

Interstate Commerce Commission
Washington, D.C. 20423

OFFICE OF THE SECRETARY

I, SIDNEY L. STRICKLAND, JR., Secretary of the INTERSTATE COMMERCE COMMISSION, do hereby certify that the attached is a true copy of the Association of American Railroads Proceedings of the Fifteen Annual Meeting of the Medical and Surgical Section, held at Chalfonte-Haddon Hall, Atlantic City, N.J, June 10, 11, 1935, the original of which are now on file and of record in the office of said Commission.

IN WITNESS WHEREOF I have
hereunto set my hand and
affixed the Seal of said
Commission this *9th* day
of March, A.D., 1993.

S. L. Strickland, Jr.
SECRETARY OF THE INTERSTATE
COMMERCE COMMISSION



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Association of American Railroads

PROCEEDINGS
OF THE
FIFTEENTH ANNUAL MEETING
OF THE
MEDICAL AND SURGICAL SECTION



CHALFONTE-HADDON HALL
ATLANTIC CITY, N. J.
JUNE 10, 11, 1935

PLAINTIFF'S
EXHIBIT
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PROCEEDINGS
OF THE
FIFTEENTH ANNUAL MEETING
OF THE
Association of American Railroads
MEDICAL AND SURGICAL SECTION

HELD AT
CHALFONTE—HADDON HALL, ATLANTIC CITY, N. J.
JUNE 10, 11, 1935

EASTERN PRINTING CORPORATION
NEW YORK, N. Y.
1935

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ASSOCIATION OF AMERICAN RAILROADS

Officers

J. J. Pelley, President
R. V. Fletcher, Vice-President and General Counsel (Law Department)
J. R. Downes, Vice-President (Operations and Maintenance Department)
A. F. Cleveland, Vice-President (Traffic Department)
E. H. Bunnell, Vice-President (Finance, Accounting, Taxation and Valuation Department)
H. J. Forster, Secretary-Treasurer

Board of Directors

J. J. Pelley, Chairman (ex-officio).
L. W. Baldwin, Trustee, Missouri Pacific Lines.
J. J. Bernet, President, Chesapeake & Ohio Railway, New York, Chicago & St. Louis Railroad and Pere Marquette Railway.
Ralph Budd, President, Chicago, Burlington & Quincy Railroad.
M. W. Clement, President, Pennsylvania Railroad.
L. A. Downs, President, Illinois Central System.
Geo. B. Elliott, President, Atlantic Coast Line Railroad.
E. S. French, President, Boston & Maine Railroad and Maine Central Railroad.
Carl R. Gray, President, Union Pacific System.
Fairfax Harrison, President, Southern Railway System.
Hale Holden, Chairman, Southern Pacific Company.
Fred W. Sargent, President, Chicago & North Western Railway.
H. A. Scandrett, President, Chicago, Milwaukee, St. Paul & Pacific Railroad.
Daniel Willard, President, Baltimore & Ohio Railroad.
F. E. Williamson, President, New York Central System.

OPERATIONS AND MAINTENANCE DEPARTMENT

J. R. Downes, Vice-President

DIVISION I—OPERATING

Officers

C. E. Denney, Chairman

J. Cannon, Vice-Chairman

J. C. Caviston, Secretary

MEDICAL AND SURGICAL SECTION

Officers

Dr. J. R. Garner, Chairman

Dr. D. B. Moss, First Vice-Chairman

Dr. Duncan Eve, Jr., Second Vice-Chairman

J. C. Caviston, Secretary

MEMBERS OF COMMITTEES

Committee of Direction

(Term expires June, 1936)

Dr. J. R. Garner (Chairman), Chief Surgeon Western Railway of Alabama, Atlanta, Ga.

Dr. D. B. Moss (First Vice-Chairman), Chief Medical Officer, Chicago, Burlington & Quincy Railroad, Chicago, Ill.

Dr. Duncan Eve, Jr. (Second Vice-Chairman), Chief Surgeon, Nashville, Chattanooga & St. Louis Railway, Nashville, Tenn.

Dr. Harvey Bartle, Chief Medical Examiner, Pennsylvania System, Philadelphia, Pa.

Dr. John McCombe, Chief Medical Officer, Canadian National Railway, Montreal, Canada.

Dr. E. V. Milholland, Medical & Surgical Director, Baltimore & Ohio Railroad, Baltimore, Md.

Dr. John R. Nilsson, Chief Surgeon, Union Pacific Railroad, Omaha, Nebr.

(Term expires June, 1937)

Dr. A. R. Metz, Chief Surgeon, Chicago, Milwaukee, St. Paul & Pacific Railroad, Chicago, Ill.

Dr. S. B. Taylor, Chief Surgeon, New York Central Railroad, Columbus, Ohio.

Dr. F. C. Warring, Chief Resident Surgeon, Western Maryland Railway, Baltimore, Md.

Dr. A.
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Ch
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Va.
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Dr. R. J.
Dr. W. J.
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CanDr. R. C.
Min
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N. Y.
Dr. G. C.
Dr. G. C.
Dr. O. B.

Dr. John

DEPARTMENT

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Medical Officer, Chicago,

Chief Surgeon, Nashville,

Penn.

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lan National Railway,

Baltimore & Ohio Rail-

road, Omaha, Nebr.

ce, St. Paul & Pacific

al Railroad, Columbus,

ern Maryland Railway,

Honorary Members

Dr. A. J. Chesley, Secretary-Treasurer, Conference of State & Provincial Health Authorities of North America, St. Paul, Minn.

Dr. H. S. Cumming, Surgeon General, Treasury Department, Bureau of Public Health Service, Washington, D. C.

Committee on Nominations

Dr. O. B. Zeinert (Chairman), Chief Surgeon, Missouri Pacific Railroad, St. Louis, Mo.

Dr. L. A. Ensminger, Chief Surgeon, Cleveland, Cincinnati, Chicago & St. Louis Railway, Indianapolis, Ind.

Dr. A. M. Hume, Chief Surgeon, Ann Arbor Railroad, Owosso, Mich.

Dr. S. C. Plummer, Chief Surgeon, Chicago, Rock Island & Pacific Railway, Chicago, Ill.

Dr. R. A. Woolsey, Chief Surgeon, St. Louis-San Francisco Railway, St. Louis, Mo.

Committee on Disability and Rehabilitation

Dr. J. D. Collins (Chairman), Chief Surgeon, Seaboard Air Line Ry., Norfolk, Va.

Dr. J. G. Frost, Chief Surgeon, Chicago & Eastern Illinois Ry., Chicago, Ill.

Dr. R. J. Graves, Chief Surgeon, Boston & Maine R. R., Concord, N. H.

Dr. W. J. Lancaster, Supt. & Med. Dir. Rel. Dept., Atlantic Coast Line R. R. Wilmington, N. C.

Dr. J. E. Pulver, Chief Surgeon, Chicago & North Western Ry., Chicago, Ill.

Representative from Committee of Direction

Dr. John McCombe, Chief Medical Officer, Canadian National Rys., Montreal, Canada.

Committee on Fractures

Dr. R. C. Webb (Chairman), Chief Surgeon, Great Northern Ry., Minneapolis, Minn.

Dr. Bradley L. Coley, Chief Surgeon, New York Central R. R., New York, N. Y.

Dr. G. G. Davis, Chief Surgeon, Elgin, Joliet & Eastern Ry., Chicago, Ill.

Dr. G. G. Dowdall, Chief Surgeon, Illinois Central System, Chicago, Ill.

Dr. O. B. Zeinert, Chief Surgeon, Missouri Pacific R. R., St. Louis, Mo.

Representative from Committee of Direction

Dr. John R. Nilsson, Chief Surgeon, Union Pacific R. R., Omaha, Nebr.

Committee on Developments Resulting from Physical Examination

Dr. S. C. Plummer (Chairman), Chief Surgeon, Chic., Rock Isld. & Pac. Ry., Chicago, Ill.

Dr. H. A. Beatty, Chief Surgeon, Canadian Pacific Ry., Toronto, Canada.

Dr. W. N. Blount, Chief Surgeon, Gulf, Mobile & Northern R. R., Laurel, Miss.

Dr. W. L. Hartman, Medical Director, New York Central Lines, Detroit, Mich.

Dr. A. M. Hume, Chief Surgeon, Ann Arbor R. R., Owosso, Mich.

Representative from Committee of Direction

Dr. D. B. Moss, Chief Medical Officer, Chic., Burl. & Quincy R. R., Chicago, Ill.

Special Committee on Medical Aspects of Air Conditioning of Cars

Dr. T. R. Crowder (Chairman), Dir., Dept. of San. & Surg., The Pullman Co., Chicago, Ill.

Dr. G. G. Dowdall, Chief Surgeon, Illinois Central System, Chicago, Ill.

Dr. R. A. Woolsey, Chief Surgeon, St. Louis-San Francisco Ry., St. Louis, Mo.

Representative from Committee of Direction

Dr. E. V. Milholland, Med. & Surg. Dir., Baltimore & Ohio R. R., Baltimore, Md.

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DIVISION I—OPERATING

MEDICAL AND SURGICAL SECTION

REGULATIONS

Representatives

1. Representatives of members or associate members shall be Chief Surgeons or other officials engaged in a similar capacity. They shall be officially designated by the members or associate members they represent.
2. Affiliated members may be appointed by the Committee of Direction.

Officers

3. The officers of the Section shall be a Chairman, a First Vice-Chairman and a Second Vice-Chairman.

Committee of Direction

4. There shall be a Committee of Direction which shall consist of 10 representatives of members or associate members within the Section, including the Chairman, the First Vice-Chairman and Second Vice-Chairman of the Section, the past Chairman last holding office and 6 other representatives of members. The Committee shall, in addition, include in its membership the Surgeon-General of the United States Bureau of Public Health Service or a representative to be designated by him, and a representative to be designated by the Conference of State and Provincial Health Authorities of North America.

5. The Committee of Direction shall conduct the business of the Section, authorize, order, define duties, determine the number of and appoint members of such committees that may be necessary to properly conduct the work of the Section.

6. Regular meetings of the Committee of Direction shall be held semi-annually, the date and place to be decided by the Chairman. Special meetings of the Committee may be held at the call of the Chairman.

7. The Chairman of the Section shall act as the Chairman of the Committee of Direction. In the absence of the Chairman his duties shall devolve upon the First Vice-Chairman. In the absence of both the Chairman and the First Vice-Chairman, the Second Vice-Chairman shall preside. Should the Chairman and both Vice-Chairmen be absent the members shall elect a Chairman pro tem.

Committee on Nominations

8. There shall be a Committee on Nominations to consist of five representatives of members or associate members not officers of the Section.

9. As candidates for the Committee on Nominations, the Committee of Direction shall select the names of ten representatives, five of whom shall be

elected. The candidate receiving the greatest number of votes for membership on the Committee on Nominations shall act as Chairman of that Committee.

10. The Committee on Nominations shall, prior to the annual meeting, select the names of two or more representatives of members or associate members as candidates for Chairman, two or more as candidates for First Vice-Chairman and two or more as candidates for Second Vice-Chairman, and 6 representatives of members or associate members as candidates for the Committee of Direction.

11. Any representative of a member or associate members may, at the annual meeting, nominate for officers or members of the Committee of Direction such representatives as desired, provided that such nominations have been endorsed in writing by ten representatives of members or associate members.

12. The representatives of members or associate members nominated for officers or for the Committee of Direction receiving the highest number of votes, shall be considered elected.

Election

13. The Chairman and Vice-Chairmen shall be elected annually by a majority ballot and shall hold office for one year or until the close of the session at which their successors are elected. The term of office of members of the Committee of Direction shall be two years and 3 members of the Committee shall be elected annually. To provide for the inauguration of the foregoing, 3 members of the Committee of Direction shall be elected at the annual meeting in 1924 to serve for one year and 3 members to serve for two years. At subsequent annual sessions 3 members shall be elected to serve for two years.

14. The election of officers and members of the Committee of Direction and Committee on Nominations shall be by printed ballot and only officially designated representatives shall be entitled to vote. When a ballot for election of officers or members of committees results in a tie such ballot must be retaken.

15. A vote in sessions of the Section may be taken viva voce, by rising, by roll-call or by ballot. If there is any doubt as to the result of a viva voce vote the Chairman can order, or on the request of three members, a roll-call vote shall be taken in accordance with the practice of the Association of American Railroads, based on the number of memberships held by each member.

Meetings of Committees

16. Meetings of any committee may be held at the call of the Chairman of such committee unless for some special reason notification to the contrary has been issued by the Chairman of the Section.

Annual meeting of the Section shall be held in May or June, the time and place to be designated by the Committee of Direction. Special meetings may be held at the call of the Committee of Direction.

17. If a member of a committee is absent from two consecutive regularly called meetings of the committee, his membership ceases *ipso facto*, and the Committee of Direction shall act as in a vacancy from any other cause.

18. Should a Committee of Direction be authorized to call an annual meeting

19. The right to vote in representation

20. An executive committee of the Section

21. These Rules shall apply to all special meetings of the Section or special meetings of voting members

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18. Should a vacancy occur in the officers of the Section, the Committee of Direction or Committee on Nominations, the Committee of Direction is authorized to appoint a representative to fill such vacancy until the next annual meeting.

General

19. The right to hold office, vote and attend executive sessions shall be vested in representatives of members or associate members only.

20. An executive session of the Section may be held at the call of the Chairman of the Section or at the request of five representatives of members.

21. These Regulations may be amended by a majority vote at any regular or special meeting of the Section, subject to approval by two-thirds of the voting members by a letter ballot.

MEDICAL AND SURGICAL SECTION

Chalfonte-Haddon Hall, Atlantic City, N. J., June 10-11, 1935

The following representatives were present:

Members	Representatives
Alton R. R.	E. V. Milbolland, Medical and Surgical Director.
Atlanta & West Point R. R.	J. R. Garner, Chief Surgeon.
Baltimore & Eastern R. R.	Harvey Bartle, Chief Medical Examiner.
Baltimore & Ohio Chicago Terminal R. R.	E. V. Milbolland, Medical and Surgical Director.
Baltimore & Ohio R. R.	E. V. Milbolland, Medical and Surgical Director.
Belt Ry. Co. of Chicago	B. C. Cushway, Radiologist.
Canadian National Railways	John McCombe, Chief Medical Officer.
Central Vermont Ry.	L. E. Sample, Chief Surgeon.
Chesapeake & Ohio Ry.	W. T. Oppenheimer, Chief Surgeon.
	J. J. Brandabur, Asst. Supervising Surgeon.
Chicago & Eastern Illinois Ry.	J. G. Frost, Chief Surgeon.
	B. C. Cushway, Radiologist.
Chicago & North Western Ry.	J. E. Pulver, Chief Surgeon.
Chicago & Western Indiana R. R.	J. G. Frost, Chief Surgeon.
Chicago, Burlington & Quincy R. R.	D. B. Moss, Chief Medical Officer.
Chicago, Milwaukee, St. Paul & Pacific R. R.	A. R. Metz, Chief Surgeon.
Chicago, Rock Island & Pacific Ry.	S. C. Plummer, Chief Surgeon.
Chicago, Rock Island & Gulf Ry.	S. C. Plummer, Chief Surgeon.
Delaware & Hudson R. R. Corp.	J. W. Ghormley, Company Surgeon.
Delaware, Lackawanna & Western R. R.	J. N. White, Chief Surgeon.
Denver & Rio Grande Western R. R.	M. D. Currigan, Acting Chief Surgeon.
Erie R. R.	W. E. Mishler, Asst. to Chief Surgeon.
Georgia R. R.	J. R. Garner, Chief Surgeon.
Grand Trunk Western R. R.	G. W. Stockwell, Asst., Western Lines.
Great Northern Ry.	R. C. Webb, Chief Surgeon.
Louisiana & Arkansas Ry.	A. A. Herold, Chief Surgeon.
Missouri Pacific R. R.	O. B. Zeinert, Chief Surgeon.
Montour R. R.	G. C. Weil, Chief Surgeon.

New York

New York

Pennsylvania

Long Isl.

Pennsylvania

Pennsylvania
Pekin & Un.
Pullman Co.

Reading Co.

Richmond, I.
R. R.
Rutland R. R.
St. Louis-San
Seaboard Air
Union Pacific
St. Joseph &
Virginian Ry.
Wabash Ry.

Western Mar.

Western Ry.

Association of

SECTION

June 10-11, 1935

representatives
and, Medical and SurgicalChief Surgeon.
, Chief Medical Exami-

and, Medical and Surgical

and, Medical and Surgical

Radiologist.
, Chief Medical Officer.
Chief Surgeon.
mer, Chief Surgeon.
our, Asst. SupervisingChief Surgeon.
Radiologist.
Chief Surgeon.
Chief Surgeon.
Chief Medical Officer.Chief Surgeon.
Chief Surgeon.
Chief Surgeon.
Company Surgeon.Chief Surgeon.
Acting Chief Surgeon.
Asst. to Chief Surgeon.
Chief Surgeon.
Asst., Western Lines.
Chief Surgeon.
Chief Surgeon.
Chief Surgeon.
Surgeon.

New York Central System.....	F. V. Whiting, General Claims Attorney.
	W. L. Hartman, Medical Director.
New York Central R. R.....	S. B. Taylor, Chief Surgeon.
	N. L. Higinbotham, Company Surgeon.
Pennsylvania R. R.....	Harvey Bartle, Chief Medical Examiner.
	Walter Aye, Medical Examiner.
Long Island R. R.....	J. W. Harper, Medical Examiner.
	A. P. Isenberg, Medical Examiner.
Pennsylvania R. R. (cont'd).....	T. B. L. Jordon, Medical Examiner and Company Surgeon.
	H. E. Heston, Medical Examiner.
	R. C. Kell, Neurologist.
	J. S. Moses, Medical Examiner and Company Surgeon.
	J. E. Nickel, Medical Examiner.
	S. W. Thust, Medical Examiner.
	J. A. White, Medical Examiner.
Pennsylvania-Reading Seashore Lines.....	A. P. Isenberg, Medical Examiner.
Pekin & Union Railway.....	J. E. Meloy, Chief Surgeon.
Pullman Co.....	T. R. Crowder, Director, Department Sanitation and Surgery.
Reading Co.....	F. S. Ferris, Chief Medical Examiner and Chief Medical Officer.
	C. Detweiler, Medical Examiner.
	C. M. Glassmire, Medical Examiner.
	H. E. Klase, Medical Examiner.
	M. J. Murphy, Medical Examiner.
	Adolph Neupauer, Medical Examiner.
	J. H. Orff, Medical Examiner.
Richmond, Fredericksburg & Potomac R. R.....	W. T. Oppenheimer, Chief Surgeon.
Rutland R. R.....	S. W. Hammond, Chief Surgeon
St. Louis-San Francisco Ry.....	R. A. Woolsey, Chief Surgeon.
Seaboard Air Line Ry.....	J. D. Collins, Chief Surgeon.
Union Pacific R. R.....	J. R. Nilsson, Chief Surgeon.
St. Joseph & Grand Island R. R.....	M. L. Crandall, Surgeon.
Virginian Ry.....	Southgate Leigh, Chief Surgeon.
Wabash Ry.....	D. A. Pence, Surgeon-in-Charge.
	W. E. Gollings, Superintendent.
Western Maryland Ry.....	F. C. Warring, Chief Resident Surgeon.
Western Ry. of Alabama.....	J. R. Garner, Chief Surgeon.
	also
Association of American Railroads.....	J. C. Caviston, Secretary. (M. & S. Section).

