for it, all has an influence.

I can tell you about one unlimited group of three thousand workers where their minimum age is somewhere around fifty-seven years of age. They have unlimited medical services and they came in with a percentage of something like twenty-five hundred services per thousand. We have had as many as eight services per patient.

Next slide, please. This is a glance down the hall in the physiotherapy room.

Next slide, please. This is one of the tile hydrotherapeutic rooms. This service is being given from early morning until late at night.

Next slide. We have not yet begun to operate our therapeutic x-ray in any great way. The facilities are all there and it is just a matter of organization before we get started. This has been a new departure. We have never done any therapeutic x-ray work before, limiting ourselves to x-ray diagnosis.

Next slide. This is one of the three general units which does the work. We have, in addition, the optical room in

the mass chest x-ray unit downstairs, and we are now contemplating a special GI unit because of the great demand in GI service.

Next slide. This is a corner of the neurology room where we run a team of about five neurologists on Saturdays. They work together with a consultant neurologist who comes in and makes the recommendations to surgery. Among the over-age group this clinic is very popular and we are running it practically every night in the week.

Next slide. This is a corner of the surgery room which has just been completed. We do a certain amount of minor surgery there, but we also use it for the patients that come in for the consulting surgeon's advice. He recommends surgery by the medical departments. (Applause)

CHAIRMAN SYKES: Gentlemen, we are very grateful to Dr. Vorwald and to the three speakers who came from New York to tell us about the Union Health Center.

I am sure that this has been a most instructive and valuable program for all of us.

The meeting stands adjourned.

...The meeting recessed at 12:30 o'clock, p.m...

R E C E S S E D

MONDAY AFTERNOON SESSION

January 5, 1948

The second session of the Council on Industrial Health convened at 2:15 o'clock, p.m., in Club Room B of the Cleveland Auditorium, Cleveland, Ohio. Dr. H. P. Worstell presiding.

Subject: Conference on Administrative Practices.

CHAIRMAN WORSTELL: Ladies and gentlemen, our first speaker this afternoon is Dr. Kenneth C. Peacock, of New York, who will speak on "Plans for Small Plant Medical Services in New York."

...Dr. Peacock read his prepared paper...

In order to conserve time I am going to ask that any questions or discussions of this and the following paper be deferred until after the next speaker. At that time I am sure either speaker would be glad to answer any questions that you may have, or elaborate further upon the things they have discussed.

Our second paper this afternoon is that of "Experience in Health Education in Industry," by Dr. H. M. Harrison of Toronto, Canada.

DR. H. M. HARRISON: Mr. Chairman, ladies and gentlemen: Before I start I think it would be advisable to tell you what the organization is that I work for.

We are a large baking concern manufacturing biscuits, candy, bread, and yeast. We have about five thousand employees scattered throughout nineteen different factories, large and small.

The experiences I give you today are just from our two Toronto plants, one plant having five hundred employees and the other four hundred employees.

Address by Dr. Harold M. Harrison, Medical Director
for George Weston Limited, Toronto, Canada.

Subject: Experiences in Health Education in Industry.

Health education in Industry is of comparatively recent origin. It is only in the last decade that it has become universally recognized as an essential part of a program of medical service in industry.

Recently I had occasion to look through a monograph on Industrial Medicine published in 1935. In all its three hundred pages there was nothing relating to education. In the index "health" and "education" were absent. I just mention this because when one is dealing with part of a program which is very much in its adolescence it allows one to take certain liberties in discussing the subject. Therefore, you have my excuses if I do not cover the subject in what you might feel to be an orthodox manner.

Now, education is just throwing light on knowledge which is available. This means teaching the entire industrial group or just a single employee.

Any discussion on health education should be prefaced by a definition of health. One of our standard dictionaries defines health as "Absence of disease or infirmity"; another,

"That condition of the body in which all functions are performed normally." To the average layman that might imply just physical health. The definition set out in the constitution of the World Health Organization more clearly sets out, I think, what we understand as health. "Health is a state of complete physical, social, and mental well-being, and not merely the absence of disease or infirmity."

This implies a broad outlook on health. Note that social and mental health are given equal prominence with physical. Now, there never was a time when we could be as optimistic about the future of preventive and curative medicine as we are today. There never was a time in the history of civilization when we needed more enlightenment on social and mental health. Technical sciences have made tremendous advances, while advance in social science has remained stationary or has gone backward.

There are more maladjusted, unhappy people today than there ever were. Only a fraction of these maladjustments reach our mental institutions which are crowded to overflowing. I quote from a recent article by Elton Mayo: "We are technically competent as no other age in history has been, and we combine with this utter social incompetence."

Industry today has developed technical skill in two directions. One line is upward, based on scientific and technical

knowledge. The other direction is downward. The boy or girl entering a factory from a school requires no skill. The need for skill has drifted downwards and he is now just a tender of machines, not a mechanic. However admirable the former, it is now my place to discuss the desirability of the latter. Suffice it to say, - that is the situation and we have to make it work. The pride in workmanship no longer remains and this loss of a sense of achievement has developed a mental inferiority which is having serious repercussions on our community life.

With this as a background we have patterned our educational program in our own industry. As I go on you will very soon become aware of the fact that ours is a personal service. Doctor C. O. Sappington in "Essentials of Industrial Health" states: "The dissemination of health information is an exceedingly difficult problem and full of pitfalls. One always has to answer two questions: 'How much shall you tell?' and 'How shall you tell it?' It seems quite clear that one cannot describe in a small pamphlet, booklet, or poster the entire number of steps in reasoning which brings one to the conclusion that certain things are, in general, good for a person and certain other things are not." As I understand that paragraph it indicates the need for personal health information.

We have two objectives, and the first is "Education

directed towards giving the employee a healthy mind," and the second is "A healthy body."

I have no excuse to offer for putting mental health first. In my experience I have seen more loss of production from unhealthy minds than I have from unhealthy bodies. These objectives are closely knit together, and the effort expended will necessarily affect both mind and body in many cases. However, there is a difference, in that the unhealthy body is more likely to have a maladjusted mental state, whereas a healthy body will less frequently have an unhealthy mind.

Now, where do we start to correct these conditions? The first opportunity is at the pre-employment examination and you must have the background of the employee. For this purpose we fill out a social survey blank.

May I have the first slide, please? We fill out this blank: Marital and Family Status, Environment, Housing, Education, Outside Interests, General Appearance, Other Comments, and the Social Service Index. I don't know what you would call that over here. In Canada it is the central body you would write to to get the information on the employee if you need it.

A nurse does not sit down with this paper in front of her and ask questions. That would be too obvious. Our nurses do blood pressure, weight, height, eyes, hemoglobin,

Wasserman, and take the personal and family history. These are all filled out before I examine the employee later in the day. There is ample opportunity to carry on a conversation and obtain the information, which is put down on the blank after the employee leaves.

When the applicant comes for his examination this survey is presented to me along with the partially completed examination form. This information is valuable right now but invaluable later on when the employee consults me for some complaint. We must remember that more than fifty percent of the visits to the medical center have little or no relation to any organic or infective condition.

The success of any program is shown in the use that is made of your medical department, and in small industry, where you have a part-time physician, the nurse plays the major role in popularizing your department.

I am very fortunate in having two well-trained Public Health Nurses who are definitely socially minded and anxious to help. Our personnel are more interested in the maladjusted individual than in any hypertensive or cardiac case.

I have one man, at present, who has a blood pressure of 280/160. He makes pies and does a good job. He is seen by his own family doctor at regular intervals, and I check him every

two months. He is properly placed and everything has been done for him.

Just beside him is a woman. She has two boys in the reformatory and one daughter who gives her a lot of worry. We are much more interested in the woman than in the man. The woman comes to see us every month or so and consults us about her problems. I think, and very definitely, that emphasis should be placed on trying to help the mentally upset in industry. I am certain that this type of individual can do more to keep down production than the properly placed organic case.

When I speak of the maladjusted employee I am not referring to the psychotic, manic depressive, etc., which as soon as recognized should get specialist attention. The one we can help is the psychological case, harried by insecurity, worry, fear, etc.

In our organization we have, as nearly as possible, eliminated the sense of insecurity by hospitalization, sick benefit, pension plan, etc. In seventeen years not one of our employees has been laid off for want of work.

Now, these employees with a worry, anxiety or fear complex are handled by our medical department which tries to train these people how to live with themselves and others. Leaving out your psychosis, any physician or nurse who has

practiced a few years has picked up enough psychology to handle most of these people. After all, the psychology required to deal with these people and their problems is mostly common sense put into action.

You all know that training them takes time and patience, and that the ability to be a good listener, on the part of the doctor, is the first requisite.

I would just like to tell you a little story. One day, about a year ago, I went to the office in the afternoon and the nurse said to me, "Doctor, I want you to see George Matullbut. George has been coming down to me quite frequently in the last two or three months and he has something on his mind. He has been having headaches, but I know he has nothing the matter with him physically. I can't seem to get it out of him."

I said, "Bring George in and give me half an hour."

He came down and I asked him a couple of leading questions. I first, of course, examined him. You have to do that before you talk to these nervous people. Well, I asked him a few questions, after I had examined him, and all of a sudden he started to talk. I think that he went over all the hells of society that anybody could imagine. He took twenty minutes to do it, as fast as he could bubble it out, and I just

sat there and listened.

When he paused toward the end, he was pretty nearly through, I just looked at him and I said, "George, funny, isn't it, everybody is wrong except you."

Well, he looked at me for half a minute and then he jumped up, shook hands with me and thanked me for what I had done which wasn't anything but sit there and listen to him. He never came back to the medical department, but four months later the Personnel Department promoted him to assistant foreman in his department.

Now, of course, you can't all get satisfactory results with that, - that is just an illustration which I probably couldn't repeat in fifteen or twenty years' experience. But, it shows what can be done by listening to some of these people.

The idea in large industry is the use of a psychiatrist; however, small industry will not support such an addition to the pay roll. The time is coming when physicians in small industry will have to have more knowledge of this branch of medicine. I have just stated a problem for which I have no solution except the handling of each case on its merits. As I said before, we try to teach these people to live with themselves and others.

Now, employees should be encouraged to get more

education, to improve their position in life. They should be urged to take up hobbies, get outside interests. Last September we tried a new idea. We contacted the various technical schools and the University of Toronto and obtained their winter programs for night classes. A notice was put up on the bulletin boards, inviting the employees to discuss these courses with the nurse. Quite a number came in and signed up for night classes. I have a feeling that this program will develop and that it should prove of definite value.

About the first of May, every year, I send a mimeographed letter, signed by myself, to every employee. It is mailed to his home address and deals with summer hazards. It deals with sunburn, poison ivy, what to do when the canoe upsets, advises about swimming, etc. We used to have many calls for sunburn on Monday mornings. We buy a two ounce jar of sunburn cream and sell it to the employee at cost. It is the same cream your army used in the South Pacific (10% Salol in cold cream). It has practically eliminated the Monday morning sunburn.

During the year we send a letter to the housewife or mother, as the case may be, dealing with the economics of buying food, the cooking of vegetables, and a great deal of nutritional advice. These letters are worded so that a dictionary is not required to understand them. These are signed by the nurse.

We feel sure, from comments heard around the factories, that these communications are appreciated.

Our letters are always personal, addressed to the employee or his wife, and mailed to the home.

I know it is not necessary to point out to you the importance of nutrition in the working population. However, to add emphasis to what I have to say, and also to provide you with convincing arguments, if they are ever required, I should like to quote from a recent address by the late Commissioner of Public Health for the State of Michigan, Dr. S. M. DeKline: "I venture the opinion that, when and if we learn to apply the knowledge we now have about nutrition, deaths from many of the degenerative diseases (including heart) will go down. The literature which has accumulated on the subject of nutrition clearly indicates a very close relation of food to health and disease. Carry with you the conviction that the science of nutrition is of paramount importance. It holds the key, I believe, to the cause of many forms of illness."

I should also like to refer you to the work of Dr. Weston Price, of this city, whose book "Nutrition and Physical Degeneration" is, in my opinion, the most worth while and readable book on the subject that it has been my privilege to read. The work of Price, and also of Robert McCarrison, show that

primitive and so-called uncivilized races can teach us a lot.

This problem of teaching nutrition to the workers is one to which I have given a good deal of thought. The more you think about it the less sure you are that any of us has a satisfactory solution. However, it is only by relating our experiences that we will eventually get an ideal nutritional program for industry. I must confess to a failure, and that is in getting results from stuffers, posters, etc.

We inserted lunch cards, breakfast cards, and balanced diets in pay envelopes. Did you ever go out the employees' entrance after they receive these carefully thought out stuffers? Well, we went out half an hour after pay time and the street was littered with balanced breakfasts, etc. We tried posters for a year or so, the best we could get on nutrition, and we still had little or no encouragement.

Of course we asked the employees, when they came to the medical center, what they ate. The replies were not satisfactory. The obese individuals are the worst, - they all seem to be so discriminating, so many never eat breakfast. That seems, to them, to be a real achievement.

One day a short chap, aged twenty-one, weighing 265 pounds, came to me to get advice on how to lose weight. I inquired regarding his diet and received the usual reply. In

desperation I handed him a paper and told him to write down everything he ate or drank, with the exception of water, for three days. Then I told him to come back and we would discuss the matter further. He did as I asked, and to my surprise I found he was taking five quarts of milk a day. He was just a lump of grease made up mostly of butter fat. That experience taught me something. Then and there I decided to complete three-day diet surveys on all employees.

May I have the next slide, please? Now, look at the top. The top tells you what we have done. A lot of talk has been broadcast and printed about diet and nutrition. It all sounds so complicated, but it really is quite simple to have a properly balanced diet.

The top is put in the employees' pay envelope and the bottom is given to the employers.

This three day diet survey started in our two Toronto plants, and it is now incorporated in our health program for all plants, and it is even a part of our periodic health examination to those not in touch with the medical center. The facts I give you are just from the two plants which I personally supervise.

It might be of interest to you to know, in a general way, what types of diets we discovered. First, we have the fat

girl who prides herself that she never touches potatoes, - that is fairly general in this group. Her breakfast consists of porridge or cornflakes and a cup of coffee. At relief she has a couple of sweet biscuits. For lunch, getting rather hungry by now, a couple of chocolate bars and more pop, and possibly some ice cream. For dinner she has macaroni, meat, pie, and cake. At bedtime, cake, sandwiches made with white bread. This diet, as you see, is hardly a reducing diet. It is a very fortunate thing if this girl has any skin blemish, particularly on her face. Draw this to her attention and you find her much more co-operative regarding a proper diet. You can hardly consider that as a reducing diet, but I have seen dozens and dozens who claim they don't take potatoes and they consider themselves on the way to getting a streamlined figure.

Then we have the person who eats everything. This type usually fills up on hamburgers, doughnuts, soft drinks, sandwiches, tea, coffee, potatoes, and pie.

I have already referred to the fat person who eats nothing. Occasionally this type gets going on the little they eat. I usually succeed in stopping this flow of information by handing him the diet survey. In my opinion there are very few fat people who do not eat more than they need. There may be some glandular cases, but in my experience they are mostly

in sideshows, certainly not in industry.

These are just examples of types which are very common. They are not influenced by us in any way.

We have no nutritional posters in any of our factories, either in the plants or cafeterias. If we had such, it is not unlikely that the employee might put down what he or she thought we wanted. Some thousands of these surveys have been done and I think the figures I give you represent, fairly accurately, a cross section of the industrial diet as we have it in Toronto.

Not four percent of the diets were considered adequate and balanced. Fourteen percent of the diets lacked sufficient Proteins. Then we jump up to forty percent that lacked sufficient Vitamin C; forty-two percent lacked Vitamin A; fifty-six percent lacked sufficient Iron. Only forty-seven percent didn't have enough Vitamin B, and seventy percent lacked sufficient calcium.

Now, this information was gotten from our initial diet survey. Of course, we went back, after that survey, and did them all. We do them all, now, on the present employment examination.

One thing I want to make quite clear is that I am fully aware that this is not a scientific nutritional analysis. In my opinion nutrition is the most fertile field for medical

research there is today. There is a tremendous amount of research going on now, and such a lot to be determined, that if you wait until you get a scientific basis for your work the majority of us will not be here.

Our method is to try to give the employees an optimal nutrition as opposed to usual nutrition.

To properly evaluate the results is quite unsatisfactory but I have a few figures which may have some bearing. We have a cafeteria, supervised by an excellent dietitian, where a dinner is served at noon. Today we serve twice the amount of whole wheat bread and our sale of milk is three hundred percent, - this is since five years ago.

Hours lost in our Toronto plants, during the first half of 1947, were 5.82%. This takes in the chap whose alarm clock failed to go off, weddings, funerals, as well as illness. Five years ago the hours lost were more than double that figure.

The difficulty with figures is that so many factors enter into the picture, - your whole health program, not just nutrition, working conditions improved, etc.

However, I want to say that we are satisfied. The majority of our employees have improved their diets and health since coming under our observation, - our attempt at guidance.

In conclusion I would like to say that it is my

conviction that the health department is of great service to industry. Serious attention to individual psychic upsets; teaching people proper nutrition and good health habits are, in my opinion, the essential prerequisites of a good medical program. (Applause)

CHAIRMAN WORSTELL: The papers of Dr. Peacock and Dr. Harrison are now open for general discussion or any questions from the floor.

There being no general discussion, the remainder of this meeting will be turned over to Dr. James Roscoe Miller, of Chicago, for the panel discussion.

DR. J. R. MILLER: Ladies and gentlemen: Industrial medical examinations are of vast and growing importance. The enactment of laws making an employer responsible for ailments produced or aggravated by reason of employment gave impetus to pre-employment examinations.

It was soon apparent, however, both to employer and employee that these examinations could be of much wider significance.

Early recognition of disease lead to correction in many instances. Thus the candidate was benifited. Job placement followed and then, for the protection of employer, employee, and the public, alike, periodic check-ups were inevitable.

The title assigned this panel is not a particularly good one. For "good" should be substituted "thorough" or "extensive", since, obviously, any examination should be as "good" as is possible under a given circumstance. The "thoroughness" or "extensiveness" depends upon many factors. The nature of work to be undertaken is a first consideration.

A physical or mental disability which would preclude employment in one field may not necessarily prevent an individual from accepting an assignment in another. cursory physical examinations, in some industries, might be considered justified if these examinations are followed by more rigid and periodic check-ups at a later date; although it has been pointed out that such cursory procedures do not offer full benefits to the individual, nor are they adequate as a public health measure.

Thus, an examination of candidates who are to work in close proximity to others, no matter how much or little physical activity or hazard is involved, can hardly be considered adequate unless it includes sufficient investigation to rule out active tuberculosis.

The Industrial Physician has still more responsibility when he is examining a workman in whose hands rests the health and welfare of others. An individual with diabetes or high blood pressure might well fit into the scheme of an organization

in many capacities, although he could hardly be considered a fit subject to operate a public vehicle, or to operate a machine where a lapse might endanger the lives of others as well as his own.

The late war emphasized the importance of careful inquiry into the state of health of all members of society. Particularly was our attention called to the underlying importance of mental and emotional balance and adjustment. This is a vast field which industry is doing much to explore. The next decade will certainly see substantial improvements in methods and understanding of this important phase.

Nor should care in evaluating the mental and physical health of employees be restricted to the so-called hazardous jobs and those requiring physical stamina or skill. Those responsible for the welfare of organizations have come to realize that it is a sound practice to take inventory at frequent intervals of those in administrative positions. Emotional and mental stresses may be as insidiously injurious as noxious fumes.

When any organization contemplates placing an individual in a position of responsibility it behooves that body to make certain that the candidate is physically and mentally fit and, furthermore, that he stay that way. This information can only be supplied by a careful examination done by a competent

physician. While we are on the subject, why not extend this principle to public officials? We supply a physician to the White House and to Congress for the purpose. Why not require fitness on the part of others to whom we trust our welfare?

What, then, are the objectives of industrial examinations? They are performed for the benefit of the employer and employee alike and, in many instances, for the welfare of the public. They should be so conducted as to uncover abnormalities which make an employee unfit for a specific task, and should aid in his placement. They should appraise him, whenever possible, of any existing disease in order that correction can be undertaken. They should be a precautionary measure where an individual is on a job of hazard or trust, and they have a pronounced influence on the Public Health of a community.

Finally, they offer a fertile source for valuable information to guide us in the future.

The purpose of this panel is to make pertinent inquiry into how effective current practices are and to make suggestions for improvement.

The first speaker on the subject is Dr. Oscar A. Sander of Milwaukee, Wisconsin.

...Dr. Sander read his prepared paper...

The discussion will be continued by Dr. George H.

Gehrmann of Wilmington, Delaware.

DR. G. H. GEHRMANN: Mr. Chairman, ladies and gentlemen: I would like to preface whatever I have to say by the bold statement that physical examinations cannot be too complete. I stand prepared to argue that one with anyone, based upon thirty-three years of experience.

Now, let us consider for a moment what our objective is in making physical examinations. We are trying to set up, and we are doing our job, a proper system of preventative medicine, and we are trying to protect the lives and the health of our employees. We are trying to protect the interests of our own industry and we are trying to do it in an equitable manner without injury to anybody. The problem is medical, - it is by no means social.

So, we come first to the pre-placement examination which I like to call selection. The problem is, as I see it, to properly select individuals who can safely work on the job, taking into consideration the physical effort required, the amount of intelligence required, and the chemical exposure to be encountered.

There are very few industries today that are not to some extent chemical and, therefore, they have within their own organization certain hazards which men must be protected

against.

So, in making that examination, what is the first requirement? The first requirement is that the doctor who makes the examination know something about the job. In my travels about the country I find, all too frequently, that examinations are made by men who don't know exactly what the job conditions are. They don't know the amount of physical effort necessary, they don't know the amount of mental capacity needed, and they don't know the chemical hazards inherent in the operation. That is the first requirement.

Now, a lot has been said about the amount of time which is necessary to make a physical examination, and I think it is rather difficult to set down exactly the number of minutes required. But, I do think there are certain things we might take into consideration, - some of which are a waste of time. Take, for example, the family history information. Personally, I am not interested in the family history. I have made this statement before, and I am criticized for it, but I make it again. I don't care what the man's family history is. I don't care whether he has a father or mother or not.

In the first place, if they are dead he doesn't know what they died of. Very often the family doctor didn't know himself, so how is he to know. So, how much value do you get

out of a family history? You don't get any, and a lot of time is wasted along that line.

Now we come to the past personal history. This is necessary, of course, but you must take into consideration that he or she, as the case may be, is there to get the job and if you ask, "How do you feel" you can't expect them to say, "I feel like Hell." They are going to say, "I feel fine," despite what they feel. You go into what they have had in the past and maybe you get some value out of that.

I think you must bear in mind the fact that the industrial examination is entirely different than an examination in a doctor's office. Therefore, we must replace the deficiencies with other equipment. What is the other equipment which I feel is necessary? Well, I think we must have a very complete visual survey. We have men working in every industry whose very safety and efficiency is dependent upon their vision.

Now we come to the chest, and I think that in every industry we must have a chest x-ray because I don't believe that in the history that one can get from an applicant, and the amount of time we have to devote to a chest examination, that we can really find out the real essentials as to what is going on in that chest. Along with that chest x-ray, of course, there is revealed a certain amount of information on the size and shape

of the heart.

Blood pressure, of course, obviously, is necessary. Complete urine analysis, also, and when I say complete I mean both microscopic and chemical.

In our own industry, in our chemical industry, we find it essential to take a blood count on everybody. We have a check against people that report for duty in the plants, all of our people in the main office, and it is surprising the number of people whose blood count shows them to be far below par. They are tired and they are not able to do a good days' work all because they are anemic. I don't know how you are going to tell this unless you use the blood count as a guide.

Syphilis is no barrier in our industry except in certain jobs. I think it is essential that we know that we have syphilitics in certain jobs where their condition may be aggravated by the chemical exposure.

Now, a lot has been said about the cost. Well, any examination that is worth while costs money, but I don't think industry can afford to put through a cheap examination because with a cheap examination you have very little or no factual information. You delude yourselves into the idea that you have information all written down on the card and it really is not there.

Then we come to the second part of our responsibility and that is periodic examinations. I could talk for a long time on that, but suffice it to say that periodic examinations should be of such a nature as to reveal the very early signs and symptoms which might be expected from the chemical exposure or the working conditions of the individual concerned.

Obviously, that does not need to be a complete physical examination. With the chemical compounds which affect the blood-forming elements of the body we need a blood count. Think how foolish it would be, for example, to use the blood count on a man who has developed a bladder tumor, - what he really needs is a cystoscopic. We could go through the whole category.

That examination must be set up, and the money must be spent, and the time given to the examination must be sufficiently thorough to give you all the information that you need to decide if this man is commencing to be sick. If we are going to wait for the time when he is sick and then propose to introduce some medical methods, - then I say that the medical program is entirely inefficient and should be given up. I thank you. (Applause)

DR. MILLER: Thank you, Dr. Gehrman. The discussion will be continued by Dr. William A. Sawyer of Rochester, N. Y.

...Dr. Sawyer read his prepared paper...

DR. MILLER: Thank you, Dr. Sawyer.

Before opening the meeting to general discussion I have been asked to again call your attention to the program of "Amputees in Action" which will be held in the Ballroom tomorrow evening at 8:00 o'clock.

DR. S. L. SMITH (Poughkeepsie, N. Y.): I would like to ask Dr. Sander, - what can this Congress and we, as individuals, do to bring about better legislation and better administration of the Compensation Law? That would be attacking one of the basic causes of this distress in our field.

DR. SANDER: Administrators of compensation are pretty much dependent on the medical profession in formulating their decisions. So, I think that the basic thing is more education of the medical profession and the doctors who are called upon to give their opinions before the administrators.

DR. W. P. ANDERTON (New York): There is something that I haven't heard brought up in any of the discussions. It affects us in our organization. I realize that much has been said about the handicapped worker in employment, but very little has been said about the man who, as a result of employment, becomes handicapped and requires to be fitted into what we refer to as "limited duty". It has been quite a problem with us. So much so, in fact, that we have formulated more or less of a

panel of management, personnel, and medical to decide many of our cases for disposition. I wonder what you gentlemen could tell me, that I could carry back, that would help us know as to whether we are on the right track.

We have even gone so far as to standardize physical limitations according to the letters of the alphabet. We have found this necessary because we find that a staff of approximately two hundred physicians are recommending different types of duty and management won't take that. As a result of this we have standardized.

DR. GEHRMANN: If I understand your question, it is about the handicapped employee that has become handicapped in your industry, your cardiacs, your asthmatics, your arthritics, and your older people.

DR. ANDERTON: We have a particular problem in our industry along that line because our average over-all age is about forty-seven with about twenty-two years of employment.

DR. GEHRMANN: Our policy, as far as the handicapped employee is concerned, when he has had service with the company is to find him a job.

Now, in our company, our employees have had ten or fifteen years of service and that is very valuable to you. If there is one possibility or any possibility whatsoever of finding

that man a job, a job to fit that man into, we do it.

Let us talk for a minute about the fellow who has become handicapped because of an accident. We consider that our obligation, as long as he lives, to provide him with work.

DR. ANDERTON: I was talking about the general run, of the type of illness we run into. We have hypertensive heart diseases, and we have plenty of them.

DR. MILLER: Dr. Sawyer, would you care to speak on that?

DR. SAWYER: I would like to have you amplify, if you will, what you mean by your alphabetical standardization.

DR. ANDERTON: As I said, we have a staff of approximately two hundred physicians recommending secondary work. We standardize on "A" no lifting, pulling, or pushing; "A-1" no lifting, pulling, or pushing over twenty pounds; "A-2", for example, no stair climbing; "B-1", no stair climbing over sixty steps a day; "C-1", no driving of motor vehicles.

We designate that to the fellows by the letters of the alphabet.

DR. SAWYER: I think that is extremely valuable, and I think that is one of the big problems that confronts every organization. I don't think, though, that we have as good an answer to it as you have. It is a constant problem and one which is

awfully difficult to solve, particularly in finding the type of job that is best suited to the individual. There aren't many easy part-time or limited jobs.

DR. ANDERTON: May I have one word more? Just as you said, Dr. Sawyer, industry can only absorb, at present day wages, a certain number or percentage of that type of individual.

I have been with my organization close on to twenty-two years. There was a time when a department of fifty men could hide-out eight, but today they can't do it any more and it is a question.

DR. GEHRMANN: We go to personnel and say, "Find a job for this fellow with these restrictions."

DR. ANDERTON: They come back and tell us that they just can't place that fellow.

When you are with us for fifteen years we either disable the individual and give him a disability allowance, or we retire him on a life-time annuity. This has become increasingly difficult. It has become an increasing liability.

Unfortunately, we do not have the turn-over, in our industry, that others have. We ought to be proud of keeping our workers so long, - but it has become a problem.

DR. D. R. JOHNS (East Chicago, Indiana): I would like to ask Dr. Gehrman what he thinks of this, - where a man

shows definite signs of toxic products after he has worked for quite a number of years with that institution, and the doctor recommends his change to another department, and there is a difference in the ratio of wages from the job he had been performing for years to this other job. What is your opinion about that? Of course, I mean outside of the union end of it.

DR. GEHRMANN: Outside of what?

DR. JOHNS: Outside of the union. Should they put this man at a different work, outside of the hazard, at the same wage he had been making at the hazard?

DR. GEHRMANN: If a man in our industry becomes disabled because of chemical exposure and that other job pays a lower rate, we maintain him on the rate that he had on his previous job. We figure that we were responsible for making him sick, therefore, we should pay for it.

DR. G. R. ROWNTREE (Louisville, Kentucky): I would like to ask Dr. Gehrman his opinion on x-rays. Do you think, doctor, that large x-rays are necessary for all employees, or would the 35 millimeter or 75millimeter fluorograph be sufficient?

DR. GEHRMAN N: We are using 35/70 for screening purposes. We also use the 4x5.

DR. G. A. WOODHOUSE (Cincinnati, Ohio): Dr. Sander, do they have any compilation of charts to show the variations

in state compensation requirements, such as you mentioned before?

Are there any charts to compare the various states?

DR. SANDER: Yes, the Industrial Hygiene Foundation, of Pittsburgh, have all that material available. You can address them at the Mellon Institute in Pittsburgh.

DR. JOSEPH SANDERS (Prudential Insurance Company, Newark, N. J.): I should like to ask a question in regard to pre-employment examination. In the event that the full-size, 11x14, chest x-ray is routinely taken, is it necessary to perform a clinical examination of the chest?

DR. GEHRMANN: If we are going to take a chest x-ray, which we do on everybody, there is no use in wasting time on a clinical examination of the chest. You don't find out much anyway.

DR. SANDER: I think you meant the follow-up, - provided the film showed some pathology. Is that right?

DR. SANDERS: That is in the event the film showed no pathology, and no change in cathardial silhouette. It could speed up such examinations in the case of females and not tie up the nurse. We have diaphragm-type of stethoscopes which we slip under the girl's dress and listen at the apex and two points of the bases. That is the point on which I want information on the general examination.

DR. GEHRMANN: We confine our examination to the heart. As far as the stethoscope is concerned, we don't use it for the chest at all.

DR. E. K. LINDER (Philadelphia, Pennsylvania): I just wanted to say that the American Journal for Surgeons has published a small pamphlet listing the Compensation Laws of various states. Their headquarters can furnish you with that pamphlet.

I would also like to ask the gentleman on the panel how he discovers asthma and asthma bronchitis if he doesn't use a stethoscope.

DR. GEHRMANN: We did enough pathology from our chest x-rays to decide all questions.

DR. SANDER: For industries where there might be an increase of bronchitis and asthma we still use the stethoscope in addition to the chest film.

DR. MILLER: Dr. Sawyer, would you like to put in your nickel's worth?

DR. SAWYER: I think you have to temper your program with the situation you are up against.

I think where you have a lot of the young people coming through, and you are in a great rush, the examination of the chest is sufficient. Where you get older people and where

you have conditions that are hazardous, and you want to know more than the x-ray will give you, you must use the stethoscope. I don't think you can adhere to one or the other. I think that Dr. Gehrman, by and large, tries to get away with just the x-ray.

DR. L. ARLING (Minneapolis, Minnesota): I would like to ask the doctors on the panel if they have had any experience in glare tests for commercial drivers.

These records being kept on the individuals and the follow-ups, - what do you do about reporting to the family physician about common colds and things of that kind? Do you refer the people to the family physician to do the follow-up? What is done about the epileptic? You can't find them with x-rays or anything else.

DR. SAWYER: There were two questions there, were there not?

DR. ARLING: Yes, - I asked you about the records. You were talking about how important they were, but you didn't go on to say what you did with them after you followed them up. Did you check over the records for some ten or twelve years, and you found a lot of common colds, and you haven't been able to do anything about them. Do you refer them to the family physician, or do you try to do something about them?

DR. SAWYER: I think we do that in a great many cases. At least we urge them to go to the family physician and we tell them we would be glad to exchange any information we have with him. Very often we recommend ways of adjusting their daily routine so as to possibly prevent trouble. It is a variety of things you do.

DR. ARLING: If he doesn't go, then what do you do?

DR. SAWYER: Well, that sometimes becomes a problem but not often or usually.

DR. GEHRMANN: You asked me about the epileptics. Well, the epileptic we do not take for plant work but we do, however, take them for office work. We are a chemical industry and we have some pretty dangerous operations, very dangerous for the epileptic to be around. However, we find no objection to having them in the office.

DR. ARLING: What I want to know, - you spoke about the history and that they didn't give too much so you were not interested in the history. That was the statement which you gave. Well, with the epileptics, they will not tell you about it and then you discover it later on.

DR. GEHRMANN: We don't usually find out that they have it until they have been in the organization for some time. In that case you have to get rid of them if they are on a

dangerous job. That is one of the deficiencies in the history. They are there to get the job and if they tell you that they are an epileptic they know they will not get it.

DR. W. M. DOWLIN (Canton, Ohio): What do you do with your seniority program? I do not mean industrial disabled, I mean physical-disabled industrial employees in your seniority program. How do you place them? How do you get them placed when, as a result of placing them, you are displacing another employee?

DR. MILLER: Dr. Gehrman, do you care to answer that?

DR. DOWLIN: I mean, - when a man is returned for light work in a department and there is no light work in the department, what do you do with that man in regard to seniority? How do you handle those situations?

DR. GEHRMANN: I still don't quite understand, but I think I can answer it this way. Let's assume we have a man whose physical condition is such that he has to be given a minor job- -

DR. DOWLIN: Light work.

DR. GEHRMANN: All right, then the next man moves up.

DR. DOWLIN: He displaces three men as a result of that.

DR. GEHRMANN: I don't see why.

DR. DOWLIN: Well, what do you do with those cases?

DR. GEHRMANN: He just drops out of one job and into another.

DR. DOWLIN: You do that in your own industry?

DR. GEHRMANN: What is to prevent it?

DR. SAWYER: I think that is the same question brought up a moment ago. It is about the employee who begins to degenerate or deteriorate as a full-fledged worker and you have to find a lighter job for him. That is one of the toughest things that confronts us today. I don't think there is any one answer. Sometimes you can find the answer and sometimes you can't. Sometimes you can retire them on a partial disability.

DR. DOWLIN: What if he is a young man?

DR. SANDER: You don't displace anyone in finding another job. I know that we don't.

DR. SAWYER: You put them in a job that is vacant.

DR. DOWLIN: There is no such animal. We have twelve thousand employees in the industry I am talking about.

DR. SAWYER: You shouldn't have to displace anyone.

A VOICE: I would like to ask the members of the panel about how much information they give an applicant that is rejected or cannot be accepted for the particular job that he is applying for? Do you tell him the reason, the physical reason

why he is being rejected or not?

DR. MILLER: Dr. Sander, will you take that?

DR. SANDER: Yes, we do. That is one of the provisions of the Wisconsin Examination Plan. The man gets a duplicate copy of the examination report, in writing, so that he knows exactly what the pathology was and what the reason is for the rejection. That is, provided it is an outright rejection.

DR. MILLER: Do you do the same, Dr. Gehrman?

DR. GEHRMANN: Yes, we tell the man why.

DR. MILLER: Dr. Sawyer, do you care to comment?

DR. SAWYER: I have always contended that if the man has to submit to the examination for a job he has the right to know.

A VOICE: In the case of aggressive pathology, such as a cardiac pathology, you have the record of the physical examination and evaluation of the man's ability at the time of entry into the plant. Can you, by periodic examinations, determine the progress and the decline of this person's ability? There is no doubt in our minds that there is a decline, but when the compensation administration handles cases like this too liberally it puts the financial load of compensation on the employer and hampers us in our rehabilitation program of the disabled. What can be done in those cases to give these people

a chance to make it possible for us to hire them without putting the penalty on the employer?

DR. SANDER: I mentioned that in my discussion. It is a matter of education. It is a slow process, - it isn't anything that you can do overnight. Some of the State Industrial Accident Boards do not have as enlightened an administration as they might have. But, the situation is improving and the overall picture today is much better than it was ten or fifteen years ago. It is a matter of slow education in all parties involved.

DR. G. SMITH (Rocky Mount, North Carolina): I would like to preface my question with a few remarks about it. We only hire about seven hundred people and we have just started an Industrial Medical Program. We have just been crawling and now we would like to walk a little bit. We would like to go into x-rays and we don't know which is best, fluoroscopy, 35/70 x-rays, 14/16 x-rays, or what. I am the so-called part-time director in this, but I am only a general practitioner. In the opinion of the panel, which would be best for us to use?

DR. MILLER: Starting from left to right, Dr. Sander.

DR. SANDER: First of all, fluoroscopy, no. You have no records of the findings except what someone saw. Miniature films for industries not having a dust or fume hazard are perfectly satisfactory for screening for tuberculosis or other

pathology.

For industries with a definite silicosis hazard, or a fume hazard, 14/17 film for the best technique possible.

DR. MILLER: Is there any disagreement from the panel?

DR. SAWYER: None.

DR. GILBERT: I would like to ask about the periodic chest x-rays. How often would you advise, once a year, once in six months, once in two years?

DR. MILLER: Dr. Sawyer, do you care to handle that one?

DR. SAWYER: We started out doing them once every year. Then the depression came along and we had to save a little money, believe it or not, and we laid out a program of every year or two years depending upon the age of the individual, what was found at the time, and the work he was supposed to do.

When an applicant is x-rayed a card is made out as to when the next x-ray is to be taken. It may be in six months, if there is something suspicious, or it may be a year, two years, or three years. I can't give you any hard and fast rule beyond that.

DR. GEHRMANN: We repeat them all every year. Some suspicious cases may be repeated as often as four times a year, just to keep track of them.

DR. GILBERT: Is there any reason for doing it every year?

DR. GEHRMANN: Well, every year you pick up something. There is an increase of malignancy of the chest. Not that it does you an awful lot of good to pick them up, but it is best to check at least once a year.

DR. D. E. DORCHESTER (Sturgeon Bay, Wisconsin): The last fellow got down to seven hundred employees. We have some railroads and utilities that have full-time medical programs going on, but as Chairman of the Wisconsin State Society on Industrial Health, we have lots of smaller industries that don't have any industrial health programs.

I wonder if these three men can tell me how they get industry interested in putting these programs forward?

DR. SANDER: Well, Dr. Dorchester is from Wisconsin and so am I. There are a good many small industries that do have a medical program, but most of them have occupational disease problems and they are pretty well taken care of. There are still many of the small industries that don't have any special occupational disease programs, some that have no program at all. I don't know how you can get them interested except, possibly, by the medical societies or the local Industrial Health Committees calling meetings of your Manufacturer's

Association groups.

That has been contemplated in Milwaukee, as you know, for within the near future. We don't know of any other way of doing it.

A VOICE: What would consist of an adequate test of the present employment for hearing ability? Just how should it be recorded, by whispered voice, spoken voice, watch ticking, or going into something more elaborate as an audiometer?

DR. SAWYER: I think the audiometer is ideal. They cost money and they don't stand up too well, at least that has been our experience when they are used constantly.

The whispered voice is something we have used for years. I ran into some doctors the other day that were testing by simply snapping the fingers at a certain distance. I think the whispered voice and watch ticking is probably sufficient in most cases.

DR. GEHRMANN: We found, in particularly noisy places, that it was necessary to go to the audiometer because there is more and more of a tendency, now, for men to say that the noise in the operation interfered with their hearing. They say that they have lost their hearing, or lost it partially, and the only way we can accurately determine just how much was lost is by the audiometer. With the noisy operations we

use the audiometer, but not in general.

DR. MILLER: Are there any other questions? If not, do the participants want to tear each other apart? If not, the meeting stands adjourned.

...The meeting recessed at 4:30 o'clock, p.m...

R E C E S S E D

CONFERENCE ON INDUSTRIAL PHYSIOLOGY

Monday Afternoon, January 5, 1948

The Conference on Industrial Physiology convened at 2:00 o'clock in Club Room A, Public Auditorium, Cleveland, Ohio, Dr. Raymond Hussey presiding.

CHAIRMAN HUSSEY: By way of introducing the program this afternoon I should like to say that this is the second year that we have had the broad subject of industrial physiology included on the program. It is a subject that has been not too well developed and one we are particularly eager to give emphasis to and give due emphasis to.

I think all of us who have followed the evolution of medicine realize that it wasn't until we had the branches of etiology and physiology that it was possible for medicine to even be thought of as a science, and it has been the application of the principles of etiology and the principles of physiology that have made it possible for us to interpret disease to develop a real concept of disease as we now have it, and it is our hope in the future that by applying the principles of etiology and physiology to the study of health we may develop the concept of health in the same way we have the concept of disease and that as a result we may have some way of evaluating health, actually diagnosing and apprising health in the same manner as we have

today in the case of disease.

I might also say that in this evolution we came from the structural knowledge we had in the way of anatomy and then the structural side of pathology and the expressions of physiological pathology came into being and we have physiological chemistry and "physiological" was added as an adjective to practically all of our subjects; and then the science of hygiene developed which represented really the methods and means of studying etiology, and then we have physiological hygiene developed.

Now we have never employed the expression "physiological engineering," but I think we should. I think although engineering sciences are just as distinct perhaps as the medical sciences, certainly we cannot develop without the engineering sciences. So if the expression "physiological engineering" may be employed now as the expression "physiological chemistry" was employed 75 years ago to indicate we were bringing chemical sciences into the study of medicine I think perhaps we may be justified in saying "physiological engineering."

It gives me great pleasure now to introduce the first speaker on the program we have to offer today, Dr. Jan H. Tillisch, Rochester, Minnesota, connected there with the Mayo Clinic, who will speak to you on the subject "Physiologic

Principles in Aviation Medicine." Dr. Tilliseh!

PHYSIOLOGIC PRINCIPLES IN AVIATION MEDICINE

Paper by: DR. JAN H. TILLISCH

Thank you very much.

Aviation medicine in its original concept in World War I had to do primarily with the selection of pilots. With the growth of aviation, especially in the past 15 years, the stimulus that was furnished by World War II, that original concept has pretty well been left behind. We still are interested in the selection of pilots but in addition to that we are interested in the selection of other air crew members, navigators, bombardiers, radio operators, flightproof mechanics, and people of that type. We are also interested in their maintenance in helping them overcome the physiological hazards which they encounter when they go to altitude.

In addition to that, we find that we have another function of aviation medicine that has come on us since or with World War II and since then, and that is the transportation of people.

Aviation medicine is no longer for just the select few, a select sub-specialty. Practically every man who has anything to do with medicine in this day and age will encounter aviation medicine in one way or another. The obstetrician must decide whether the pregnant woman can fly, how far along she

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can be before he can transport her by air. The psychiatrist must think whether his patient can be transported or whether it may bring on a psychotic episode. Probably all the specialists of medicine, the internists are the group of diseases most frequently met with in aviation medicine.

For this group here, who are interested primarily in industrial medicine, we find many of you who have direct contact with aviation medicine. You may have test pilots, those of you who are with aircraft companies or you may have pilots who are flying the company plane, or you must take part in the selection of pilots, the maintenance of them, overlooking the equipment that has to do with the medical part of it. Not only that, but many of you who are connected with concerns who do not have planes will find a large number of your executives, a large number of people in those concerns are going about by air at this time and you will frequently have the question posed to you, is it safe for me to fly because I have had a heart attack, or this or that. In other words, every physician should have a certain knowledge of aviation medicine. It is not a specialty for just the select few.

Now for an understanding of aviation medicine it is necessary to have a certain concept of the basic principles of the atmosphere and of the physiology of the cardiac and of the

vascular system. If you will bear with me a few minutes, I would like to review those.

(Slide) The atmosphere, as we know, is divided into two divisions, the troposphere and the stratosphere. The troposphere extends up 33,000 feet at the poles and 56,000 feet at the equator. While the stratosphere is that area above it. We, of course, are interested at this time primarily in the troposphere, that atmosphere in which we live.

The troposphere is characterized by turbulence and when there are changes there is a temperature drop. The higher we go the colder it is. The stratosphere is a more or less constant temperature, very little weather changes and very little turbulence.

(Slide) Now as high as it is practical for man to go we find that the composition of the atmosphere does not change. All of us know the higher we go the more anoxia we develop. That is not due to any change in the composition of the atmosphere. This remains constant, approximately 21 per cent oxygen, 79 per cent nitrogen, and rare gases. These figures, that is, within the practicality of man, remain the same. What is it, then, that brings about this lack of oxygen as we go to altitude?

(Slide) Well, if we think of that atmosphere as a haystack, perhaps we can get a better concept of it. The air,

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of course, is bearing down on us just as this hay is bearing down on any individual that would be at the bottom. We see at the lesser altitudes wisps of hay packed more closely together, just as molecules of hay are. On the other hand, the higher we go, the more loosely packed are those wisps of hay so that actually the weight of that column of atmosphere is 14.7 pounds per square inch at sea level. However, if we get up here to 20,000 feet, we find that more than half of the weight of that column is contained in this part of the atmosphere. The higher we go, the less that weight is, of course.

(Slide) As a result of this decrease in pressure, the higher we go in altitude we find a bubble of gas at sea level will stand as it goes up. You may recall Boyle's Law, which states the volume of the gas varies inversely to the pressure exerted. In other words, following this solid line here, we will find a bubble of gas will expand in this way: Perhaps it is a little better demonstrated by the next slide.

(Slide) At 16,000 to 18,000 feet a bubble of gas will have two times the volume it does at sea level. At 25,000 feet, 3 times; at 34,000 feet 5 times; and 39,000 feet 7 times. This is of academic interest to us right here, but if we are in a plane and that bubble of gas is in our middle ear or sinuses or gastrointestinal tract it can cause a great deal of discomfort.

How does this lack of pressure cause the lack of oxygen as we go higher?

(Slide) We find, as I said, there is about 21 per cent oxygen in our atmosphere. However, when we take a breath we dilute that atmosphere air in the residual air with the complementary air that is contained in our lungs, so actually the percentage of oxygen that is in our alveolar is 14.5 per cent.

Now the pressure at sea level is 760 millimeters of mercury barometric pressure, so we have an oxygen pressure or oxygen tension in our lungs normally of 110 millimeters of mercury. Now let us go to 18,000 feet, where we still have 14.5 per cent oxygen in our lungs and where the barometric pressure is 380 millimeters of mercury, and we will find our oxygen tension is 55 millimeters of mercury, just half. In other words, the pressure of oxygen that is contained in that alveolus - when I say pressure, I mean pressure just as pushing this chair - the amount of push that oxygen has to push itself through the alveolar membrane and the pulmonary capillaries is just half what it is at sea level.

There is one further catch to this. I don't mean to go into higher mathematics or anything, but we do find that the air in our lungs is saturated with water vapor and as the body temperature is always constant we have a constant amount of water

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vapor in our lungs. That has been measured and found to be a tension of 47 millimeters of mercury. So actually we don't have 760 millimeters of total pressure; we have 760 minus 47. If we take 14.5 per cent of that, we find approximate alveolar tension is 103 millimeters of mercury. In other words, as that oxygen, total pressure, goes down, we find that our oxygen pressure or oxygen tension goes down.

(Slide) To go on just a minute with this water vapor pressure, which is constant in the lungs, we find that at sea level it doesn't amount to very much. In fact, it only takes up 6.2 per cent. However, if we go to 63,000 feet, we find that the total barometric pressure at 63,000 feet is 47 millimeters of mercury. If we already have 47 millimeters of mercury pressure present in our lungs due to the water vapor we find the water vapor takes up 100 per cent of our pressure there.

To go on with this, we could give a person at 63,000 feet 100 per cent oxygen. It would do him no good whatsoever because that total would be taken up by our water vapor tension. The way we get around that is by breathing in pressure ice cabinets, which I will speak of in just a minute.

(Slide) Thus we find certain changes take place in the body due to changes in the altitude and the most important thing is that change in air pressure which I have just been dis-

cussing. We find we have decreased oxygen pressure. We find that we have expansion of gases in body cavities, going back again to Boyle's Law, the higher we take a bubble of gas the more it expands.

We find a third thing due to this change in air pressure, this decrease. That is, the evolution of gases in body fluids. That might be likened to uncapping a bottle of carbonated water. That is, we have carbon dioxide distilled in water under pressure. When we uncap, we release the pressure and CO_2 bubbles out. The same is true in the body. The gas that bubbles out is nitrogen chiefly from the body. When we go to altitude, the pressure is decreased and we become uncapped and we have bubbles of gas evolving in our body fluids.

The second change that takes place is the change in temperature with the increasing cold, which at the present day is not much of a problem because we have adequate heating in our airplanes.

Change of speed in three directions takes place as we go into the air rather than change of speed in two directions as we are accustomed to on the ground.

(Slide) Now of the things that have to be considered as we go to altitude, probably oxygen lack is the most important and we find we have various types of oxygen lack in the body, or

anoxia. We have acute anoxia and chronic anoxia. Chronic is that type where the body is exposed to oxygen lack for a sufficiently long period of time so that the body is able to make adjustments. The erythrocytes become higher. The hemoglobin becomes higher. Our blood volume becomes greater. They are able to adjust. The acute anoxia is where the individual is not exposed to lowered oxygen tension for a sufficiently long period of time so he is able to adjust to it, and we class acute anoxia into four types for convenience. They aren't entirely accurate but they serve as a working classification:

Anoxic anoxia, which means a lowered oxygen tension in our arterial system. And we find we have two types of anoxic anoxia, - that due to external causes where there is lowered oxygen tension in the air we breath and that of course is the type of anoxia we encounter when we go to altitude. Internal causes of anoxic anoxia might be a foreign body, an obstruction in the trachea where the individual is unable to breathe air into the lungs, or it might be due to the consolidation of the alveoli, such as pneumonia, so the air cannot be passed into the pulmonary circulation.

Therefore, the chief type of anoxia we are interested in in aviation and in altitude is anoxic anoxia. However, these others enter into the picture: Anemic anoxia, which means there

12 is not adequate hemoglobin to carry the oxygen to the tissues.

Stagnant anoxia is where we have adequate oxygen breathed in and adequate hemoglobin to carry it but the circulation is too slow to get it around with sufficient speed to satisfy the demands of the tissues. The typical example of that is in cardiac decomposition,

Histotoxic anoxia is where we have adequate oxygen, adequate hemoglobin, too, and sufficient speed of the circulation to properly carry it around but when the oxygen is delivered to the tissues there is a paralysis of the oxidative process of the tissues so the tissues are not able to use the oxygen. One of the more common types of histotoxic anoxia is cyanide poisoning. Another one you may be more familiar with, that of the hang-over. That is purely a case of histotoxic anoxia.

(Slide) In speaking of the stages of anoxia, we have arbitrarily taken various levels. I wish to say before discussing these slides that these figures are not absolutely correct. There is tremendous individual variation in the different stages. Where an individual goes from sea level to 10,000 feet, there is not sufficient oxygen lack to really cause any bodily-made adjustments. We do find an individual's night vision will be cut down somewhat. That is not of sufficient importance from the compensatory stage.

15 From 10,000 to 14,000 feet we find the body's compensatory ability will be called into play, and these are primarily respiratory and cardiovascular. We will find the individual will breath somewhat more deeply and a little more rapidly, to increase the amount of oxygen in his alveolar. We will find a slight increase in pulse rate and a slight increase in the blood pressure so the cardiac efficiencies are increased and oxygen gets to the capillaries.

When we get to the disturbance stage, which is from 14,000 to 20,000 feet approximately, we will find the individual's compensatory processes are no longer able to properly adjust the body to this oxygen lack, and we then begin developing the symptoms of anoxia, which I will discuss in just a minute.

The critical stage, 20,000 feet or more, is where the individual goes into unconsciousness. We will find people who can go to 24,000 feet and will not become unconscious; other people may become unconscious at 17,000 or 18,000 feet. Again, these figures are generalizations which fit the average individual.

(Slide) Now, as to the signs and symptoms appearing at the disturbance stage of anoxia. We may see cyanosis. We will see impairment of the special senses, and the special sense that is most early affected is the vision. We will find a cut-

ting down of the vision. Later on there will be a diminution of the pain sense and touch sense, and finally a diminution of the hearing sense. We will see personality change and these personality changes are not unlike those of acute alcoholism. The individual may become euphoric. He may become pugnacious or depressed but we will frequently see these personality changes. In fact, they are as striking as anything we see in this anoxic group. There will be a slowing of the mental processes and the individual's memory will be foggy and his thinking will be fuzzy, and it is because of this slowing of the mental processes and lack of memory that occurs in these people that we so frequently will have where an individual will go up in the chamber or in a plane to rather extreme altitudes and really do everything wrong, not be able to solve problems, sometimes make a fool out of himself and yet, he will come down and say, why, it didn't bother me a bit. He won't recall anything that happened when he was at the anoxic level. We also find physical fatigue and incoordination. These people will be all tired out and it will be an effort for them to do anything.

Now it is possible for an individual to go through this disturbance stage into the critical stage and become unconscious without developing any of these symptoms. They may seem to get along perfectly adequately and then suddenly become un-

15 conscious. However, usually if the individual is closely watched he will develop one or all of these symptoms.

Now, fortunately, despite what we find from our neuropathologists that frequently anoxia will leave a great deal of residual damage, fortunately in the usual anoxia encountered in aviation if the person lives through it he will entirely recover. In the Eighth Air Force they had as many anoxic episodes as in any of our air forces. I believe there were only four cases reported where an individual survived severe anoxic episodes who had any residual cerebral damage. Usually that person will recover entirely in from 24 to 48 hours after an anoxic episode. They will have headache, lethargy, nausea and prostration. After 48 hours in the average individual it will clear up entirely.