Conference of State and Provincial
Health Authorities of North America. A. J. Chesley, Secretary.
International Journal of Medicine and
Surgery.....F. C. Lewis, Editor and Publisher.
Mayo Clinic.....C. H. Mayo, M. D.
.....W. J. Mayo, M. D.
.....F. A. Willius, Cardiologist.
The Johns Hopkins University, School
of Medicine.....Dean Lewis, Professor of Surgery.
United States Navy.....Rear Admiral P. S. Rossiter, Surgeon
General.
Wheeling Clinic.....W. S. Fulton, M. D.

and

Guests.....E. H. Shields, M. D.
.....F. L. VanSickle, M. D.

The first session of the
Section of the Association
forty-five o'clock, in C
Chairman, Dr. J. R. N

THE CHAIRMAN: T
The first thing on the
Caviston.

THE SECRETARY: A
letter from Mr. Downe
roads, which I will read

"Dr. John R. Nil-
Chairman, Medicine
Association of Am
30 Vesey Street, N

"Dear Dr. Nilsson
"Referring furth
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THE CHAIRMAN: T
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Members of the Me
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them as their excellent
efficient Secretary, Mr.
by the members of the

Chesley, Secretary.

Lewis, Editor and Publisher.

Mayo, M. D.

Mayo, M. D.

Willius, Cardiologist.

Lewis, Professor of Surgery.

Admiral P. S. Rossiter, Surgeon
General.

Fulton, M. D.

Shields, M. D.

VanSickle, M. D.

MONDAY MORNING SESSION

June 10, 1935

The first session of the Fifteenth Annual Meeting of the Medical and Surgical Section of the Association of American Railroads was called to order at nine forty-five o'clock, in Chalfonte-Haddon Hall, Atlantic City, New Jersey, by Chairman, Dr. J. R. Nilsson.

THE CHAIRMAN: The meeting will come to order please.

The first thing on the program is the announcements by our Secretary, Mr. Caviston.

THE SECRETARY: Mr. Chairman, about the only announcement I have is a letter from Mr. Downes, Vice-President of the Association of American Railroads, which I will read. It is dated June 7th:

"Dr. John R. Nilsson,
Chairman, Medical and Surgical Section,
Association of American Railroads,
30 Vesey Street, New York, N. Y.

"Dear Dr. Nilsson:

"Referring further to your letter of April 4th:

"I was hoping that it might be possible for me to attend your annual meeting in Atlantic City on June 10th and 11th. but now find, much to my regret, that it will not be possible for me to do so.

"Trusting that you may have a successful and well attended session, I am

"Yours very truly,
J. R. Downes."

In addition, as you know, Mr. Chairman, Mr. Pelley, President of the Association, was invited to be present, but he had an engagement which made it impossible for him to be here.

THE CHAIRMAN: The next item on the program is Remarks by The Chairman.

Members of the Medical and Surgical Section and Honored Guests:

It gives me great pleasure to welcome you to this, the Fifteenth Annual Meeting. It has been a privilege to serve as your Chairman during the past year, having had the cooperation of all the committees, which have given thoughtful and painstaking consideration to the various problems assigned to them as their excellent reports will verify. The kind assistance of our very efficient Secretary, Mr. J. C. Caviston, has been appreciated by me as well as by the members of the various committees.

As you know the Section was invited by the Chief Surgeon of the National Railways of Mexico to hold its meeting in conjunction with a Pan-American Railway Surgeons Congress, which was scheduled to convene in Mexico City May 5th, when a new hospital was to be dedicated. When this invitation was being considered, your Committee of Direction also considered the possible desirability of reverting to the practice followed from the organization of the Section in 1921 to 1927, that is of holding our annual meeting at the same time and place as the annual meeting of the American Medical Association. It will be recalled that the change in practice as to the date and place was made because of the inconvenience and trouble experienced by the delegates to our meeting in securing hotel accommodations in certain cities where the A.M.A. had convened. In spite of this, a check of the record of attendance shows that the average number of Chief Surgeons attending the meetings of our Section was considerably higher when held in conjunction with the A.M.A. For this reason your Committee of Direction decided again to try out the former practice and hold the 1935 meeting in Atlantic City at the same time as the meeting of the American Medical Association. I believe this will be one of the most interesting, instructive and important meetings that we have had for some time.

Since our meeting in Washington, D. C., as you are no doubt aware, a new association called "Association of American Railroads" came into being October 12, 1934, and assumed the activities of: (a) Association of Railway Executives; (b) American Railway Association; (c) Bureau of Railway Economics; (d) Railways Accounting Officers' Association.

The new Association is composed of five major departments, namely: I. Law; II. Operations and Maintenance; III. Traffic; IV. Finance, Accounting, Taxation and Valuation; V. Planning and Research.

With the exception of the former Traffic Division, the several Divisions and Sections of the former American Railway Association are included in the Operations and Maintenance Department of the new organization. That department now includes the Medical and Surgical Section. The activities of the Operations and Maintenance Department are under the supervision of Mr. J. R. Downes, Vice-President.

The continued success of the Medical and Surgical Section will depend entirely upon the interest manifested by its members.

There was one disappointment to me which occurred when the Chairman of the Fracture Committee sent out a questionnaire to our 119 members and only 50 replies were received. I appreciate, of course, the fact that our problems vary. Some members are Medical Directors whose chief duties are of an administrative nature while others have added duties and responsibilities of personally caring for operative and fracture cases.

One of the outstanding accomplishments of our organization is the result obtained by the conducting of biennial physical examinations participated in by 51 of the 134 Class "A" railroads (defined as railroads having annual operating revenues above one million dollars). Such examinations enable us to produce an invaluable mass of information and we now have accumulated records of approximately 250,000 cases. With the remaining 83 Class "A"

railroads are readily approachable by command.

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led by the Chief Surgeon of the National Association in conjunction with a Pan-American Association scheduled to convene in Mexico City will be dedicated. When this invitation was received, the Direction also considered the possibility of following from the organization of the annual meeting at the same time as the American Medical Association. It was decided to the date and place was made because of the experience by the delegates to our meeting in certain cities where the A.M.A. had the record of attendance shows that the ending the meetings of our Section was in conjunction with the A.M.A. For this reason, it was decided again to try out the former location in Atlantic City at the same time as the Association. I believe this will be one of the most important meetings that we have had for

D. C. as you are no doubt aware, a new name "Railroads" came into being. (a) Association of Railway Surgeons; (b) Association of Railway Officers' Association.

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railroads and those not in Class "A" adopting these examinations, you can readily appreciate the extent of valuable statistics which would be at our command.

The Fracture Committee has rendered a very complete report, a copy of which you all have. After being read by the Chairman, Dr. Webb, it will be open for discussion.

The Committee on Physical Standards has given this subject considerable thought for two years and now has some very definite suggestions to offer relative to changes that should be made. These same have been approved by your Committee of Direction. If they meet with your approval they will be passed on to the Operating Division for their further consideration.

The Committee on Disability and Rehabilitation was unfortunate in losing its Chairman, Dr. Cale, by death, and I wish to thank Dr. A. R. Metz, Acting Chairman, for carrying on the work of this Committee. The result of its effort will be read by the Doctor with discussion to follow.

The special committee on air conditioning has arranged to have Dr. Crowder tell us about the research work that is being done at the Pullman Company's plant. I am sure this will prove very interesting.

The Section has continued its contacts and cordial relations with the United States Bureau of Public Health Service, the several State Health Boards and the American College of Surgeons, as well as with other Sections and Divisions of the Association. The most recent contact was in regard to the threatened epidemic of Amoebic Dysentery in 1934. At the request of Acting Surgeon General Dr. Pierce, many of our railroads took additional precautionary measures in regard to the handling of food in the Dining Car and Hotel Departments. On the Union Pacific System as a further precautionary measure all food handlers had from one to three stool examinations. All positive cases and carriers were hospitalized and treated.

During the past year the Section has lost five of its members by death:

Dr. George W. Cale, Jr., Chief Surgeon, St. Louis-Southwestern Railroad and Chairman of Committee on Disability and Rehabilitation.

Dr. F. E. Smith, Chief Surgeon of the Wabash Railroad and past President of Chief Surgeons Association.

Dr. J. M. Wainwright, Chief Surgeon, Delaware, Lackawanna and Western Railroad.

Dr. R. V. Slocum, Superintendent and Medical Director, Relief Department, Atlantic Coast Line Railroad.

Dr. W. R. Hamilton, Chief Surgeon, Pacific and Idaho Northern Railroad.

All were active members in our Section and will be greatly missed by all of us. Letters of condolence were sent to the members of their families at the time of their death by our Secretary, Mr. Caviston.

As Chairman and in behalf of our Secretary, Mr. Caviston, I desire to express our appreciation and thanks for the cooperation and assistance of the Chief Surgeons during the past year. (Applause.)

THE CHAIRMAN: For many, many years I had the idea that the chief duty of a medical director or chief surgeon of a railroad was to look after traumatic cases, but when I became Chief Surgeon of the Union Pacific five years ago, I soon learned that one of my principal duties was to keep a close check on the physical condition of the men in the Operating Department, especially those in the yard, train, engine and signal service, this being done, as you all know, through our biennial physical examination and one of the principal examinations that we make is of the heart and blood pressure.

I think this Section is very fortunate this morning in having with us Dr. F. A. Willius, Chief Cardiologist of the Mayo Clinic, who has examined and treated many of these railroad cases, who will now talk to us on "Cardiac Hazard and the Railroads." (Applause.)

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THE CARDIAC HAZARD AND THE RAILROAD

FREDERICK A. WILLIAMS, M. D.

Section on Cardiology,

The Mayo Clinic, Rochester, Minnesota

The railroads, like other common carriers, are constantly striving to minimize the risks of travel and transportation, and in this campaign for safety, special emphasis is placed on the health of employees, especially those under whose direct responsibility rest the lives of the traveling public. This group of workers comprises engineers, firemen, conductors, brakemen, flagmen, switchmen, yardmasters, train dispatchers, wire chiefs, telegraphers, crossing gate-men, section foremen, and others whom we could mention. The sudden onset of serious illness or death among them and the inevitable remissness of duty consequent to these circumstances may lead to a catastrophe.

I do not know to what extent all the railroads have interested themselves in the health of their employees, but accounts of the endeavors of certain organizations have been published. In the recent report of one important line of transportation, a splendid program of health supervision was revealed which might well be patterned after by others not approaching this high standard. All prospective employees and all old employees in any way involved in the operation or maintenance of trains and equipment are thoroughly examined every two years. In event that the examination discloses findings indicating that closer supervision is necessary, the employee is compelled to be re-examined within a year or sooner. Under this plan, engineers are examined every year after the age of fifty and every six months after the age of sixty.

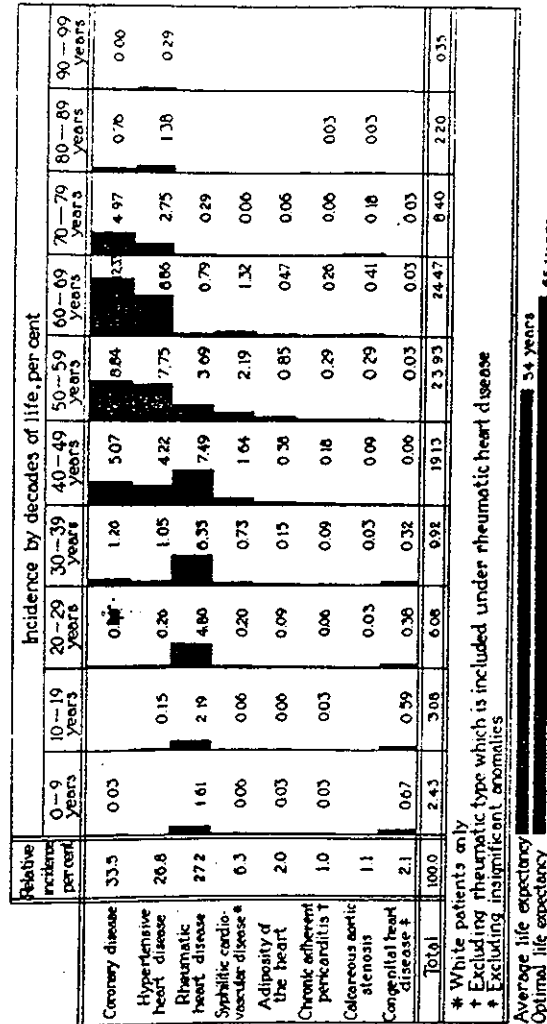
The ultimate effectiveness of this or any other well ordered plan of health supervision, however, is directly proportional to the thoroughness of the individual examination. Careless and superficial examinations clearly defeat the purposes of such endeavor and are only makeshifts of good faith.

I wish to confine my discussion to certain problems of heart disease and their relation to the railroad. The first involves the thorough examination of all applicants for employment, so that the presence of organic heart disease can promptly be detected and such applicants irrevocably rejected in so far as positions of important responsibility are concerned. Such a criterion not only absolves the employer from his responsibility to the traveling public, but likewise absolves him from eventualities that may arise later with regard to his employees.

It is an acknowledged fact that heart disease is on the increase in this country, so that we are justified in the conclusion that the need for careful selection of employees with reference to heart disease will parallel this increasing incidence. In this problem the examiner is confronted with the probability of encountering all forms of heart disease, and on him is imposed the responsibility of obtaining a comprehensive knowledge of this important subject. Here, a definite parallelism may be drawn to certain questions arising in insurance medicine. The applicant, anxious to seek employment, either wilfully or through lack of understanding fails to reveal certain symptoms

which may be absent under conditions of rest, so that the entire responsibility for their detection is placed on the acuity and perception of the medical examiner. He is therefore obliged, if he is conscientious, to resort to numerous methods of detection to justify his opinion.

In order to portray the incidence of heart disease with reference to potential employees, an analysis of 3,418 cases of the principal forms of heart disease is presented according to the occurrence of such forms in the ten decades of life.



Coronary disease is closely followed by hypertensive heart disease. Other forms of heart disease are of less importance. The figure would be of large municipalities. Other forms of heart disease in 2.0 per cent, and disease in 2.1 per cent.

The determination of these various forms of heart disease is given in the following table.

MATHEMATICAL PROBABILITY FORMS

Forms of heart disease
Coronary
Hypertensive
Rheumatic
Syphilitic cardiovascular
Adiposity of the heart
Chronic adherent pericarditis
Calcareous aortic stenosis
Congenital

*Example: If a man has heart disease, the probability is 1 to 2, whereas the probability is only 1 to 836.

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	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	Total
Chronic adherent pericarditis †	10	0.03									10
Calcareous aortic stenosis	11										11
Congenital heart disease ‡	21	0.07									21
Total	100.0	2.43									102.43
* White patients only											
† Excluding rheumatic type which is included under rheumatic heart disease											
‡ Excluding insignificant anomalies											
Average life expectancy											54 years
Optimal life expectancy											65 years

Coronary disease ranked first, with an incidence of 33.5 per cent; it was closely followed by hypertensive heart disease, with an incidence of 26.8 per cent. It must be remembered, however, that coronary disease and hypertensive heart disease are frequently found in the same patient, so that the basis of classification in this analysis was based on the predominance of one or the other. Rheumatic heart disease occurred in 27.2 per cent of the cases, whereas syphilitic cardiovascular disease occurred in only 6.3 per cent. The latter figure would be considerably increased in a group of patients such as inmates of large municipal hospitals, a considerable number of whom would be colored. Other forms of heart disease occurred with relative infrequency: adiposity of the heart in 2.0 per cent of the cases, non-rheumatic adherent pericarditis in 1.0 per cent, calcareous aortic stenosis in 1.1 per cent, and congenital heart disease in 2.1 per cent.

The determination, according to the law of mathematical probability, of these various forms of heart disease with regard to the decade in which they occur is given in Table 1.

Table 1

MATHEMATICAL PROBABILITY OF PATIENTS WITH HEART DISEASE HAVING ONE OF EIGHT FORMS OF HEART DISEASE (BASED ON 3,418 CASES)*

Forms of heart disease	Age, periods, years									
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99
Coronary	1/83		1/23	1/8	1/4	1/3	1/2	1/2	1/3	1/5
Hypertensive		1/21	1/23	1/9	1/4.5	1/3	1/3	1/3	1/2	1/1.2
Rheumatic	1/2	1/1.4	1/1.3	1/1.6	1/3	1/6	1/31	1/29		
Syphilitic cardiovascular	1/42	1/53	1/30	1/14	1/12	1/11	1/19	1/144		
Adiposity of the heart	1/83	1/53	1/69	1/68	1/50	1/28	1/52	1/144		
Chronic adherent pericarditis	1/83	1/105	1/104	1/113	1/109	1/82	1/93	1/144	1/75	
Calcareous aortic stenosis			1/208	1/339	1/218	1/82	1/60	1/48	1/75	
Congenital	1/4	1/5	1/16	1/31	1/328	1/818	1/836	1/287		

*Example: If a man whose age falls within the decade 60 to 69 years, has heart disease, the chances of the condition being coronary disease is as 1 to 2, whereas the chance of the condition being congenital heart disease is only 1 to 836.

These probabilities do not refer to a general group of individuals, but to a group of patients who had one of the eight forms of heart disease listed.

Now let us presume that careful appraisal of applicants will result exclusively in the addition of workers with normal cardiovascular systems, so that the problem becomes transferred to those employees who are already in service. This, therefore, implies the development of heart disease among employees.

I am led to believe that, with certain obvious exceptions, employees of maturity and with years of experience are of great value to the railroad, and that their services are unwillingly relinquished unless they have been proved to be unfit to continue with their responsibilities. It is this group of workers, ranging in age from fifty to sixty-five or seventy years, that I wish to discuss in detail.