(Slide) Now, how do we combat this lack of oxygen at altitudes? Of course, we combat it by oxygen systems and in general, we have four types. The constant flow most of us are familiar with. That is the type of system used therapeutically in your offices. That is the BLV mass and with a rebreather bag. It is the type of system that just as its name implies has a constant flow. Oxygen will flow constantly through that mass. It is very excellent up to 20,000 to 25,000 feet. Above that, it does not deliver an adequate amount of oxygen to take

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care of it.

The demand oxygen system, again is just as the name implies. We build up a negative pressure with a triple valve and the oxygen is delivered. When we built up a positive pressure with exhalations we develop a triple valve and shut off. In other words, it comes only with demand. In this type of oxygen we are able to go to 30,000 to 35,000 feet. Above that, it falls down.

We then come to the pressure type of mass, where oxygen is delivered to us under pressure. Remember, when we first spoke of oxygen it was the pressure that was the important thing and that is how we were able to go to the altitude above that. We are now using in many of our commercial aircraft, the DC-6 and the Constellation and the Stratacruiser a pressurized cabin where pressure is forced into the cabin and the individual is then maintained at an altitude far below that in the air.

(Slide) This more or less shows diagrammatically the pressure cabin. Air is forced in here so we may be flying at 30,000 feet but the cabin pressure, the altitude, simulated altitude inside that is about 8,000 feet. In other words, a pressure cabin is just the reverse of a Diesel pressure chamber which we used in school. There you will recall air was pumped out, a negative pressure was built up. Here we pump in and

17 develop a positive. That will be the type of aircraft generally within a few years most of us will be flying.

(Slide) Now, as you recall, one of the effects of decreased pressure was the anoxia. Another was the expansion of gases in our body cavities, and these are the three systems that are chiefly affected by the expansion of gases. All of you who have flown have felt the fullness in your ears, which you have cleared in one way or another. That is merely due to the fact that when you go up - say you have a pressure of 760 millimeters of mercury in your middle ear and you go to 18,000 feet - the pressure on the outside is only 380 millimeters. You have increased pressure on the middle ear and that causes pressure on the tympanic membrane and you have pain. If carried on long enough it may rupture the middle ear. What is done is open the Eustachian tube and we do that by chewing gum or salivary fluid or close our nostrils and cause gentle pressure until we hear our ears pop.

We come on down to the paranasal sinuses^{which} are affected, usually when they are diseased, and we do not have an open passage-way to the outside, and in this group going up or coming down you may have pressure changes and quite severe pain.

The gastrointestinal tract, fortunately, is well equipped with two orifices which can usually take care of that

18 expansion of gases. However, occasionally we will find, especially in rapid ascent the gas will become entrapped in an intestinal loop and you can imagine going up to 25,000 feet where three times the volume or 45,000 feet where 7 times the volume, a bubble of gas will assume a great deal of importance when it is trapped in your gastrointestinal tract.

(Slide) This is a patient who had pneumothorax and I show it just to show the expansion of gases. This picture was taken at ground level and this taken at 10,000 feet. That is as high as we dare go with this individual. You will find it here in the pneumothorax I think and here at 10,000 feet it has expanded and you can see how this adhesion is put on stretch. It wouldn't take much more to rupture that, and of course, that can take place any place in the body where you have entrapped gas.

The third effect of altitude, that is, the evolution of gases in our body fluid does not interest us too much today because actually that is more a problem of military aviation. We are not going high enough in civilian aviation for it to assume any importance. What happens there, as I have said, is like uncapping the bottle of carbonated water and we have bubbles of nitrogen form in the blood, usually collecting around the joints and sometimes causing very extreme pain. It is prevented

19 by breathing 100 per cent oxygen for half an hour to an hour before ascent. It is nothing at the present time nor do I believe we will ever have to be very interested in this third effect of altitude in civilian aviation.

(Slide) Now with this background in aviation, how does it affect our chemical practice of medicine, and for convenience I have provided our group of diseases that are affected cardiovascularly. Of the cardio, we are interested in carotid, sinus, postural, hypotension only in regards to the pilot. We don't want to have a pilot or at least I do not, who is going to be unconscious even momentarily, and therefore, we are always very careful to check our pilots for this. As far as the passenger is concerned, it is of very little significance. He has no more reason for developing unconsciousness in the air than on the ground level.

Valvular heart disease generally will rule a pilot out. I am not sure we are correct on that, but I won't go into it at the present time. However, valvular heart disease that is compensated for in a passenger can fly with impunity. Valvular heart disease that is not compensated for had best not fly, because, unless it is, we have anoxia due to the cardio. If we add anoxic anoxia to that, we may bring about very severe cardiac embarrassment. If a person were decardiac, it is best for him

to take oxygen from the ground up.

Hypertension, the same reasons may apply. The individual with benign hypertension - I don't mean as pilot but as a passenger, may fly. On the other hand, a person with hypertension with heart disease and cardiac compensation had better not fly, or with any of the other complications.

The person with coronary thrombosis with individual flying is an individual problem. Certainly an individual who had had a recent coronary thrombosis had better not. A person with angina pectoris had better not because we have not only the anoxia but there is no doubt a certain amount of nervous strain in there and it may bring on an attack, so in general I advise the person who had a coronary thrombosis not to fly unless it is very necessary, and if he flies, to be sure there is oxygen on the plane.

As far as the respiratory diseases are concerned, infection of the upper respiratory tract are not of great significance except they render the individual subject to aeritis, that is, expansion of the gas in the middle ear, and to aerial sinusitis. It usually can be overcome by some of the barbiturates, such as benzedrine or tulamine.

The patient with pneumonia who already has present anoxic anoxia, to add anoxia of altitude to that may be serious.

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It may cause definite respiratory failure. For that reason, if it is necessary for a patient with pneumonia to fly, he should be given oxygen from the ground up.

The problem of the patient with pulmonary tuberculosis flying has not been entirely settled. I believe a patient with minimum pulmonary tuberculosis can fly. However, there is one important thing in regard to tuberculosis, and that is in general a patient who is having pneumonia thorax or tuberculosis should not fly. I think the x-rays I just showed you explain why. There have been deaths reported where individuals have gotten on a plane as a result and have not told the authorities about it, and it has been necessary to go to 15,000 feet or some extreme altitude and as a result of that, have died either due to the tearing of the adhesions which might have occurred in the case or a mediastinalship or other complications.

Asthma - the average patient with asthma can usually fly. If he is in the midst of a severe attack, I think it advisable for him not to fly or if he is subject to frequent attacks, it is better for him not to fly. We find frequently, perhaps due to nervous stimulation, perhaps due to the mild anoxia, that many patients frequently have severe attacks.

Peptic ulcer in the gastrointestinal system - these people can fly without difficulty unless they have a threatened

22 perforation. If they have a subacute perforation, the expansion of gases in the gastrointestinal tract may be sufficient to cause a perforation and give trouble. For the same reason, patients who have had recent gastrosurgical procedure had best not fly until the incision in the wound is healed. We may get expansion of gas in the gastrointestinal tract and a breaking down of the suture line and the resulting complications.

Intracranial injuries were transported by large number in World War II. However they were transported at very low level, 1,000 or 2,000 feet. In ordinary commercial flying, we cannot absolutely guarantee transporting an individual at such low altitude. Therefore, the individual with an intracranial injury probably as a best rule had better not fly until he has entirely recovered. The reason is two-fold. He may have air entrapped which may expand and cause difficulty or he may have or already do have a cerebral anoxia due to the injury and if we add the anoxic anoxia of altitude we may do considerable cerebral damage. Along that line, they take encephalograms and take the men out of the air mail service until such time as they are fully recovered. Otherwise, they will have comebacks of pain, headaches and such as they have never had before.

The psychotic patient probably not due to the anoxia but the stimulation of flying frequently will become manic on

the plane. If you take a person who is psychotic and put him on a plane he may become beserk. Because of this and because of the possible danger on the plane, I think it is advisable not to transport the psychotic by plane.

The patients with neuroses can fly without trouble except for one thing. They are more subject to air sickness, but otherwise they come to no harm.

The patient with anemia, as anemic anoxiation, however, it is usually quite mild and he can usually fly without trouble. On the other hand, a patient with a severe anemia had best not fly unless oxygen is present.

I think the entire thing may be pretty well summed up in the words of Colonel Tuttle, who is one of the deans of aviation medicine and a former commandant of the school of medicine at Randolph Field and now medical director of United. He says he thinks the average person can fly without difficulty if he walks right, looks right and smells right. (Applause)

CHAIRMAN HUSSEY: Thank you, Dr. Tillisch.

The next paper on our program this afternoon is to be presented by Mr. Theodore H. Hatch, Research Director, Industrial Hygiene Foundation of America, Inc., Pittsburgh, who will speak on the subject "Physiological Requirements in Industrial Machine Design." Mr. Hatch!

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PHYSIOLOGICAL REQUIREMENTS IN INDUSTRIAL MACHINE DESIGN

Paper by: Mr. Theodore F. Hatch

Mr. Chairman, Ladies and Gentlemen: I am not going to talk specifically about the design of machinery from the standpoint of the operator. I would rather try to point out the need for more concern with this problem than has been given in the past.

I think it is more than significant that in the first issue I think it was of General Industrial Hygiene 27 or so years ago, one of the lead articles was on industrial physiology and in the very first issue of Occupational Medicine the lead article was on the subject of industrial physiology, and yet during this period of more than a quarter of a century physiological problems of industry certainly have not occupied much of the time of those of us who specialized in this field. There is, of course, very good reason for that.

Now in the broad sense, industrial hygiene is concerned with far more than the discovery and control of occupational diseases. In the broad sense, it is concerned with the whole problem of maintaining the best possible relationship between industrial worker and his industrial environment. We are not only concerned with the occupational diseases but all other diseases that this essentially artificial industrial environment

25 imposes on a large section of the population concerned with the general well being of the individual, with his efficiency and even contentment, if you will.

Certainly in terms of the total industrial occupational disease problem never was a very big one. The total number of people affected by the clear-cut health hazards always was and certainly is now affecting a very small fraction of the total population.

Furthermore, during the past 25 years we have seen a tremendous amount of progress made in the control of the occupational diseases, a great deal of progress in the technics of studying them, establishing the relationships between the disease and the nature of the occupation. Many of them have been brought to a very high degree of control and even for those occupational diseases that are not now under complete control the technics, the principles have been well established and it is only a matter of applying those principles and technics in a vigorous manner so that for the future there appears to be very little reason why a specific occupational disease should develop very far.

Those problems have occupied our attention almost exclusively in the past. It is entirely logical that we should turn now more and more to some of the less obvious diseases of

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industry.

The returns will not be as dramatic as they are in the case of the specific occupational diseases but will be of far greater benefit because of the greater number of human beings involved.

Perhaps the biggest problem that faces industry today is the problem in human relations.

Mr. Given, president of the American Brake Shoe Company, speaking at the Industrial Hygiene Foundation meeting in November, emphasized that very well. In fact, he put the industrial health program on the very top of the list of matters that must be of active concern to the president of a modern company.

Industrial hygiene in this broad sense is very much concerned, plays a very great part in this problem of human relations, so that for the future undoubtedly we will see more and more attention paid to these more subtle stresses. Now in going into the new aspect or different aspect of industrial hygiene we want to keep two things in mind, as I see it. A great deal of the progress, very gratifying progress in industrial hygiene over the past 25 years comes about because of two factors. First of all, it has been characterized by teamwork. Dr. Hussey mentioned a moment ago the joint effort of physicians, chemists, toxicologists, engineers, and every-day physicists working to-

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gether and not separately accounts to a very large degree for the progress that has been made.

The second factor is that in industrial hygiene as practiced in this country we have developed to a very high degree the concept of quantitative relationships, statistical concept, it is true, but real nevertheless. So in the study of the etiology of the occupational diseases the study is one of relating the disease to the physical and chemical factors of the occupation. Meaningful relationships have been established, then, between the nature of the disease and the incidence of the disease among the exposed workers and factors of the environment which could be measured. Meaningful relationships have been established and from this standards of a kind have been developed so it is possible through quantitative measurements of the environment to predict in a useful manner the probable effect from exposure to those environmental factors by comparing the levels of exposure as found in a given occupation with the standards so developed, it is possible to appraise the environment and establish the control requirements that have been necessary in order to bring it under control.

Now, as we go into these more subtle problems of industry, these two unique features of industrial hygiene become more important than in the past. In the case of a specific

28 occupational disease it doesn't make a great deal of difference whether our standards are right or not. By that I mean whether the standard is right or not is not going to change the course of the disease. If the standard is wrong, we will continue to have the disease.

For the most part, occupational diseases are fairly clear-cut. They provide in themselves immediate yardsticks that tell us whether or not our control procedures are effective. It is not a matter of opinion. There is little opportunity for confusion and controversy which always arise when you deal in terms of opinion.

When we go to the more subtle effects, such as the effect of noise or the design of the machine, you can see what an opportunity there would be for controversy if we deal in terms of opinion. So if we are to go into these other aspects of the total industrial environment, there is a greater need for establishing good relationships between the man and his industrial environmental factor than there was in the case of the specific occupational diseases.

In the same way, it is essential that we develop even to a higher degree the teamwork that has characterized industrial hygiene. Certainly, when we deal with the industrial machine it is pretty obvious the physiologist could not work by himself.

29 The industrial machine must be correct functionally. It must produce the right kind of a pot. It must do it in an economic manner. The problem is not one of laying down physiological requirements quite independent of the functional. The requirement is for establishing them jointly. So that as we go into this broader aspect of the work these two characteristics must be kept in mind, - teamwork and developing meaningful yardsticks by means of which we can measure progress.

I don't know a better illustration of this than in a company recently. One of our large industries had a long drawn-out strike. That strike was drawn-out especially in its latter stages because of lack of agreement between the management and the union over the extra time allowance that was to be provided over and above the pure time motion requirement for performance of the job. The management had employed a figure of 15 per cent in keeping with the practice of their industry, after calculating the pure time requirement added 15 per cent for the extra time allowance. The union representatives said it must be 30 per cent, and so the thing hung fire, 100 per cent disagreement so far as the magnitude of the time allowance was concerned. The engineer in charge of the time and motion work in this company traveled about the country visiting other industries, other factories in this industry to find out what their practices were.

30 He found the 15 per cent value was the common thing employed in the industry, but most seriously he could not find anywhere in the industry any good scientific evidence to justify the 15 per cent figure. It had just grown out and become accepted practice. He came back to his company, then, with this thought in mind: It is the opinion of management the figure should be 15 per cent. It is the opinion of the union it should be 30 per cent, and they both have complete right to their respective opinions. Now, we can't allow a big industry in the country to bog down and just stop producing over arguments that arise from matters of opinion. This gentleman recognized he would never be able to reduce the extra time allowance completely to figures. You can't assign all of these personnel problems quantitative value but suppose that you were able to do so to the extent of 50 per cent or 75 per cent, the 100 per cent disagreement over 25 per cent that was left would probably not be enough to justify a continuation of the strike. So we have got to have meaningful scientific methods for measuring such factors as this one of the extra time allowance.

Now in keeping with the modern industrial hygiene program which emphasizes the positive concept of health in industry, we are all familiar with the very extensive progress that is being made in job analysis, the pre-placement examination

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for the best selection of workers for jobs, the formulation of training programs, to train men best to fit them for specific jobs. The activities in this field illustrate I think very well the complexity of modern industry. We didn't have sufficient things in years gone by and largely because they weren't needed in the relatively simpler industry of the earlier day.

There is another part to this program that I want particularly to talk about, one that is not commonly discussed in articles on job analysis and pre-placement selection, pre-placement examinations. I would like to suggest this: That wherever it is necessary to select men specifically for jobs - I am talking now about special skills - because that job imposes certain stresses on the worker, I would like to suggest there is something wrong with that job. It isn't enough to find out what are the special stresses and then find men who are able to cope with those stresses. When you do that, you are drawing on the reserves of the population. You are having to find particular men to do particular jobs. We need to go one step further and find out why it is that a particular job imposes certain stresses and to what extent it would be possible to eliminate those stresses from the job, so in addition to job analysis, the setting up of requirements for the job and the selection of men to meet those requirements we must add this third step of studying the job to

see wherein it is possible to eliminate from the job those special stresses that make it necessary to pick men for the job.

There is very considerable opportunity I believe for doing this in connection with the design of industrial machinery. Mechanization characterizes American industry. We have increased our productivity for the past 50 years at a pretty uniform rate of about 3 per cent per year. That means that in the course of 30 years we have doubled our productivity per man. Taking all industry as a whole, with spectacular improvements in particular industries, we all know how that changed the complexity of our industry. It has made possible the huge industries of today. It has very greatly increased the problems from the standpoint of the nature of the job.

It would scarcely have been possible to discuss matters of machine design 30 or 40 years ago. They are interested today because of this great increase in mechanization. We now have nearly 7 horsepower of electrical energy and other forms of energy available in industry per worker. I like to illustrate this by calling attention to the fact the worker can not work himself at much more than one-fifth horsepower, so on the average we have the power equivalent to some 30 men under the control of each worker in industry. Now 50 years ago if you had a crew of 30 men you would have a foreman, very carefully

selected foreman, to supervise those 30 men. Today, we are giving one man the power of 30 men in the form of the complex machine.

For the future we may expect far greater mechanization. We saw during the war great advances in electronics, in several mechanisms in automatic calculators and one thing and another, all of which can be applied in industry, with the result it will mean greater mechanization, the single operator controlling far more power than today.

The operator still plays a part in the machine, no matter how complex. There is still an operator. Now this machine we can think of from a physiological point of view as merely the extension of the man. In the old days of the manual laborer the man's muscle provided the source of power and his brain and all the rest of him served as the controlling mechanism. With the modern machine, the power is fed in from the outside. The machine consists of a device for the use of that power, with suitable controls which when manipulated by the man causes this power to perform useful work, so the machine is an extension of the man physiologically. We cannot take it for granted that because the machine is highly successful in its functional performance that it is necessarily the best design from the standpoint of the relationship between the machine itself and the

54 operator.

There is a vague sort of a realization in industry among time and motion engineers, industrial engineers generally, a vague realization that there is something wrong, something lacking, and that there is need for studying the physiological requirements of machinery. In general, however, the engineers around through industry are not acquainted with physiology and physiologists. They have little idea of how to set up systematic studies. Engineers by and large are pretty suspicious of the suggestion you can study man in any systematic way. Nevertheless, they do realize it is time now to do more than merely design machines from a functional point of view. Man hasn't been neglected. I don't mean to suggest that, but the consideration of man has been pretty elementary. The machine designer will have an average man. He says he is so high, his arms are so long, his legs are so long. The working height should be so many inches based on the average man, and that is about as far as he goes.

Could I have the slide, please? (Slide) I have just one slide here. It is a rather fanciful thing taken from a recent article in Fortune Magazine. It suggests what some people are thinking with respect to the mechanization of industry. You may have seen this article, some of you. It appeared about a

35 year ago on the automatic factory, in which it was suggested in the factory of the future the machine would be built not to build a certain part but to perform certain functions, as you break the manufacture of all parts, all pieces of apparatus and equipment down into functions, and then you would have one machine whose function it was to bore holes and another machine whose function it was to turn out rings, and so on. And that through a control station fed into the control station certain instructions. Those instructions would cause materials to be fed to the machine and would cause the machine to perform its necessary functions, and at the end, all these various parts would be brought together and still acting on the instructions from a central control box they would be assembled into total parts.

As I say, that is a bit in the future but I want to use this slide just to illustrate the relationship between the man and the machine. Here in this slide they have suggested the man in the form of these several senses and muscles over here on the left, the operator manipulating the central control box which you see is depicted as the brain and in turn send messages down to this functional machine, has an arm out here with a crude finger on it, and one over here, and that is supposed to manipulate parts and put them on the machine and through the proper instructions in this central station, this machine would do one

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thing one day and some thing else another day.

Well, we haven't gone that far yet, but man still operates a machine through controls. You know it performs all the heavy work. He has to adjust small wells and levers. He has to manipulate delicate controls which in turn through a system of gears and levers and so on cause the machine to perform its task.

There is a great deal of data available in physiology right now, available in pamphlet form and other fields that can be applied at once to the improved design of machinery. More importantly, there is experimental technic of proved value which has been applied particularly in military problems, which can be taken over almost bodily for the study of industrial machine from the standpoint of the operator. We have any number of illustrations of what can be done during the war. One very elementary illustration comes to my mind of how far wrong you can go in the design of a machine if the operator is not taken into account. One weapon I know about proved to be useful or usable by only the smallest third of the military population. Through improper use of the space that was available in the weapon and around the weapon, they were forced to pick the smallest third of the population to operate the weapon.

I am quite sure in anti-aircraft gunnery the tremendous

number of rounds of ammunition that were required to bring down a single plane came about not because of any deficiency in the functional characteristics of the weapon but through the inability of the operator to utilize the mechanical capacities of the weapon simply because he couldn't see fast enough to manipulate the weapon.

Those technics are being applied directly to industry and we only need now to bring the physiologist and the engineer together in industry to set up the necessary research properly oriented to the industrial problem to get going.

Thank you very much. (Applause)

CHAIRMAN HUSSEY: Thank you very much.

Is Dr. Goldwater here?

I neglected to tell you before we started this meeting that Dr. Kehoe, unfortunately, had to leave yesterday, and therefore couldn't be here today, so for so many of you who anticipated seeing him I am sorry you will be disappointed.

The next paper is by Dr. Leonard J. Goldwater, Professor of Industrial Hygiene, Columbia University School of Public Health, who will address you on the subject of "The Physiology of the Bone Marrow in Relation to Industrial Intoxication."

PHYSIOLOGY OF THE BONE MARROW IN
RELATION TO INDUSTRIAL INTOXICATION

Paper by: DR. LEONARD J. GOLDWATER

Dr. Hussey, Ladies and Gentlemen: To cover completely the subject of the physiology of the bone marrow in relation to industrial intoxication would I am sure take a considerably longer period of time than any of us are prepared to spend here this afternoon. Consequently, I shall touch, and only briefly, on some of the higher spots in this rather large subject.

... Dr. Goldwater presented his paper ... (Applause)

CHAIRMAN HUSSEY: Dr. Goldwater's paper brings the program to an end unless some of you have questions you might wish to ask Dr. Goldwater. If you have, you have the privilege now of asking them.

DR. BRIEGER (Philadelphia): We have started only recently to understand and to examine the physiological function of the bone marrow. While we have switched from cellular pathology to functional pathology in other fields, the bone marrow has remained largely the object of cytological examination. Only recently we have learned that the oxygen consumption by the bone marrow is astonishingly low if we compared the high cellular activity with the bone activity..

It is also interesting to note that quite a number of toxic substances have a peripheral effect on the blood and

simultaneously a central effect on the bone marrow.

To the list of toxic substances which have a depressant effect on the bone marrow the thioureas and the thiorams should be added.

CHAIRMAN HUSSEY: Any further remarks or questions?
If not, the meeting is adjourned.

... The session adjourned at 4:00 o'clock ...

ADJOURNMENT

CONFERENCE ON RESPIRATORY INFECTIONS

Tuesday Morning, January 6, 1948

The Conference on Respiratory Infections convened at 9:20 o'clock, Moderator: Austin Smith, M.D., Chicago, Secretary, Council on Pharmacy and Chemistry, American Medical Association.

MODERATOR SMITH: We promised to start at 9:15 and since it is a few minutes beyond, then I believe the session can come to order with probably a minimum of interruptions from now on.

The opening Conference on Respiratory Infections, in fact the opening conference for today in this particular room is one that deals with a subject in which all of you are intensely interested, and furthermore, it is one in which the general population has extreme interest. These people, those of you who are in general practice, consult you constantly to inquire of you what is the latest treatment for flu, the latest prevention; what is the latest treatment for colds, what is the latest prevention and what is a sure cure. Probably they have as much interest because of newspaper publicity in new advances as each of you have in those advances because of the benefits to your medical practice.

Because of the lateness of the hour, with your permission I would like to dispense with some opening remarks. They

will be given to the stenotypist and probably appear in the print later, and instead, concentrate on the things which are to follow, two talks which will be presented by two outstanding authorities, following which there will be a discussion period and if there is time available for questions. All of us who are on the platform urge that you submit questions. We hope that there will be a free discussion.

The first speaker, Dr. Milton Veldee is director of the Division of Biologic Control of the National Institute of Health. All of you I am sure have heard his name and many of you know him personally. That division is the one which is responsible among other things for the control of serums and vaccines and analogous products that are made available in this country and of course under virus vaccines we have many items of particular concern to Dr. Veldee and his associates.

Dr. Barach is Associate Professor of Clinical Medicine, at College of Physicians and Surgeons, Columbia University, and likewise is known to all of you by name, and I am sure to many of you personally, and he will discuss after Dr. Veldee the subject of aerosol therapy. I would like to propose at this time that we reserve the questions until the two speakers have finished.

Also sitting on the platform is Dr. Torrell Sollman,

chairman of the Council on Pharmacy and Chemistry, formerly dean of Western Reserve School of Medicine. He likewise is known to you and those of you who graduated in not even more recent years remember his book on pharmacology.

Now I would like to turn the meeting over in so far as comments are concerned to Dr. Veldee and to Dr. Barach. Each of these individuals has some slides to be shown, and once again I would like to suggest that we reserve the questions until after Dr. Barach has finished his comments, and at this time all of us urge you to participate in the discussion.

Dr. Veldee!

VIRUS VACCINES -- A REVIEW AND EVALUATION

Paper by: M. V. Veldee, M. D.

Dr. Smith, Ladies and Gentlemen: The topic which has been assigned to me is review in the evaluation of virus vaccines. In view of the character of this subject, I have chosen to make my remarks altogether extemporaneously rather than attempt a formal paper. I think perhaps I can bring out the points which I wish a little better that way and still not give it the high standing of a technical paper, which of course it cannot be.

The subject review in the evaluation of virus diseases of the respiratory tract necessitates mentioning several of those diseases, but only one of them is really involved in a virus vaccine.

There are five diseases or groups of diseases which need to be mentioned in the opening remarks in such a discussion. The first of these is the disease due to the psittacosis virus. That has a very definite clinical importance but as a public health measure or as an epidemic disease it has relatively little importance.

As you know, the psittacosis-like virus produces a pneumonia or pneumonitic-like infection of the lung and therefore is confused with a number of other infections of the lungs. On the other hand, it is contracted altogether by rather intimate

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contact or exposure to infected birds with this disease. Therefore, it does not appear in true epidemic form and for that reason there has been no real interest in prophylactic measures other than eliminate the infected birds. With those few remarks, I think we can drop that disease from further discussion.

The second disease or group that should be mentioned is Q fever. Q fever to most of us is a relatively new infection, so to speak, in that we have not encountered it in the past. It primarily was a laboratory infection where most of us had the pleasure of securing it at one time or another if we happened to work in a laboratory where research work in that disease was going on. Under those circumstances, it appears altogether to be an inhalation infection but one of shall I say not virulence but easy to contract. One apparently needs only to walk down the hall in the laboratory where work is going on and he may become infected. I presume the air from the cages is contaminated.

More recently, however, it has come much more to the fore because there has been, as you know, reported outbreaks in workers in certain slaughter houses or associated with cattle. Just at the present time there is quite a number of cases being reported from southern California. They all have a connection with cattle in one way or another. The total number of cases

at the present time is not accurately known but we do know it is in a fairly wide, but still localized area quite prevalent.

The means of spread have not yet been determined and it is proving to be a very interesting piece of research, but what significance it will have in the over-all picture of the total population is not yet fully established.

Naturally, since laboratory workers seem to be so readily infected there was a great deal of interest in attempting to develop a vaccine for this disease, if for no other reason than to protect laboratory workers. Our group out at Manton has been able apparently to produce a vaccine against Q fever. Being a rhabditsial disease, one would believe it should be fairly easy to produce a vaccine along the line we produce Rocky Mountain typhus vaccine. Apparently that is being the case. The tetrose grow readily in the embryo in the egg and the purified vaccine can be prepared from that source.

In experimental laboratory analysis this is producing a fair degree of protection and we hope that there will be sufficient agenicity in the vaccine to protect humans from the disease. Whether it will be a vaccine that will have any real need in public health practice is a question, but certainly if we are to have epidemics in localized slaughter houses, the immunization of small industrial groups may become advisable.

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The third disease or group of diseases which need to be mentioned are the pneumonitis or atypical pneumonias which are mostly surely due to a virus of some nature. We know relatively little about this virus and since it has not been isolated or or has not so far been cultivated in the laboratory. Under those circumstances, no progress whatsoever has been made toward the development of a vaccine which might be of value in this disease.

On the other hand, in view of the fact it is not a true epidemic disease there is, of course, some question whether even if the vaccine were available that it would be of practical use. Where the infection is so slight and the cases so scattered, of course, general population immunization is not a desirable procedure.

That leaves, then, in the group to be discussed two diseases or groups of diseases which have real public health importance, and against which it would be very nice if we had effective vaccines.

The first one is the common cold. What is the common cold? Obviously, there are a great many irritations and infections in the upper respiratory tract which are labelled by diagnosing common cold but it is also equally clear I think that probably not all of them are due to the same factor. We have,

for example, in the spring of the year the so-called rose cold or the cold which is due to allergy.

Then, at other seasons of the year we have other irritations from odors and fumes and things of that type which are irritations rather than true infections, but nevertheless, running through that whole group there certainly are some which are due to a common etiology, and that group should probably be designated epidemic cold rather than common cold, since it does come in epidemic form.

Everyone who is interested or acquainted in the field of immunology feels this type of cold is due to a virus disease. Some years ago, as you know, Dr. Doshay and his associates did succeed in transmitting this infection to chimpanzees, and they acquired a disease very similar to the disease in the human. In view of the fact at that time the only animal available for study of this infection was the chimpanzee, naturally, the research possibilities were exceedingly limited. Since that time the embryonated egg has been developed into a very excellent laboratory test tube and that has opened up a wide range of research which formerly was not available to that laboratory research worker.

In the last year, we have had reports from two different laboratories indicating that they have succeeded in transmit-

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ting to the embryonated egg a virus which in all probability is the virus of the common cold.

A group working at Galveston, Texas, reported in Science in September that they had succeeded in getting something into the egg which in turn produced a disease in humans in every way identical clinically to the infection as it is in a person from whom the culture was obtained.

More recently than that, two of our workers at the National Institute of Health have reported in Science identical results. They have been able to take nasal washings from a group of volunteers at the local institution in Washington and have succeeded in getting into the egg something which is producing or which is able to reproduce in other volunteers a disease which appears in every respect to be the same as the common cold which infected the donor of those nasal washings.

The work, of course, has not progressed far enough to say anything definite as to what the future possibilities are in the way of developing a vaccine for such a disease. So far, at least, and speaking now only from our own group, they were able to get something growing in the egg but, unfortunately, it produces no disease in that egg and there is no way so far of identifying which egg shows any growth and which one does not, and for that reason we can only identify the fact that we have

10 something thereby taking some of the allied or the macerated chick egg embryo membranes and reir .oculating other volunteers. That in itself, of course, is a real handicap towards making progress and also in developing a vaccine.

Now the other difficulty which appears to arise is that thus far there has been no indication that there is any immunity resulting from such an infection. One of the men pursuing this work at the Institute seems to have one cold after another. Each time he picks up a new egg he gets the cold and as far as he knows, it is still the same virus, and if so, it indicates, of course, there is no immunity developing following such an infection.

Should that be the case, then we would have to conclude that we do not acquire any appreciable degree of immunity following an infection with so-called common cold. That probably is in line with the experience which we have all encountered in that we seem to get colds without any real provocation and almost at any time during the year.

It may, of course, be that further work will bring out points we do not now know and which might make it feasible to produce a vaccine of some value, though I think it is fair to say that one would be very, very skeptical at this stage in the game.

That brings us, then, to the other disease or group of diseases of virus origin, of the upper respiratory tract, namely, influenza. You gentlemen know clinically as much about influenza as I do, I am very sure, and it is hardly necessary to review the clinical symptoms and those features of the disease. I only propose to review in a brief way a few things regarding the virus and what can be accomplished in using it in terms of the vaccine.

The influenza virus was first isolated early in the thirties by Smith, Ladlow and Andrews, England, and that particular strain when isolated has been designated Type A Strain Virus. Since that time, Dr. Francis in this country isolated another virus immunologically and otherwise which appeared quite distinct from the A Strain. At the same time, the new strain did produce a disease which clinically was not distinguishable from the disease earlier identified as Type A. Thus we have at the present time two strains of viruses, Type A and Type B, both of which produce clinical influenza indistinguishable one from the other and both of which appear in epidemic form at one time or another.

A study of influenza in the laboratory has been made quite simple in many ways because we do have laboratory methods of getting out virus and of identifying them. That, of course, is of a very great help in studying any disease, - ability to

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find the organism and to handle it in the laboratory. This has been aided a great deal by the development of antibiotics, which in turn are bacteriacidal. It is now relatively easy to isolate the virus of influenza because you can rid nasal washings of most of the bacterial contaminina so when you inoculate your parent or inoculate your eggs you have already eliminated the second egg contaminant and the organism becomes much easier. At the same time, the red cell agglutination technic permits the study of antibody level in patients or people treated with vaccine. This, of course, gives a very good guide to agenic properties of various strains and also the comparison of the results which occur following an actual infection which follows the use of experimental vaccines.

Now at this point I should like to show you a few slides, none of which are mine, of course, but have been taken from various published papers, to illustrate what is accomplished by an attack of the disease or immunization following the use of vaccine.

If we can have the slides in order, now, please.

(Slide) What I wish to explain in these first slides is that there is a degree of measurable immunity. Well, this first slide is presented to show merely that following an infection with clinical recognized influenza and clinically proven influenza

by isolation of the virus we get antibodies in the serum. This happens to be only influenza A. We should show exactly the same results if the slide were prepared for influenza B. What we are interested in here primarily is the antibodies in an outbreak of influenza A. The titer has gone up to this level, whereas in the control population it was approximately 200. That is the red cell in the gluten titer. Correspondingly, in the same individuals there was no rise in the titer against influenza B. Roughly it is about 150 and slightly actual in your control population.

(Slide) This slide shows what results from the injection of one dose of poly-virus vaccine, taking A first. The agglutination in this group was 147. Following the injection of the vaccine it rose to this level, which if you will remember the previous slide is roughly in the same level as resulting from an infection. That is 1780 there. The virus also contained influenza B, and here the pre-vaccination was 249 and the post one slightly over 1,000, so you had a rise here of about 12 times in the antibody titer here and in this instance 3.5.

Of course, one must not take these figures too seriously in that in another corresponding group the differences might even have been in the reverse order, but still it does demonstrate you can produce an antibody rise in persons receiving

injections of antibody vaccine and those rises are in proportion to the rises which result from the rises of an actual infection.

(Slide) This study which I think was done by Dr. Solket of Michigan is shown to give some idea of the duration of antibody level in persons receiving vaccine, here again, taking the type A. The pre-vaccination at 59 and two weeks later 548, a slight growth in four months and a further growth in one year. The B component started approximately the same level and more or less follows the same picture.

Now I do not believe that you can assume from these few figures at least that immunity necessarily lasts for a full year merely because you had this titer, because if you will recall from the earlier slide, our control groups had a relatively high titer in themselves. So that one cannot say from this slide alone that these people were immune for a whole year. There is a very good probability that they were immune here for two weeks and also they had more than the average immunity for four months, but at the end of the year their sensitivity backed down to normal.

(Slide) Now what is the effect of influenza vaccine in a population with regard to the prevention of the disease itself? This table, as you probably will recognize represents the summary of the experience which led up to the adoption of

influenza virus vaccine for military use. There are certain drawbacks to the table and that is principally that the interval between immunization and the outbreak was a relatively short time, a matter of a few weeks, so that we have no measure here as to the durability of the immunity and also we have no measure as to its ability to protect against real severe influenza.

These happen to be very mild outbreaks, so that with those exceptions we can say that you do get a degree of protection against prevailing type of influenza, a vaccine which this represents. There were over 6,000 persons vaccinated, again another control of an equal number, and the number of cases you see were 139 in the vaccinated and 442 in the control, which gives you of all the cases 76 per cent appeared in the control group and about 24 per cent in the treated group. Those are certainly not spectacular results in any way. If you were to compare this, for example, with the results obtained through the use of tetanus toxoid, the difference certainly would be most striking, because in the use of tetanus toxoid in the military the results were almost 100. In fact, they were so good it is the outstanding demonstration of what a good antigen does accomplish.

I believe it is fair to say that this is probably at the other end of the scale. It is a relatively poor result, but we must remember that they are preliminary results with the

vaccine which was still in the developmental stage and probably not near as good as is now being made or as could be made with further experience.

(Slide) I asked our slide-maker to use the table in this instance but by mistake he elected to make it from the graph. However, this is influenza B now. There were 600 persons in this group, - this happened at Ann Arbor, - 600 persons in the vaccinated and about 1,000 in the unvaccinated. As the epidemic proved to be by isolation of the virus, you will see it is influenza B. In the unvaccinated group we had a total of 109 cases, the black lines, and a total of only 7 cases which is represented by these small squares, so that here the results are quite striking in their protective value of the influenza B component against this particular outbreak.

Now again, you must remember that the vaccine was given only about two weeks or so before the outbreak occurred. Two weeks is probably the optimum interval at which to inject influenza virus vaccine based on antibody level titers.

(Slide) This illustrates the results at another school, namely, Yale University, in a small outbreak of influenza B. There were two groups attending the university at that time. One had previously received the prevailing influenza virus vaccine, whereas the other had received no vaccine, and the

results are pretty well indicated.

You see the outbreaks were proven by the fact that influenza B actually were isolated from 13 out of the cases studied, and in 36 others there was a definite serological rise of influenza B. In terms of actual cases, the navy group which had received no vaccine had 132 cases and the army had only 3 cases. Now I think that is a very fair study in that these boys lived under essentially the same conditions and went through the same medical clinic for their care, so that as near as two groups could be identical I think it is correct to say that these were identical. Just at the moment I do not recall how long before this epidemic occurred the army personnel had received their immunizations. I am sure it is correct to say it was a relatively short time. I think it was a matter of just a few months.

(Slide) This brings up one of the sour notes in influenza vaccine up to the present time. You probably are fairly well aware there seemed to be no value in influenza virus vaccine with the season 1946-47, namely, the last winter. Immunization seemed to fail. Cases occurred just as frequently in the immunized as in the unimmunized. One could explain that in either of two ways: Either the vaccine was no good and did not build up immunity or we were confronted with another strain

of virus which evidently was different from those used in preparing the vaccine. As it turned out, the latter proved to be the case. You will see here there is no protection in this group whatsoever, though they had previously been immunized with the prevailing vaccine. The rate here is 7.19 and here 8, so that one group was no better protected than the other.

Laboratory studies in many places during that winter showed that a prevailing strain was antigenically different and the strains used in the vaccine did not produce an antibody which covered or immunized the antigen of the strain then prevailing. I will refer back to that a little later.

(Slide) Now this slide is only presented to illustrate what you gentlemen already know, namely, that the symptoms of the prevailing type of influenza is so uncharacteristic of any specific disease. In other words, it represents symptoms which we may have from influenza A. We certainly have it with many of the things which are called colds and even other mild infections give a list of symptoms similar to this, so that when we diagnose a disease as influenza in the community without having it verified by laboratory isolation of the organism it may not mean very much.

Those are all the slides. Now through these slides which we have hurriedly looked over I think it is fair to conclude

that there is an antibody rise following an infection with the virus of influenza. That antibody rises either with an infection of influenza A or with influenza B or with some of the sub-strains of either of these.

At the same time, the antigen shows that a similar type of antibody rise can be stimulated by the injection of hale culture virus propagated from the fluid of the embryonated chicken egg, and in clinical studies, such as they are, and unfortunately, up until now they are a little bit limited, it was demonstrated that if you have a strain prevailing in a community antigenically similar or antigenically identical to the strain used in preparing the vaccine, you can't expect a degree of immunity which gives protection against the prevailing disease. Thus far, the evidence seems to be satisfactory.

Now, there are certain deficiencies in that evidence, and we might enumerate them in rather brief order. The first deficiency is that we have only had experience with relatively mild influenza. The question is always raised, will this vaccine prevent against severe influenza, such as we had in 1918-19. Well, the truth of it, of course, is that we do not know. During the 1918-19 outbreak the method for isolating the virus was not known, and as a result, we do not have available any place a culture from that outbreak. Everyone assumed that it was a typical

influenza organism but there is no clear-cut and accurate data to back that statement up.

The next deficiency in our data is that thus far the immunization or the studies have been made on small groups which may not always have been a fair representative group of the community as a whole. Those of us who are engaged in research work know that a laboratory experiment sometimes does not always prove the same when tried in a community experiment. While I think it is fair to say that we have suggested the community experience might be the same, yet we would feel much happier if we had such experience back of our data.

The other deficiency is that the immunization studies have been on a very short-time basis. The slides which I showed you showed results only from immunizations having run for two weeks or perhaps a month or some very short time like that. Obviously, if we don't have immunity lasting longer than two weeks or a month, community immunization becomes an impractical procedure.

Now what still are the problems unsolved, problems relative to the use of influenza virus vaccine? This season at least the great question is, what coverage can we expect from influenza virus vaccines? We have already demonstrated that the existing vaccine can certainly represent the best vaccine

that could be made on the basis of knowledge at hand. We have demonstrated it failed to cover the outbreak of last year. How often will we encounter variations in the prevailing strain so that the vaccine used will not cover? If this is going to occur, very frequently, vaccine production will lag about one season behind the prevailing epidemic. In other words, it takes a matter of four, five, six months or so to get a strain isolated, get it acclimated to growing and to produce a vaccine, so that it is at the moment at least impossible to keep ahead of the prevailing strain if that strain is going to change antigenically from season to season. The chances there will be such a change are quite remote I think. This one of last year was the first one we had encountered since the research work with the virus was undertaken.

This year, we are commencing to have an outbreak on the west coast and from all indications at the present time it is a type A strain which antigenically is covered by the prevailing vaccines. So that if eventually we can isolate enough strains from epidemics year to year so we will have all the antigenic strains available, then we should be able to produce a vaccine which will antigenically cover from one year to another.

Now the other problem from a public health standpoint is duration of the immunity, and until that is more adequately

solved we still will have a big question as to whether immunization is a public health practice which can wisely be undertaken.

It seems to me almost impossible to expect that we keep the population immunized if immunity is going to be only a matter of months. Even if it would be only one year it would still become a difficult problem to immunize the entire population each year.

On the other hand, it might be feasible to keep selected groups immunized on that basis; industrial groups or institutional groups could be protected.

The problems of production of the vaccine have been I think entirely licked. I admit it seems a very large undertaking to handle so many things and produce vaccines in the large quantities used. However, industrial methods have improved so that laboratories are able to handle thousands of eggs each day and produce vaccine with relatively small loss due to contamination or failure of the virus growth. One laboratory finally attained the high level of handling something like 10,000 eggs each day for six days a week. Now that is really big business in the handling of fertile embryonated eggs and to most of us who had anything to do with it I think we are still surprised that it could be done and could be done with as little loss as actually proved to be the case.

Now I think in summarizing I should like to read a short statement from a report which appeared in the August issue of the APHA and is prepared over the signature of a study committee on vaccination against influenza, as to the specificity of effect:

"On the basis of present knowledge, influenza virus vaccine appears to have an effect of a rather specific nature against infection by influenza A and influenza B. There is no evidence of common colds and other unidentified respiratory infections. Nor is the effect of vaccine as now constituted against all the possible variant strains known. There is no satisfactory evidence of protection against such an epidemic as that of 1918."

And then: "General Application. Influenza A has occurred in epidemic form at intervals of 2 to 3 years; influenza B, at intervals of 4 to 5 years. It was anticipated on the basis of the preceding experience that an epidemic of influenza A would occur in the winter of 1946-47; blustery, irregular outbreaks of the disease were identified in the spring. The time of the recurrences cannot, however, be rigidly predicted. Although the epidemics have been widespread, the clinical disease has been generally mild and of comparatively low incidence. The resistance induced by vaccination is now known to persist

effectively from one season of prevalent respiratory infections to another, and the expense of the vaccination must be considered.

"In view of these considerations, a recommendation for general employment of influenza vaccine by health departments is not warranted administratively at the present time." (Applause)

CHAIRMAN SMITH: Thank you, Dr. Veldee, for your review and evaluation of virus vaccines.

This will be followed by a discussion by Dr. Barach, College of Physicians and Surgeons of Columbia University, whose discussion is on "Aerosol Therapy in General and Industrial Practice." Dr. Barach!

AEROSOL THERAPY IN GENERAL AND INDUSTRIAL PRACTICE

Paper by: Alvan L. Barach, M.D.

Mr. Chairman, ladies and gentlemen: I propose to omit the history introduction of this paper and present to you first the summary of the results obtained, and then to illustrate certain features of aerosol therapy with lantern slides. If time permits, I shall then discuss the relation of the particle size to the deposition and absorption of chemotherapy and anti-biotic aerosol in the lung.

... Dr. Barach presented his paper ... (Applause)

CHAIRMAN SMITH: Thank you, Dr. Barach, for your review of aerosol therapy in general practice.

For a few minutes we will have a question period. I assume, like in college days, you will want a seventh inning break, at least before the next session begins, but in the next five or ten minutes we will have an opportunity for the answering of questions.

In order to open the discussion, I would like to ask Dr. Veldee a question, because I know that it has been confronting many of you at many times.

Dr. Veldee, there are on the market today many so-called vaccines which the Council of Pharmacy and Chemistry has not yet recognized for the very simple reason they do not believe them efficacious. Could I ask you to comment on that?

DR. VELDEE: Well, Dr. Smith, my first answer is I do not see how you can immunize against a specific disease by the use of another antigen which is totally different in every way.

My second answer would be that during the year 1920 the prevailing opinion seemed to be that many of the colds were due to bacterial organisms commonly found in the upper respiratory tract. Also due to the stimulation of the Bess Reed Case work, the impression got around that you could immunize against these organisms by the oral taking of certain vaccines in tablet

form. I am sure that I am correct in saying that since that time bacteriologists and immunologists have adequately demonstrated not only that you cannot produce immunity against these organisms irrespective of how you administer them but also that you positively cannot produce immunity against them when you take it by mouth. So that on the basis of evidence of that type, I think it is fair to say that that prevailing opinion has long since acquired very long grey whiskers and has been put away in moth balls.

Nobody today who is acquainted in the field would at any time recommend therapy of this type to prevent a disease of an entirely different etiology.

CHAIRMAN SMITH: Thank you, Dr. Veldee. There presumably have been published in the literature in the past several papers which on the surface would appear to present the belief that cold vaccines when taken by mouth might be efficacious. However, it is entirely possible they can be explained as a statistical coincidence, and I would like to ask Dr. Sollman to comment on that if he would, because his knowledge of experimental medicine and therapy extends over many years. Dr. Sollman!

DR. T. SOLLMAN: Mr. Chairman, from the ancient times, as pointed out especially in Beacon's work, this matter of coincidence of seeing the things that you want to see, that it

would be nice to have occur, impressing themselves upon you, is very much less painful than the things that would be disappointing, has been a pitfall into which everyone projects himself unless he protects himself by some method that is not so subjective.

The most effective of those methods, of course, is the statistical analysis of the results in comparison with control groups. This matter of the need of control groups and then of careful comparison by some sort of statistical method, which need not be perhaps entirely orthodox, as long as it employs common sense, some sort of statistical comparison is absolutely indispensable if a person is to get any real result. I presume, Dr. Veldee, you have taken statistical data of this sort for the basis of the statement you have made.

CHAIRMAN SMITH: Thank you, Dr. Sollman.

Dr. Sollman has probably expressed the thought that sometimes without control experiments too much wishful thinking enters into the results.

DR. O. A. SANDER (Milwaukee, Wisconsin): I have been asked, of course, and many of you have, should we immunize this year or immunize next year. I heard Dr. Veldee say that because of this new strain last year, because of the possible new strain this year, that it would be impracticable to recommend vaccina-

tion of industrial groups unless a clear-cut epidemic of A or B seemed to be developing. Now the Los Angeles epidemic would seem to be a clear-cut A; if it begins to spread, I am wondering if Dr. Veldee then would advise that we should start vaccination.

CHAIRMAN SMITH: Dr. Veldee?

DR. VELDEE: Following the isolation of the new strain, which prevailed a year ago, namely, the FM-1 strain as quickly as possible the producers of vaccine on a commercial basis were urged to get that strain into production, so that now the vaccine which you purchase on the market not only contains the three strains previously there, namely, PR-8 and which is of the type A and Lee of the type B, but in addition, a certain percentage of the FM-1 components, so that we should have this season a better coverage than we had a year ago when vaccine failed because of the appearance of FM-1. As it now appears, the outbreak which is prevailing in southern California is certainly of a type A variety or strain.

But so far it is not quite the time to say whether the prevailing strain leads more to the FM-1 substrain of A or to the FRA, but it does look as though it is covered by the present vaccine. Now, whether you should immunize or not, I think will have to remain a decision for yourselves, since one cannot lay down, I believe even yet, fixed rules for the country as a whole,

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and I believe that is well brought out in that report from the committee from which I read.

CHAIRMAN SMITH: Thank you, Dr. Veldee.

Now are there questions?

DR. DINBERG (Harvester Company): I would like to report on an experience we haven't published as yet. We immunized 17,000 workers and had 7,000 controls, in the spring of '46-'47, and after examining our figures we came to the conclusion - these were analyzed statistically - that we had no benefit from the vaccine at all. As a matter of fact, there was a flu epidemic in the early winter of 1947 and so further studies - these workers were principally in the Chicago area - at the University of Chicago showed that this epidemic was again an A variable in strain. This was a rather large experiment and we followed the workers from October of '46 to April of '47 and our results showed that the vaccine was ineffective. We decided, however, that we would not go ahead with the vaccine this year. Should this epidemic of influenza in Los Angeles be specifically identified as A, I should like again ^{to ask} the same question as Dr. Sander. How long should we wait before we go ahead and immunize our people?

DR. VELDEE: The indication is the height of your immunity result is reached in about two weeks. Does that

answer?

DR. KENNETH PEACOCK (New York): Many of us that had the unfortunate opportunity of seeing that terrible stuff in '18 and '19 felt so far as we were able to keep track of particularly the men in the service who had influenza at that time, that practically none of those individuals had recurrences of influenza.

Now in your epidemics, as you say, particularly the one type of vaccine, the one type of A you mentioned recurred say in 4 years or so, in epidemic form. Was that what you stated?

DR. VELDEE: That was when I was reading from this report, that epidemics of A are apt to appear in that cycle, but not necessarily in the same individual.

DR. PEACOCK: There are just two points that are interesting to me. In the work you have done on influenza have you any records on how long that will protect, or if it does protect? If your epidemics do recur more or less as you state, isn't that somewhat an indication of more or less mass protection after an epidemic has passed?

DR. VELDEE: Well, I am sure there is a period of immunity in those who have had the disease, but personally, I do not have statistics to bear out how many years that immunity would last, but the fact remains as this report states, the out-

breaks do appear in these cycles, but of course, there are always plenty of individuals in the community who did not have the infection in the previous outbreak and they would likely be candidates for this next one.

CHAIRMAN SMITH: I think we would have time for about two more quick questions.

DR. LEONARD ARLING (Minneapolis): What is your opinion of the pneumococcus effect?

DR. VELDEE: The experience with that, of course, is very limited in that not many good control studies have been made. That one in North Dakota was very encouraging and again I think the question is who should be immunized and when? I think it is fair to say that it is not a type of immunity which you would want to apply to a community irrespective of age and occupational status. I may say that we have recognized the product for license by the Squibb Laboratory and they hope to make the preparation available for those who wish to use it.

CHAIRMAN SMITH: That is interesting. Incidentally, bearing on that particular problem, in the past only proteins have been regarded as capable of producing antigenic vaccines and now you have the polysaccharids and there is some interesting speculations as to what it may offer.

Dr. Barach, have you any comment?

DR. BARACH: It seems to me in those cases that are apt to get recurring infection with bronchiectasis, in the case of the bronchial disease that would be a worth while thing to immunize them with the product.

DR. LONG (Philadelphia): I would like to ask Dr. Barach if he had any experience with or advice on the use of streptomycin aerosol in early active pulmonary tuberculosis.

DR. BARACH: We have used streptomycin aerosol in cases of laryngeal tuberculosis and also in animals. It does protect in animals and it does seem to be of value in laryngeal tuberculosis. It is also true that streptomycin intermuscular is of value in laryngeal tuberculosis. Most of the reports use both aerosol and intermuscular injection of the drug. We haven't actually used streptomycin aerosol in early pulmonary tuberculosis. We haven't used it now for the most part in chronic pulmonary tuberculosis. I do know that Dr. McDermid and Dr. Mushinham have used it in cases of tuberculosis that have started mild and have spread so they get a mottled lesion.

I would say in our experience we haven't tried it in early pulmonary tuberculosis.

CHAIRMAN SMITH: Thank you. I know we would like to have more questions and answer them, but 11:00 o'clock is upon us and on behalf of these individuals on the platform, I would

like to express our appreciation of the kind, thoughtful attention you have devoted to the subject, and Dr. Veldee, Dr. Barach, and Dr. Sollman, I know I speak for the audience when I say we all enjoyed hearing you and we do appreciate your being here.

... The session adjourned at 11:00 o'clock ...

ADJOURNMENT

TUESDAY MORNING SESSION

January 6, 1948

The Conference on Nutrition in Industry convened in Club Room A of the Cleveland Auditorium, Cleveland, Ohio, at 9:30 o'clock, a.m. Dr. James S. McLester presiding.

CHAIRMAN McLESTER: The future of the nation in these troublous times depends upon industrial capacity and this, in turn, depends in no small degree upon the nutrition of the workers.

In discussing Nutrition in Industry, therefore, you are considering one of the means through which the destiny of the race can best be insured.

We are fortunate today in that the discussion is to be lead by two men who have done outstanding pioneer work in this field.

Dr. Charles C. Lund was the first man to point out the paramount importance of adequate nutrition to the surgical patient. His brilliant work has demonstrated that if the injured person, or the person to be operated upon, is to have the best opportunity for recovery, then he must be adequately nourished.

Dr. Robert S. Goodhart was Chairman of the Committee on Nutrition in Industry of the National Research Council, and

much of the wonderful accomplishment of the American worker, during the recent war, can be ascribed to his efforts and to that of his colleagues.

Now, the first thing we are going to do is ask Dr. Lund and Dr. Goodhart to say something, and then you will be invited to ask questions of these men and they will answer.

I will now call on Dr. C. Lund, Assistant Professor of Surgery at the Harvard Medical School.

Address by: Dr. C. C. Lund, Assistant Professor of
Surgery, Harvard Medical School.

Subject: Nutrition in Industry.

What I am going to talk about is the result of a lot of cooperative work done with many colleagues in several different departments of Harvard University, and of the Boston City Hospital.