I will comment only briefly on the obvious impairments of cardiac function as their recognition is inescapable in well conducted physical examinations. In this category would occur well marked cases of cardiovascular syphilis, such as aneurysm and aortitis with aortic insufficiency. Syphilitic aortitis, unless complicated by the foregoing factors, by atresia of the coronary ostia or septal gumma, would not impair cardiac function sufficiently to be an important consideration in potential sudden death. However, the possible association of syphilitic involvement of the central nervous system and impairment of mentality would constitute a hazard demanding prompt and definite action. Likewise, marked hypertension with cardiac hypertrophy and impending failure is very readily recognized and results in clinical phenomena that cannot be concealed. Individuals with moderate degrees of hypertension, whose heart, kidneys, and brain remain adequate, can safely be permitted to carry on with their duties provided they are subjected to careful medical supervision.

The disease that under certain conditions presents the most difficult problem in diagnosis is coronary disease. The outstanding, but not the sole, subjective manifestation of coronary sclerosis is the anginal syndrome, and in approximately 25 per cent of cases the diagnosis rests entirely on the presence of these phenomena. Physical examination may fail to reveal any evidence whatsoever to justify the opinion that the coronary arteries are seriously diseased. In medical practice the patient invariably is willing to reveal the history of his complaints, but in the case of the afflicted employee who is faced with dismissal or demotion, admission of such complaints may be refused until such a time as deceit is no longer possible or the presence of the disease is dramatically revealed by the employee's sudden death. The greatest incidence of coronary disease occurs in the sixth and seventh decades of life, and all men of these ages obviously must be designated as suspects. Beyond this age period the hazard is materially reduced, although it is an acknowledged fact that it is very unusual to observe normal coronary arteries beyond the age of seventy years. This apparent paradox finds an explanation in the fact that, as a rule, patients with serious and progressive impairment of the coronary circulation do not reach the older ages, and while coronary sclerosis is to some degree regularly present, it is frequently of the non-obliterating type. These observations were clearly demonstrated in recent studies by Smith and me which among others permitted the conclusion to be drawn that the heart that allows life to continue to advanced age is an organ of unusual integrity.

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In the consideration of patients with coronary disease it is essential to separate them into certain clinical groups, for the reason that associated or consequent conditions may so alter the pathologic processes as to result in a variation of subjective and objective clinical phenomena. Three basic groups are at once evident: (1) cases of coronary sclerosis with associated hypertension in which varying degrees of hypertrophy of the left ventricle occur, (2) cases in which healed cardiac infarction exists, and (3) cases of coronary sclerosis without these conditions just mentioned.

The first group is usually recognized with little difficulty, at least the presence of heart impairment is evident owing to the inevitable hypertrophy of the left ventricle. These patients, whether or not they present the anginal syndrome, invariably display dyspnea on undue effort.

Those cases in which the patient has survived coronary thrombosis and the cardiac infarct has healed are virtually always recognized by the elicitation of a careful history. The previous occurrence of a prolonged attack of retrosternal or epigastric pain of severe intensity and of considerable duration strongly suggests previous coronary thrombosis. When this story is supplemented by the knowledge that the patient exhibited the phenomena of shock, and that fever and leukocytosis ensued, no doubt, of course, remains.

The latter group, that is, cases not associated with hypertension or previous cardiac infarction, or in other words, cases of uncomplicated coronary sclerosis, frequently are the basis for diagnostic difficulty. The physical examination may reveal no abnormalities, the heart is not enlarged, and in those cases in which the true history is not acknowledged the medical examiner is required to utilize additional methods of detection.

Thus, we inevitably become confronted with the application of the electrocardiograph in order to make the medical appraisal complete. It is not merely the use of an instrument of precision, but the skillful and intelligent interpretation of its graphic inscription as applied to the individual patient. In order to emphasize its value in the appraisal of the coronary circulation, I wish to present some data regarding a recent study comprising 2,000 cases of coronary disease. The criterion forming the basis of selection was the anginal syndrome. The cases were grouped into the before mentioned divisions, as the electrocardiogram is also influenced by such associated conditions as hypertension and healed cardiac infarction.

Associated and significant hypertension occurred in 915 cases (45.8 per cent), healed cardiac infarction in 282 cases (14.1 per cent), whereas in 803 cases (40.1 per cent) coronary disease was uncomplicated by the foregoing conditions.

It is perhaps more important first to consider the incidence of normal electrocardiograms as they occurred in this study, that is, when this method of examination failed to reveal additional positive and incriminating evidence. When the entire group is considered, the incidence of normal electrocardiograms was 34 per cent. It is necessary at this point to define clearly the graph that I considered as normal. I disregarded the minor and variable alterations that may occur in normal hearts, such as ventricular preponderance, axis deviation, premature contractions, variations in the contour of the P waves, and notching

and slurring of the QRS complexes in isolated leads, that is, records not fulfilling the requirements of bundle branch block.

When the incidence of normal electrocardiograms is considered in reference to the necessarily created groups, a definite variation in incidence obviously occurs. The lowest incidence of normal electrocardiograms was found in those cases in which healed cardiac infarction occurred, namely, 20.6 per cent. The incidence in those cases with hypertension was intermediate, being 38.0 per cent. The highest incidence of normal electrocardiograms was found to occur in the uncomplicated cases of coronary sclerosis, this incidence being 46.1 per cent. The abnormalities consisted of significant T wave negativity and conduction defects, such as complete and incomplete bundle branch block, delayed auriculo-ventricular conduction, complete heart block and disturbances in rhythm such as auricular fibrillation and flutter, nodal tachycardia, and a lengthened Q wave in lead III.

The value and importance of the electrocardiogram in clinical medicine has been apparent for more than two decades, and its practical value is being appreciated more fully each year. The application of this diagnostic adjunct in cases in which the clinical history cannot be relied on is an additional weapon in the elimination of undesirable employees.

Let it be presumed for the moment that the sole basis for diagnosis of coronary disease was vested in the electrocardiogram, and that we were willing to accept the diagnosis of cardiac disease as revealed by it in order to appraise its value as a single diagnostic method. Let it further be presumed that the various graphic abnormalities which my experience has taught me to consider as being significant, and which I have mentioned, are in truth significant. The analysis of the data in this study would at once indict 60.1 per cent of the 2,000 patients.

The cases comprising group 3, that is, those of uncomplicated coronary sclerosis, are those in which physical examination may fail to reveal conclusive findings on which to make the diagnosis and in which the diagnosis may rest wholly on the clinical history. This is true in 25 per cent of the cases. Here, the electrocardiogram immediately incriminates 53.9 per cent of the patients. Cases complicated by hypertension and healed cardiac infarction are largely eliminated on the physical findings alone.

The electrocardiogram is a diagnostic adjunct and, when properly interpreted, becomes a method of precision that is indispensable in the complete scheme of cardiac diagnosis. The acquisition of a large experience with the electrocardiogram in railway medicine will be very productive, especially when repeated records can be had during the lives of many employees.

I wish to comment briefly on another cardiac lesion, the inception of which is extremely subtle and which may cause sudden death, where clinical recognition of the disease is shamefully low. I refer to calcareous aortic stenosis. It is particularly important to the railroad, when employees occupying positions of great responsibility are concerned, because it invariably becomes evident after the age of fifty years and occurs predominantly among men.

The lesion is usually limited to the aortic valve and consists of the deposit of variable amounts of calcareous material involving the annulus of the valve,

frequently one of the leaflets. Fusion of the aortic material occurs, stenosis predominates, and failure and death may also be present. This failure and death.

The etiology of the disease has been expressed in many hypotheses, but the process is definitely open to controversial facts. The hereditary nature of the disease is slight in its incidence, but has resulted in stenosis.

The clinical recognition of certain fundamental features, the sex ratio, the age of onset, the apparent etiology, the heart failure appearing with these symptoms have

Considerable cardiac disease, the degree of stenosis, the reverberant systolic murmur, the aortic but frequently mitral regurgitation finding. It is usually mild but not always being absent during heart failure. In a fourth, insufficiency is present, a sign which has been the absence of the aortic pulse is small and the pulse is complicated by aortic regurgitation. In mind, the identification procedure.

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The etiology of the lesion is not definitely established. Two extreme views have been expressed: one that rheumatic fever is the cause, and the other that the process is degenerative, with the resulting deposit of calcium. Both hypotheses are open to question and time does not permit a discussion of the controversial facts. However, definite evidence exists pointing to the inflammatory nature of the lesion, either infectious or toxic, where the lesion appears to be slight in its inception and not recognized until its progressive character has resulted in stenosis.

The clinical recognition of calcareous aortic stenosis becomes possible when certain fundamental facts are borne in mind. It occurs predominantly in males, the sex ratio being about 8:1, and approximately 80 per cent of the cases occur after the fiftieth year of life. The past history rarely discloses an apparent etiology. The lesion is very slowly progressive and symptoms of heart failure appear late in life and the period of survival is usually short after these symptoms have appeared.

Considerable cardiac enlargement is the rule, although this will vary with the degree of stenosis and the time the lesion has been existent. A rough reverberant systolic murmur of great intensity, usually best heard over the aortic but frequently audible over the entire precordial area, is a constant finding. It is usually transmitted into the carotid arteries. A systolic thrill is usually but not always palpable over the aortic area. It may be evanescent, being absent during heart failure and reappearing with the restitution of cardiac function. In a fourth of the cases the blowing diastolic murmur of aortic insufficiency is present. With few exceptions, the aortic second tone is absent, a sign which has been of untold value in the recognition of this lesion. The absence of the aortic second tone indicates fixation of the valve leaflets. The pulse is small and the pulse pressure is normal or reduced except in the cases complicated by aortic insufficiency and hypertension. With these facts in mind, the identification of calcareous aortic stenosis should be a routine procedure.

In 1931, Christian predicted the roentgenographic demonstration of these calcareous lesions during the life of the patient. Sosman and Wosika, in 1933, demonstrated the feasibility of this and, more recently, Camp at The Mayo Clinic has been able to demonstrate the lesion in every case sent to him for special study. His method chiefly involves the skillful use of the fluoroscope, although in some cases in which the deposits of calcareous material are considerable, their clear-cut demonstration on films is possible. The patient is examined in the erect posture, either in the right or the left oblique position, and a small vision aperture is used, usually $1\frac{1}{2}$ inches (3.8 cm.), to permit the selective localization of shadows. The calcified leaflets are visualized as dancing shadows moving downward during systole and rotating in a clock-

wise manner. At times the calcified annulus is clearly visualized through its elliptical configuration. Other extraneous deposits of calcification are eliminated by shifts in posture, and calcification of the hilar lymph nodes are eliminated by having the patient hold his breath, under which condition the shadows would cease to move. Calcified areas in the pericardium and the aorta are distinguished by their laminar character and position.

I have attempted to call your attention to the magnitude of the heart problem as it affects life today. It unfortunately is not a problem in which abatement can be anticipated, but all evidence points to the fact that it will tend to grow in importance as time progresses.

It thus becomes evident that increasing care must be exerted in the selection of employees, and that employees already in responsible positions be thoroughly and repeatedly examined during their term of service, particularly when they approach the fiftieth year of life. This scheme of protection must be viewed not only from the standpoint of public liability, but the welfare and care of the worker must also be constantly kept in mind.

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THE CHAIRMAN: Thank you, Dr. Willius, for your excellent paper. If there are any question I am sure the Doctor will be glad to answer them.

I have one I should like to ask him. Doctor, given a case of healed infarct with a normal electrocardiogram in an engineer, say, fifty or fifty-five years old, would you put him back on an engine?

DR. WILLIUS: With a healed cardiac infarct with a normal electrocardiogram?

THE CHAIRMAN: Yes.

DR. WILLIUS

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DR. WILLIUS: How much time had elapsed since the time of the infarct?

THE CHAIRMAN: Well, say he was in bed eight weeks, up and around and ready to go to work in about three months.

DR. WILLIUS: No, I wouldn't let him come back in three months. It takes three months for an infarct to completely heal.

THE CHAIRMAN: Would you ever let him come back?

DR. WILLIUS: Yes, I certainly would.

THE CHAIRMAN: Are there any other questions? If not, we will pass on to the next subject.

DR. ADOLPH NEUPAUER (The Reading Co.): Dr. Willius, I enjoyed your paper very much, it is highly instructive, but there are a good many questions in my mind that are not entirely clear and some of those questions have to be settled every day, not from the standpoint of clinical manifestation but from the standpoint of bread and butter, in connection with clinical manifestations, history and whatever adjuncts you may use to make a proper diagnosis.

You very properly mentioned and eliminated some of the primary causes, namely, an applicant who suffers from the primary cardiac diseases, such as, acute rheumatic fever, chorea, tonsillitis, quinsy, and we also can think of the secondary factors those difficulties usually produce, namely, mitral disease, single or double and in some cases aortic stenosis and perhaps once in a while aortic regurgitation.

I recall that when I had charge of the New Jersey State Sanitarium for Tuberculosis, there were several youngsters who had well established histories of acute rheumatic fever but to my great surprise there was practically no mitral disease but there was an aortic stenosis. However, those cases usually do not give us much concern. They are eliminated by the history and by the physical findings.

The great question that arises in railroading is what are we going to do with men between fifty and seventy, who have labored and worked for a company for twenty, thirty, forty years, when cardiac decompensation begins to show itself? I haven't found much trouble with the sclerotic type of cardiac disease, which usually occurs between fifty and seventy, but for lack of proper terminology I did find considerable trouble in cases which you may classify instead of "myocarditis, myocardosis."

What do you find in those cases? It is not a question of mitral stenosis or mitral regurgitation, it is not a question of aortic stenosis or aortic regurgitation, they are eliminated easily, but here you have a man say sixty-five years of age, he has a fairly good heart, and as the Doctor said, practically no clinical manifestations that he will tell you about, or during physical examination there are no signs nor evidences that there is a cardiac disease present. He may have a good first sound, he may have a good second sound. The first and second sound, as you all know, are produced by the semi-

luminar valves and the first sound by the myocardium itself, but his first symptom will be shortness of breath on slight exertion or similar complaints.

With due respect to the electrocardiograph, it is only an adjunct, and although it may establish a definite diagnosis, it cannot replace the history and the complete physical examination and clinical manifestations as given by the patient and observed by the examining physician.

In this particular case, whether it is myocardial degeneration or myocardial infiltration, I have from personal observation more respect for the cases we called myocardosis. Invariably the heart that suffers from fatty infiltration or myocardial degeneration is liable to go out when you least expect it. Therefore, if you could give us some information what to do with cases that suffer from hypertension or no hypertension; valvular lesion or no valvular lesion; myocardial degeneration or myocardial infiltration, with compensatory or no compensatory symptoms, we should appreciate it. The question is, what are you going to do with them. (Applause.)

THE CHAIRMAN: Are there any other questions?

DR. WILLIAMS: I don't know that I quite understand what group you are referring to, Doctor. The group 3 that I indicated is the uncomplicated case of coronary sclerosis without hypertension, without healed cardiac infarction, and is the type that I think is frequently designated as myocardosis which I prefer to think of in terms of its pathologic picture, that is the muscular reaction is a myocardosis which may be a localized thing or it may be a diffused thing. That is the group that I attempted to portray and to bring out the fact physically and historically we may have no intimation of its presence, particularly in insurance medicine where it is more of a problem than it is in railway medicine. In civil life these people will tell us the truth. They seek our advice and there we must pay attention, of course, to all the little subtleties of clinical medicine, the history of mild dyspnea upon effort, the condition of the arteries elsewhere in the body, the peripheral arteries, and a careful study of heart tones. Frequently in the absence of murmur, a study of the heart tones will give us a pretty definite idea that something is not right, particularly if we see these patients on numerous occasions. And then lastly, as I have attempted to point out, the electrocardiograph does give us very definite incriminating evidence in many cases where we can have our positive record where other things will not show.

It is a big problem and I defy anyone to identify or to recognize them all. It can't be done.

THE CHAIRMAN: We will pass on to the next subject, which is the report of our Fracture Committee, Dr. R. C. Webb, Chairman.

Dr. Webb read the following report of the Committee on Fractures and exhibited on the screen a film on Fractures, prepared by the Massachusetts General Hospital, showing the proper method of transporting the injured using the Thomas, Keller and Murray splints.

ASSOCIAT

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Dr. R. C. Webb (Ch.
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(Circular M. & S. 166)

ASSOCIATION OF AMERICAN RAILROADS

MEDICAL AND SURGICAL SECTION

REPORT OF COMMITTEES ON FRACTURES

Dr. R. C. Webb (Chairman), Chief Sur-
 geon, Great Northern Railway Com-
 pany.

Dr. L. A. Ensminger, Chief Surgeon,
 Cleveland, Cincinnati, Chicago & St.
 Louis Lines.

Dr. B. L. Coley, Chief Surgeon, New York
 Central Railroad Company.

Dr. O. B. Zeibert, Chief Surgeon, Missouri
 Pacific Railroad.

Representative of Committee of Direction
 Dr. Duncan E. Jr., Chief Surgeon, Nashville, Chattanooga and St. Louis Railway.

New York, March 30, 1935.

TO THE MEDICAL AND SURGICAL SECTION:

The report of this committee has been prepared chiefly by correspondence
 between the committee members and the chairman. The reports of the pre-
 vious fractures committees have been reviewed, and a questionnaire has been
 sent to all chief surgeons, and their answers have been studied and incorpo-
 rated in this report.

Fractures as an Economic Problem

The cost of personal injuries on railroads in America averages about seventy-
 five cents for each one hundred dollars gross revenue. Of this expenditure,
 about one third goes to pay for fractures. A railroad having gross earnings
 of one hundred million dollars annually may therefore be reasonably expected
 to be spending about \$250,000.00 annually on fractures.

Fractures as a Humanitarian Problem

The importance of fractures as a humanitarian problem is being increasingly
 recognized throughout the entire world. Fractures are increasing in number
 faster than the distribution of knowledge of fracture treatment. National
 committees have been formed by the American Medical Association and by
 the American College of Surgeons for the study of methods of attacking the
 problem and the prevention of avoidable disabilities following fractures.

The Teaching of Fractures in Medical Schools

Professors of Surgery in America are constantly being harassed by national organizations covering different branches of surgery, with requests for more and better teaching of the students in the particular division in which the organization is interested. More and better teaching of fractures, traumatic surgery, cancer, thoracic surgery, urology, orthopedics, neuro-surgery, et cetera, is being constantly urged in our medical schools. The department of surgery has a definitely limited number of hours of the student's time during the third and fourth years. With the hours of instruction reasonably apportioned to the various subjects, it is obvious that the number of hours available for instruction in fractures is necessarily limited. A student cannot be expected to be competent in the treatment of fractures on graduation from medical school.

Hospital internes in the average one year internship again must divide their time to cover all branches of medicine. The hospital interne rarely appreciates the opportunities of observing the treatment of fractures. Too often those who take additional years of surgical training and specialization in surgery do not come in contact with traumatic surgery and fractures until they are out in private practice and seeking a railroad appointment or similar connection with traumatic surgery as a "pot boiler."

Opportunity of Association of American Railroads Medical and Surgical Section

The National Committees on Fractures of the American Medical Association and of the American College of Surgeons recognize the sad need of improvement in the care of fractures and the prevention of avoidable disabilities. Every railroad chief surgeon could give them additional information on fracture disabilities if it were necessary to do so. As railroad chief surgeons, we have contacts with the medical profession in every important town or village in America. We recognize the importance of preventing avoidable disabilities following fractures because we know better than any other group of surgeons of the thousands of dollars added to the cost of settlement in each such case. We recognize the importance of continuous vigilance in preventing an increase in the cost of fractures as well as the possibility of further reducing their costs among injured railway employees.

From a humanitarian standpoint, the railroad chief surgeons are deeply interested in the improvement of the care of fractures not only among railroad employees but among the population in general. Because of our contacts with the profession, we are better able to institute a program for the care of fractures among our employees than any other surgical group. Some parts of the programs of the other committees call for the expenditure of money which, although relatively small, is more than they have. A few hundred dollars will suffice for any one railroad in one year, and we as chief surgeons are in the advantageous position of being able to recommend the spending of a few hundreds to save several thousands.

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Fracture Program on Railroads

The Fracture Committee of the Association of American Railroads recom- mends the adoption of a fracture program on each American Railroad under the direction of the chief surgeon with the following headings:

1. First Aid and Transportation Splints.
2. Diagnosis of Fractures.
3. Special Fracture Report Blanks.
4. The Treatment of Fractures.

Your committee feels that the general adoption of such a program on each railroad will be of benefit from an economic, humanitarian and educational standpoint, and will not only be of value to the injured railway employees, but will be of benefit throughout the communities served by the railroad. It is true that many railroads are adequately caring for fractures among employees, but there is a constant changing of railroad surgeons, and a definite and continuous program is advisable.

First Aid and Transportation Splints

The foundation of any program of improvement is of the greatest impor- tance. If the treatment of a fracture is always started correctly the future treatment will have a better chance of being correct. The Thomas-Murray hinged ring splint for the upper extremity and the Keller-Blake hinged half ring splint for the lower extremity are the accepted first aid and transporta- tion splints of today. The United States Army specifications for the splints are published in "The Outline of the Treatment of Fractures" published by the American College of Surgeons. These specifications can be given to a competent shop foreman, and the splints can soon be turned out for approxi- mately one dollar each without the padding. The splints can be padded satisfactorily with cotton and a bandage. We recommend that the railroads make their own Thomas-Murray and Keller-Blake splints until they can be brought in the market at reasonable prices. We recommend that the chief surgeons arrange for the manufacture of these splints for distribution on the railroad at all first aid stations, on wrecking trains and at other points con- venient for possible fracture cases. We recommend that chief surgeons cir- cularize their regularly appointed doctors and offer them an opportunity to purchase these splints at cost plus postage. Every railroad doctor should be sufficiently equipped in traumatic surgery to apply the most modern first aid and transportation splint to fractures of the long bones. It may be necessary to first give some of the doctors lectures on the value of traction in first aid and transportation splints. It also may be necessary to give instruction in the application of these splints. The moving picture film from the Fracture Service of the Massachusetts General Hospital or some similar moving pic- ture film is recommended for this purpose and can be profitably shown at annual meetings of the surgeons of the railroad.

We recommend that all ambulances which handle railroad fracture cases be requested to carry these splints. The ambulance companies become

enthusiastic over these modern splints as soon as they have had experience with the splints. We recommend that local surgeons be requested to demonstrate the use of these splints at safety meetings and that every possible method of educating the employees with moving pictures, et cetera, be used in order to teach them the value and comfort of proper splinting before they are transported in case they have a fracture.

We believe that if the chief surgeons will place these splints in the proper places along their railroad, in the hands of all their local surgeons and on all ambulances serving the railroads, that it will cause these splints to be adopted at once throughout the United States, and that it will be a great humanitarian move for the benefit of all concerned. In addition, it will result in a reduction of the cost of personal injuries on the railroads.

Diagnosis of Fractures

The diagnosis of fractures on railroads is an x-ray problem. Many of the fracture cases which end in lawsuits have been insufficiently diagnosed. An adequate diagnostic study would have prevented some of the lawsuits. Inadequate x-ray diagnosis shows up too often when the x-ray films in the possession of the company's medical department are gathered up for purposes of defending a lawsuit.

X-rays of fractures may be made with an insufficient number of views, on films which are too small, too much skeleton may be included on a large film resulting in distortion, single films may be used when stereoscopic views should have been made, the Potter-Bucky diaphragm may be omitted when its use is necessary and indicated, and also the films may be so poorly made or developed as to prevent an adequate diagnostic study.

We recommend that the following set of instructions be furnished every railroad surgeon for his guidance in having x-ray diagnostic studies of fractures or possible fractures among railroad injuries.

General Directions for Guidance of X-ray Work in Fractures

Hand. Two views: Anteroposterior and lateral on one 10 x 12 film or two 8 x 10 films; to include fingers and carpal bones.

Wrist. Three views: Anteroposterior, oblique and lateral views on one 10 x 12 or three 8 x 10 films; to include metacarpals and lower third of forearm.

Elbow. Two views: Anteroposterior and lateral on two 8 x 10 films. In case full extension of the arm cannot be obtained, for the anteroposterior view, make two anteroposterior exposures; one with the posterior surface of the arm resting on the plate and one with the extensor surface of the forearm resting on the plate.

Humerus. Two views: Anteroposterior and lateral on two 10 x 12 films.

Shoulder Girdle. Two views: Stereoscopic exposure on two 10 x 12 films to include head, neck, and upper third of humerus and outer two-thirds of clavicle; forearm and hands in supination. **USE POTTER-BUCKY DIAPHRAGM.**

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of instructions be furnished every time making x-ray diagnostic studies of fractures and injuries.

Use of X-ray Work in Fractures

Anteroposterior and lateral on one 10 x 12 film or on two 8 x 10 films for carpal bones.

Anteroposterior, oblique and lateral views on one 10 x 12 film or two 8 x 10 films for metacarpals and lower third of forearm. Anteroposterior and lateral on two 8 x 10 films. In order to be obtained, for the anteroposterior views; one with the posterior surface of the forearm with the extensor surface of the forearm.

Anteroposterior and lateral on two 10 x 12 films. Stereoscopic exposure on two 10 x 12 films of humerus and outer two-thirds of radius. USE POTTER-BUCKY DIAPHRAGM.

Chest for ribs. Two views: Stereoscopic plates in posteroanterior position on 14 x 17 plates.

Skull. Five views: Stereoscopic of both sides of the skull on 10 x 12 films. Single views on 10 x 12 films of the frontal bone, of the occipital bone and a single view of the facial bones made in nose-chin (Water's) position. Total of seven 10 x 12 films. ALL VIEWS ON THE POTTER-BUCKY DIAPHRAGM.

Cervical Spine. Three views: Stereoscopic anteroposterior on 10 x 12 film of whole cervical spine and stereoscopic anteroposterior on 8 x 10 film through open mouth to show atlas and axis. USE POTTER-BUCKY DIAPHRAGM. A single lateral on 10 x 12 film to be made WITHOUT Bucky diaphragm at six foot distance, patient preferably in erect position, with plate against the shoulder and parallel to the spine.

Dorsal Spine. Two views: Anteroposterior and lateral on two 14 x 17 films. USE POTTER-BUCKY DIAPHRAGM.

Lumbar Spine and Sacro-iliac Joints. Two views: Stereoscopic anteroposterior and single lateral on three 14 x 17 films. USE POTTER-BUCKY DIAPHRAGM.

Pelvis including both hips. One view: Stereoscopic on two 14 x 17 films. To cover pelvis, hips, and upper portion of shaft of femur. USE POTTER-BUCKY DIAPHRAGM.

Femur. Two views: Anteroposterior and lateral on two 14 x 17 films. Preferably on Potter-Bucky diaphragm.

Knee. Two views: Anteroposterior and lateral on two 10 x 12 films.

Leg. Two views: Anteroposterior and lateral of portion of tibia and fibula injured, on 10 x 12 films. All fractures of the shaft of the tibia with overriding of fragments without a fracture of the fibula at or about the same level should have the upper third of the fibula X-rayed as such fractures are common.

Entire Shaft of Tibia and Fibula including ankle joint. Two views: Anteroposterior and lateral on two 14 x 17 films.

Ankle. Two views: Anteroposterior and lateral on one 10 x 12 or two 8 x 10 films. The anteroposterior view is to be made with the patient on his back, the heel resting on the plate. The lateral view is to be taken with the patient on his side, the external malleolus resting on the plate. Never attempt to show an anteroposterior view of the ankle and foot on the same plate.

Foot. Two views: Anteroposterior and lateral on one 10 x 12 film or two 8 x 10 films. Views should show tarsal and toe bones.

Os Calcis. Special view: When patient has fallen from a height and landed on his feet, in addition to the anteroposterior and lateral views described above, a plate should be made of the os calcis. This plate is best obtained with the patient lying on his back, the plate under his heel and the tube so centered that the ray will pass through the os calcis at about a fifty degree angle.

Facial Bones. Two views on three 10 x 12 films. Stereoscopic posterior anterior views made in nose-chin or Waters' position. Single lateral view with the affected side down. USE POTTER-BUCKY DIAPHRAGM.

Lower Jaw. One stereoscopic view of the affected jaw upon 8 x 10 films, the ray being directed obliquely upward.

We recommend that all railroad chief surgeons have a set of directions printed for their railroads and furnished to all company surgeons for guidance in taking x-rays of fractures or suspected fractures. We recommend that all railroad surgeons be required to send their before and after x-ray films to the chief surgeons' office as soon as possible after final reduction in order to permit the chief surgeon to complete the file on the case for his records and for the claim department record and in order to permit the chief surgeon to advise with the surgeon treating the fracture and to help him if possible. We recommend that whenever feasible a company roentgenologist be appointed to furnish readings on the films as submitted to the chief surgeon and to criticize in a helpful and constructive manner, the films submitted, when indicated.

We wish to quote here from a recent letter from Dr. Samuel C. Plummer, Chief Surgeon of the Chicago, Rock Island and Pacific Railway Company, former Chairman of the Medical and Surgical Section and former Chairman of the Committee on Fractures:

"I feel strongly on the matter of the amount of good which can be done by adopting a standard set of directions for x-rays of fractures because my experience of three years with this method on the Chicago, Rock Island and Pacific Railway Company has given positive evidence of its benefits in the matter of improvement of the handling of fractures."

Special Fracture Report Blanks

The usefulness of a specially arranged blank which will assist a surgeon in studying and recording a fracture and describing his treatment is recognized by some of the chief surgeons who are using either the American Surgical Association or the American College of Surgeons' form for fracture reports. When the surgeon treating a fracture fills out such a blank and forwards it to the chief surgeon's office with the properly made before and after x-rays, the surgeon has not only been both consciously and unconsciously helped in his work, but the chief surgeon is in a position to give him and the railroad the benefit of his experience. The surgeon who is careful and desirous of improving his treatment of fractures rarely objects to filling out such a blank. If all railroads would adopt the practice of having a fracture report form filled out promptly with each fracture and forwarded to the chief surgeon's office, it would soon become an accepted procedure, and there would be no objections. We recommend the preparation and adoption of a suitable fracture report blank for use on all railroads.

The Treatment of Fractures

Fractures are emergency surgical problems, and the treatment should begin at the place of injury with the application of first aid splints, and the final reduction should be completed within the first few hours. It is apparently generally recognized that the recent graduate in medicine is not capable of

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from Dr. Samuel C. Plummer, and Pacific Railway Company, Section and former Chairman

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treating fractures, and a one year internship has not furnished this training In a four year medical course, approximately four hundred and fifty hours are allowed the department of surgery for teaching all branches of surgery. A very small percentage of this time is devoted to instruction in fractures or other problems in traumatic surgery which is sorely needed by the general practitioner. On the other hand, the needs of the general practitioner for instruction in Obstetrics are recognized by an allowance of approximately four hundred hours for that subject. The regular curriculum for the four year course in one of our leading medical schools calls for a total of 4,234 departmental hours. The department of Obstetrics is allowed four hundred and eleven hours or approximately ten per cent of the medical course. The department of Surgery is allowed four hundred fifty seven hours which is also approximately ten per cent of the medical course. The need of the general practitioner for instruction in minor surgery, traumatic surgery and fractures is recognized as almost on a par with the need for instruction in obstetrics. The weakness of the general practitioner in the treatment of fractures is widely recognized. Medical schools receive considerable support from railroads in the way of taxes, interest and dividends, and ten per cent of the graduates become railroad surgeons. Your committee recommends that an effort be made to enlist the aid of medical schools in solving this problem.

The centralization of fractures is generally recognized to be highly desirable, but for various reasons is not always feasible. Centralization of fractures which might be adequately treated locally produces an unnecessary delay before the start of final treatment with a definite increase in expense. Furthermore, it is to the interest of railroads to have well trained doctors for the general population of the communities which they serve.

Three elementary books on the treatment of fractures have been recommended by previous committees on fractures of this association. In 1927 the committee recommended the "Outline of Treatment of Fractures" adopted at the Massachusetts General Hospital Conference of 1922, and the committee arranged for the purchase of these Outlines in quantity. In 1931 the Committee on Fractures recommended the "Primer on Fractures" published by the American Medical Association. In 1933 your committee recommended "An Outline of the Treatment of Fractures" published by the American College of Surgeons. Your committee again recommends these three books for distribution to railroad surgeons.

Your committee recommends that education of railroad surgeons in the treatment of fractures be further carried on at annual meetings of the surgeons, and that the presentation of papers and case reports on the more common fractures such as those illustrated in the above mentioned elementary books be encouraged.

The uncommon and difficult fractures and those requiring operative treatment should be centralized at the direction of the chief surgeon. The adoption of modern transportation splints will overcome many objections to centralization. The adoption of directions for proper taking of x-rays and the prompt submission of a complete fracture report with these x-rays will assist

the chief surgeon in directing the centralization of those fractures which should be centralized.

The Result of Questionnaire

A questionnaire was sent out through the office of the Secretary to 119 chief surgeons of railroads in United States, Canada and Mexico. Answers were received from fifty chief surgeons who had on their staffs 8,700 local surgeons. It is to be regretted that we did not have one hundred per cent returns from our questionnaire because it would be of interest to know just what percentage of the medical profession could be contacted in a fracture campaign carried on by railroad chief surgeons. It is probable from these figures that the remaining sixty-nine chief surgeons had at least an additional 6,300 local surgeons giving a total of approximately 15,000 railroad surgeons in America. Thus it appears that one doctor out of every ten is a railroad surgeon.

1. Do you feel that fractures create a substantial percentage of the cost of personal injuries on your road? 43 YES. (On the Canadian National under the Workmen's Compensation Laws the cost was twenty per cent). 7 answered NO.
2. Do you feel that treatment of fractures as a humanitarian problem should be attacked by railroad chief surgeons? 42 YES; 8 NO.
3. Do you feel that railroad chief surgeons as an organization should take a place with other organizations in attacking the fracture problem? 44 YES; 6 NO.
4. Do you feel that the treatment of fractures could be improved upon your railroad? 44 YES; 6 NO.
5. Do you feel that modern medical schools train students sufficiently in fractures to care for such cases on your road? 45 NO. (One said "Absolutely not;" another "Of course not"); 5 YES.
6. Do you feel that a one year internship completes the training in fractures sufficiently? 48 NO; 2 YES.
7. Have you a program for the improvement of first aid and transportation in fractures on your road? 26 NO; 24 YES.
8. Have you adopted the Thomas-Murray hinged ring splint for first aid and transportation of fractures of the upper extremity? 10 YES; 40 NO.
9. Have you adopted the Kellar-Blake hinged half ring splint for first aid treatment and transportation of fractures of the leg and thigh? 3 YES; 43 NO. Four were still using the Thomas splint.
10. Have you demonstrated the use of these splints with movies or otherwise to your local surgeons? 3 YES; 47 NO.
11. Do you think it is possible to get ambulance companies serving your railroad to carry these standard emergency splints? 20 YES; 30 NO.
12. Have you adopted a standard set of directions for x-rays of fractures? 24 YES; 26 NO.