I will begin with Dr. John Crandon, who is the Registered Surgeon in the service with which I served back in 1937 and 1938 when I was studying Vitamin C in relation to surgical patients.

Then, going on to Dr. Stanley Levison, in Ross Green, who was Resident on the burn assignment during the war. Then, in the Thorndike Memorial Laboratory, which is a medical laboratory in Boston, we have Dr. F. L. Taylor and Dr. Charles Davidson. In the Fatigue Laboratory, of Harvard Business School, and that is the right address, Dr. Robert Johnston and his colleagues.

Now, my work has to do with nutrition in relation to major surgery of all kinds. It is not focused entirely on industrial surgery, but the implications of the work go right into industrial surgery. Many of the patients on which our studies were made were the result of actual industrial accidents.

I can point out one or two of them later.

Now, my talk is going to be about the factors, nutritional factors, that influence the recovery from injury and to some extent, the recovery from illness.

To repair a wound one has got to create in the neighborhood of the wound the conditions of nutrition, of oxygen supply, of pH, so that cells can divide. The division of cells cannot take place when there is too much difference from normal in any one of a dozen known directions.

Now, the factors that our data is concerned with, and that I will speak of today, are the protein metabolism and the metabolism of Vitamin C, thiamine, riboflavin and nicotinamide and, presumably, there are many other factors that are of importance but on which I have no data.

If a patient, for instance, is badly depleted in protein tissue, edema occurs spontaneously. If a wound occurs in a person who is depleted, but not badly enough to have spontaneous edema of the ankles, there will be edema of that wound. If Vitamin C is too low the cells cannot lay down new capillaries and cannot form intercellular binding substances.

If thiamine is low, then the injury is not so much a cellular injury as an injury to the entire system, which makes the patient more susceptible to shock, traumatic shock.

Incidentally, Vitamin C has a part to play in traumatic shock which is not too well understood, and protein has a part to play in shock. All these substances, if depleted, provide more shock than the patient would otherwise have. Riboflavin is important in repair, and niacin is also important in the same enzyme system.

Now, what are the situations that a surgeon is faced with in studying and trying to correct some deficiencies? How frequent are such deficiencies? First I must say this, - that the keynote in recovery of a patient with an industrial injury, or any other injury, is "Surgical Care." You can't make up for good surgical care by any nutrition, but you can help out and save time with good surgical care if the nutrition is taken care of.

There isn't any question that many badly nourished people have recovered from illnesses. We cannot, in surgery, put anything in front of good surgery. That means correct reduction of fractures, proper treatment of shock, proper prevention of shock, proper correction of internal injuries, and all that goes with good surgery which I won't go into now.

Now, there are two situations in regard to these patients. The first situation is the nutritional status of the patient at the time he is injured, and there are a surprising

number of people in the population who have not gotten full-blown deficiency disease that you can spot as they walk down the street and say, "Here comes a man with scurvy." But, there are many who are so close to these deficiencies that a very small injury will upset them greatly and on whom some nutritional therapy will ^{be} a great deal of help. I can point out one or two such patients in the charts that I will show. So, you can consider that a certain percentage of your injured people may be in poor shape, nutritionally, at the time they are hurt.

Now, the second thing is concerned with the damage to the nutrition that the injury itself does. In order to furnish the Vitamin C, for instance, that is necessary to repair a large burn, the body will take it from any place it can get it, and that means it will take it from the blood and from the body fluids, and probably it will deplete the fixed tissues in the body rather rapidly. I say "probably" because I can't prove it. All we know is that the patient with a large wound, of which a burn is the most striking example, does become depleted in Vitamin C very rapidly unless Vitamin C is supplied in large amounts.

Now, with that introduction, I am going to go over some of the evidence with you by showing a few slides.

The first slide is from the New England Journal of

Medicine in 1939 or 1940, from an article by Crandon and myself on the recovery from scurvy that Dr. Crandon produced on himself.

He went on a strict diet, scurvy-producing diet, while working as a resident in the hospital. He maintained the diet for six months. At the end of that time we demonstrated, by an experimental wound, that the wound would not heal. Then he was treated for scurvy and this is the result of it. This is part of the record of the treatment.

Three months before we had made a wound which had healed. We made those wounds in a way so that we could not tell, within any close range, whether healing was completely normal or not. There has been evidence shown by other workers, Dr. Chester Jones and Dr. Marshall Bartlett, of Boston, Massachusetts, that three months deprivation of Vitamin C, in a patient who was otherwise normal, would produce a condition where healing is impaired, but it does take place.

Now, at the end of this time, and for several weeks before, the Vitamin C level in Crandon's blood was absolutely zero. It was also zero in his white blood cells.

On April 27th a gram of C was injected intravenously, promptly, - it was not given in a slow intravenous or by 10 cc's at a time. It was all pushed in within a minute. That upper

left-hand chart is an excretion curve and a blood curve of the C.

Now, those figures over at the left indicate the milligrams per hundred cc in the blood and the decigrams excreted from the urine. Decigrams are not used much in medicine, but in order to have the figures come out even we used them. What it amounts to is that in the first hour one-tenth of that gram went out into the urine, and in the next two hours practically nothing, and at the end of the hour the plasma showed about little more than twice as much C as the normal person would have.

You notice how rapidly it was excreted. At the end of one hour there was a normal figure, and at the end of two hours it was almost down to zero. From then on there wasn't any.

The next morning the figure was again zero. That indicated that that gram of C, except for the one-tenth part of it that went into the urine, was gobbled up by the tissues. There was a great deficit and it went right out of the blood into the tissues.

The next morning we gave him another gram, just the same way, and you can see that the blood figure went a little bit higher. It stayed a little bit higher, and half again as much went into the urine. It still was, essentially, gobbled

We were giving her what we thought were rather adequate doses of all vitamins, but we had had so much to do, so many other things to study, that we hadn't done tests for Vitamin C or for any other vitamins.

During the early stages she had a lot of grafting done and then she got in such bad shape that the dragstedts were not healing, the grafts were melting away, and we couldn't understand it because we were pouring in the protein and we were giving vitamins at the rate of two hundred and twenty-five milligrams a day. That is shown by this column along here.

Now, that was given in the form of three multicebrin capsules a day which gave her two hundred and twenty-five milligrams of C, plus three times the supposed daily requirement for the other well-known vitamins. Yet, when we finally got around to testing her on the two hundred and twenty-fourth day she had zero in her blood.

So, the next day this dose, here, was given after that determination. We gave her a gram intravenously, in addition to what she was getting ordinarily, but on the third morning it was still zero. On the fourth morning it finally worked itself up to point-four, and on the fifth morning it was up to point-five.

Then we shifted her to oral doses and it stayed all

right. Now, that was one step that resulted in the final recovery of this woman. That explained something to us that we had had no conception of until the date of this work, which was 1944, and that is that three times the daily requirements for the healthy person, of Vitamin C, isn't enough for certain persons with serious infections, such as burns.

It isn't even enough to allow them to avoid scurvy. This patient had scurvy. She was lying on her back and she didn't show any signs of it, but she did have it.

Next slide: Now, here are some saturation tests that we did later, - not on this patient, but on another patient. They are a little bit confusing. This was a woman with a rather small burn, only about three percent of the body area. That would mean three times the size of her hand and fingers, extended like this, and this burn was somewhere on her side.

She was a housewife of about middle age, and reasonably healthy looking. We discovered that she never liked fruit and she never ate it. She also didn't like the hospital diet, and so she didn't eat the diet very well. The best part of the diet was the fruit and she wouldn't eat that.

We did a skin graft on her and got a complete, absolutely zero take. This was just about the time we were getting started on test determinations and so we did a saturation

test.

Now, here are some standards. These are half, one and a half, two, two and a half, three hours after a gram of C has been put in intravenously. This shows what happens to it. Wait a minute, - this is not a gram. Let's start over again. This is the zero point here, - this is before the injection. This is not a gram, this is a quarter gram. This is a small saturation test which we used in some of our experiments.

A normal man starts at just over one point, zero, and goes up in half an hour to a little under three, and then comes back in four hours to where he started.

This patient started at zero and went up to one and a half, back to zero in two hours, etc. We had some patients with true scurvy that were diagnosed on the medical ward. Some of them showed almost the same curve.

Now, here is the excretion chart. These excretions are cumulative. That is, you will find in the first half hour specimen forty milligrams. In the next you have twenty and you add the forty to the twenty and you put your dot here. You get another twenty-five here, and then you add so that this is the total that has been excreted in the four hours. This is the normal and you see that about half of the quarter gram is excreted. Here is the survey on this patient and you will notice

they are exactly the same.

We treated this patient, in fact we over-treated her. We kept her going on a large dose for a good many days and then we did a curve again. We also treated the scurvy patients and you can see that they all gave the same blood curve. Here you see that they all gave pretty much the same excretion, urine excretion, although this patient even after twenty-five days treatment was still storing the C, storing more than the normal.

Next slide: Now, that was what a small burn will do. That is the patient that I spoke of who comes to you with an injury, who is close to scurvy, and then with a small burn gets scurvy that prevents healing.

Now, here is an industrial accident case. This was a very healthy thirty-three or thirty-five year old machinist. He was a high-grade man working on magnesium parts of some complicated machinery. There was a lot of magnesium powder in a pile adjacent to the machine where it had gotten rubbed off by the cutter he was using. Somehow this powder got on fire and that causes a very intense flame. Fortunately he was clothed in wool and didn't have much grease on him and his clothes didn't catch fire. He got a flash burn of his face and of his hands.

Now, this was a good stiff flash burn but it wasn't

third degree except for the tips of his ears which he lost. Now, the face is three percent of the body area. His hands and a little on his forearms made another four percent of the body area and so the total was seven percent of the body area, - none of it third degree.

He didn't eat anything for about five days and his face swelled up. He was such a healthy man and he had such a good history of normal food in the past that we deliberately withheld vitamins and high protein intravenous treatment because we knew that he wouldn't get in too bad shape. So, we have a record of what happens to a man with this moderate burn without any vitamin therapy at the start.

You see, promptly, his plasma of Vitamin C, on the fourth day, reached zero. Now, Crandon had to go without Vitamin C for about seven weeks before he got to zero. So, something knocked this man's Vitamin C right down. Down in here his intake begins, but notice that it is a very small intake. It is .1, .3, .1. All that is calculated out of oranges. We gave him large amounts of orange juice and, except for the saturation test, he was given no Vitamin C intravenously or by mouth.

You see, here, his output dropped right down to zero. This dotted line, across here, indicates average output of supposedly normal people who were not taking supplementation.

Here we come, for the first time, to thiamine findings. These are output figures. You can't do thiamine in the blood, as yet, or any of the B vitamins. Here you see that it is definitely low until you come along here when he began to eat and his burns began to heal. The same thing is true with riboflavin, and the same is true with nicotinamide.

Next slide: Here is the vitamin saturation test on him on about the tenth day. That is a bum figure there. Again we have to apologize for something going wrong in the laboratory because it is impossible for the C to jump up and then drop down and go up again when all of it was given at this point. The urine shows a perfectly good curve.

Now, he was given a large saturation test. He was given a whole gram, but he only put out a quarter of it. That means he had a need for his tissues and he took it up. This curve shows the same thing and maybe the bad thing there is that we got a high value.

Now, this is what a really terrible burn will do. I am not showing you many of these pictures. This shows much more than vitamins, this shows proteins plus vitamin deficiencies. This patient was treated long before we started the vitamin studies and we gave him Vitamin C at somewhere between two and five milligrams a day which we thought was plenty.

This was the worst surviving patient from the Coconut Grove fire. I have shown this slide before, and it has been published, and some of you people may have seen it. This picture shows this man a very few days after the fire when he still remained fairly well nourished. Here he is at the end of a hundred and fifty days when he is beginning to get better.

A little prior to that he got into a terrific nutritional edema. There is a loss of weight there of about seventy pounds. Those are bed sores on his ribs, and there is another one over his illium which occurred because he had to lie on his face for such a long time. His whole back was burned.

Next slide: Now, I want to say something about the nitrogen metabolism as well as the ascorbic acid. After a burn, after certain other injuries where there are very large draining wounds, a great deal of protein goes into the outside world in the form of pus or blood and is lost nutritionally. Early after any injury a great deal of protein is broken down in the body and excreted by the kidneys in the form of pepsin and proteose. The result is that these patients, with these severe injuries, have tremendous losses of weight.

We did some studies to see whether we could put protein into patients as fast as we were losing it. Now, here is a man who was burned at least as badly as the man you saw

and he did not survive, - we were not able to save him.

On the first day he really got a good nitrogen intake, but that is a pretty artificial figure because that is calculated almost entirely on the basis of plasma and whole blood which was given to treat the shock. It was not really given for nutritional purposes and may not have had much nutritional effect.

Along here he got five or six grams of nitrogen a day which is only half the normal intake of protein for a person who is not ill. Therefore, he dropped weight and strength very rapidly and just in the urine, without checking the protein losses on the surface, he put these amounts out.

By the fifth day we really started treating him, mostly intravenously, and we were able to balance what he was putting out in the urine. Then we pushed him harder and harder, both intravenously and through the stomach tube, but we couldn't gain. As fast as we put protein in it would go out and the excretion from the urine, all through here, represented the break down of a tremendous amount of tissue.

Now, to show that we were really giving him calories as well as protein, - you can see we reached a point here where he was getting thirty-five hundred calories a day. He was given ascorbic acid. The first day he was given half a gram,

the next day one gram, the next day a gram and a half. He was given a gram a day here and then we dropped it down and he received this dose, here, which was about seven hundred milligrams a day. His plasma and ascorbic acid went right down to zero. After two days of two grams a day it finally went up again.

Now, I don't believe there was anything we could have done to save that man, but that shows what terrific changes in nitrogen metabolism and vitamin metabolism occur in these patients that have thirty or forty percent of the body burned in third degree burns.

Next slide: Now, here is a surgical triumph. This was not an industrial accident case, this was a street accident. This man was hit by an automobile while he was a pedestrian and he was brought into the hospital with a very obvious compound fracture of the lower leg.

After he had been x-rayed and had returned to the operating room for something to be done to his leg, it was noticed that he had bloody urine which hadn't been noticed before. It was also noticed that he was going into shock.

The Burn Assignment, at that time, was studying all kinds of shock. Our resident was called and it was perfectly obvious that this man had an inter-abdominal injury, not of his bladder, and that he also had a kidney injury.

We operated on him, after giving him a lot of blood, and found free blood in the belly but it was all coming from the kidney. So, his belly was sewed up and he was turned over on his side and his kidney was taken out because it was busted completely. This operation was done under spinal and it was found that he had a bloody spinal fluid. That led to the additional diagnosis of a fractured skull, and on the next morning he had pneumonia.

In the meantime he had been given almost his full blood volume of new blood and so the next morning we gave him everything we could think of that might do some good. He got very large doses of penicillin, and then he got nutritional therapy in the form of intravenous proteins and intravenous vitamins. I also want to tell you that he got nothing by mouth for a week, all this nutritional therapy was done intravenously and not by mouth or stomach tube.

During the first week he was given over three thousand calories a day. Now, each time you see "nitrogen" here you multiply it by six to make it into protein. That first day he was given sixty grams of protein equivalent, but that was all plasma. On this day he was given a hundred and twenty grams of plasma equivalent, and that meant two bottles of amidin. On this day he was given three bottles, here two and a half,

and here two and a half. With that, of course, you don't get all these calories of that amount of amidin, - you have to add some glucose besides.

Wait a minute, we have to go back a minute because I was looking at the wrong column. The black columns are your urine outputs. He was given two bottles of amidin a day, right through here, and he did lose more than we gave him. This, here, represents his protein deficit.

Now, we gave him Vitamin C right from the start, a gram a day. We also gave him other vitamins, - all the vitamins you see on the next chart. Notice here that between the sixth and seventh day the Vitamin C and the plasma jumped way up with the same intake. The Vitamin C output jumped way up showing that we had caught up with this destructive process, and at the same time we caught up with the destructive process in the nitrogen metabolism.

Next slide: Now, this is the same man, only with the nitrogen balances here, and showing the doses of the other vitamins. It shows the enormous doses, fifty grams of thiamine, twenty grams of riboflavin, seventy-five grams of nicotinamide; and then all of a sudden the whole thing, the nitrogen, the Vitamin C, and the other vitamins all got caught up and this fellow got well.

I am taking a lot of time on this, but there are only a few more.

Here is another man that was not an industrial accident case. I won't take so long on him, - this just shows his vitamins.

This man was completely intoxicated and he ran after a trolly car, in our subway, missed it and fell under it and lost both of his legs. He was given treatment for shock and then his vitamins were studied and you will notice that with large intakes it was about five days before he was brought anywhere near normal. His was not as exciting a case as the other one. His depletion was not as bad. He was a much younger man than the other man.

Next slide: This is that same man showing two Vitamin C saturation tests. This one, right after the accident, in which the plasma figures weren't too bad except that the peak was low for a man who was given a whole gram. His excretion was practically zero while he was recovering from shock whereas two days later his excretion was appreciably higher.

I think that I had better stop now and wait for the question period. (Applause)

CHAIRMAN McLESTER: Our next speaker is Dr. S. Goodhart, Scientific Director of the National Vitamin Foundation.

He will speak to us on "The Administration of an Industrial Nutrition Program."

DR. S. GOODHART: The subject of "Administration of an Industrial Nutrition Program" is not quite as exciting as the treatment of accident cases, but it is of fundamental importance.

I will make my formal presentation quite brief because I think that in the answer and question period pertinent problems might be raised, - some much more pertinent than any I can bring up in the formal presentation.

...Dr. Goodhart read his prepared paper...

CHAIRMAN McLESTER: Now we hope you will ask questions. I am going to ask each person to stand up and ask your question loudly and distinctly so everyone in the room can hear.

DR. L. J. GOLDWATER (New York, N. Y.): We have a plan in our company where we furnish the meal free of charge to the worker. I was wondering if any studies have been made in dollars and cents as to the costs, what it costs our company, and what it might save. Does it save anything?

DR. GOODHART: That question has been raised quite a few times as to some way of measuring the actual economic worth of the industrial food service to the plant, and whether it pays the plant to subsidize, - whether food service should be self-

supporting. That is a question of judgment on the part of management as to whether they are being benefited by the cafeteria. We can't measure it or figure it out in dollars and cents.

DR. GOLDWATER: Have no studies been made?

DR. GOODHART: It is impossible except for an individual plant. That would be the only way, - a plant to try it for profit, to break even, or to subsidize, and that would have to be done by each individual plant concerned.

There is ^{no} doubt but that the food service which is run primarily to feed the workers properly is better than one run for profit. There is no doubt about that, it can be proved over and over again. It depends on what extent the plants are subsidized to the cafeteria or food service. It depends on the plant's own evaluation of what it means to the individual plant.

A VOICE: I would like to know what criteria one would use for deciding whether or not an in-plant feeding service would be either necessary or desirable.

DR. GOODHART: I mentioned something in my paper about that, but I think that there are a couple of items to be considered. One, of course, is the availability of commercial restaurants, whether or not these commercial eating places are serving proper food; whether the prices are too high, whether

or not they would meet with the plant's nutritional desires, and whether or not they are open for odd shifts. All these are factors.

Additional factors are the standard of education in the homes of the workers, if the majority of the workers bring lunches from home and these lunches are very poor, it is often difficult to get into the homes, and it is often easier to change those habits if you have all the workers together in an in-plant food service. Whether or not there is food available during the rest periods is a factor that might be a final deciding factor. Another one is whether or not it is necessary to supply breakfast to the worker.

All of these things must influence the decision of the medical department in deciding on the food service. I don't think the size of the plant is a major consideration because even a small plant can have a food service which can be run by the employees. I don't include that as a determining factor.

I think there is one factor which the medical department will have to judge for itself in making its recommendation, and that is its own appraisal as to how far the plant would be willing to go in doing a good job because a poor job might leave everybody worse off than they were before from the standpoint of morale.

DR. J. D. WALTERS: I have several questions here and I wonder if both speakers wouldn't mind commenting on these points.

What educational program do they have for the workers in regard to their habits, as well as educating the individuals on proper nutrition? Do you want one question at a time?

CHAIRMAN McLESTER: Dr. Lund, would you care to answer that first question?

DR. LUND: I believe that should go to Dr. Goodhart.

DR. GOODHART: Well, on the educational programs, I might say that at the present time there is no government program on nutrition for workers, educational or otherwise. Some of the states have programs and a number of industrial plants have worked out programs of their own.

During the war a number of papers were published by the Department of Agriculture outlining nutrition education programs that the industrial plant might consider. These can be obtained by writing to the United States Department of Agriculture or to the State Health Department which has access to these publications of the War Food Administration.

Now, as for recommending, at this time, a specific program for any one plant, I think that would be out of order. I think that in a community of any size you will have individuals

who have worked on these programs during the war. You can go to your local Red Cross Nutrition Committee or similar organizations, or your State Health Department could help you on outlined educational programs.

One point I would like to make is that too often when people talk about programs they think of concentrated efforts to change the attitude of the worker and it is carried on with a bang for a short time and the thing is then dropped. That is a waste of money. We did a lot of that through the war and we always do a lot of that because it makes a big show, but it is no good.

What I mean by a good nutritional program for the workers is a good, constant merchandising job in in-plant food service where there is one, or a constant education of the workers through the medical department as they come in, and a continuous day-by-day procedure in the plant and in the home which becomes part of the organization of the medical department. That is what is needed rather than these sporadic outbursts of enthusiasm which don't accomplish a great deal.

CHAIRMAN McLESTER: Your next question?

DR. WALTERS: What I meant, - I would like to see a program that would be very expressive, very specific, instead of pamphlets, booklets, etc. I would like to see something

that takes the problem right to the individual who is consuming the food. For example, a little chart right over a certain food that states, "Why is this food being served to you today?" If you have a certain season and you have a reason for selecting a certain food, that is significant. You could tell them how to get the most benefit out of that food.

CHAIRMAN McLESTER: You mean that the worker should have a little nutritional education?

DR. WALTERS: Yes.

CHAIRMAN McLESTER: That is part of the over-all scheme. Child's Restaurants tried that a few years ago and went broke on it. The rest of the menus had all the numbers of calories and the numbers of vitamins, etc. The man who was in charge at that time, I think, died about the time that scheme went broke. But, we agree that education is the thing.

DR. WALTERS: Wouldn't it be of great benefit to all concerned, within the factory, if there would be elimination of vending machines? Those machines selling coca cola, tobacco, deficiency foods, - crackers, cookies, peanuts, and the like, and to substitute a healthy food spot so that they can get the food in abundance, an apple, an orange or some other food that is fresh. You could teach them at the same time why these foods should be used.

CHAIRMAN McLESTER: Dr. Lund, if you don't own any coca cola stock would you mind answering that question?

DR. LUND: Well, I haven't any coca cola stock, - I wish I had. I don't think that is such a serious matter.

I am a general surgeon with a wide type of practice. I teach in the medical school a very small part of the time and I see a good many patients, both in the offices and in the hospital, and some of them are the borderline type of case where the surgeon, or the medical man, or the gynecologist can take part in the care. Take the matter of hemorrhoids, take the matter of menopausal symptoms in women. I do gynecology as well as surgery and there are a good many patients to whom I have to give some nutritional and medical advice.

I probably spend more time on nutrition than most surgeons do because I am interested in it. I have a feeling that there is something that is less than optimum in most American diets, of people who are doing sedentary work, doctors, lawyers, housewives, - I don't know that housewives are sedentary but at least they are not getting out and playing golf very much. I don't have as much experience with fellows doing hard labor, farmers, woodsmen, and such because I am in a big city. I don't believe that cutting off the source of soft drinks, coca cola, crackers, salted peanuts, and things like

that really gets to the fundamentals of nutrition.

As you can see, I am very much impressed with vitamins. I take them myself and I think they do me some good. I give them to all my patients and they tell me they do good, except those that are trying to lose weight and they have the complaint that it increases their appetite.

I think that the whole public needs a lot of education in diet and that a great fraction of the population needs a not too strong vitamin pill, and they need to be encouraged to eat more meat and less fat and sugar. I shouldn't be too much afraid of the men in the plants that are really consuming calories in the day's work as I would be of the office people in the plant who are not consuming so many calories. I don't know, I have never been a plant physician, but I should think that the employees would just laugh at you if you tried to take the coca-cola machines out.

How about our own hospitals which are completely under the control of the doctors? Even in the north, now, you go into the operating rooms and you go by the front door of the hospital and there is a great big coca cola machine.

CHAIRMAN McLESTER: Dr. Goodhart, would you care to comment?

DR. GOODHART: I want to dicker on this particular

point. There are other problems in connection with the vending machines. The first is the character of the food served and the other is the cost. As you may know, the food that is obtained through the vending machine, generally, is expensive. You are buying a packaged article in small quantities at a relatively high price, and in addition to that the type of food that is served in the vending machines certainly needs serious consideration.

I think it is not uncommon for workers in the south and west and some of the north to drink as much as six to fifteen coca colas a day. What affect that has on the nutritional balance, or in-balance, of the individual person today I don't know; but I know that twenty to sixty cents a day taken out of the income of the average worker in a southern mill, or in almost any type of mass industry, is quite a cut out of his income.

Now, if he is going to spend that amount of money a day for soft drinks he is either going to do one of two things. He is going to cut down on the food he eats at lunch or his family is going to have to cut down, - one or the other. It becomes, on that score alone, an economic problem that ought to be considered by any medical department which is interested in the nutritional welfare of the worker.

Of course, there are other problems in relation

to the strongly acidified drinks such as erosion of the teeth and things of that sort which are still open to argument. But, leaving those out of it, it becomes an important economic factor. If you have a cafeteria and the plant is putting on a good lunch for about sixty cents, and the worker also consumes a lot of these soft drinks; you just stop and add up the income of the average worker with a family of wife and two or three children. You just stop and figure out what happens to the money which he has budgeted for his food.

The thing, then, becomes one of very practical importance. I am not against vending machines as such. I think vending machines as such can be important assets if the foods which you serve through them are the right type and the prices are right.

I agree with Dr. Lund in that our experiences have shown that those individuals who have a very high caloric requirement are less apt to have nutritional deficiencies than those who have a low caloric requirement.

On this point I would like to make another statement which I think is incontrovertible. Most of us exaggerate or tend to exaggerate the caloric requirements of the industrial worker. Most workers, in modern industry, do not work hard physically. They do not eat enormous amounts of food. Three

thousand calories as an average, for the modern man, is too high. That is why some of your workers maintain their weight balances and their energy output on caloric intakes of less than three thousand calories. When you get down that low and you get into an economy where the availability of foods such as milk and cheese is not too good, then you get into a situation where you have to pay pretty good attention to the balance of the diet in order to meet the recommendations of the food and nutrition board.

It is a difficult job and I think, in many of these cases, as Dr. Lund has pointed out, the wise use of vitamin preparations should be considered.

CHAIRMAN McLESTER: If all the vending machines would dispense milk you would all say that they are practical.

DR. NORRIS W. GILLETTE (Toledo, Ohio): I am Medical Director of the Willis-Overland plant in Toledo, and in addition we take care of the work of fifty other plants or so. We employ, at times, eight, ten, fifteen or eighteen thousand men, and the question is not one of whether we have cafeterias in the plant. It is a question of the supervision of those cafeterias and the reason for that is that the men cannot possibly leave the plant for outside food. They cannot get the food from the outside.

Then, too, it is a question as to whether the plant itself shall serve this food or run the cafeteria, or whether it shall be run by companies that come in and supply this food.