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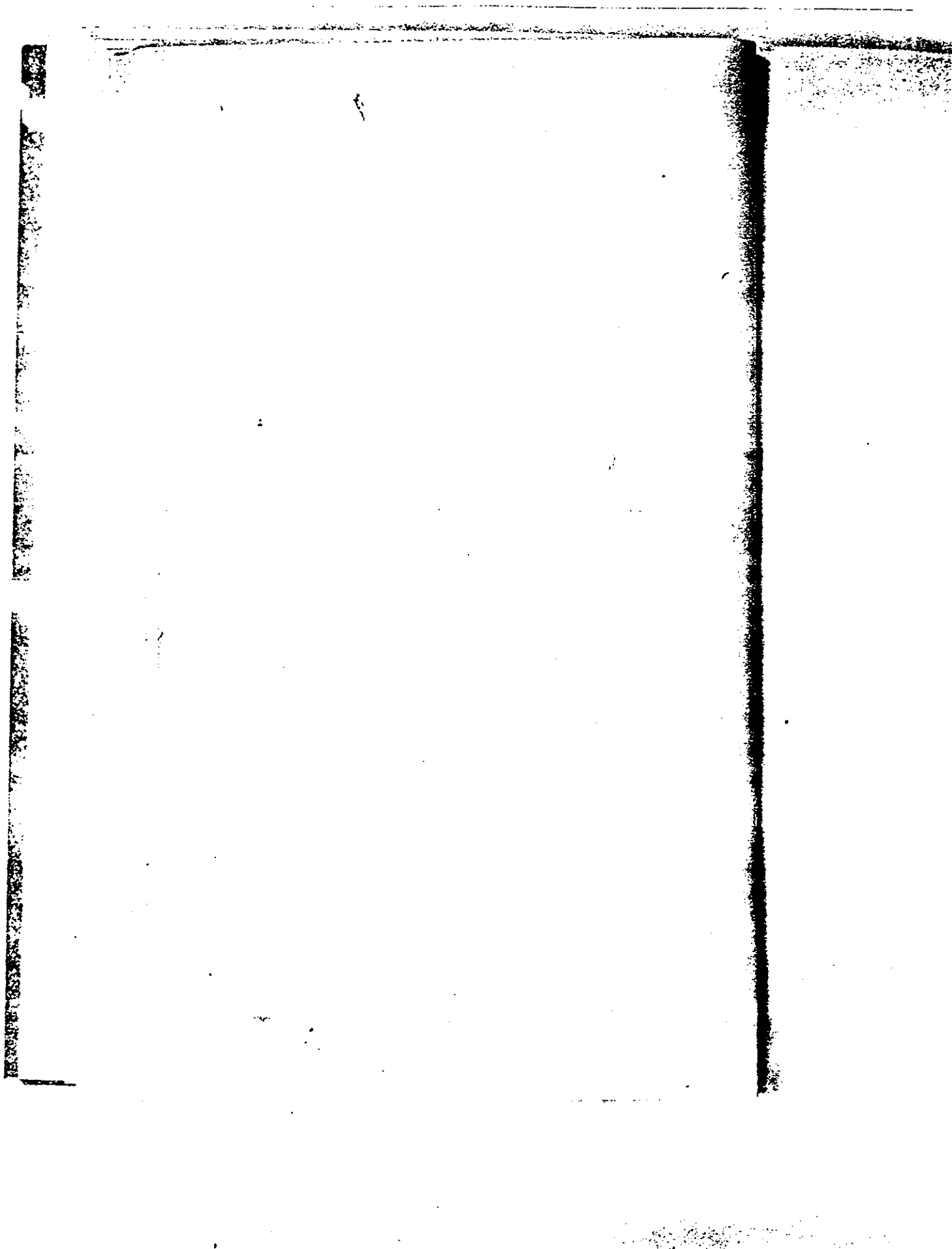
ndard set of directions for x-rays of fractures?

13. Do your surgeons take a sufficient number of x-ray views on the proper sized films? 45 YES; 5 NO.
14. Could the x-ray diagnostic service of fractures on your railroad be improved? 35 YES; 15 NO.
15. Do you have any special method or blank for reporting fractures? If so, will you please enclose one. 42 NO; 8 YES. (One used the American Surgical Association blank; 7 used the American College of Surgeons blank.)
16. Have you furnished your surgeons with the American Medical Association "Primer on Fractures?" 14 YES; 36 NO.
17. Have you furnished your surgeons with the American College of Surgeons "Outline of the Treatment of Fractures?" 11 YES; 39 NO.
18. Do you devote a substantial portion of the program of your annual meetings to the treatment of fractures? 27 YES; 23 NO.

Summary

Apparently the consensus of opinion of American Chief Surgeons of Railroads is that medical graduates have received too little training in fractures while in medical schools, and that very few one-year internships give sufficient additional training in fractures to permit these doctors to assume the responsibility for the treatment of a fracture when the person injured is a railroad employee. The general adoption and approval of basic principles and methods of treatment on all railroads will assist in their complete application on each railroad. We recommend that an effort be made to obtain the thorough adoption on each railroad of the basic methods described in this report with the hope that at a later date we may approach the more advanced and complicated problems among the more common fractures occurring on railroads. Training in the treatment of fractures is today of necessity a postgraduate problem, and it will probably continue to be such for several years to come.

Respectfully submitted,
COMMITTEE ON FRACTURES,
DR. ROSCOE C. WEBB, Chairman.



RAILWAY COMPANY

SURGEON'S FRACTURE REPORT

1. Name of Injured..... Place of Accident.....
 2. On (Date)..... 19..... Time..... A. M. P. M. Address.....
 3. Occupation?..... Age?.....
 4. Cause of Fracture.....
 5. Hospital entered (name)..... Time..... A. M. P. M.
 6. First Treatment, time..... A. M. P. M. 7. Final Reduction, time..... A. M. P. M.

EXAMINATION

8. BONE.....
 9. SITE.....
 10. TYPE: simple..... compound.....
 stick..... subperiosteal..... impacted.....
 transverse..... oblique..... spiral.....
 comminuted (describe).....
 into joint (describe).....
 11. DESCRIPTION OF DEFORMITY (including shortening).....
 12. NATURE AND EXTENT OF INJURY TO SOFT PARTS, especially vessels and nerves.....
 13. X-RAY, antero-posterior..... lateral.....
 before reduction.....
 After reduction.....

After reduction.....

TREATMENT

14. CLOSED REDUCTION: yes..... no..... (a) Number of hours after injury.....

(b) Method and position of fixation.....

(c) Anaesthetic used..... yes..... no.....

(d) Anatomical result obtained.....

15. OPEN REDUCTION: yes..... no..... (a) Number of days after injury.....

(b) Method and position of fixation.....

Anatomical result obtained.....

(d) Was non-operative treatment tried first?

(e) Was GENERAL or LOCAL anaesthetic used?

(f) Was internal fixation material subsequently removed?

(g) Why?

(h) When?

(i) Did infection occur?

6. Period of complete immobilization (actual or estimate)

7. Period of protection (actual or estimate)

8. Total period of protective treatment (actual or estimate)

9. REMARKS:

Signed..... M. D.

THE CHAIRMAN: This report is up for discussion.

DR. S. C. PLUMMER (Chicago, Rock Island & Pacific Railway): Mr. Chairman and Members of the Section: I should like to speak briefly of three things in connection with this report. The first is that it is a most excellent report and there are many suggestions in it that can be properly carried out. In that connection I wish to emphasize the value of getting young blood on our committees. Nothing has given such impetus to this matter of fractures in this Section as Dr. Webb's presence on the committee and I am glad that he is now Chairman of the committee. That is the first thing I wanted to say.

The next thing is in regard to the handling of films—skiagrams—and the method which Dr. Webb has been practicing and advocating for several years. In previous reports of this Committee on Fractures his methods were presented to you, and he quoted me, as you noticed, in regard to my opinion of the method since I adopted it on the Rock Island Road. One beauty about this is that this system of handling x-rays can be put into practice and bring valuable results at practically no expense. To the Chairman of our Section who is with the always prosperous Union Pacific this matter doesn't count, but to those of you who are unfortunate enough to be with railroads whose stocks are down somewhere around one dollar a share and your instructions are to regard the expense of every nickel, it means a good deal. Don't hesitate to put this matter of x-ray film handling into practice because nobody will object to the expense, which is practically nil.

During the three years we have had this in operation on the Rock Island, my assistant has become a qualified expert on x-ray films. He examines every one of them and in case of doubt he refers them to our consulting roentgenologist who is a man who gives his whole time to this work. It has got to be so now that in 90 per cent of my assistant's reports the consultant agrees with him and in the other 10 per cent he gives very valuable suggestions.

One thing about getting your x-ray film sent in according to instructions; it isn't enough to send out a circular letter informing all of your surgeons how it ought to be done. Very few of them will remember that and submit their films promptly. So we guard against failure in that phase of it by having mimeographed letters already prepared and as soon as we get a report of a fracture we immediately send this out asking that the films be sent in and they practically always come promptly.

The third thing I want to speak of is one that I think is comparatively new and very important. That is the matter of the education of surgeons in order to become competent in the handling of fractures, which Dr. Webb has brought out so well. He showed plainly that they can't possibly in the curriculum in the medical colleges give sufficient time to this subject to prepare their graduates for the handling of fractures. He also brings out the fact that the internship does not give them sufficient experience to handle fractures as they should be handled. It is really a postgraduate matter, as Dr. Webb says. They must follow this up later by associating with some competent man who does have a large number of fractures to show them.

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REPORT OF COMMITTEE OF DIRECTION

MEDICAL AND SURGICAL SECTION

ANNUAL MEETING, ATLANTIC CITY, N. J., JUNE 10-11, 1935

The Committee of Direction, Medical and Surgical Section, recommends the following changes in the Recommended Physical Standards as adopted by the Association in 1925 and covered by Circular No. D-1-60.

The changes proposed all relate to the general rules shown on pages 3, 4 and 5, and to the first and second paragraphs under the heading "Physical Examinations," page 8, and eighth paragraph on page 9, Circular D-1-60. The specific suggested changes are as follows:

Rule 1, Page 3: Add the following clause to the first sentence, third paragraph: "and such others as are enumerated in Classes A, B and C, pages 6 and 7." This will make the sentence in question read: "Air brake and steam heat inspectors, car inspectors, crossingmen, gate and flagmen, chauffeurs, trackwalkers, watchmen, and such others as are enumerated in Classes A, B and C, pages 6 and 7."

General Rule 4, Page 3: The word "five" in the sixth line was changed to "two" and the words "with the exception that after the age of forty, such employees shall be re-examined at least every two and a half years," were eliminated. This will make the rule read: "4. Employees, engaged in engine, train or signal service and such others as may be designated from time to time by the railroad management, must pass a satisfactory physical examination or re-examination, including an examination of sight and hearing (and also an examination on colors if the employees are required to read signals) at least every two years, or at more frequent intervals if required by law or otherwise."

General Rule 7, Page 4: Change this rule to read as follows: "7. All employees mentioned in Rule 4, who upon examination for promotion or when periodically examined, are found to have a blood pressure of over 175 and less than 200 systolic, with a diastolic above 100 and below 120, shall be kept under observation. It is recommended that employees in the above classification with blood pressure of 200 or over systolic or a diastolic of 120 or over be held out of service pending further investigation, and should be returned to service only with the approval of the Chief Medical Officer."

Rule 1, Page 4: At bottom of page, change to read: "All examinations of sight, color sense, and hearing, shall be made by physicians."

Rule 2, Page 5, Subdivision (a): Change this to read: "(a) Sufficient acuteness of vision to see clearly the prescribed visible signals."

Rule 2, Page 5, Subdivision (b): Change this to read: "(b) Ability to distinguish colors accurately and promptly."

Rule 5, Page 5: Eliminate the words "have with them" in the third line and substitute the word "wear." This will make the first sentence of Rule 5 read: "Employees whose vision requires the use of glasses to meet the standard and whose duties necessitate the reading of signal indications must, while on duty, wear such glasses." Also change the last sentence of this rule by eliminating the words: "Examinee must comply with the provisions of this rule and," and substitute the words "The employee must." This will make the last sentence of this rule read: "The employee must be examined with each pair of glasses."

First Paragraph following Rule 5, Page 5: Insert the word "rigid" making the sentence read: "It is recommended that where employees engaged in engine service are required to wear glasses for distant vision, and goggles are used, the lenses must be placed in the rigid type goggle frame."

Page 8, first paragraph under general heading "Physical Examinations": Change the first sentence following the italics to read: "The applicant or employee is required to remove sufficient clothing to permit of a proper examination, the examination to take place behind screen or in private quarters. The examinee is to stand in a bright light and present successively front, back and sides."

Page 8, second paragraph under general heading, "Physical Examinations": In fourteenth line, change sentence beginning "Note heart action, etc., etc.," to read: "Check blood pressure and note heart action and respiration before and after exercise."

Page 9, eighth paragraph: Add at end, "and abnormal variations of the blood pressure." The paragraph will then read: "Chest—Caries or necrosis of ribs unresolved pneumonia, marked emphysema, chronic pleurisy, pleural effusions, chronic bronchitis, tuberculosis, asthma, organic diseases of the heart or large arteries, protracted functional derangement of the heart, and abnormal variations of the blood pressure."

THE SECRETARY: You understand, gentlemen, that if these changes in the present physical standards are approved here they will be submitted to all the chief surgeons for a vote by letter ballot, and if approved by a majority of the chief surgeons will then have to be passed on to the Operating Division, which Division, in conjunction with the Medical Section, originally prepared these standards. I mention that as information.

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THE CHAIRMAN: You have heard the reading of these proposed changes. They are up to the members either for changes, adoption or rejection. What is your pleasure?

DR. R. A. WOOLSEY (St. Louis-San Francisco Railway): I move that the changes be adopted.

. . . The motion was seconded and carried. . . .

THE CHAIRMAN: I just received a message from Dr. Phillip Kreuscher, dated Chicago the 10th, which I will read:

"At last minute find it impossible to attend meeting. Very sorry."

We have with us this morning Dr. W. S. Fulton, the Chief of the Clinic at Wheeling, West Virginia. I understand that he is a big game hunter, and I should like to have him talk to us a few minutes on big game hunting in Africa. (Applause.)

(NOTE: Dr. Fulton gave an extremely interesting account of his hunting trip to Africa, relating some of his personal experiences in hunting different types of big game such as Lions, Tigers, Elephants, Cape Buffalo, etc. Dr. Fulton requested the Secretary to simply record him as a "pinch-hitter" on the program and on account of the lack of time to properly prepare his remarks for publication, asked that detailed reference to same be omitted.)

THE CHAIRMAN: Thank you, Dr. Fulton. Your talk has been very interesting and exciting, but I am going to stick to fishing and the movies. Is there anything else to come before the meeting at this time?

DR. PLUMMER: Mr. Chairman, we were all very sorry last year when Dr. Hopkins had to announce his retirement from active participation in this Section. He had been with us since the organization of the Section and had always been very active. I am glad to say that his successor, Dr. Pulver, is here with us and I wish you would make it a point to get acquainted with him because we want him to participate in the Section's activities so as to carry on the work Dr. Hopkins did when he was with us. I am going to ask Dr. Pulver to stand so that you will recognize him. (Applause.)

DR. PULVER: Thank you very much, Doctor.

THE CHAIRMAN: If there is nothing further, we are adjourned.

. . . The meeting adjourned at 12:30 p.m. . . .

TUESDAY MORNING SESSION

June 11, 1935

The meeting was called to order at nine forty-five o'clock by the Chairman, Dr. J. R. Nilsson.

THE CHAIRMAN: Come to order please.

The Secretary has a telegram from Dr. Hume, which he will read to you.

THE SECRETARY: A telegram from Dr. Arthur M. Hume dated the 10th:

"Unavoidably absent this year. Best wishes to you and all."

THE CHAIRMAN: The next thing on the program is an address by Rear Admiral P. S. Rossiter, Surgeon General, United States Navy. We will ask Dr. Milholland to introduce him to the Section, please.

DR. E. V. MILHOLLAND (Baltimore & Ohio Railroad): Mr. Chairman and Gentlemen: In the fall of 1892 two young men from Baltimore started the study of medicine in the Medical School of the University of Maryland. They had been friends for quite some time prior to that (I happened to be one of them), and both graduated in 1895—forty years ago which is quite a long time. After graduation one promptly entered the Government Service and gradually progressed until at present he is in charge of a particular branch of the Service.

It gives me great pleasure to have the honor of presenting Dr. Rossiter, Surgeon General of the United States Navy. (Applause.)

REAR ADMIRAL P. S. ROSSITER: Mr. Chairman and Gentlemen: Dr. Milholland has sort of spoiled things now by recalling the forty years' business which we sometimes try to forget.

When I was asked to read a paper before this Section it occurred to me that it would be suitable to speak of the similarity of surgical problems in the Navy and naval service and in the railway service. I have nothing new to present, merely to remind you of the similarity of our problems.

. . . Rear Admiral Rossiter read his prepared paper as follows:

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SIMILARITY OF SURGICAL PROBLEMS IN THE NAVY AND
IN RAILWAY SURGERY

By

REAR ADMIRAL P. S. ROSSITER,
Surgeon General, U. S. Navy

Before pointing out some of the similarities between the surgical problems faced by railway and naval surgeons I would like to draw attention to certain general similarities between the occupations of railroading and seagoing which I believe are of interest and which show that we are brothers under the skin. Both are commonly and very correctly considered hazardous pursuits, both entail upon their followers much travel, one by land, the other by sea; both have a reputation of winning the approval of the fair sex, the sailor "with a sweetheart in every port," and the railroad man with a sweetheart at the "other end of the line." The latter feature considerably increases the hazard.

To turn to the more serious consideration of the many points of resemblance between naval and railway surgery. The first of these is the extreme character of the violence causing the wounds and injuries received by the patient in the majority of cases. Trains are heavy things and travel fast. If they strike a man, an automobile, or another train, or are derailed, the destructive force exerted is great and the injuries resulting correspondingly severe. Warships are also very heavy things, built to withstand the might of the sea and the destructive force of gunfire, bombs, and torpedoes. If a hatch, a fitting, a piece of machinery, or a gun on them produces a wound it is likely to be of a severe character. For example:—

The projectile for a sixteen inch gun weighs somewhat more than a ton. Of course, they are largely handled by machinery but men handle the machinery. A battleship is taking on ammunition and 16-inch shells were being lowered to the magazines by means of light cranes. The foot of an unwary seaman is caught between the edge of one of these shells and the steel deck with a resulting traumatic amputation.

A battleship is laboring in a heavy sea, rounding Cape Hatteras, the Cape Hatteras of the West Coast of the United States, and, like Hatteras, a graveyard of ships. In passing through a doorway a sudden lurch of the ship throws the heavily armored door around on its hinges crushing the man between the door and its casing, causing a rupture of the liver, which resulted fatally.

Someone leaves the securing pin out of an armored hatch weighing 1,500 pounds. A roll of the ship or other jar causes it to fall on a man passing up or down. The degree of injury depending on the part of his body engaged.

A steam pipe carries away in a heavy sea. In such accidents aboard ship the burns are likely to be more general than in railway casualties on account of their occurring in confined spaces and one of the most serious results with which we have to deal is from the inhalation of live steam.

I was myself the senior medical officer of a ship when a boiler explosion occurred in which four-inch headers carried away, filling the fire rooms with steam and live coals and resulting in 63 casualties and 9 deaths. Four of the

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a follows:

In sailing ship days, falls from the mast were common injuries and often resulted fatally. Though less frequent now, a man on an armored cruiser anchored in the harbor fell from the fighting top and struck a ladder leading from one deck to another. He sustained six fractures as well as ruptures and dislocation of several viscera, resulting in death.

Of course, with such extreme force applied and the resulting seriousness of injury, shock and its treatment is with us in the Navy, as with you in railroad work, a matter of prime importance. Our practice in the Navy in regard to shock is simply that of sound surgical practice everywhere:

Control of hemorrhage.

Morphine.

Transportation without increasing the injury.

Only the most necessary operative procedure until reaction occurs.

This subject of transportation of wounded and injured from the scene of a disaster is always a matter of importance. Celerity of movement without increasing unduly damage already done, is the goal aimed at. The Navy and military services generally are specialists in this matter of transportation of wounded. Our naval medical departments on board ship will go down into the double bottoms or into a torpedo defense blister and bring a man with a compound fracture of the femur up narrow vertical ladders and through small manholes and hatches, without increasing the injury and think nothing of it. It is all in the day's work with them. Landsmen would stand aghest at the task of hoisting a patient from a ship to a boat or from a boat to ship by crane in the open sea, but this is an every day experience with the naval medical officer. The removal of badly injured men from such inaccessible places as firerooms, turrets, and fighting tops requires appliances specially adapted for such tasks and personnel trained to handle them. In the transportation of men from the place of injury, to the point where definite treatment can be given, the Stokes stretcher, devised by former Surgeon General Charles F. Stokes, has been invaluable. This simple yet ingenious stretcher has been

Though much has been done to ship, as it has been on railways. practice of the naval and railroad entirely remove the menace of flammability, escaping steam, or other burns may result. In battle, too, numerous and severe burns, particularly fifty percent of the wounds are caused by the gases in the compartments and passages. Here is a graphic account of the experience at Jutland:

"A turret was penetrated by killing or mortally wounding in addition to blowing off the front afterwards, fire from some smoke in readiness for loading and set explosion found vent partly to shot down the trunk, where it delivery. This sheet of fire flew upward to the switchboard flat mess deck, whence it proceeded and finally burnt itself out going flame may be gauged from the in its path. All the occupants included the whole of the after The position for the latter had effect of a shell explosion, since line. The dead were discovered in some cases they had been jar

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in use for over twenty-five years and has proven its worth in two things that
apply the severest of tests, time and war. Improvements and modifications of
this stretcher permit it to be used as an improvised operating or dressing table.
It can also be placed on two wheels and used as a wheeled hand litter in the
field. Recently constructed models of duralumin have proven highly satis-
factory. The movement of injured from difficult and inaccessible places,
whether the distance is but a few feet or many miles, has been a particular
concern of naval surgeons and has been developed by them to a degree nowhere
excelled and in but few places equalled. Such problems of transportation must
also be met by the railway surgeon who has often to remove injured from
wreckage piled in wooded or broken country to the rescue train or ambu-
lances. Here the hospital car of the wrecking train corresponds to the sick-
bay aboard ship and the railway hospital to the hospital ship or base hospital.
The railway surgeon, however, is less likely to have his hospital car destroyed
while he is working, than is the naval surgeon to have his sick-bay or battle
dressing station shot away during action. In either case, however, that is
that, and makes little difference.

Though much has been done to lessen the danger of conflagration on board
ship, as it has been on railways, burns are a not infrequent wound in the
practice of the naval and railroad surgeon. The utmost precautions cannot
entirely remove the menace of flare backs in fire rooms, explosion of am-
munition, escaping steam, or other of the many accidents possible in which
burns may result. In battle, too, the naval surgeon is faced with the care of
numerous and severe burns, particularly on certain types of ships. On battle-
ships fifty percent of the wounds were burns, due to confinement of burning
gases in the compartments and passageways following the explosion of shells.
Here is a graphic account of the effects of a shell on such a ship in the action
at Jutland:

"A turret was penetrated by a heavy shell which detonated within,
killing or mortally wounding all the members of the gun's crew, in ad-
dition to blowing off the front roof plate. Almost a quarter of an hour
afterwards, fire from some smoldering clothing reached the cordite charge
in readiness for loading and set this alight. The flash from this secondary
explosion found vent partly through the open roof, but the flame also
shot down the trunk, where it ignited more cordite which was awaiting
delivery. This sheet of fire fled by another route past the shell rooms,
upward to the switchboard flat, up a hatchway on to the port side of the
mess deck, whence it proceeded forward, then across to the starboard side,
and finally burnt itself out going aft. The heat generated by this wave of
flame may be gauged from the fact that both glass and steel were melted
in its path. All the occupants of the passages were killed, and these
included the whole of the after first-aid party with the surgeon-in-charge.
The position for the latter had been selected as being immune from the
effect of a shell explosion, since its situation was 20 feet below the water
line. The dead were discovered lying precisely at their action stations;
in some cases they had been jammed together and wedged into a narrow

alleyway by the force of the blast so that they appeared to be standing up life-like. Their appearance was similar to waxen figures of a deep yellow hue, their unaltered features testifying to the instantaneous onset of death. At one point where the flame has paused for a moment, prior to rushing up a hatch, the flesh was charred and blackened by burns of the third and fourth degree. In three cases the scalp had been completely burnt away, leaving the polished vertex of the skull bare. One man was discovered alive 10 minutes after the event, but he died before assistance could be rendered. The reaction of this erythritic shock was so tremendous that even in such a short space of time his features could not be recognized owing to the edema. To what extent this was due to the terrific heat, the pressure of the blast, or the irritant chemical must be left to conjecture."

Burns are notably less in proportion on light cruisers and torpedo craft. In the treatment of burns we used to largely depend on the use of wet alkaline dressings and alkalies given internally. The Medical Departments of all our ships have large quantities of sterile sodium bicarbonate solution and large shell dressings ready at all times. Morphine is given freely for the pain and shock. Present treatment is individualized, however, being such as seems best fitted to the particular case. The tannic acid spray has proven readily adaptable and highly satisfactory.

In respect to early amputation, we are very conservative attempting to save if possible. The guillotine operation with subsequent extension on the soft tissues and secondary operation if necessary is the general policy, when immediate amputation is imperative.

Compound fractures also frequently seen by naval surgeons, either as the result of gunshot fractures or from extreme violence in aeroplane accidents or other falls, are also commonly seen by the railway surgeon. In the Navy we routinely make use of prophylactic doses of antitetanic serum in practically all compound fractures as well as in any serious wound in which the danger from tetanus is a likely possibility, although the need for such prophylaxis aboard ship is debatable.

One of our most important problems in traumatic surgery in the Navy, in recent years, has been the increasing number of automobile and motorcycle injuries. For a long period of time the leading cause of accidental death in the Navy was drowning. This, however, had fallen into second place and deaths from motor vehicles is, at present, firmly entrenched in first place. Practically all of such accidents occur, of course, while the men are on leave and liberty, though there is an occasional accident with official vehicles operated on naval stations. In 1933, motor vehicles were responsible for 1,064 or 15.65% of all admissions to the sick list for accidental causes. Of these 1,064 motor vehicle injuries, 845 were incurred in passenger carrying automobiles, 146 on motorcycles, and the remainder in trucks and other motor vehicles.

Two features of military and naval surgery which are of interest to railway surgeons also are the use of tags for wounded and injured in battle or in major casualties such as a turret disaster. These tags give the name, rate, diagnosis, treatment, and state whether or not tetanus antitoxin has been given. The other feature is the careful instruction given in First Aid to all officers and men

of the Navy, thus enabling shipmates even if the available. This care to which naval surgeons must also be of the grade.

Although not coming concerning it, I want they may be compared interest been displayed color perception. On statistics of the Report years, and the experience eight out of ten of the rejected for physical dis color sense is of course. A battleship worth \$40 jeopardized because of of the deck or lookouts men. Only the best of must perceive objects, running lights, under hail, snow, and spray. Snellen test card and 2 we are considering the candidate to read the 20 the requirement for the 25/20 vision. Depth of official color perception others, particularly the false security in inexperienced conditions and after vision.

It has been an honor appear before such a display many years ago I was, as the present able Chief boyhood friend and class

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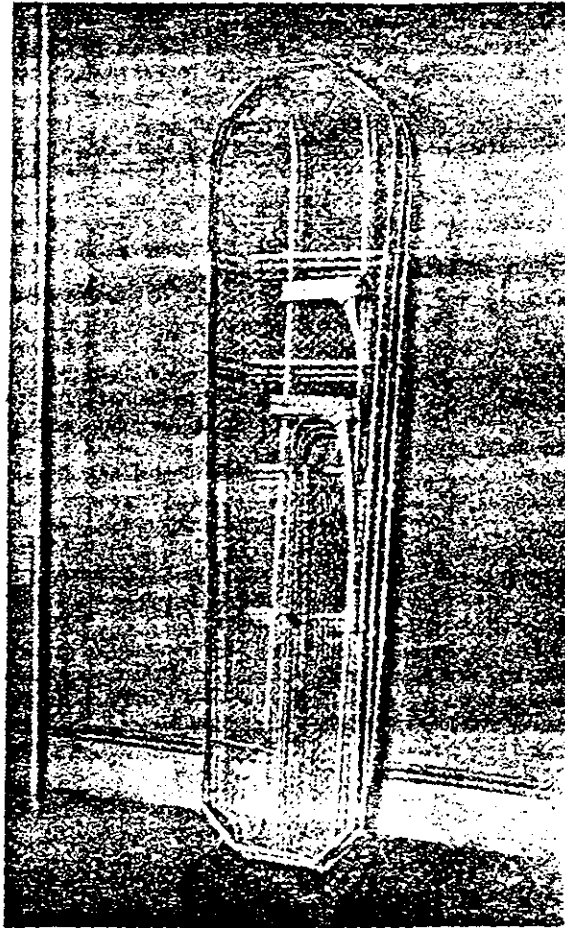
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of the Navy, thus enabling them to render intelligent assistance to injured shipmates even if the highly trained medical personnel are not immediately available. This careful training in First Aid is an extremely valuable feature to which naval surgeons have given great attention and it is one, I believe, that must also be of the greatest value in dealing with railway casualties.

Although not coming under the head of surgery, as we are frequently asked concerning it, I want to mention our physical examinations in the Navy so they may be compared with those used by the railroads. Particularly has interest been displayed in regard to our requirements as to visual acuity and color perception. Our general physical standards are very high and the statistics of the Reports of the Surgeon General of the Navy, over a period of years, and the experiences of our recruiting officers, show that approximately eight out of ten of those presenting themselves at our recruiting stations are rejected for physical defects. The necessity for high visual acuity and excellent color sense is of course very great with us, as it is also with railroad personnel. A battleship worth \$40,000,000 and carrying 1,500 officers and men cannot be jeopardized because of the poor eyesight or deficient color sense of the officers of the deck or lookouts. The same rigid requirements must exist also for trainmen. Only the best of eyesight and color sense is good enough for those who must perceive objects, their speed and direction of motion, and the color of running lights, under varying conditions of glare, darkness, fog, rain, sleet, hail, snow, and spray. The official visual acuity test of the Navy is with the Snellen test card and 20/20 vision in both eyes is the requirement. To this we are considering the addition of a time element such as compelling the candidate to read the 20/20 line in not more than four seconds. This is already the requirement for the submarine service. Gun pointers are required to have 25/20 vision. Depth perception is also of prime importance in aviators. The official color perception test of the Navy is the Stilling test supplemented by others, particularly the Edridge-Green lamp. The latter, however, may give false security in inexperienced hands and unless the test be made under fogged conditions and after visual fatigue.

It has been an honor and great pleasure to have had the opportunity to appear before such a distinguished, practical, and efficient group, especially as many years ago I was, for a short time, connected with the B. & O., and also as the present able Chief Surgeon of that most excellent system is an old boyhood friend and classmate.

(NOTE: After completing his prepared address, Rear Admiral Rossiter exhibited a number of lantern slides showing use of stretchers in the Navy under various circumstances. Four of the slides are reproduced herewith.)



Stokes Stretcher now made of duralumin. There is a perineal and separating section for the legs so that they can be splinted.



Showing splinted
in handling t

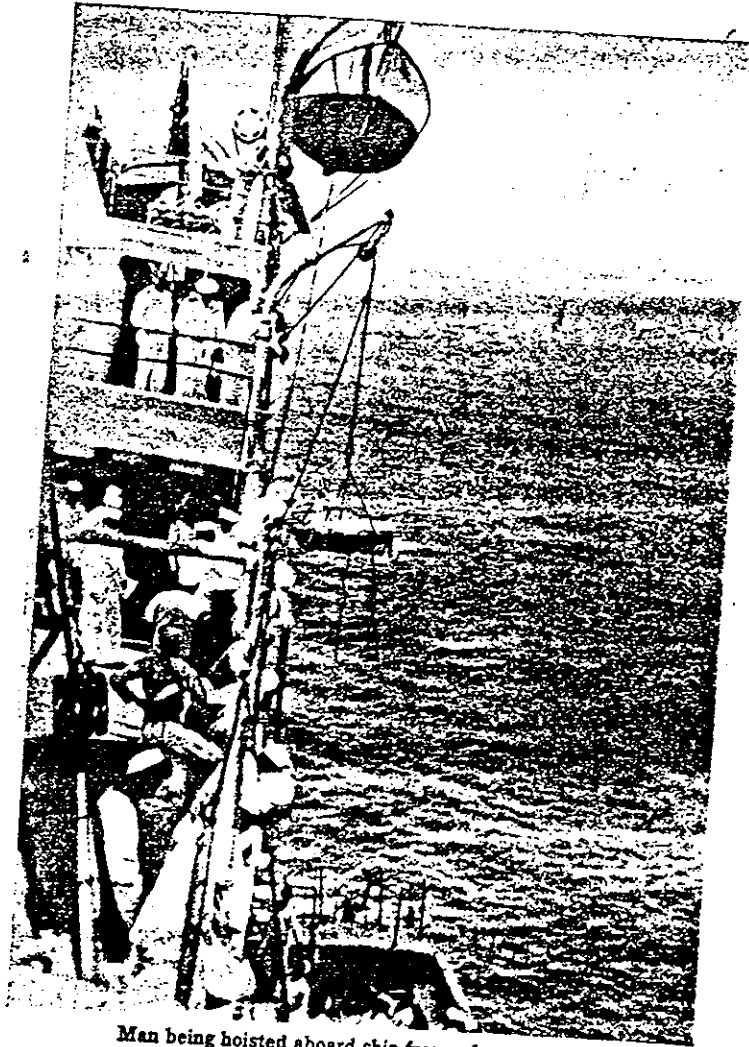
address, Rear Admiral Rossiter
g use of stretchers in the Navy
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at they can be splinted.



Showing splinted leg, foot rest and perineal rest. Necessary
in handling through hatches and up narrow ladders.



Man being hoisted aboard ship from a boat at sea.



THE CHAIRMAN
 Doctor I am sur-
 If not, we will
 Developments I
 Taylor, Chairman

... Dr. S.
 Developments R.



Man coming aboard ship from an airplane.

THE CHAIRMAN: If there are any questions you would like to ask the Doctor I am sure he will be glad to answer them.

If not, we will pass on to the next subject, the report of the Committee on Developments Resulting from Periodic Physical Examinations, Dr. S. B. Taylor, Chairman.

. . . Dr. S. B. Taylor read the prepared report of the Committee on Developments Resulting from Periodic Physical Examinations as follows:

(Circular M. & S. 172)

ASSOCIATION OF AMERICAN RAILROADS

MEDICAL AND SURGICAL SECTION

REPORT OF COMMITTEE ON DEVELOPMENTS RESULTING
FROM PERIODIC PHYSICAL EXAMINATIONS

Dr. S. B. Taylor (Chairman), Chief Surgeon,
New York Central Railroad.
Dr. W. N. Blount, Chief Surgeon, Gulf,
Mobile & Northern Railroad.
Dr. H. E. Feher, Chief Surgeon, Chicago,
North Shore & Milwaukee Railroad.

Dr. A. M. Hume, Chief Surgeon, Ann Arbor
Railroad.
Dr. A. W. Ide, Chief Surgeon, Northern
Pacific Railway.

Representative of Committee of Direction
Dr. Harvey Bartle, Chief Medical Examiner,
Pennsylvania Railroad.

NEW YORK, N. Y., May 15, 1935.

TO THE MEDICAL AND SURGICAL SECTION:

Your Committee, after considerable thought, concluded to send out a questionnaire covering Mental Diseases, Wassermans, Colonic Stasis, Dental Hygiene, and Defects that Would Immediately Disqualify Men in Engine and Train Service. A topic was assigned to each member of the Committee who prepared a query covering his subject. The answers were in turn returned to him for consolidation and such remarks as he cared to make.

As heretofore, insufficient study has been given by the recipient of the questionnaire, hence you will understand that it was very difficult for the Committee member to effectively correlate the answers. As an example of what a Committeeman thinks of the answers received, we would refer you to a statement by none other than Dr. Harvey Bartle, Chief Medical Examiner of the Pennsylvania Railroad Company:

"It seems to me from the replies received in answer to these questions, there is no uniformity along the line suggested, but in my mind this part of the questionnaire has served a good purpose in arousing thought on the subject and probably can be elaborated upon in the future, looking forward to uniformity along the lines suggested."

We feel, as Dr. Bartle does, that the topics under consideration demand further study, not alone by the Committee but by every member Line, or we should say, its chief surgeon.

The psychoneuroses cover a very important field and one to which we have heretofore paid only passing attention. To the experienced observer,

the Company neurologist or bears its own label of distinct. we lesser observers it does cause and effect in an under.

Operating officials can be to whom has been delegated mentally unbalanced, by giving peculiarities. Even the physician be able to make a correct diagnosis that, under stress, men in cerebation. A man may be cerebation as when he has while, of course, it is perfectly an accident.

The operating department false timing of cerebation is may be due to congenital defects the bowel contents. Many you do not have a true incu employment with full efficiency a man for entrance into the and know whether he is too excitable or unduly dull, either

We think it well to submit because they reflect the general mental cases:

"The Psychoneuroses—We and legally with few exceptions and have a normal feeling to obligations. Occupation is a

"Traumatic Psychoses—We recovery unless actual brain also be safely employed under states or post traumatic men"

"Psychoses due to Somatic quite normal and should be is usually given, before a recurrence or exaggeration of the physical

"Manic Depressive Psychosis be based largely on the past history that he suffered from frequent warning, I would not re-employment infrequent or if there is a high increasing activity or depressive positions where moderate sup

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Yon. Y., May 15, 1935.

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the Company neurologist or psychiatrist, each and every psychosis or neurosis bears its own label of distinction in a clear and comprehensive picture. To us lesser observers it does require oftentimes a great deal of study to place same and effect in an understandable position.

Operating officials can be very helpful to the chief surgeon, or the surgeon to whom has been delegated the duty of examining men suspected of being mentally unbalanced, by giving the examiner a word picture of the suspect's peculiarities. Even the psychiatrist, in many of these cases, needs a lead to be able to make a correct diagnosis. It is becoming more and more apparent that, under stress, men in all walks of life may have an unsafe timing of cerebation. A man may be equally as unsafe with an unduly heightened cerebation as when he has a slow cerebation. The former may overdo, while, of course, it is perfectly clear that the latter is timed too late to prevent an accident.