In the Willys Overland plant the arrangement is that an outside company comes in and supplies the food and runs the cafeteria.

Now, the Willys Overland, as are all of the automobile plants, as you know, is very much managed by unions. That includes every subsidiary that comes into the plant to supply food or supplies for the plant.

So, at the present time these cafeterias are supplied by one of the outside companies and these must be approved not only by management, but also by the union.

Now, I have assumed that it was a part of my job to have these cafeterias inspected at regular intervals and I send the physicians around to see them and I will then get a report on the condition of these cafeterias. I may find that the food is poorly served in cafeteria B, that the food is not properly prepared, that there are open cans of food, or that the ice-boxes are unclean, or that some of the food is left over from day to day.

That is done and then the report is made to the management and to the union, and also to the man that runs the

cafeteria. Then if there is any further question we go back and make a check up.

Then, too, there may come some question. The man that runs the cafeteria says "That food is all right," or "That food was good." It is important for the medical man, in automobile plants at least, to be on good terms with the head of the union. I take the head of the union, and this report, and go down and inspect it with him and say, "This is the report I got from my man and these are the things that must be done."

We have established our own regulations as to what we think is good service, and the type of food to be served, the way it is served, and how much these men should be given free rein in the serving of their food and in the type of food that is given. I think that all comes under the medical department and we have assumed it as such.

Fortunately I am on excellent terms with the head of the union in this plant. I take him duck hunting and that is a very good way to sit down and talk about things with him. You must have him believe you when you tell him that these things are necessary. You tell him, when you both shoot at a duck, that he shot it and you didn't, even though you did it, and he believes you after that. That can be done in different ways.

It is important, first, for one who has charge of

things like this to establish a regulation within himself as to what he wants to do in the plant and then to put into effect these things, and then to be able to have means to put them into effect.

Those are all things that I think we should think of.

CHAIRMAN McLESTER: Thank you very much, Dr. Gillette.

A VOICE: Dr. Lund, you, I think, implied, but I am not sure whether I got it all straight, that previous good nutrition makes a difference in surgical conditions.

DR. LUND: Previous good nutrition makes a very large difference in recovery from accidents. Take, for example, the wounds patients recovered from during the war, - given good surgery in plenty of time, as compared to the results of good surgery in the average, let us say, brother of beast member of the civilian population.

The soldiers that were in good condition could stand the most incredible injuries, way beyond what people in civilian population could stand. That was based almost entirely on their own physical condition, their own nutrition rather than on any post-operative nutritional efforts made at the front line.

I have no doubt that some modern methods were used up on the front line, but they were not the determining factors.

CHAIRMAN McLESTER: I know Dr. Lund will agree with me

when I inject an explanation of what he just said. The wonderful surgery seen during the war wasn't entirely due to the antibiotics used, but due largely to the good state of the soldier.

That leads me to bring in this and I believe Dr. Lund will agree with me on this. The Food Nutrition Board of the National Research Council estimates that the protein intake for the average man, we will say, is seventy grams. Now, the American soldier got a hundred and forty grams of protein a day and, I think, he fought a little better, and he got well a little quicker because of that. Do you think that is true, Dr. Lund?

DR. LUND: I certainly do. I think that the Food Nutrition Board's standards are the best possible standards to be set up under present information, but I think it is quite likely that the future will show that in many regards they are not quite optimum.

DR. GOLDWATER: In an eight-hour day shift with an additional half hour for lunch, in a light, monotonous industry, in your opinion, when do you think the rest periods should be in the morning and afternoon? How long should they be?

DR. GOODHART: Our recommendation on that score is about two and a half hours after the previous meal. If the lunch hour is at twelve o'clock then the rest period would occur around two-thirty in the afternoon. Of course, on your breakfast

it is a little bit more difficult because so many workers don't have breakfast and for those that do, it is difficult to determine just when they did. But, the break should be at least two hours before lunch because, for one thing, if they eat such foods as milk during the rest period that will have an effect upon their appetite for lunch.

In actual practice the rest period in the morning is not nearly so important as the rest period in the afternoon. I think that the accident curves show an increase in the accidents from between 10:30 o'clock and 11:00 o'clock in the morning, and around 2:00 o'clock and 3:00 o'clock in the afternoon. So, that would be the logical time to have the rest periods.

DR. GOLDWATER: How long should they be?

DR. GOODHART: I can't say exactly how long they should be, but you have another problem there that some other people could talk about. That is, if the rest period is too long the worker's efficiency drops off. It has been shown, for example, that if the lunch period is half an hour the worker can resume his work at the level at which he left off before the lunch period. If the lunch period is an hour he is sluggish in getting back into his stride. There is a definite loss of momentum if the break is too long.

CHAIRMAN McLESTER: Are there any further questions?

DR. WALTERS: I am sorry to take up so much time, but I am very much interested in this nutrition angle. Dr. Louis Andre and I have seen nutritional-deficiency conditions under good nutrition and I would like to bring out a few more things. I know these statements are startling, but I want to tell you a little bit more about what we have found in regard to nutrition.

As a dermatologist I practiced nutrition eighty percent of the past fourteen years. Twenty percent of the time I put in on allergies, x-rays, and the like. By taking out these vending machines we have cleared a lot of these so-called conditions of the feet, of the groin, et cetera. By stopping coffee we reduced headaches. Is that what we need to create to stop our headaches, - a good substitute for asperin? Do we have to give them coffee?

Do we have to give them calories in order to make them use a lot of the food? The more we try to work on calories the more we lose of our natural minerals. I know that in many of these patients, with good surgery, the wound would open up.

You take Vitamin C levels, they are below the natural levels. If you take natural manganese and supplement that in their diet, Vitamin Colanin, a good fiber tissue will form. You will find, the more you concentrate on the habits of these

individuals, that if they are given enough sleep, enough rest, enough outdoor activity, enough exercise, if they are given happiness and removal of a lot of the problems that they have, the more they will get out of nutrition. It can even help in the case of cancer. Nutrition is just one small phase of health.

CHAIRMAN McLESTER: Dr. Lund, do you feel like commenting on those suggestions?

DR. LUND: Well, I am very much interested, and I am afraid my answer to your previous question was a little flip. What made me take the line I did was the fact that I have not had experience in industrial plants and I hadn't realized that it would be practical to educate the workers sufficiently so that they would accept the removal of the coca cola machines.

I feel very strongly as you do that too much sugar is bad. I am as bad as Dr. Joslin on that, although I don't see how you can treat diabetes. I think it is wonderful that you have been able to achieve such a high degree of education.

I was a little startled about your remark on cancer, but perhaps we had better not go into that because I do have an interest in cancer myself.

The fact that you have accomplished that, I should think, is well worth a scientific paper. Have you any reference, have you written that up?

DR. WALTERS: I have written it, - but I have found that education has to be taken very, very slowly. For instance, on one of the papers that I have written on acne vulgaris I have listed about four hundred and fifty complaints that are present in all acne patients. I gave the major ones down to the lowest ones and it covered a period of about six years.

I documented that paper with photographs and when I submitted it to the various dermatology journals, well, it was too scientific for one and they suggested I should break it up into half a dozen papers. Then I submitted it to another and before I knew it I had six or seven articles for this one.

I have put into the literature the patient's time, the logical problems. I have put in the particular reactions to it, - hypertension. I have put all these into the various journals and they have been published. The acne article has been accepted.

I have a varicose aneurysm paper in preparation which is going to be accepted. It is just in the revision stage.

I have tried to cover too much. There are around forty or fifty different blood examinations that I make on the average derm patient. The average patient, who has had the entire routine thrown at him, is willing to do anything to find out what is wrong, what has caused his condition.

So, I could write articles on Vitamin C levels, Vitamin B levels, phosphate levels, albumin, et cetera. I could do a lot of work on this, but I want to get as much of this into the literature as possible and I have found that by breaking it up you lose a lot of it.

You lose a lot of allergies by getting into good nutrition. Each meal should be all fruit or all vegetable and you could supplement it by your proteins, and they come in with your fruit. Use your whole-grain cereals as much as possible.

I think that is a short resume of how to get better nutrition and how to cure a lot of these so-called incurable conditions.

A VOICE: I think I can settle any doubts as to what can happen if you take the vending machines out because I tried it. We had a strike.

I read somewhere that it takes ten years to change food habits and I think that is a rather conservative estimate because we have been trying for five years and we haven't made very much impression.

We have plants scattered all over the country and we find peculiar regional likes and dislikes that are very hard to change. For instance, in New England, in the plant we have up

there, they serve a particularly, at least to me, revolting dish which I advised the supervisor of the cafeteria to get rid of. There is a Portuguese name for it but I called it a grease sandwich. Well, we had a strike there too.

So, I think that you have to approach the problem of industrial nutrition from the labor point of view. You just don't get anywhere at all. People have very fixed ideas of what they want to eat. I believe that if you approach it from that side you will be able to do something.

CHAIRMAN McLESTER: We have agreed to adjourn at 11:00 o'clock for another meeting, so we have just about five minutes. Dr. Lund, will you close your discussion, please?

DR. LUND: Well, I thank you for the interested questions and the apparent interest in what I had to say. Some of the material that I talked to you about has been published. As a matter of fact, the charts on vitamins and burns came out in the Archives of Surgery, November issue, which was delivered within the last week.

The charts on vitamins and shock were in a paper entitled "Ascorbic Acid, Thiamine, and Riboflavin in Acute Burns" with a long list of authors. With the same title, the same vitamins in acute injury was published in the Annals of Surgery, about October, 1946. Those who are interested in

getting more detail will find it there; material on protein nutrition and over-all papers on burns are to be found in S,G, and O Collective Review on Burns dated about May, 1946. I guess you had better get the collector's review and go back from that. I thank you. (Applause)

CHAIRMAN McLESTER: Thank you, sir. Dr. Goodhart, you are next.

DR. GOODHART: There is just one thing I would like to say. I think we are all very pleased with Dr. Gillette's discussion. He agrees pretty much, almost entirely, on what I had put here in this paper on how a program should be run.

There are one or two points I would like to make. First of all, interest in the nutrition of the workers in the plant should not be interest, primarily, in changing dietary habits just for that sake. You should recognize that dietary habits are changed with difficulty, nevertheless they can be changed, and the changes should be brought about gradually through the clever merchandising of food, - proper food.

In addition to that, there are ways of protecting the diets in which the workers themselves do not participate, - it does not involve changes in their dietary habits. For example, adding dry milk solute to bread, et cetera. All of these are procedures which improve and protect the nutritional welfare

of the individual, but do not involve any obvious changes in his eating or dietary habits.

I think it is important for the medical department to use all the resources that are at its disposal in attacking the problem and in dealing with the individual, - telling the individual not to eat so and so.

All right, you can do that if he comes into your medical department, but you can't do it to him en masse. But, you can get together with his representatives and discuss means and procedures for improving the diets of the workers as a total in the plant.

I caution you to be very careful that when you recommend a change in dietary habits you know exactly what you are doing and why you are doing it. For example, some nutritionists or dietitians will walk into a plant and say that something is bad, that you should take it out. Well, it isn't bad, - do you know it is bad? There is no scientific data of any kind to indicate that fried foods are any less digestible than any other food. There is no reason to believe that relatively high fat content in that diet is bad. As a matter of fact it may be good. Some people eat a diet containing around thirty-five to forty percent fat and they do very well on that.

So, it is necessary, before one goes in and undertakes

any radical changes, to make sure that the changes recommended are not based upon an individual superstition, but are based upon some food knowledge, on some scientific or actual nutritional basis. (Applause)

CHAIRMAN McLESTER: I want to thank you all very much. The meeting is adjourned.

...The meeting recessed at 10:55 o'clock, a.m....

R E C E S S E D

TUESDAY MORNING SESSION

January 6, 1948

The Conference on the Outlook for Industrial Medical Service convened at 11:00 o'clock, a.m., in Club Room B of the Cleveland Auditorium, Cleveland, Ohio. Dr. A. J. Lanza presiding

CHAIRMAN LANZA: The first speaker on this program is well known to all of you. He is the President-elect of the American Medical Association. I present to you Dr. R. L. Sensenich and I know he needs no introduction.

...Dr. Sensenich presented his prepared paper...

Thank you, Dr. Sensenich.

The discussion will be continued by the Chairman of the Council on Medical Education and Hospitals. I present to you Dr. Herman G. Weiskotten who also needs no introduction.

...Dr. Weiskotten presented his prepared paper...

Thank you, Dr. Weiskotten.

We are fortunate in having with us the Chairman of the Council on Medical Service, - Dr. James R. McVay.

...Dr. McVay presented his prepared paper...

Thank you, Dr. McVay.

Gentlemen, you have listened to three penetrating and stirring addresses on the subject of Industrial Medicine and Its Future.

The subject is now open for discussion and, gentlemen, I trust that you will not be backward about coming forward with your questions. Who will start the discussion rolling?

I might say, before this gentleman speaks, that he is the Chairman of the Committee on Industrial Medicine of the New York County Medical Society. It is a non-profit trust for that purpose.

DR. K. PEACOCK (New York, New York): In all of our discussions and studies, in all of the good assistance and brains we have been able to collect to help us on this problem, we still have two main stumbling blocks.

All of your discussions brought out the very definite problems that we have been fighting and in each case you have put up a suggestion of a question. This is a question of how, for instance, can a program be put over in industrial plants, not the big plants because they are taken care of, - in the small plants?

No answer has been given to that, or any suggestion of an answer and I am very much interested because there have been many men here who are interested in small plants and they have asked me the question. We don't know, we are still trying to answer it, - how to convince a small operator.

In New York they are tough. Maybe they are tough

in other places, too, but our small manufacturers and our small business men in New York are really tough. There isn't any question about that.

How are you to convince the small manufacturer to put in medical care that will cost him something and, after you have done that, where and how are you to convince enough medical men to go into industrial work in small plants, on a part-time basis, in order to furnish the proper type of men for that work?

If you have any suggestions on those questions you will help us greatly.

CHAIRMAN LANZA: Dr. Sensenich, will you answer that?

DR. SENSENICH: This shows how courageous or how reckless I am. As a matter of fact, the two points raised here are the most important. I would agree with the doctor that they are the most difficult to answer.

I don't know that there is any given approach to the whole matter of these small plants. The problem in the smaller communities is not so difficult, the reason being, probably, that the small manufacturer in a smaller community feels himself a bit more responsible in so far as the social structure goes. He is closer to his employees and he feels his responsibility in that direction.

It is less difficult, there, to have established a

state of avoiding misunderstanding between the doctor giving the medical service in the plant and the doctor outside.

I frankly think that the matter must be approached with reference to the relationship between the doctor doing the part time service and the doctor on the outside. The approach there must be one of definite understanding in the medical profession. It must be understood, first of all, that the plant physician who is on a part-time basis is not poaching on the practice of the physicians on the outside. It must be understood that he is not using his acquaintance with the employee on the inside as a means of access to the family work.

The second one is that, in turn, the physician on the outside shall feel and respect properly the importance of the physician in the plant and his part in the over-all structure; rather than simply seeing him as an employee, even on a part-time basis, of this employer of labor.

Now, that is a long statement involving two essential points. If you can establish the proper confidence between the physician doing the part-time work and the physician on the outside not interested in the industry, then you have made the first step.

As I pointed out, or tried to point out in my paper, it would seem that if the profession in that community approached

the matter properly that they could very readily establish that kind of understanding.

The man who is on a part time basis, if he is respected by the rest of the community, could certainly be respected as well in that particular activity in industry as he would be in his practice on the outside.

Now, when you come to the problem in New York, or where you are dealing with the small plant in the large community, then you have, unfortunately, to deal with the matter that the doctor developed there and that is that it is very difficult, first of all, to sell the employer the idea that it is his responsibility to the community. It is very difficult to sell him the idea of the proper relationship between himself and his employees in matters other than the frank, open results of trauma in employment, or those things which the law sets out as compensable illnesses.

I know they have done a grand job there and I regret that I can't go any further. I have often thought that, possibly, one of these Councils that have contacted the top management, the National Association of Manufacturers and the labor unions, that they perhaps might even go to the extent of sending a man into a community, if he could be helpful, to interview these employers and to try to establish that contact between the employer

and the local medical group. I don't know whether that would be practical. We have tried to keep the American Medical Association out of in any way projecting itself into the local problems, but it might be possible for some method of approach to be established which would not be in any way embarrassing to the profession but whereby, much like the detail man who calls at your office and talks about pharmaceutical preparations, that he might talk to the employer about the health in his particular institution. He could talk about how it would be to his advantage as well as to the advantage of the employee to give serious consideration, and perhaps spend some money, in establishing that kind of service in his industry.

I am sorry that I haven't been able to add more.

DR. GRAY: I think Dr. Peacock's work has been wonderful and I think his aims are quite understandable, but I think maybe he is trying to do a big job too quickly.

Now, you can't sell industry a plan, or at least it is very difficult to sell them a plan such as you have evolved except on accomplishments. You can talk to them and even show them the figures that their own Manufacturer's Association has compiled, - you have a lot of them, you know, even from the National Manufacturer's Association.

I would suggest for a place like New York, - we have

a place that is something like New York, maybe they are not so hard-headed, but they are Connecticut Yankees and there is not much that is soft about them; I would suggest that you might try something that we are trying.

In Hartford we have gotten a small unit of five plants and those plant services are performed on a part-time basis by a full-time man. In that way we know that this full-time man is a man that has had some public health training and has had training in industrial medicine, and is fairly well versed in minor surgery.

We have very carefully worked out the medical plans for those five industries. They will be reported on very shortly so I don't want to go into details, but I can tell you one thing and that is that there has been a cut of seventy-five percent in the amount of money that the insurance companies have had to pay for medical and surgical disabilities.

It demonstrates, too, doctor, what you have said and it is so important, - the relationship between the doctor in industry and the doctor outside industry. By showing the desirability of that and the carefully controlled experiment we can show how a well-controlled job will work.

Now, one of the things that is done in this little experiment of ours is consultation service. The individuals get

this service and as a result of that, actually hundreds, in the eighteen months this has been going on, have been sent back to the family physicians. The outside physicians like this service.

Now, this man does not do any major surgery, - he recommends the surgeons that have been acceptable in these industries previously. He does emergency work and he does re-dressings, and the surgeons like it immensely because they have a fairly good diagnosis when the man is sent to the hospital.

It is all worked out so that the man is sent into one of the three hospitals that we have there in Hartford to be taken care of by a particular person that that factory wants. It is worked out so that the interne knows when he comes in from that particular factory that he is to be Dr. Smith's patient. Dr. Smith knows that it is to be his case and he has some diagnosis on it. He knows that the patient will go back to somebody who will take care of him.

There is a health educational program carried on in these particular industries and I am quite sure, when we are prepared to show what is accomplished in getting them to come in, we will have to bar the doors.

The thing that is worrying me more than anything else is the lack of trained men that we have to do this job. I know that there has been a great deal more emphasis put on

preventative medicine in our medical schools in the last few years, but the average physician, I fear, who would be willing to take up this work, the general practitioner, will have to be very carefully supervised in this work because he can make or break the job.

I would like to see a training program instituted in many of our universities, and I don't mean to say, necessarily, among the undergraduates except to the extent that that can be gotten into the curriculum. There should be post-graduate work for these men. We know what they should have, we know what they are going to be up against, and we know how tremendously valuable a full time-man in part-time work, if I may use that expression, can be in the industry for medicine, and in the community.

It is one of those wonderful opportunities in which a doctor is well paid for his work and the industry, just as they profit in manufacturing a product, gets a very definite return on the amount of money they put into it. You have a better worker in the community and everything is a question of gain.

Just as a little idea of what good medical service can do in the removal of an occupational disease, - I just want to say one word about the work in Danbury, Connecticut. They were forbidden the use of mercury in the making of hats. I was told by the Retail Merchant's Association that the fact that

mercury was now prohibited was worth several million dollars a year to Danbury. Consequently, they were better able to understand their responsibility and it actually had been worth more than a million dollars to the retail merchants in Danbury. You can see what just the removal of that particular hazard accomplished.

DR. W. A. SAWYER: Dr. Sensenich mentioned the possibility of cooperation between the doctor in the plant and the private physician. I want him to know of this experience we had in Rochester. I hate to bring it up, but this was our actual experience. Through our local Tuberculosis and Health Association, with their assistance and through County assistance we conducted a mass radiography program. It was evident that there was a desire on the part of the small plants to form some sort of health service from a community standpoint.

A committee was appointed, consisting of doctors and industrialists, to see whether something could be set up. The County Medical Society was asked to participate. They were asked if they couldn't delegate some young men, as they came back from the service, to interest themselves in this part-time effort. It was taken to the County Medical Society and was voted down solidly, - "Hands off, we want nothing to do with it."

DR. SENSENICH: Yes, things of this nature have been

coming to my attention.

DR. SAWYER: Now, Dr. Sensenich, there is one thing that has to emanate from American Medical Association sources if we are ever going to influence some of these County societies in their thinking because this thing has been stopped and we cannot go ahead without the doctor's help.

DR. GOLDWATER: I think it might be interesting to add another experience similar to that reported by Dr. Sawyer. I believe it was Dr. Peacock who reported his difficulty in interesting industry in industrial health programs.

I happen to know of an instance where a group of manufacturers, representing about twenty-five small plants in the community, themselves got together and decided they would like to have a medical program, an industrial health program for their particular group of clients.

They called upon persons presumably experienced in planning such things. Before this plan had progressed very far a memorandum or resolution came to the head or leading member of this group. It was signed by a number of the physicians saying that they were opposed to the development of any plan having to do with industrial health. That was followed shortly by a resolution from the Secretary of the County Medical Society and they also were opposed to anything of this sort being

established within the County. I would like to know whether the gentlemen on the platform would have any suggestions as to how that situation might be met.

DR. PEACOCK: May I say a word on that? That is one problem we don't have in New York, this program having been worked out in the County Medical Society in New York City, by the special Industrial Committee for just that purpose.

The Comitia Minora unanimously authorized our program. The authorization from the Comitia Minora was brought up in an open medical meeting and was passed unanimously. There was not one dissenting vote in the County Medical Society. So, you can see we don't have that problem in New York.

DR. SENSENICH: Well, I don't want to inject my answers to all these problems. In the first place, I recognize that in certain areas, and I shouldn't say just certain areas as I think that might possibly happen in a good many areas if the problem is not properly approached. Unfortunately, medical men who are pretty busy do not give very much thought to the problems that we have discussed here.

I think the proper way to do that, certainly, would be to approach the medical society and in each medical society there are sufficient numbers of substantial individuals who are not going to be swayed by immediate reactions to something which

they feel is encroaching upon their field, general practice or the medical field. If those men are given an opportunity and an explanation, and a little time, I think that in most instances that kind of problem can be met before it precipitates an adverse opinion on the part of the society.

I hope I am not over-stating the situation, but I can frankly state that I don't know, after a period of somewhere around eighteen years in activity in medical affairs, - I don't know of a situation in a County Medical Society that could not be solved if properly approached. I would insist that in each community there are a sufficient number of sufficiently broad-minded and right-thinking medical men to influence the situation if it is brought up to them and they are given sufficient time to consider.

Perhaps Dr. McVay can say something about that. In his work he contacts County Medical Societies all the time.

DR. McVAY: I think often times, in the individual communities considering these problems, in which they have not been able to work them out, there has not been close enough cooperation between, for example, industrial situations and the medical society.

I think it is a two-way problem. I don't think you can say it is the blame of the medical society, entirely. I

think in many instances, where you analyze the situation carefully, you will find that both of them are somewhat to blame.

They have a meeting devoted to industrial health and you will find a very small sprinkling of the men in that community at that meeting. I think a great deal could be done by both the Council on Medical Service and the Council on Industrial Health in attempting to develop through the state committees and down to the local county levels a closer cooperation between those two groups.

I believe that is the way that problem will have to be approached.

A VOICE: I would like to know if Dr. Sensenich, or Dr. McVay, or other doctors here, from their experience, are they prepared to submit something in the character of an acceptable pattern, something that is not tightly bound but something that would be acceptable, would be a reasonable basis for discussion, immediately, when it is submitted to the medical societies. Maybe Dr. Gray can tell us something from the successful experience they are having over in Connecticut.

DR. McVAY: You mean for the Counties?

A VOICE: Yes, to be submitted by these various groups.

DR. PEACOCK: We had our thing well prepared. We put in three or four years work on it before we brought it to the

Society as a whole. There was not a thing there to be objected to.

DR. GRAY: If they have an Industrial Medical Committee of their State Medical Society, then the thing I should have done was go to them and get them to sell the idea. I know that the idea we have isn't just the idea we had when we went there. It was studied over and then worked out so that when it was put in it was accepted. But, it was first brought up to the Industrial Medical Committee of the State Medical Society. We had some big fellows who knew the big fellows in the Societies.

I wonder if this doctor went ahead and figured out what he thought was a good plan and then put it into view. I expect he got an explosion.

DR. PRICE: I just want to add to the sour note sounded. I think it is very timely because of some of the remarks made this morning. I think the experience of Dr. Sawyer and the experience of Dr. Goldwater have been repeated throughout the country. I think if we would follow the Tuberculosis Association's experiences we would find that there isn't a section of the country in which this experience hasn't been gone through by some community.

Therefore, it seems to me that Dr. McVay prefers segmental medicine. The segments treated in this manner are

going to revolt. I think that if these lofty standards have been placed by some of the leaders in medicine, then they should be gotten rid of and the medical associations in the small communities, well, the entire country would be better off.

I am Vice Chairman of the Community Council with Dr. Peacock and I think we are getting somewhere by getting every segment represented.

DR. A. M. PULEO: I would like to ask Dr. Sawyer and Dr. Goldwater why their plans were rejected. What were the reasons given?

DR. GOLDWATER: I didn't say in my description that this plan had been presented to the County Society in the very, very early stages and it had been drawn up to fit in with the acceptable practices in the field of industrial medicine approved by the American Medical Association and by the American College of Surgeons, and by other responsible groups.

The objectors stated no reason for the objections. I have my own opinion as what they were.

DR. PULEO: What are those opinions?

DR. GOLDWATER: They were worried they might lose some business.

DR. SAWYER: I have no specific knowledge of the objections either, but on this committee was the Vice President

of the County Medical Society (he is now President) and he was for this plan. He took it to the Comitia Minora and it was voted down. They gave no reasons, but private practitioners were not liked.

DR. GRAY: I think it is entirely a lack of understanding.

DR. SENSENICH: Maybe the Comitia Minora needs the educating.

DR. E. L. HENDERSON: I only want to add a local note to this statement. Four years ago we proposed the plant program in Westchester County, or in certain definite areas involving, at that time, twenty-five practicing physicians. Since that time we have sixty-three men practicing in that area. In proposing this plan I went directly to the Comitia Minora of the Westchester County Medical Society and tossed it on the table. I said, "Here is what we propose, what do you fellows think about it?" I told them to think it over, kick it around a bit. I said, "We won't do a darn thing until you give us the light."

We had several sessions and nothing came of it. It was passed and it has been operating for four years. We put in one additional statement and that was that we would not change it without first asking Comitia Minora's approval.

Two things have come up in the interim. The first

was the use of the influenza vaccine which they approved. The other was the use of penicillin areosis in minor sinusitis and bronchitis, - this they disapproved. We gave the vaccine but we haven't given any penicillin.

We are getting along all right, but I think the answer is in two directions. Number one, - you have to go to the doctors early. If the doctors find out something is in the wind and they haven't been consulted, naturally they will be against it. Number two, - you want to have enough members of the Comitato Minora that are friends of yours.