The operating department should further be given to understand that late timing of cerebation is not always due to a certain specific disease, but may be due to congenital defects, drugs, and even absorption of toxins from the bowel contents. Many of these men, if caught sufficiently early, where you do not have a true incurable disorder, can be reclaimed and restored to employment with full efficiency. We feel that the examiner when studying a man for entrance into the service should observe his reaction to questions and know whether he is taking the examination seriously, whether he is excitable or unduly dull, either one of which should disqualify him for service.

We think it well to submit Dr. Blount's answers to the questionnaire because they reflect the general practice of most chief surgeons in handling mental cases:

"The Psychoneuroses—Would re-employ, as they are competent mentally and legally with few exceptions, usually have good insight into their condition and have a normal feeling towards their fellowman, their responsibilities and obligations. Occupation is also a good therapeutic measure in such cases.

"Traumatic Psychoses—Would re-employ, as these cases are normal after recovery unless actual brain injury has occurred. In this case they could also be safely employed unless they show evidence of paralysis, convulsive states or post traumatic mental enfeeblement.

"Psychoses due to Somatic Diseases—Would re-employ, as they are usually quite normal and should be as efficient as ever after recovery. A warning is usually given, before a recurrence of this type of psychoses, by a recurrence or exaggeration of the physical disease responsible.

"Manic Depressive Psychoses—The re-employment of these cases would be based largely on the past history of the case. If the case in question showed that he suffered from frequent attacks or if violent symptoms came on without warning, I would not re-employ them. However, if the attacks are mild or infrequent or if there is a history of adequate warning, such as a gradual increasing activity or depression, I would feel safe in re-employing them in positions where moderate supervision could be maintained.

"Dementia Praecox—As a class I would not re-employ them, though these should be more individualized possibly than any of the above types. Many of these cases could do excellent work in some routine occupation, but I would not feel safe in employing them in responsible positions as this disease is characterized by loss of interest, episodic out-breaks and a gradual mental deterioration and they could not be held legally responsible for their acts."

In connection with the foregoing, Dr. Blount states that The Psychoneuroses, Traumatic Psychoses, and Psychoses due to Somatic Diseases are shown preference so far as his railroad is concerned and that is in line with most of the answers received from other chief surgeons.

The Wassermans place us on a little more familiar ground. With only one exception, in answer to the questionnaire, all were of the opinion that Wassermans were not only helpful but a necessity.

The general consensus of opinion seems to be, as to the matter of routine Wassermans, that they are not of a great deal of importance without some clinical history and study. Dr. Fisher very aptly says:

"From my study of the questionnaire, I am of the personal opinion that, where indicated, Wasserman tests are essential and that the advantages accruing from same have a tendency to prevent personal injury either to themselves or the public, when lues is present. Those persons infected become unfit prematurely and their economic status with the company is terminated much earlier than would ordinarily be the case if they were free from infection.

"The Wasserman, being of a questionable nature unless scientifically performed with subsequent check-up by other methods and clinical findings, not always being a true indication when found, cannot be considered as a safe procedure in the detection of the accident-prone individual, nor do I believe it possible that any accident due to man failure can be directly attributed to an individual where positive Wassermann findings are present without other clinical manifestations."

It is generally understood that no railroad makes a practice of demanding a Wassermann on every man they examine, but all do demand a Wassermann where clinically indicated.

Colonic Stasis and Dental Hygiene are still more familiar and yet, especially in colonic diseases, it will be well worth your while to spend considerable time in its study, since quite a number of disqualifying conditions emanate from a diseased or dirty colon. This same observation can easily apply to defective teeth and gums. Unfortunately, we are, unlike the spokesman for Pepsodent, unable to advance a specific for their cure other than removal of teeth and individual treatment for each condition found to affect the gums.

Dr. Hume, to whom the answers to the questions were submitted in connection with Colonic Stasis and Dental Hygiene, has this to say after studying the replies received from the sixty railroads:

"Colonic Stasis—An analysis of replies received shows sixteen railroads have collected some data and consider the matter as of importance. Three

of these companies, enginemen and trainmen, the record of man fails that the conclusion 'no observation'.

"Inasmuch as man and a resulting investigation, and might it not be well to bit more attention hysteria."

"Dental Hygiene—the subject as 'improper' railroads report 'no their replies being 'cause,' 'not important'.

"Here seems to be of the believers, who and thus bringing the

Dr. Hume falls in mittee that we should to type and why cert

Last, but not least, and one with which we are inserting the question: this series of questions: opinion and practice

Question 1. "What sugar under 80 and above 120?"
Answers:

No regulation...
No experience...
Treatment under...
Disqualifies...
Temporarily laid...
Depends on occurrence...
Hospitalized—has...
Infrequently made...
Over 120, not considered...
(Insulin not permitted...
Sugar in urine prohibited...
Treated—permitted...
Medical advice—...
Frequent examination...

not re-employ them, though these in any of the above types. Many in some routine occupation, but in responsible positions as this disease is out-breaks and a gradual mental gradually responsible for their acts." It states that The Psychoneuroses, as to Somatic Diseases are shown and that is in line with most of them. It is a familiar ground. With only one it were of the opinion that Wassermann is to be, as to the matter of routine deal of importance without some reply says:

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of these companies state that 'it is a powerful factor in reducing ability of enginemen and trainmen.' Forty-four railroads report 'no observation,' 'no record of man failure,' and 'not industrially important' (It is fair to assume that the conclusion 'not materially important' may be classed as a result of 'no observation').

"Inasmuch as more than one-third of the replies shows investigation of and a resulting interest in the subject, while nearly two-thirds show 'no investigation,' and a probably resulting opinion of 'not industrially important,' might it not be well to suggest to the 'doubting Thomases' that they give a bit more attention to this subject and a little vacation to cardiovascular hysteria."

"Dental Hygiene—Sixty replies were received, of which forty-two consider the subject as 'important and having definite influence on man failure.' Six railroads report 'no observation.' The remaining twelve are unbelievers, their replies being 'few man failures due to dental infection,' 'not a potent cause,' 'not important,' and 'highly overrated.'

"Here seems to be a golden opportunity for missionary work on the part of the believers, showing to the unbelievers the dangers of focal infections and thus bringing them into the faith."

Dr. Hume falls in line with the heretofore general thought of the Committee that we should go into a more thorough study of focal infections as to type and why certain organs of the body are affected therefrom.

Last, but not least, Dr. Bartle's questionnaire is exceedingly interesting and one with which all of us should be perfectly familiar. At this point we are inserting the questions submitted by Dr. Bartle and the answers received. This series of questions and answers give a true reflection of the diversity of opinion and practice by the various chief surgeons:

Question 1. "What is your practice with employees having a fasting blood sugar under 80 and above 120?"

Answers:

No regulation.....	1
No experience.....	12
Treatment under observation.....	9
Disqualifies.....	2
Temporarily laid off.....	9
Depends on occupation.....	2
Hospitalized—handled on merits.....	2
Infrequently made—some risk.....	1
Over 120, not controlled by diet, disapproved.....	1
(Insulin not permitted on duty)	
Sugar in urine prevails—if kept free, allowed to work.....	1
Treated—permitted to return to service if recovery sufficient.....	1
Medical advice.....	1
Frequent examination.....	1

Taken out of service.....	1
Switchmen and enginemen kept out if clinical evidence jeopardizes service.....	1
Observation and family doctor.....	1
Depends on symptoms.....	1
Not allowed in train service.....	1
Depends upon findings.....	1
Not interfered with if can do their work safely.....	1
Urine and blood sugar check at intervals.....	1
Trainmen re-checked every thirty days.....	1
Under 80, disregard—determine if diabetic—handle on merits.....	1
Over 150 out of service, if enginemen; under 80 depends on symptoms.....	1
Under 80, adenoma of pancreas or part of pancreas excised— over 120, treatment—return when condition satisfactory..	1

Question 2. What is your practice with employees having retinal hemorrhage?"

Answers:

No experience.....	12
Disqualifies.....	5
Temporarily laid off—treated.....	9
Depends on occupation.....	1
Hospitalized—handled on merits.....	1
Indefinite leave.....	1
Out of service—treatment by eye specialist.....	3
Non-hazardous employment—observation by oculist.....	2
No ruling.....	1
No answer.....	1
Not employed but treated.....	1
Not returned to engine or train service.....	2
Diet—monthly examination.....	1
Depends on diagnosis and subsequent cure.....	1
Check-up and observation.....	3
Non-hazardous work or pension.....	1
Limited service.....	1
Refer to oculist.....	1
Not allowed train service.....	2
Close check of blood pressure and kidneys.....	1
Not arisen in last five years.....	1

Question No. 3. "What is your practice with employees with persistent unilateral deafness?"

Answers:

Taken out of train service if permanent.....	1
Treated—not disturbed.....	2

Disqualifies.....
Depends upon pos
No experience.....
No regulation.....
Continue employm
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Service limited.....
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Pension or discharg
Depends on merits

Question 4. "What is congestive phenomena of

Answers:

Heart and kidneys—
Treated in non-haz
Disqualifies.....
Depends on positio
Rest and treatment
No answers.....
No experience.....
Hospitalized—han
Depends upon exte
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Depends upon position or occupation.....	7
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No regulation.....	2
Continue employment.....	5
Continue employment if safe and efficient.....	3
Enginemen taken out.....	1
Trainmen taken out.....	1
Continue with frequent examinations.....	3
Decided by Company aurist.....	1
Not allowed in operating department.....	3
Observation—removal if work hazardous.....	1
Frequent observation—allowed to work.....	1
Complete, would disqualify for further employment.....	1
Do not disturb.....	1
Service limited.....	6
Work until superior officer disapproves.....	1
Not disqualified if old employee—not accepted for employ- ment.....	1
Non-hazardous employment if in train service.....	2
Out of service until condition rectified.....	1
Non-hazardous work.....	3
Allowed to work if other ear good.....	2
Referred to neurologist, aurist and neuro-surgeon.....	1
Pension or discharge.....	1
Depends on merits.....	1

Question 4. "What is your practice when employees are found to have congestive phenomena of organs or extremities?"

Answers:

Heart and kidneys—stopped from work—treated if possible.....	2
Treated in non-hazardous occupations.....	3
Disqualifies.....	2
Depends on position.....	3
Rest and treatment.....	3
No answers.....	8
No experience.....	3
Hospitalized—handled on merits.....	3
Depends upon extent and recovery.....	7
Removed pending recovery.....	3
Indefinite leave.....	2
Referred family physician.....	3
Observation—removed if work hazardous.....	2
Treat cases.....	5
Heart disease and Berger's disease—either may disqualify.....	1
Depends upon phenomena.....	2
If heart disease, consider thyroidectomy.....	1

Check-up and observation.....	2
Allowed to work if physically fit—advise treatment.....	1
Not disqualified if old employee—not accepted for employment.....	1
Refer to internist and cardiologist—rest and treatment.....	1
Disqualify if condition disabling.....	1
Restricted service.....	1

Question 5. "What is your practice when employees are found to have persistent headaches, dizziness or vertigo?"

Answers:

Not kept in train service—transferred or dismissed.....	2
Treatment—if not relieved, out of service.....	3
Disqualifies.....	4
Temporarily laid off—treated.....	6
Depends on position.....	2
Cause determined—referred family physician.....	2
Hospitalized—handled on merits.....	3
Placed non-hazardous positions.....	4
Temporarily out of engine service.....	1
Indefinite leave.....	2
Referred to oculist and neurologist.....	3
Decided on merits after complete examination.....	7
Not allowed to continue in operating department.....	2
Out of service until diagnosis.....	4
Cause and removal same.....	5
Out of service until cured.....	3
If menace to themselves and others, discharged; if not, safe positions.....	1
Check-up and observation.....	3
Examination by neurologist and other specialists if indicated.....	1
Allowed to work if can do it safely—referred family physician—hazardous occupation, removal until corrected.....	1
Vision checked—blood pressure taken.....	1

With the above statement, the Committee feels that you will understand this is purely and simply a progress report.

Respectfully submitted,
COMMITTEE ON DEVELOPMENTS RESULTING FROM
PERIODIC PHYSICAL EXAMINATIONS,
DR. STERLING B. TAYLOR, Chairman.

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FROM

AYLOR, Chairman.

THE CHAIRMAN: Gentlemen, you have heard this report. What is your pleasure?

DR. PLUMMER: I move that it be accepted and approved.

. . . The motion was seconded by Dr. J. R. Garner and carried. . . .

THE CHAIRMAN: The next item on the program is an address, "The Complications of Fractures," by Dean Lewis of Baltimore. I will ask Dr. Bartle to present the speaker.

DR. HARVEY BARTLE (Pennsylvania System): Mr. Chairman and Guests and Gentlemen: When your program Committee was casting about for individuals who would give grace and honor to our program one of the first names suggested was that of the speaker who is about to address us. The Pennsylvania Railroad counts it no small honor and privilege to have him as one of its consultants. So it is a real pleasure to present the Professor of Surgery from The Johns Hopkins University, School of Medicine, Dr. Dean Lewis. (Applause.)

FRACTURES

DEAN LEWIS, M.D.

The Johns Hopkins Hospital, Baltimore, Md.

I appreciate the invitation to appear before you this morning. Recently I received a pamphlet from one of your members who is serving on a Committee dealing with the treatment of fractures. In this pamphlet it is deplored that the recent graduate does not fully comprehend the treatment of fractures. I will admit that they do not know as much about fractures as they should. Why this statement is limited to medical students or recent graduates is hard for me to understand, for I am sure that many of us years after graduation will, in certain instances and at divers times, regret that we have not a better understanding of the treatment and complications of fractures. The studies and recommendations of such a Committee sharpen our wits and keep us mentally alert.

There are two principles in the treatment of fractures which we must recognize. When I was a medical student most of the emphasis was laid upon splints. At the present time much less is said of splints, for if one knows what he is trying to accomplish he will devise a dressing to suit the individual case. Criticism is directed at times to books dealing with fractures, because specific recommendations are not given for the treatment of a certain fracture. The one consulting the textbook fails to realize that this is an impossibility and how cumbersome and unwieldy such a book would be.

The first principle that should be followed is that the long fragment which can be controlled should be dressed in line with the short fragment which cannot be controlled. Some fractures in which this principle is exemplified will be cited.

In fractures of the surgical neck of the humerus, the upper fragment is abducted and rotated outward by the supra- and infraspinatus muscles and the teres minor. The long fragment must be abducted and isolated outward to bring it in line. The axillary pad devised by Stromeyer recognized to some extent this principle. At the present time the aeroplane splint meets the indication.

In fractures of both bones of the arm or of the radius between the attachment of the supinator and the pronator radii teres, the supinator and the biceps are the muscles which have to be considered when attempts at reduction are made. The supinator supinates the short upper fragment upon which the biceps also acts, flexing the fragment. The forearm must, therefore, be flexed relaxing the biceps and dressed in full supination, so that the long fragment which is acted upon by the pronator radii teres may be brought in line without. Occasionally I see a fracture in this location in which this principle has not been recognized or followed and union has occurred with the short upper fragment supinated and the long lower fragment pronated. When such occurs supination and pronation are distinctly limited and the patient may suffer severe pain.

One of the best examples of this principle is offered by subtrochanteric fractures. In this fracture the upper fragment is flexed, abducted and rotated outward. It should be emphasized that there are only three internal rotators of the thigh, the tensor fasciae femoris, the gluteus minimus and the anterior fibers of the gluteus medius. If this fracture is to be dressed properly, the long fragment which can be controlled must be dressed in flexion, abduction and external rotation. Of course, traction and counter-traction must be used to overcome the longitudinal displacement. Recognizing this principle the surgeon holds the key to the successful treatment of many fractures.

The second principle is dependent upon the recognition of the mechanism of the fracture. The mechanism should be recognized and when the fracture is corrected, the force which produced the fracture should be reversed and the part involved dressed in the reversed position.

Supracondylar fractures of the humerus afford an excellent example of this principle. Some 95% of supracondylar fractures are fractures by extension, about 5% are flexion fractures. In the extension fractures, the line of fracture runs from above and behind, downward and forward, the lower fragment being displaced backward or backward and outward, while in the flexion fracture the line of fracture runs from above and in front, downward and backward, the lower fragment being displaced upward and anteriorly. I have heard a number of reasons why the fracture with displacement posteriorly is dressed in acute flexion. Fig. 1-A and B. It has been said that the tense triceps acts as a splint, that it is easier to bring a flexed arm into extension if stiffness of the joint develops, than an extended forearm into flexion. These reasons never appealed to me much. The most urgent reason for the position of acute flexion that I know of, is that the fracture is produced by extension and in order to secure proper reduction the force is reversed and a dressing applied in the reversed position. If acute flexion were used in the flexion fracture the lower fragment, the line of fracture running from above and in front downward and backward, would be still further displaced and the deformity increased.

The usual Colles' fracture is caused by a fall upon the thumb and in the fracture extension is combined with supination and when this fracture is reduced, the force is reversed and when properly reduced, the hand falls into a position of flexion and supination. The dressing by a roller bandage, suggested by Lexer, forces the hand into this position. Fig. 2-A and B.



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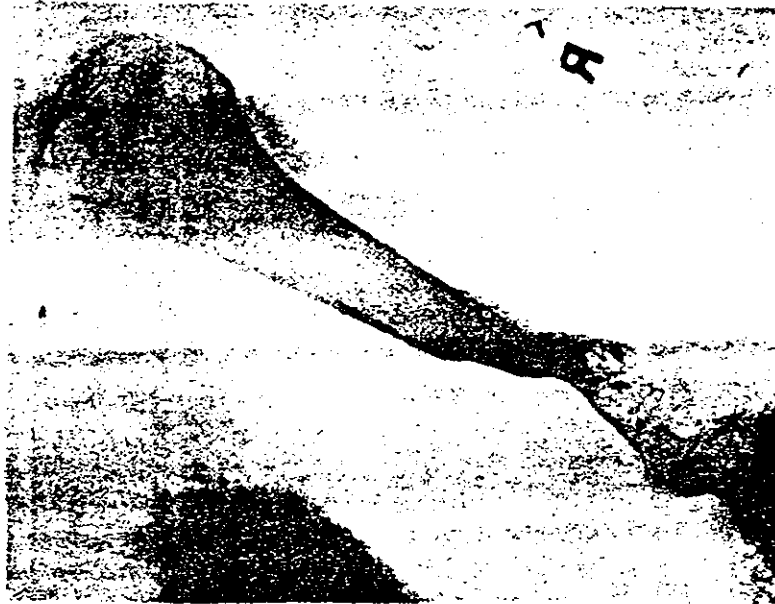
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FIGS. 1-A AND B.—Non-union (Nearthrosis) nine years standing. Union secured with intramedullary bone graft.
Fixation with small Lane Plate.