CHAIRMAN LANZA: I think you have something there.

There are lots of ins and outs to this whole business and I am sure some of you have other angles that you would like to bring up.

DR. L. H. GRIGGS (Syracuse, N. Y.): I would like to ask the panel their opinion of the evaluation of industrial health teaching days. They could be scattered throughout the larger centers of the state with the approval of the local County Medical Society.

DR. WEISKOTTEN: Dr. Griggs, I believe that is a question which you people should answer. Attempts have been made by County Medical Societies and by certain medical schools to offer refresher and graduate courses, and a series of post

graduate courses in the field of industrial health.

I would like to ask you, - how much are we accomplishing?

DR. PEACOCK: You ought to get Dr. Lanza to answer that. He is the man on that subject.

CHAIRMAN LANZA: I can say this, and I am very glad to have the opportunity of making this point: As we have heard in the last few days, and this morning, and at the meetings we have in the evenings, we go around to County Medical Societies, et cetera.

There are quite a number of plans being tried out. Some of them are in operation, some of them are sponsored by local medical societies, some of them are sponsored by groups of doctors, some of them are off-shoots of one or another form of group insurance. You are going to see many more of them and the trend is, as the second speaker said this morning, towards that sort of medicine, namely, bringing a large proportion of the population under some form of pre-paid medical service plan.

However, one of our main responsibilities, as far as the Council on Industrial Health is concerned, and one in which several members of the Council are active, is to see that there is provision made for the proper training of those who are concerned in carrying out an industrial medical program or industrial medical service.

Two skills are involved, - the doctor and the engineer. The plans are being formulated and are actually under way in various centers now to develop a graduate basis training for doctors and engineers in the field of industrial hygiene and in industrial medical service. Does that answer your question?

I might say that there have been in the past, and are still being carried on a number of refresher courses at different medical schools. It is short, intensive training on various points of industrial medicine, but the over-all training of graduate doctors and graduate engineers is just now beginning to blossom out.

DR. GRIGGS: That partly answers my question.

I am Chairman of the Committee of Industrial Health for the State of New York and, of course, in upstate New York we are not accepted as a part of New York City. In the past couple of years, - and I assure you that I didn't expect to get up here with my friend Dr. Weiskotten, we haven't accomplished very much in getting out into the smaller communities. I want to repeat that I am Chairman of the Committee on Industrial Health for the State of New York and that we are not really a part of New York City. We are in the backwoods.

But, the point is that we haven't accomplished very much, we have tried this and that and the plan that I feel might

be the most successful is to organize sort of a teaching set-up and have Industrial Health Days scattered throughout the state.

I feel that the man for us to reach, primarily, is ⁱⁿ our own backyard. Insurance carriers tell me that their greatest problem is to get proper medical care for the industrial so-called compensation cases. I had the idea that we could set up some sort of a teaching staff, dermatologists, minor surgeons, et cetera, who could organize these afternoons and go out throughout the state. That was my question.

DR. SENSENICH: It is some sort of machinery as that which I suggested in mentioning the Council on Industrial Health. Obviously that should be done within the state. Have you attempted anything of that kind?

DR. GREGGS: We did that, but that was before my time. About three or four years ago we had one meeting in Syracuse and we invited the nurses and manufacturer's representatives and we had quite a successful day. But, I feel that the whole crux of the situation is to reach the man who does it or has the contact with the industrial worker. That is the point, to bring him into that meeting.

CHAIRMAN LANZA: Thank you, doctor. If there are no more questions the meeting is adjourned.

...The meeting recessed at 12:30 o'clock, p.m...

R E C E S S E D

TUESDAY AFTERNOON SESSION

January 6, 1948

The Conference on Rehabilitation convened at 2:00 o'clock, p.m., in the Cleveland Auditorium, Club Room B, Cleveland, Ohio. Dr. Frank H. Krusen presiding.

CHAIRMAN KRUSEN: The meeting will please come to order.

It has been said by the late great Dr. Francis Peabody, of Boston, that "Death is not the worst thing in the world and to help a man to a happy useful career may be more of a service than the saving of a life."

The rapidly developing field of physical medicine rehabilitation which leads physicians away from their pre-occupation with simply saving lives and guides them into new methods of providing happy lives is worthy of serious consideration.

The amazingly fine programs in rehabilitation in the Army, Navy, Veteran's Administration, and particularly in the Army Air Forces during World War II has stimulated the interest of industrial physicians and civilian practitioners throughout the United States.

I desire to pay particular tribute to General David Grant, the air surgeon, for his vision in recognizing the importance of rehabilitation, his wisdom in placing it under the

leadership of Colonel Howard Rusk, and for his unswerving support of the Air Forces Rehabilitation program which has revolutionized our concepts of convalescent care and the management of handicapped persons.

We are very fortunate in having with us today not only Dr. Rusk, whose amazing achievements in rehabilitation have brought new hope to handicapped civilians, but also two of his former associates, Dr. Donald Covalt and Dr. A. Ray Dawson.

Then, to complete our galaxy of stars we have Dr. Thomas B. McKneely, Chief Medical Officer of the Office of Vocational Rehabilitation.

Physical medicine includes the employment of the physical agents for physical and occupational therapy and physical rehabilitation. Occupational therapy has been defined as "medically prescribed activity (other than gymnastic) with a remedial objective." Physical reconditioning is the procedure followed in the prevention of physiologic retrogression during convalescence, and it is directed toward the restoration of full strength and stamina to convalescent patients.

Rehabilitation includes the employment of all forms of physical medicine in conjunction with psychosocial adjustment and vocational retraining in an attempt to achieve the maximal function and adjustment of the patient and to prepare him

physically, mentally, socially and vocationally for the fullest possible life compatible with his abilities and disabilities.

It is gratifying to note that medical educators finally are beginning to give serious attention to the development of teaching and research in the fields of physical rehabilitation and physical medicine.

Dr. D. Baily Calvin, dean of the University of Texas School of Medicine wrote recently: "In the field of physics as related to physical medicine and physiological chemistry, great advancements have been made. If health is to be construed as normal equilibrium, with proper function in all organs doing their job in proper manner, then disease must be considered as a departure from dynamic equilibrium. The need, therefore, is for the physician to serve as a health engineer, an analyst whose function is to re-adjust the equilibria of the body and bring them back into normal homeostatic balance." This is exactly the approach of the physician specializing in physical medicine who devotes great attention to dynamic physical reconditioning, to the employment of physical procedures for analysis of disorders of function and to the application of physical agents for restoration or maintenance of a normal or nearly normal physiologic state.

In an article entitled "Transition in Medical

Education," Dr. Alan Gregg, Director of the Medical Sciences Division of the Rockefeller Foundation, observed that "During the past seventy-five or eighty years, one of the most significant efforts of medicine has directed itself to finding the cause of disease." He pointed out that this "preoccupation with the cause of disease has greatly influenced medical education."

He added that "Etiology became, as it were, the husband of diagnosis and the father of treatment." This led Gregg to the conclusion that "preoccupation with the causation or etiology of disease all too often eclipses the light that might come from a study of the dynamics of the disease process."

He added, "We take such a primary concern for the cause as perfectly natural. I wonder if we don't exclude thereby some other very important aspects of disease? Witness the singularly freshness of Howard Rusk's ideas upon the possibilities of intelligent convalescent care. If we had cared as much for therapy as for etiology, we should have little to learn from Rusk, instead of much."

To the physician who is interested in physical medicine and rehabilitation, it is pleasing to observe that medical educators having the broad vision of Calvin and Gregg foresee advances and transitions in medical education which indicate a diversion of interest of medical educators from their

preoccupation with etiology and an advancement into a stage in which therapy begins to assume its rightful place in medical education. It is reassuring, moreover, to perceive that proper attention to the treatment of the patient as a person and as a whole is beginning to receive serious consideration.

Certainly, the importance of the maintenance of dynamic equilibrium will become more and more apparent as this new trend develops, and just as certainly, physical medicine and rehabilitation will continue to forge to the front as this trend becomes more evident.

It is, therefore, singularly fitting that this group of experts should discuss this very subject with you. We have been assigned certain subjects for discussion and we have agreed that each man shall talk for about ten minutes concerning his own subject and then we will have some questions and general discussion.

I am going to ask Dr. Donald Covalt, now Associate Professor of Rehabilitation and Physical Medicine at New York University College of Medicine, formerly Assistant/Physical Medicine Rehabilitation in the Veteran's Administration, and now the Clinical Director of the new New York University Rehabilitation Clinic in New York City to open the next phase of this conference with a discussion of the "Demands of Daily

Living."

DR. DONALD COVALT: Dr. Krusen and members of the Conference: My topic is "Demands of Daily Living" and I would like to start out by saying that I am not going to talk about "damands" but rather about the "Activities of Daily Living."

At Bellevue and at New York University we have developed in the rehabilitation service over one hundred of these simple "activities for daily living" that you and I often do without thinking.

The handicapped person sometimes spends weeks and months, and many hours a day, developing with what they have left these activities that we do so very easily. They run the gamut from brushing their teeth and combing their hair, for the handicapped person of upper extremities, to dressing themselves. For those with lower extremities and above, learning to put on their braces, muscle re-education, learning to walk, crutch gait and, finally, the end result, I think the end result, our hundred and first activity, is learning to get into a car and drive it themselves.

These are simple activities that take much time. For instance, learning to get from a wheel chair to a toilet for the spinal cord injury patient, a maneuver that they can learn to do themselves in perhaps fifteen to twenty seconds.

The first time they try it it may take them two or three hours.

In our experience at Bellevue, we have just completed a service of one hundred hemiplegias. Out of these ninety were able to become ambulatory, around fifty percent had to have braces, thirty of these were able to return to work. This is only one aspect of rehabilitation.

I say it is only one aspect, but it is a most important one and one in which the physical therapist, the occupational therapist, and the physical educator might well take a part. They would all have to take a part to have the program succeed.

One other example that I wish to cite to you is that of a hundred and twenty neurological cases at our Minneapolis hospital of the Veteran's Administration. Most of these individuals were World War I veterans and many of them had been in for as long as ten years. Some of them had been flat on their back for over two years. Some of them had to be carried on stretchers to the physiotherapy department for the first time.

The whole endeavor, which took approximately nine months, was under the direction of Dr. Baker, who was with us today; the whole team of the physical therapy department, and all of the rehabilitation workers concentrated on these one hundred and twenty. You will ask, "Was this worth while?" I want to

show you what can be done with hard work and a little imagination.

At the end of nine months in rehabilitation, twenty-five of these World War I veterans had left the hospital and returned to work, thirty others discharged and capable of self-support or care. Part of them were able to do part-time work, and of those remaining in the hospital thirty were ambulatory, twenty-five more were capable of self care, and all but ten had progressed in their rehabilitation, - only ten were considered hopeless.

Let us think of this outside of humanities. These individuals had a life expectancy of at least six years. They had gone into the hospital to remain there for the next six years of their life's expectancy at a twelve dollar a day patient cost. That is average throughout the Veteran's Administration. It means a saving to the government and to you as tax payers of over a million dollars, - just these fifty-five patients leaving the hospital.

One other point in the activities of daily living that is most important and a field that needs to be investigated and research work done in is in our tuberculosis patients. I think the average for the entire country is something like forty-five percent of the tuberculosis patients leave AWOL or against medical advice. In the Veteran's Administration it is

forty percent. Where an active rehabilitation program is in progress, and this must be under medical direction, one planned according to what that patient can do in terms of his chest disease, - give these men a plan that gives them hope and they will work and they will stay in the hospital.

In the very first rehabilitation program on these tuberculosis patients the AWOL's and against medical advice discharges has gone down from forty percent to eleven percent.

Lastly, in trying to work a program out for the handicapped persons we, at Bellevue, have three principles that we start out with before we can have any program. First, range of motion of the handicapped person. Second, muscle tests, and third, those activities of daily living that they can now do. With those three factors you can sit down with a patient and work out his program of physical therapy, occupational therapy, and start in to make this man ambulatory, able to walk, able to go up and down curbs, able to go across streets, and then it is possible to work out a vocation that it is possible for this man to accomplish. I thank you. (Applause)

CHAIRMAN KRUSEN: Thank you, Dr. Covalt.

The next discussion from a member of our panel of experts on rehabilitation will be by Dr. A. Ray Dawson, Assistant Medical Director in charge of Physical Medicine Rehabilitation

in the Veteran's Administration.

Dr. Dawson will speak to us on a subject which is of particular interest to this group, "Correlating Rehabilitation and Industrial Practice."

DR. A. RAY DAWSON: In order that we might immediately arrive at an area of common understanding I would like to present the views of the Council on Industrial Health. The following was taken from the March, 1947, issue of Occupational Medicine and is by Dr. Seeger. I quote:

"The Council is of the opinion that rehabilitation is preeminently a medical problem and likely to continue as such for many years to come. Physical restoration is the fundamental principle in the rehabilitation of the crippled and disabled, and these services can be adequately carried out only under medical direction and supervision. Other aspects of the problem, notably vocational training and placement, are also important but must rest fundamentally on the best possible medical reduction of the disability. It is believed that the members of the medical profession are not generally conversant with the size and urgency of the problem of rehabilitation, and the Council expects, therefore, to give more and more attention to reviewing this whole field and the place of medicine in it; to educate the members of the profession about current

trends and methods; to maintain a clearing house of information; to foster effective states relations; to maintain proper contact with official and voluntary agencies, and to work closely in this field with other official groups in the American Medical Association, more particularly the Council on Physical Medicine."

The views of the Council have been very stimulating to us who devote our full time to these endeavors. The dissemination of information relative to medical rehabilitation is most urgently needed and in this connection I'd like to praise the Editorial Board of Occupational Medicine for their selection of such fine professional articles on this subject.

Medical rehabilitation has been termed the third phase of medical care. This is most certainly true and it includes the restoration of employability. With this as our goal in treating the sick or disabled it is evident that the industrial physician is intimately involved in this phase of medical care, and he will go as far along the road of rehabilitating the disabled individual as is practical for his specific industry.

Therefore, in discussing this subject I think that it would be wise for us to divide the areas of industrial practice into, one: Industrial practice in small one-activity plants. Two: Industrial practice in large multi-activity plants. Three: Industrial practice in large insurance carrier

type of plant.

No discussion of Correlation of Rehabilitation and Industrial Practice would be complete without a discussion of the attitude of Industry. In this connection I'd like to present for your consideration that it has been said that industry has passed through three stages of development. The first is processing, the second is mass production, and the third is mass selling, and it is now in the fourth stage, that of management and public relations. As medical rehabilitation is an accepted fact of good management and is an element of superb public relations, it would seem that industry is awaiting the guidance of the medical profession in establishing larger activities in this field.

The grand report of England's industrial progress during the last half of 1947 is all the more impressive when we take into consideration the large problem of medical rehabilitation and industrial placement which her industries faced.

I was told last summer by physicians of the Bureau of Pensions of this problem, how it was being met and of the fine cooperation of management and labor. England needs more manpower and every individual is apparently being rehabilitated to industrial placement.

Finally, it is hoped that we never again face the

crisis of a war that did so much to stimulate the employment of the handicapped, but certainly the experience of the war did demonstrate that medical rehabilitation is a practical and profitable procedure.

This morning Mr. Hansen, Vice President of Liberty Mutual, gave me the last statistics on their rehabilitation information. First let me tell you that this covers seven hundred and ninety-seven industrial accident cases that were treated by the Liberty Mutual in Boston. Now, six hundred and seventy-three or eighty-four percent of the cases improved. The number of cases not improved by treatment were a hundred and twenty-four, or sixteen percent.

It would seem that without the pressure of the war we could rehabilitate for the sake of humanity and for the enjoyment of the individual as well as for greater production and profit. I thank you. (Applause)

CHAIRMAN KRUSEN: Thank you, Dr. Dawson.

Our next expert is Dr. Thomas B. McKneely, Senior Surgeon, United States Public Health Service; Chief Medical Officer, Office of Vocational Rehabilitation, who will discuss the relationship of the federal and state program to the medical profession with particular emphasis on its relation to physical medicine.

DR. THOMAS B. McKNEELY: I have as a subject one that is of particular interest to me. I am not an expert in physical medicine. I have to sit in Washington and see that things go right in so far as it is possible in the programs that the states are actually operating in the field of vocational rehabilitation.

I would like to point out, first, that under this program of rehabilitation we have a limiting phrase or an adjective modifying rehabilitation, namely, vocational rehabilitation. As we look at the program and read the definition of rehabilitation services we will appreciate how broad a program this can be.

Vocational Rehabilitation Services may be defined, and I quote: "Any services necessary to render a disabled individual fit to engage in remunerative employment." The objective of this program, then, is placement of an individual who has a disability in employment.

Now, physical medicine has as its purpose the physical rehabilitation or reconditioning of a disabled person, or you might say the restoration of function through the application of physical means. That, obviously, is as broad a definition of the vocational services as can be given.

This phase of the practice of medicine is of particular

interest to those of us who are engaged in this program of vocational rehabilitation because it seems to us to offer hope to many of our severely disabled civilians. Physical medicine and vocational rehabilitation certainly have a common interest in the restoration of functions, however, vocational rehabilitation as we operate it under the Public Law 113 has many ramifications that are beyond the simple restoration of functions.

The Federal-State program of Vocational Rehabilitation is a joint endeavor, having as its objective, the placing of persons with physical or mental vocational handicaps in remunerative employment. To accomplish this purpose, persons of employable age now unemployable because of physical or mental conditions must be made employable through the provision of necessary vocational rehabilitation services. Vocational rehabilitation services, I repeat, may be defined as "Any services necessary to render a disabled individual fit to engage in remunerative occupation." These services may be enumerated as follows:

1. Medical diagnosis, including specialist examination and hospitalization needed to arrive at a medical appraisal of the person's physical and mental condition.
2. Medical and surgical treatment, including hospitalization, drugs, nursing services, convalescent home care.
3. Provision of prosthetic appliances.

4. Counseling and guidance, which continues throughout the course of vocational rehabilitation and gives direction to the process. It is through the counseling and guidance technique, coupled with psychological measurements and the medical diagnosis that a vocational diagnosis is made. On the basis of the vocational diagnosis, a job objective is jointly determined by the client and the counselor.
5. Training for the selected job, which may include training of varying direction and complexity, ranging from simple touch-up on skills by on-the-job training to a college course.
6. Placement in the proper job, which involves physical demands analysis and physical capacities appraisal. The mental and emotional components of the client's make-up must not be overlooked in placement.
7. Job adjustment through follow-up visits to the client and employer after placement.

This listing of services is not intended to be complete and in detail. Its purpose is to give a broad conception of the many ramifications involved in the vocational rehabilitation of an individual. An attempt is made to view every client in his entirety, evaluating his every asset as well as his liabilities. Generally, we will find that the client's assets can be made to outweigh his liabilities or handicaps.

There are a great many points of similarity between the vocational rehabilitation program of the State agency and a well-managed personnel department in industry. In both there is medical assistance, counseling, and guidance. Both want a good

medical examination to determine physical limitations and the presence of hidden disabling conditions; both want psychometric tests to uncover outstanding interests and abilities; both want to place an individual in a job for which he is suited and on which he can produce. Some industries will provide training courses to fit an individual for a job. Industry, however, is dealing largely with able-bodied persons, whereas vocational rehabilitation agencies are devoting their energies only to persons who have been unable to secure employment because of mental or physical conditions which have prevented them from obtaining employment.

In considering the place of physical medicine in vocational rehabilitation, it would be well to summarize some of the characteristics of clients served by State vocational rehabilitation agencies, including the nature of their disabilities. During the fiscal year ending June 30, 1947, there were 43,874 disabled persons rehabilitated into employment, seventy-two percent of whom were males and about eighty-six percent of those were white. About half were between fifteen and thirty years of age.

An analysis of the history of onset of disabilities in this group indicates that thirty-one percent of the disabling conditions originated in employment or other accidents,

fifty-one percent originated in disease, fifteen percent were congenital, and about three percent resulted from either military or civilian war service. Now, in about three-fourths of the persons rehabilitated the disability originated before the age of thirty, thus the bulk of persons rehabilitated are young and have many useful years of living ahead of them.

The nature of disabling conditions is of interest. Disabled persons with various types of orthopedic involvements, amputations, and congenital absence of members comprise about half of the total number rehabilitated.

Now, we have broken this down into rather broad categories. The orthopedic disabilities, other than from poliomyelitis and cerebral palsy are about twelve thousand; the residuals of poliomyelitis about twenty-six hundred; from cerebral palsy, a small number, five hundred; amputations and congenital absence of members, about six thousand.

Now, there are a number of other categories which might be listed but I believe these are the ones that are of particular interest in this discussion since these are usually more amenable to physical medicine.

Not every client with disabilities such as listed above is eligible for medical and/or surgical treatment. Those responsible for the operation of the Federal-State program

of vocational rehabilitation want reasonable assurance that the treatment recommended will either remove or substantially reduce the handicapping condition within a reasonable period of time. Medical or physical restoration services, as well as other services, are looked upon as an investment in the client's future and there is a desire for a return on the investment.

We are all aware that the program is tax supported, and that unnecessary or unwise expenditures are to be avoided. Further, the condition must be static, not acute, or so rapidly progressive as to endanger life or make the formulation of a rehabilitation plan unfeasible.

For example, a State agency would not accept for physical restoration services a client with a recent fracture or a recent burn but if disability remains after a certain period has passed physical restoration services might be provided.

It is of interest to note that medical services may only be provided if the person is unable to pay in whole or part for the necessary services from his own resources. If he is unable to pay for any of the needed services, physical restoration services are provided without cost to the individual. Otherwise, he contributes to the cost of treatment and other medical services in accordance with ability to pay.

The above describes in a general manner the specific

provisions contained in Public Law 113, of the 78th Congress, which defines the area within which the State agency may be reimbursed from Federal funds for medical services provided clients. The law further provides that States will not be reimbursed for periods of hospitalization in excess of ninety days for any one condition. Regulations under the law specify that for a client to be eligible for physical restoration services, the condition must constitute a substantial employment handicap. These services, as I implied, are not provided to make a client happy, but rather must be a necessary part of the vocational rehabilitation plan.

Those services I mentioned earlier as vocational rehabilitation services are provided to disabled people by eighty-seven agencies in all of the forty-eight states and the District of Columbia, Puerto Rico, Alaska, and Hawaii. In thirty-six of these states separate agencies provide vocational rehabilitation services for the blind.

I have just come from a meeting of a day and a half in which the medical consultants of the eleven states comprising the region out of the Chicago office have been meeting to discuss problems concerned with the operation of the medical aspects of this program. I mention this simply to point out that in the state agencies there is medical supervision and

medical guidance to the program.

Medical direction is given by part-time or full-time medical consultants on the State staff, supplemented in many states by district medical consultants. Each State agency has a Professional Advisory Committee to assist the medical consultant and State director in formulation of medical policies. With respect to treatment, each State agency utilizes the services of physicians having specialty qualifications in the applicable field.

States try to have their clients treated by those physicians certified by the American Specialist Board, those eligible for certification, or those otherwise qualified as specialists. Physicians receive fees for their services in accordance with a schedule of fees for specified services.

We feel that the service of the best available specialist is the most economical. Many of the persons applying for vocational rehabilitation services have disabling conditions that have existed untreated for years; many have conditions which represent failures of earlier inadequate treatment; many come to us after being offered no hope by the physicians in their home community.

Each applicant, if otherwise eligible, must be evaluated to determine whether physical restoration services

can assist in vocational rehabilitation. Not all can be helped by medical treatment. It is difficult to determine the proportion which would be acceptable, within the limits of the Act, to treatment. The percentage would vary considerably between different parts of the country, depending in part on the availability of good public medical care. In some southern states the percentage may be in the neighborhood of forty or fifty percent. In others it may be less.

As we have gained experience in the provision of the broader services authorized by Public Law 113 in 1943, it has become apparent that in many localities available services still are not adequate to rehabilitate clients with certain types of disabilities. We rather glibly refer to the severely disabled group. It is difficult to define the term "severely disabled." I hesitate to define it in relation to particular categories of disability. There is a tendency to think of the "severely disabled" client as one who cannot be rehabilitated through the utilization of services usually available in a community, or one that requires the application of special services, - medical or otherwise. At any rate, the definition of the term is not exact, but is relative to many factors, including job opportunity.

There is an increasing interest on the part of State vocational rehabilitation agencies, among others, in this so-called

severely disabled group. There is a growing feeling that many of the special services needed by this group can only be provided in a rehabilitation center, which is another term that needs some definition. The OVR conceives a rehabilitation center to be the integrated provision of all necessary vocational rehabilitation services, whether these services be concentrated largely under one roof or be located in several places in a community. Irrespective of whether services can be concentrated or dispersed in a community, there is need for the inclusion of adequate provisions for physical medicine in all its modalities.

The Virginia State Vocational Rehabilitation Agency opened a vocational rehabilitation center last month in a part of the buildings of the former Woodrow Wilson General Hospital near Staunton, Virginia. One of the first positions on the center staff to be filled was a specialist in physical medicine, and almost the first service placed in operation was the physical medicine department.

Only a casual glance at the first client group accepted was needed to see that the majority were using crutches, braces, or were in wheelchairs, - all probably scheduled for physical medicine measures.

Among the disabling conditions that we feel can only be served in a center such as the one in Virginia are recent amputees or less recent amputees who have not learned to use an

artificial limb; paraplegics; the more deforming and resistant residuals of poliomyelitis; peripheral nerve injuries; and other conditions resulting in substantial limitation of motion in significant parts. This listing is not intended to be inclusive, even of those conditions which may respond to physical medicine.

During the past year, with the assistance of our consultant on orthopedics and prosthetic appliances, the Office of Vocational Rehabilitation has been attempting to increase the interest of the medical profession in the problems of the civilian amputee. Outstanding among these problems is the proper fitting of the prosthesis and adequate training in its use.

Of course, consideration of the total problem goes further back than this would indicate. It goes back to the surgeon's decision to amputate and his selection of the level of the amputation. However, in the State-Federal program, most of the amputations have already been performed when the client applies for service, which accounts for our particular emphasis on proper fitting and adequate training.

In civilian life, all too frequently the orthopedic surgeon is not sufficiently interested in proper fit and training. Much of the responsibility for these matters reverts to the salesman of a limb company simply through default. The salesman frequently wears a limb himself and attempts to teach on the

basis of his own experience. He undoubtedly has had some success, because many civilians wearing limbs satisfactorily were so instructed. However, it is known that there have been many failures, too, because State vocational rehabilitation agencies have surveyed the group provided with limbs and found that an appreciable percentage have not used the limb successfully, or have laid it away entirely.

Exactly which professional specialty group should have responsibility for the fitting or the training is a matter for others to decide. However, State vocational rehabilitation agencies do feel that there is a need for professional supervision in this area.

Earlier in my discussion I indicated the number of clients among those rehabilitated in 1947 who had orthopedic conditions. This figure does not include those with orthopedic conditions who were not rehabilitated. There are a number of possible factors contributing to failure in the un-rehabilitated client. Undoubtedly, in a number of instances, failure may have been due to the unavailability of appropriate therapy. Sometimes a lack of awareness on the part of a local physician that something can be done elsewhere prevents the client from ever reaching that source of service.

From these observations I believe you will gather

that State vocational rehabilitation agencies are vitally interested in the potentialities of physical medicine and have among their clients many who need the services of this specialty group.

State vocational rehabilitation agencies also wish to work closely with physicians and to encourage early referral of those patients whose conditions may interfere with successful employment. The value of early referral is similar to value of early diagnosis and treatment in medicine. (Applause)

CHAIRMAN KRUSEN: Thank you, Dr. McKneely.

We come, now, to the last expert on our panel, Dr. Howard A. Rusk, Chairman and Professor in the Department of Rehabilitation and Physical Medicine, New York University College of Medicine, Associate Editor of the New York Times, and formerly Chief of Rehabilitation in the Army Air Forces. Dr. Rusk will discuss the "Place of Rehabilitation in the Practice of Medicine."

DR. HOWARD A. RUSK: Ladies and gentlemen, I want to talk very rapidly because there are a lot of things I would like to share with you today, - a lot of headaches we have had in the past eight months in setting up a program of rehabilitation in the general hospitals, and also some of the little victories that have come to us within this period of time.

Eight months ago, in Bellevue Hospital, we established the first service of this type in any general hospital, that we know of in the country, for the care of the civilian disabled. We are a major department in the hospital on a par with medicine and surgery and I must say that we have had complete and total cooperation of the entire staff. Cooperation, I believe, based on our basic philosophy in the program and that is that we are a service department to all other departments in the hospital.

Nose and throat, for example, - the laryngectomy has to learn his speech. The blind, the deaf, although we don't have a specific program in for the blind and deaf because of other agencies available in New York, but that is a part of our orthopedic patient. The arthritic, the maladjusted, the cerebral palsy, the poliomyelitis, the neurological problems, - when definite medicine is over, when the fever is down, when the danger to life is past, when the sutures are out, - what happens from that time to productivity is our problem.

We have no direct admissions in our ward, but we see patients through all the other services in the hospital.

Our criteria for acceptance of patients are these:

Is the medical condition static or progressive? If it is progressive, can we progress faster than the progression of the disease?

Second, - can we accomplish something to allow this individual to live a purposeful life by training him?

If those two criteria are met and a bed is available the patient is admitted. As Dr. Covalt told you, beside the routine range of motion we have muscle tests and they are tested for the inherent needs of daily living.

Now, we don't call them patients in our wards, we call them students because they go to class from nine o'clock in the morning to five o'clock in the afternoon, with two hours off for lunch.

Those with lower disabilities work three hours a day in ambulation and elevation. The elevation room is set up with ramps, steps, a half of a municipal bus, an actual bus so that when an individual has mastered it they can travel on a public vehicle any place in the country. They begin with mat exercise and go clear through the needs for ambulation in a city like New York.

To show you how such a program works, Dr. Deever,

my associate, has been running a survey for the New York Chapter of Infantile Paralysis on poliomyelitis cases who have had the disease for at least a period of five years. The survey isn't complete, but in the last six weeks we have had five poliomyelitis cases in the women's ward, alone, who have been home bound because they have not had proper training.

One was a paraplegic poliomyelitis without abdominals. She had had four major spinal operations and six or eight other types of surgical procedures. She could walk on a level, but had been home-bound because she couldn't get up a curb or couldn't get on the bus. It took a week to teach her the curb and she could get on the bus in the first fifteen minutes. At the end of that time she left the hospital to go out on a job as a trained stenographer, - she had had that training but hadn't been able to work because she couldn't get on a bus. That is just an illustration of the patients that we see.

Patients carry their records with them. You can stop a patient in the hall at any time and look at the record and say, "Why aren't you here, or why aren't you there?" Rounds are made before and after classes and the whole program is dovetailed to the need of this individual.

I think I can show you how the whole program works by showing you our organizational set-up. We have a

director service here, and our total program is divided into the physical medicine section and the physical rehabilitation section. We have direct physical education, and under rehabilitation we have social service. We have two social workers assigned to our eighty beds who are absolutely indispensable in this program because you have to know when the patient comes in what your final distribution is going to be. You have to have a place for them to go because this program is not a domiciliary-care program for chronics. We have dynamic therapeutics, dynamic training, and when the individual has reached his maximum improvement he has to be released. About ten percent will go to domiciliary care, - the failures. The rest will be distributed into the homebound program, sheltered workshop, selective placement in industry, or full-time employment in industry.

In this program we have an individual called a "vocational counselor," and it is his job to start, within forty-eight hours, to evaluate the vocational possibility of this individual.

Then we have a psychologist who works at this level in the program, a speech therapist, and a volunteer program. In our program at Bellevue the Junior League has furnished us with full-time volunteers who come in and work under a supervisor

of volunteers. They serve for a two year period under her supervision. They help with the occupational therapy, they assist the social workers, and they work in administration.

In addition to that the volunteers have the recreation program and recreation in our hospital starts at five-thirty and goes from then on until eight or nine o'clock at night. It doesn't consist merely of bringing in entertainers, there are discussion groups one week, there are films, and there is one group on home gardening. It is amazing what you can do with a dollar, imagination, a few seeds and a little know-how.

This home-gardening is a tremendous thing for shut-ins and we have had a great deal of interest in it. We hope to eventually write it up as a project and make it available generally. But, all of this group is our first line team.

Then we have five specially assigned consultants, a psychiatrist, an orthopedist, a neurologist, and a plastic surgeon. The remainder of the consultation is taken care of through general consultation services, but all of these individuals are specially assigned because they have a special part to play in this program, and they make their rounds weekly.

Now, when the individual has reached his maximum improvement he is moved out of the program. If he requires preventive medicine, if that becomes primary, he is referred

back to the special ward to fit his need. When training is primary, then it is our responsibility.

It has been our experience in this program that one of the most valuable things about it is for the individual to be working with other disabled people because he has space lines he can follow, those worse off, those better off, et cetera. He can see what training can accomplish. We don't feel that the hemiplegics should be segregated from the paraplegics. We have found a very healthful ² affect in having them together, even with some of our psychoneurotic problems.

With patients with physical disabilities, if you put them in the total program you will find that the general effect is not unsalutary. Our psychiatric problems on the wards are practically nil. You give these patients a little hope, and a little know-how, and a plan and you don't have to go from "a" to "z" with them. If "a" is a total confinement to bed and "z" is complete activity, - if you can take a patient who has been in bed for three months or three years and teach him self-care and let him walk to the lavatory and not have to use a bed pan, teach them to take care of their own daily needs and that is all you need.

We do have great psychiatric problems when the individual gets out of the hospital and for that he has to be

conditioned. Our whole staff has to participate in this program. Their primary objective is to get that individual to the point where he can go out at his level and work in dignity.

That, in general, is our set-up in the hospital. As I said, and would like to repeat, we have had a hundred percent cooperation with the other members of the staff.

We now teach forty hours to the undergraduates on indoctrination in the care of the patient. In those lectures we talk about little things. We talk about observation of little things, - the patient treated as a whole individual and how the various basic signs fit in to make up the totality of an individual. In the sophomore year we talk about occupational therapy, what is it, what does it do? It isn't just something to take up time until two, three, or four o'clock and make a rug on a loom, - what is the purpose of it?

We teach physical therapy and physiology. The physiology of early amputations, the tie-up of physiology and chemistry and physics to the whole program.

In the junior year we get into the basic therapeutics problems in physical medicine.

In the senior year we have sixteen clinics, hemiplegia, one on amputees, arthritis, et cetera.

We hope, eventually, to set up a program in chronic

disease so that a freshman student can be assigned to a patient that we know is going to have the rest of his life impaired by some chronic disease or disability, and let that individual student follow the patient through the four-year period in order that he may see, focused on one person that he has seen and followed, the problems, the totality of the individual and the necessity for treating the individual rather than the disease.

We talk about this country, or some people do, that there are no new opportunities and no new arrivals. Many of us, I think, who practice clinical medicine feel that all research is going to be done in the laboratories, that great amounts of money are going to be spent in laboratories, and that the cause of the disease doesn't depend so much on us but on the trained scientists in the laboratories.

In this field of medicine the research field is absolutely untouched. Take, for example, the largest occupational group in America, - the disabled housewife. There are five million of them, two million of whom are either on crutches or wheel chairs. There has never been a time study or motion study made so that a woman can take care of her own house competently from a wheel chair.

There is no reason under the shining sun why it can't be done. Vacuum cleaners with short handles, certain types

of simple fixtures in the bathrooms, sills away from the doors, bedrooms planned so that they can get inbetween them with a wheel chair. There is no reason in the world why a woman in a wheel chair can't be perfectly competent in her own home, and this is certainly true of a woman on crutches.

The most interesting case is a cardiac in industry. We studied the jobs and in many jobs you could reduce the energy requirements fifty percent. Now, the borderline cardiac, - if you can go in and prescribe for her a method of taking care of her house with a reduced energy requirement of twenty-five percent you will make that woman a competent individual.

Cancer, - you don't think of it in terms of rehabilitation. How about the proper exercise for post operative individuals? The individuals with eradicated breasts, - what exercises can they take and should they take to prevent or reduce the edema? What exercises can they take to relieve the condition of the abdominal muscles? How are they going to be trained to live psychologically and physically with that condition?

There are problems for the amputee in cancer and we see them all the time. There is the individual who has had his leg off. He has a good stump, a good job, and he buys a leg but it doesn't fit.

We had a woman in our service last week. She had

her legs off for three years. They had bought two legs but she came in on the arm of her husband and used a cane simply because nobody had ever taught her to use balance. Somebody had told her that she had to come down on her heels first and she was totally inadequate and insecure. It took three weeks of training to get her off the cane and out of the house by herself.

All of these are fields untouched. Take arthritis, we have two experimental cases now. One is a young man who had been in bed four and a half years, - his legs were totally fixed. He had good forearms and good shoulders and by simple balance he was taught to swing his stiff legs out over the bed. The crutches were at the top of his bed and he could pick them up and walk a four-point gait with his crutches. He can get back into bed the same way.

He went into our watch repair unit and was fine except that after four hours his feet got sore. So, we had to devise some way for him to take the weight off his feet. We first tried a bicycle seat, but that proved inadequate. Now we are working on the basis of the thing that happens to you when you ride a bony horse, - where do you carry the weight? We have made a horse out of wood and sponge rubber and he can now take a part of the weight off his heels and give them relief.

How is he going to sit down? Well, we went to

Hollywood for that one. You know these reclining seats the actresses use when they can't sit down because they might muss their dresses? Well, he backs up on that and the table is tilted up on that and that is his chair.

Now, he can't travel because he can't sit down, but he has shown himself so proficient that we are setting up a home program for him to assemble watches. Bulova watch people set up the program. Now, here is a boy twenty-four and a half years old who would have spent all of his time in a chronic hospital in bed. Now he has a home program tailored to meet his own needs. He thinks it is worth while and so do we.

Hemiplegia: When do you start to train? Retraining starts the day they regain consciousness. We know the shoulders will freeze in three to six weeks if they aren't properly exercised. If they are kept in bed it takes a week to get them in the upright position because of the hyper-static phenomena. If we get them early we can save them months of disability. Dr. Covalt has told you that forty percent of our hemoplegias, in the first series, we have been able to get back to work.

Tuberculosis: I think we are learning from the graphic reports coming in that you can't put a patient's mind in a cast. To say to a man that has a family and financial problems, "Go to bed and don't worry," anybody knows that is

not possible for him. So, he goes back to that heavy job and he is going to break down. That is why two-thirds of our hospital sanitarium beds are filled with relapsed tuberculosis patients. They either die or relapse within the first five years after the discharge. But, we have evidence from all over the country that you can reduce that to three or four percent with proper training, retraining, hardening periods, et cetera.

We have just had beautiful evidence of Dr. Covalt's point at our Sea View Hospital at Staten Island. The number leaving against medical advice has been reduced to one percent. It just goes back to the simple point that you have to treat the individual rather than the disease.

We have worked out, in Bellevue, a little welcoming pamphlet for the patients. We tell him why he is going to be exercised, what his schedule means, and what his outlook is in simple, factual language.

We took two old wards and made them over. We cut them up and made a men and women's ward. We are short of nurses, short of personnel, so we took this course. We made these wards into dormitories and if the patient progressed rapidly in his training he was graduated into the dormitory. When he went there the lights could be kept on longer, he had certain privileges that the ward patients didn't have, but for

that privilege the patients took care of the dormitory. They swept it, made the beds, and they don't have nice four-cornered beds, but the patients make them and they are happy and they are doing the things there that they are going to have to do when they leave.

The morale has been terrific. A great many of them help each other. Tom Francis, who is one of our patients being treated for poliomyelitis, has been helping us in speech therapy. We find individuals who can help teach in the program in addition to the buddy-type of teaching. They have small groups of patients that they get together and indoctrinate them in some of the techniques they have learned the hard way.

We have eighty beds in Bellevue now. In the new Bellevue we are to have six hundred. The master plan has been published it has been recommended that in 1950 there were to be eight thousand beds, in greater New York, for convalescent care and rehabilitation. That is twenty percent of all the hospital beds in New York.

I think, with all the hospital building, with all the talk of chronic disease, that we should take into consideration some of the experiences we have had in the management of chronic disease. We who have been working in this program, and only for a few months, know that these are only our first

observations, but we are sure enough of our ground to say, flat-footedly, that with a dynamic training program there is absolutely no limit to what can be accomplished. It is going to be much more, I think, than most of us think possible. The average person with a chronic disease can be trained to go out of the hospital for domiciliary care, can be taught self-care, can be taught to do some little gainful work, even if in a home-bound program, and can live some sort of a normal life outside of an institution.

What are we going to do about it? This has to be a part of medical education. Our faculty believes this is a necessary part in the teaching of the student. You could get a few hours in medicine, a few hours in surgery, a few hours in orthopedic, on this subject, and if everybody pitches in and gives you a little that you can pass back to the students, yours and theirs, that directly affects their specialty, then there is no problem in working this into the curriculum.

Disabled citizens in this country have a right to know what can be done with dynamic training. Doctors have to be indoctrinated as to the techniques, and they are very simple. This is a program of a lot of little things; hard work, imagination, attention to detail, utilization of simple engineering principles, et cetera.

Tom Francis, our poliomyelitis patient here, has spent six years in general hospitals. He came to us in July. He had no protractors and his medical care had been excellent, but he was in a home for incurables because he couldn't do four or five simple things. He had a rocker-arm splint for his arm, but he didn't have enough strength to use it. In three weeks he could use it. We got him an IBM typewriter and in two weeks he was able to write two single-spaced letters to his mother which was the first communication they had had in six years.

It took us six weeks to teach him to turn over in bed. He is still working with the therapist, but he turns over in bed fifteen times every morning as a part of his routine. As a result of this work he now has a job and is going back to practice law the first of January.

Doctors must know such opportunities exist. Patients must know. Industry must know that disabled people make good workers. I think it can best be sold to industry by the simple explanation that nature has been kind, that we have tremendous powers of over-training and over-compensation; that the blind man put in a job where he can use the type of sensation that nature has increased, such as hearing, can do a better job in that particular job than the normal man.

Put a deaf man in a job that requires visual acuity

and he will do a better job than the normal man. Put a paraplegic in a job where he can sit down and use the strength in his fingers and arms and he can out-work the normal man. There are dozens of studies that show it, - one, two, three, four; better production, less accidents, less labor turn-over, less absenteeism. It goes straight across the board and that is the way we sell it to industry.

Then the legislators have to know. This vocational program should have ten times as much money as they have to spend. They had about eighteen million dollars, I think it was, last year, but when you talk in terms of airplanes and battleships it is a drop in the bucket. Now they have to go back and ask for a two million dollar deficiency appropriation.

I wrote a letter about it last week and I was ashamed to do it because if the individuals who make the laws understood the different needs that such a program has not only in humanities, but in dollars and cents, - it is the soundest political program that any man could back.

Those of us working in the program understand that we have to continue this program of education in these four facets if we are going to really practice dynamic therapy in chronic diseases and give patients total medical care. I thank you. (Applause)

CHAIRMAN KRUSEN: We have only a short time left because at three-thirty Dr. Henry H. Kessler will have the Amputations Clinic in this room. We have only fifteen minutes more and there are a few questions that have come to the panel. We are going to take these questions first and if there is time I will let you ask some additional questions. But, to start the ball rolling, there are a few questions here that the members of this group have asked the panel to answer.

The first question has already been answered, partly by Dr. Rusk. The question is, "Is it sound economy to employ the physically handicapped person in industry?"

I have before me a statement by Louis I. Dublin, a hardboiled statistician of the Metropolitan Life Insurance Company. He says, "Humanitarian considerations apart, a concerted drive to apply modern knowledge to the problem of the handicapped would be sound economics."

Dr. Covalt, have you additional points you care to point out?

DR. COVALT: I think quite possibly that Dr. McKneely should answer that. I think their experience in their service of cases in 1944 would be most interesting.

DR. MCKNEELY: I won't quote figures directly, but our statisticians have surveyed the increase in income of persons

rehabilitated and compared that with the income before rehabilitation and they have arrived at the conclusion that within two or three years, following rehabilitation, or even less, the clients will have returned to the government in the form of income taxes and other taxes more than the cost of their rehabilitation.

CHAIRMAN KRUSEN: Dr. Dawson, would you care to add anything?

DR. DAWSON: I think the statistics which I have just referred to are quite indicative along that line. Of the seven hundred and ninety-seven cases surveyed, four hundred and thirty-four were dropped from compensation, - at least compensation was terminated. Three hundred and sixty-three, at the time of this study, were still indeterminate. Sixty-four percent, in other words, of those cases that were improved were back on a full employment status.

CHAIRMAN KRUSEN: To show the versatility of the handicapped worker, Dr. Kessler in his new book on rehabilitation of the handicapped mentions that four thousand four hundred and forty-four handicapped persons are employed in six hundred and fifty-three different types of work. That indicates their great versatility.

Dr. Rusk, have you any additional comments?

DR. RUSK: I have just one. In an unpublished report made by the Bureau of Labor, taking eleven thousand handicapped workers to eighteen thousand normal workers in a cross section of industry, - every type of job had the same results quoted.

CHAIRMAN KRUSEN: Here is a question that will interest the experts here. It is a question that has been asked by an industrial physician. The question is, "Is rehabilitation really the doctor's job? Why can't social service handle it?

Who would like to take that? Dr. Rusk.

DR. RUSK: This is a team-work job. It is primarily a medical problem and the doctor's responsibility.

To go back to the hemiplegia, I don't think that we have done a job with our hemiplegics when we give them potassium iodate and six ounces of sodio-bromide and leave them to sit in a rocking chair. Their home may be fine, but they are the unhappiest people in the world.

This is a team, as I tried to point out, and it is an attack of the problem from the physical, psycho, social, and vocational standpoint. I don't think it is the responsibility of social service any more than it is the physiotherapist's job. It is all a team-work proposition.

CHAIRMAN KRUSEN: Thank you very much Dr. Rusk and

Dr. Covalt.

DR. COVALT: I would like to point out on your cardiac and tuberculosis patients, - there is no one but a doctor could take charge of the rehabilitation of those two cases.

CHAIRMAN KRUSEN: The time is about past when the surgeon can say, "Your stitches are out, you can go home and go back to work," or when the interne can say to the patient, "Your temperature is down, you can get out and go back to work." It just doesn't work out that way.

I think ^{this} /is a question from an industrial doctor, too. The question is, "Why should I ask my company to take the risk of hiring handicapped people when there is now an adequate supply of fit workers available?"

DR. RUSK: I think we have pointed out that if you use these people where they can use their over-compensated senses that they would out-work the normal person.

I saw a report recently from a large company where thirty of the top executives were examined in January and there was not one single one of the thirty who were physically fit. Yet, that company doubled its income in the next year. I think you have to stay physically fit for whatever you are doing. Everyone isn't going to run the mill every morning and if you use

people in jobs where they can use their over-trained, over-compensated senses, then that is good business.

They don't want a hand-out. They don't want four balls and a free trip around the bases. They also don't want two strikes on them before they come up to bat. If my observations are correct, all they want is a chance to take a cut at the ball on the same basis as anybody else, and if they make a hit to get around the bases. But, if they get around the bases in time the run ought to count.

CHAIRMAN KRUSEN: Any further comment? I think that has been pretty well answered.

Here is another question: "Is the Peoria plan applicable to other communities?"

Dr. Rusk, do you want to take that?

DR. RUSK: The Peoria plan, as I understand it, is a community-industrial group who have organized to have a unit set up where handicapped employees may register and where industry can pick from that reservoir of handicapped individuals those they can fit into specific jobs in their plants.

For instance, the Caterpillar Tractor Company, - I don't think they hire epileptics because they are in heavy industry, but they are used by certain other industries in Peoria. Certain other types are taken by Caterpillar that other

small companies can't take .

They have one of the one hundred and fifty community rehabilitation centers that give certain types of training services to disabled people. There are only one hundred and fifty such centers in the entire country.

I think this plan applies to any community except when you get into the very large cities. I think it would be a little bulky in the larger cities and would have to be unitized.

CHAIRMAN KRUSEN: I think I can add a little to this discussion.

Peoria, Illinois, affords an outstanding example of a community which planned well in advance to set up a coordinated program for veterans, and it has seen the wisdom of applying it to non-veterans as well. The Peoria Plan for Human Rehabilitation had its roots in the wartime needs of local industry. Industrial leaders, physicians, civic and welfare workers got together and developed a definite plan for employing disabled people in suitable jobs.

Cooperation was sought and obtained from each group, in a meeting, to meet a particular responsibility in the total program. The only paid employee at the beginning was a counselor, and local citizens and organizations bore the cost. From this modest beginning, there developed first a rehabilitation

plan for returning veterans of the community, and finally for all disabled residents of the area. With the recent expansion, support and guidance from state and federal sources have been required, but the Peoria Plan will serve as a useful model for other industrial cities of moderate size, and it should be extended into other communities.

This is the next question, "Should the industrial physician participate in a community rehabilitation plan?"

DR. DAWSON: Yes.

CHAIRMAN KRUSEN: Dr. Dawson said, "Yes." Can you amplify?

DR. DAWSON: What we need is a definition of industrial medicine. As I understand it, the definition of industrial medicine means "Determining the employability of an individual and trying to keep him employed." That means trying to keep him on the job and if we include in that the third phase of it, care, the restoration of employability; I don't know of anyone that is more interested in rehabilitation than the industrial physician.

He is the man who is going to take our product and use it. I don't see how he can be a success without being interested in rehabilitation. He is limited somewhat in relation to how large his industry is and whether it is a single-activity

industry or whether it is larger and has many activities. But, that becomes an individual problem.

DR. RUSK: It is part of his job, too, to take these people and get them back to work.

CHAIRMAN KRUSEN: Thank you, Dr. Rusk and Dr. Dawson. I notice that our time is running short, - are there any statements that any of you care to make?

DR. RUSK: I neglected to say one thing and that is that we have worked out admission procedures, discharge procedures, organization charts, nursing procedures in rehabilitation wards, and they are available at Bellevue. If any of you are interested if you will drop a card to me at Bellevue Hospital I will be glad to send you a package of this entire material we have worked out if it will be useful to you.

CHAIRMAN KRUSEN: Dr. Sawyer, have you any comments to make from the standpoint of an industrial physician?

DR. SAWYER: I agree with Dr. Dawson and Dr. Rusk. I don't see how you can neglect the importance of this development. .

I think there is one thing that might be mentioned, Dr. Rusk, that you didn't mention and that is that there is value in employing these people in the encouragement it gives to others. They can see what can be done if they should one

day become handicapped.

DR. DAWSON: Dr. Sawyer is from the Eastman Kodak Company.

DR. R. A. SUTTER (St. Louis, Missouri): I would like to ask the panel, "How do you overcome the psychological barrier to the successful rehabilitation of a man who has a claimed partial disability?"

CHAIRMAN KRUSEN: Dr. Rusk, will you take that?

DR. RUSK: Well I think, in certain cases, that you can't do it until some type of settlement is made. I think the chronic backs have been one of the best indications and when the individual gets an anxiety complex over a long period of time it is a difficult problem. It is psychotherapy, it is confidence, - he has to be assured that he can come into a program and work for an agreed period of time. The combined efforts of the entire team can assure him and his doctor that he can get back to a job, that a settlement can be made, or that he can be put on a trial basis for a period of months. But, it is difficult when they are fixed, when they have an anxiety in addition to the physical disability.

DR. SUTTER: Then it takes it out of the realm of the industrial problem and it becomes a public problem.

DR. RUSK: Well, you can gamble a little training

money on the basis that you may get him back to work and off the road. I think it has to be an enlightened attitude on the part of industry, the public, the rehabilitation people, and the doctor.

You can't promise, but you can take him in and really give him a try. It is the same way that you attack a questionable cancer. You can't say to a patient, "I am going to operate on you and remove this cancer." You can only say, "I am going to operate and do it, do the best that I can. We are going to do it if it is humanly possible." That is what you say to the individual that has a fixation and an anxiety.

CHAIRMAN KRUSEN: In order that Dr. Kessler may come in on time we will have to close our session.

In closing, however, I should like to read to you one statement which I think is one of the most unique and interesting of all statements.

John Galsworthy, at the Allied Conference on the After Care of Disabled Men, way back in 1919, said; "Restoration is at least as much a matter of spirit as of body and most of it is central truth. Body and spirit are inextricably conjoined. To heal the one without the other is impossible.

If a man's mind and courage and interest be enlisted in the cause of his own salvation healing goes on apace and

the sufferer is remade. If not, no mere surgical wonders, no careful nursing will avail to make a man of him again.

Therefore I would say that from the moment he enters the hospital look after his mind and his will. Give him food; nourish him in subtle ways; increase that nourishment as his strength increases. Give him interest in his future. Light a star for him to fix his eyes on so that when he steps out of the hospital you shall not have to begin to train one who for months, perhaps years, has been living mindless and willingless, the life of a half-dead creature.

That this is a hard task none who know hospital life can doubt. It needs special qualities and special efforts quite other than the average range of hospital devotion is obvious, but it saves time in the end and without it success is more than doubtful. The crucial period is the time spent in the hospital. Use that period to recreate not only the body, but mind and will power, and all shall come out right; neglect to use it thus and the heart of him a sufferer and of him a would-be healer will break from sheer discouragement.

A niche of usefullness and self-respect exists for every man however handicapped, but that niche must be found for him. To carry the process of restoration to a point short of this is to leave the cathedral without a spire. To restore

him, and with him the future of our countries, that is the sacred work."

The meeting stands adjourned.

...The meeting adjourned at 3:30 o'clock, p.m...

A D J O U R N M E N T

1
CONFERENCE ON OCCUPATIONAL CANCER

Tuesday Afternoon, January 6, 1948

The Conference on Occupational Cancer convened at 2:30 o'clock, Dr. Ernest Brown, presiding.

CHAIRMAN BROWN: Ladies and Gentlemen: I regret very much to say Dr. Shields Warren, who was to have presided at this session has not yet arrived. We hope he will arrive in a reasonably short time, and in order to avoid delay, I think we will now proceed with the second paper, which will be presented by Dr. William T. Salter, New Haven, Connecticut, Professor of Pharmacology, Yale University School of Medicine. Dr. Salter!

CHEMICAL ASPECTS OF OCCUPATIONAL CANCER

Paper by Dr. William T. Salter

Dr. Brown: I feel a little embarrassed about opening this meeting, because I understood I was going to be well protected on either flank by a man from Boston on one hand and a man from New York on the other. Because New Haven is always in that situation, I felt right at home. But now I find I am playing tackle with an unguarded line and although that play worked pretty well a few weeks ago in the Yale Bowl, I am not so sure the play will work so well in Cleveland.

... Dr. Salter presented his paper ... (Applause)