FIGS. 2-A AND B.—Loss of substance of humerus due to gun-shot wound. Union secured by Bone Graft. Musculospiral recovery after suture.

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The same principle applies in the reduction and dressing of Pott's fracture and the dressing devised by Dupuytren a century ago, recognized fully and applied the principle of reversing the force which caused the fracture.

Injuries to the soft parts, nerves, vessels and muscles often prolong the disability associated with a fracture longer than the injury to the bone. Still there is a tendency to focus most, if not all, the attention upon the fracture and the associated injuries may be completely overlooked. Nerve injuries are not uncommon. Among the nerves most frequently injured is the musculospiral. Injuries of the musculospiral nerve are uncommon in fractures of the surgical neck and as the nerve is well protected by muscle in this situation, contusion is more common than division, but I have recently seen two cases in which the musculospiral in fractures of the surgical neck had been caught over a sharp fragment and pulled into the line of fracture. Injuries occur most frequently in fractures through the middle of the shaft, through the musculospiral groove and in extension supracondylar fractures, in which the lower end of the upper fragment is displaced upward and backward.

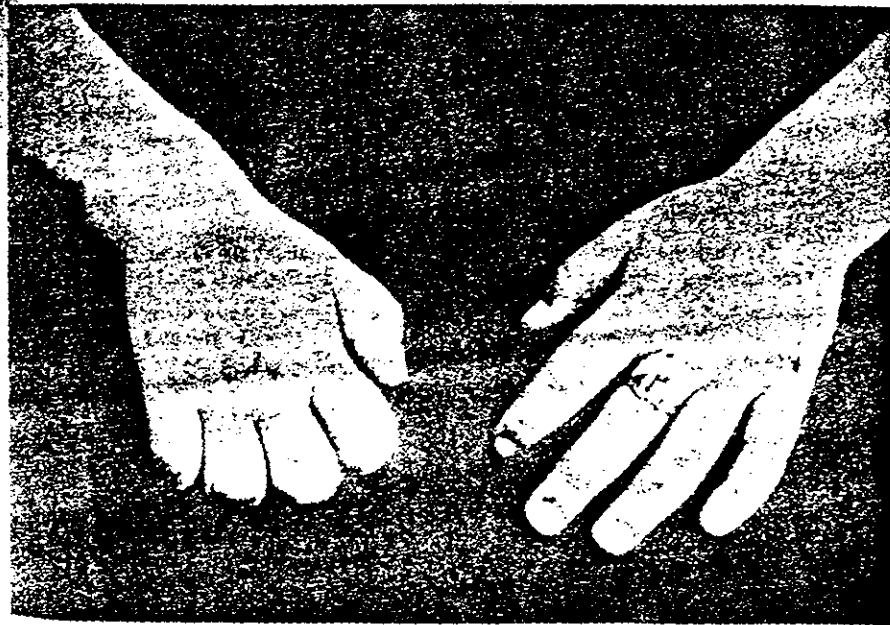


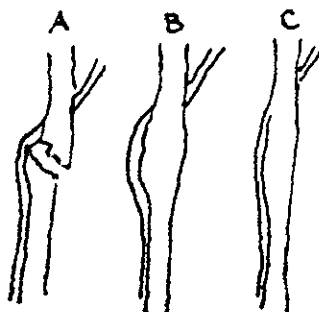
FIG. 3.—Ischemic palsy. Early stage.

Injuries of the median nerve also occur in some extension supracondylar fractures, the injury being caused usually by the lower end of the upper frag-

FIGS. 2-A AND B.—Loss of substance of humerus due to gun-shot wound. Union secured by Bone Graft. Musculospiral recovery after suture.



ment. The median nerve injury is not infrequently overlooked because of the slight disability. In median nerve injury the opponens pollicis and the long flexor of the thumb are paralyzed and the thumb cannot be flexed. This is the disability irrespective of the level at which the nerve is injured.



Musculo-Spiral Palsy (primary) following fractured humerus.

Jan., 1922—Fractured arm wrestling (a).

March, 1922—Oper.: Fusiform thickening of nerve (b).
Neurolysis performed (c).

Result—Complete recovery.

Fig. 4

The ulnar nerve may also be injured in fractures about the elbow. Platt has discussed these injuries in a paper published some five years ago.

Another nerve complication comes on late. I refer to late ulnar nerve palsies. These palsies are not so uncommon and the history is usually typical. One of the early cases that I saw gave the following history. The young man, 17 years of age, was a student at the University of Wisconsin. Shortly before I saw him, he experienced tingling over the ulnar distribution of the left hand and soon after he noticed that the muscles were wasting. He thought that this might be prevented by fingering a violin. He bought one and began to practice. When he removed his clothing for examination, a marked cubitus valgus and a prominent internal condyle were very striking. I asked him if the elbow had been injured and he said he remembered that when he was a young child he fell. His mother called a doctor who made a diagnosis of fracture. The first symptoms of a nerve lesion developed some twelve years later. The history and deformity are typical. The lesion is the same in all cases. The young man had sustained a fracture of the external condyle and union had not occurred. Non-union after fracture of the external condyle is so common when closed method of treatment is used that I have about come to the conclusion that an open reduction should be attempted in these cases and the fracture nailed or sutured to the shaft.

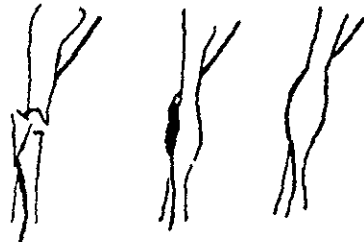


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Musculo-spiral palsy (secondary) following fractured humerus.

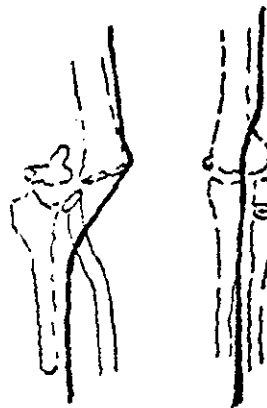
Sept., 1920—Fractured arm. Reduction by open oper. In cast for 2 mos.
When removed wrist drop noted.

March, 1921—Oper.: 4 cm. of nerve caught in scar. Neurolysis.

Result—Complete recovery.

Fig. 5

Late ulnar palsy, first described by Mouchet, is not so infrequent. Various operative procedures have been advised, one of which is cuneiform osteotomy with correction of the valgus position. The best operation is transposition of the ulnar nerve. The nerve is removed from the groove back of the internal condyle and transposed anteriorly between the intermuscular septum of the flexor and pronator group of muscles. The nerve is much better protected in this position than when placed subcutaneously.



March 30, 1923

Oct. 1, 1924

March 30, 1923—Fell and broke rt. arm. Median nerve palsy noted at once. Open oper. necessary for reduction. Within 3 mos. nerve palsy had disappeared.

Result—Practically normal motion and complete recovery of nerve palsy.

Fig. 6

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In the treatment of nerve injuries associated with fractures, the question arises as to the time when conservative methods must be abandoned and active surgery instituted. It is difficult to make any hard and fast rules. I am convinced, however, that if definite improvement has not been noted at the end of three months, operative treatment is indicated. By improvement I mean a definite return of motor function. Entirely too much emphasis is laid upon changes in sensation, the significance of which is often interpreted with difficulty. The line of procedure should be determined entirely by improvement or lack of improvement in motion. If an operation is performed, the procedure to be followed naturally depends entirely upon the conditions found. In many instances a neurolysis will be required. The dissection when possible, should be made through intermuscular septa, so that subsequently the nerve can be placed in a non-bleeding bed. When the nerve is exposed there will be found not infrequently a thickened epineurium and adhesions which will require careful removal. At one time Cargile membrane, fat, fascia and a number of other materials were used in neurolysis. They are not required and I think that most are harmful. The nerve when properly prepared should be placed in a non-bleeding bed, separated from the bone by muscle. This procedure usually suffices.



Sept., 1920 April, 1921

Sept., 1920—Fractured lower end of humerus. Good reduction after several attempts. Gradually developed difficulty in use of index finger and thumb. April, 1921—Entered hospital with median nerve palsy. At oper. a neuroma was found where the nerve was adherent to the lower end of upper fragment. Neurolysis.

Result—Practically a complete recovery.
1925

Fig. 7

In other instances the nerve will be divided, sometimes torn, so that there is a considerable hiatus. End to end suture of the nerve is the only procedure that promises results. In making the suture the neuroma must be resected until normal looking fasciculi are exposed, the significance of the internal topography must be recognized and the ends of the nerve not rotated. The

suture should be placed so that the nerve is not kinked, so that the ends are formed when the suture is made.

Fortunately the results are usually good. In the case next to the muscle, the results are as high as 85%. However complete paralysis.



Fig. 8.—Typical

Palsies following nerve injuries of fractures. Careful

ictures, the question abandoned and active fast rules. I am concerned noted at the end improvement I mean a emphasis is laid upon en interpreted with entirely by improve- on is performed, the the conditions found. ection when possible, bsequently the nerve exposed there will be dhensions which will ne, fat, fascia and a are not required and y prepared should be e by muscle. This

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suture should pass through the epineurium and the ends carefully approximated, so that the fasciculi are not crushed or a space left in which a hematoma be formed when the sutures are tied.

Fortunately the musculospiral nerve which is most frequently injured, gives next to the musculocutaneous in the arm, the highest percentages of recovery after suture. If the suture is at all satisfactory recovery may be expected in as high as 85% of the cases. Recovery usually occurs in from 5½ to 7 months. However complete the recovery, the abductor longus pollicis may remain paralyzed.



FIG. 8.—Typical deformity in late ulnar cubitus valgus. Prominent internal condyle.

Palsies following nerve injuries are among the most disabling complications of fractures. Careful examination should be made of all fractures to determine

whether they are present, so that appropriate therapeutic procedures may be instituted.

Ischemic palsy is still a too frequent sequel of fractures. Recently the cause has been clarified and it is now recognized that the obstruction is to the venous circulation. Ischemic palsy follows most frequently supracondylar fractures of the humerus, supracondylar fractures of the femur, Colles' fracture and Pott's. The majority of cases are seen in the upper extremity after supracondylar fractures. The same mechanism which causes ischemic palsy in the young would cause gangrene in the old. During the past few years, the etiological significance of the subfascial hematoma has been recognized and the induration of the antecubital fossa should suggest the possibility of the development of a venous obstruction which may terminate in degeneration of the myofibrils, followed by scar tissue formation.



Fig. 9.—Deformity in late ulnar palsy. Fractured external condyle with non-union.

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THE CHAIRMAN
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ditions of the brain at earlier stages. The time will come when we shall not simply say, "This man has epilepsy or fits," but we shall find the cause for those diseases. The nervous system has developed from the ectoderm or coverings of the body. Some persons eat strawberries and get urticaria, and it is so with many foods, to which, here and there, an individual is sensitive. Is it not possible that some food or other allergy may cause temporary disturbance of the coverings of the brain in the sensitive individual, resulting in an epileptic fit? Can its cause be compared in any way to the feather pillow which will produce in some people asthmatic attacks? If necessary, we shall perform exploratory operations on the head at an early stage of disease and turn the light of day onto many of the pathologic conditions of the brain.

A remarkable advance has been brought out in the study of Meniere's disease. I have seen these patients end in hospitals for the insane because they had suffered from the disease so long that they were unable to care for themselves. Now the neurologic surgeon cuts a nerve, and the patient walks out of the hospital in a week and goes back to his work.

This cannot be called an address, I think it had better be called some remarks on things. Speculation, trying to get a picture of the cause of what confronts us and the remedy for it, is a most important thing. We must have a medical and surgical new deal on nervous and mental disease to see if we cannot do something about it. In other words, it is better to think and sometimes think wrong than not to think at all.

DR. SOUTHGATE LEIGH (Virginian Ry.): I would move, sir, that we rise to show our respect and deep affection for this great and good man who has done so much for us all.

. . . The members arose and applauded. . . .

THE CHAIRMAN: We also have the honor of having Dr. Charles Mayo with us. We should like to hear a word from Dr. Charles Mayo. (Applause.)

DR. CHARLES MAYO: I thought that I had effectually hidden myself, at least from the Chairman, and I am not down for an address.

I am always pleased to come to this meeting or any surgical meeting because I always learn something. I either like what is said, or else it leads me to thinking that the speaker is wrong. Either way it makes one think, and if one really thinks he may learn something.

Dean Lewis' remarks always please me because I really agree with him. He is larger than I am and I ought to agree with him. (Laughter.) I am careful to agree with him, at least, when I am near him. But I was thinking that probably I had been wrong in dealing with some arteriovenous aneurysms simply by ligation of the connecting passage from artery to vein, and always ligating it with a rather loose suture of silk of pretty good size, not cutting the channel off quickly but slowly devitalizing it, by allowing the connective tissues to form from the local irritation and gradually thicken up and choke off the connection; I tied tight enough to shut off the circulation but not

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The early clinical picture of ischemic palsy is that of a venous obstruction, the swollen mottled hand, pain, beginning contracture, the fingers projecting from the swollen hand almost as if from a bag. The diagnosis should be easily made and the pathological changes recognized. If the antecubital fossa is swollen and indurated an immediate attempt at reduction should not be made. The extremity should be suspended until the swelling and the acute condition subsides. If the condition does not improve, it may be advisable to incise the antecubital fascia and remove the subfascial hematoma. Such a procedure may be necessary as a last resort. After the deformity has developed, the final results will depend entirely upon how much cicatricial tissue has replaced the contractile substance of the muscle. In the milder cases, elastic traction should be employed. Forced straightening of the fingers and hand should not be

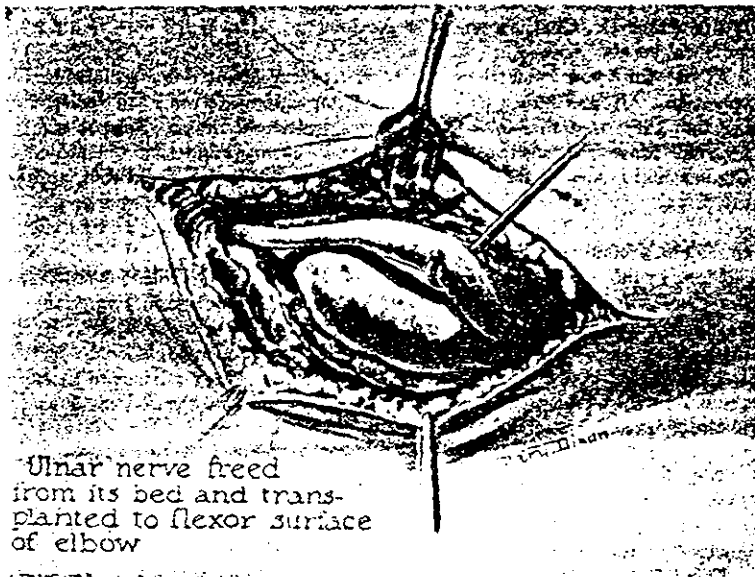


FIG. 10.—Operation for late ulnar nerve palsy.

attempted for hemorrhage may occur in the muscle which will cause more scar tissue. The most satisfactory operation, if such is required, is the dropping of the pronator flexor group lower down on the ulna, thus causing a relative lengthening of this group.

The treatment of fractures has greatly improved during the past few years.

Some of the greatest and longest disability is now caused by soft part injuries, the seriousness of which is not recognized when the fracture is first seen.

THE CHAIRMAN: If there are any questions I am sure the Doctor will be glad to answer them.

I am going to ask him just one question. I notice, Doctor, that you use a Lane plate occasionally. What is your indication either for leaving them or removing them?

DR. LEWIS: I leave them in until they get loose and if they get loose I take them out.

THE CHAIRMAN: If they cause no trouble you just leave them in?

DR. LEWIS: I leave them in but I don't use them any oftener than I have to.

THE CHAIRMAN: When I was a student in medical school my professors of surgery often mentioned the names of Drs. Charles and William Mayo. I do not know of any surgeons who were referred to more often than the Mayo's. It was either Dr. Charlie's operation for bunion or Dr. Will's operation for umbilical hernia.

At one time you know there was a controversy about doing gallbladder operations. It was either cholecystostomy or cholecystectomy. I remember that they used to refer to Dr. Mayo's watertight drain. Then it was Dr. Will Mayo's stomach operation. I made up my mind that the Mayo Clinic would be one of the first clinics in this country that I would visit, and my first trip was in 1906, and I remember that at that time there were on the staff twelve men. Their father, Dr. W. W. Mayo, was still living and I used to see him around the clinic occasionally.

I was so impressed with Dr. Will Mayo's work on the gallbladder that, a few years later when I had a very severe and serious attack myself, I wired the Doctor and asked him if he would take care of me if I came to Rochester. He immediately wired "yes." I went up there and was operated upon by the Doctor, and, of course, I got along very nicely. I was very anxious to leave the hospital as is everyone. So I paid my hospital bill and then I went down to the clinic and I wanted to pay my doctor bill. They said, "You will have to settle that with Dr. Charles Mayo."

Well, he wasn't in town. So I had to wait over a day to see Dr. Charles Mayo. I wasn't going to leave town without paying my doctor bill. I went to see Dr. Charlie Mayo and he said, "Young man, we have never charged a doctor." I then expressed my appreciation and gratitude.

Due to the excellent treatment, skill and good judgment of Dr. W. J. Mayo, I have enjoyed perfect health for the past twenty years.

It is a special pleasure and privilege and honor to present Dr. W. J. Mayo. (Applause.)

DR. W. J. MAYO: Mr. Chairman and Gentlemen: I am sure we were all very glad, and I am very proud to have had this opportunity that the Doctor recalls to my mind. I think all of the older members of the profession recall with satisfaction that the profession always has taken care of the doctors and their families without fee.

In this day when so many younger men are coming into the practice of medicine, we wonder whether they have the same opportunities that we had

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in our early days. I do not speak of the doctor's opportunity from the standpoint of the present economic disturbance, but rather because of the many factors that are entering into the practice of medicine. For instance, when I graduated, away back fifty years ago, from the University of Michigan, the average duration of the life of mankind was only thirty-eight years. Now it is fifty-eight or fifty-nine for men and about sixty-one or sixty-two for women, because women biologically are the more important. Contagious diseases have nearly disappeared, while diseases of middle and later life—cancer and disturbances of the heart and vascular system—have naturally increased, and new diseases—the result of changing habits and social customs—are becoming evident. Mental and nervous diseases are increasing. The brain and related tissues are relatively a late development, not so well protected by heredity and therefore more readily affected by age and necessity for social adaptation caused by the change from the manual to the machine age, from muscle to brain.

I sometimes think that when I am away from home I am often of more value than when I am at home, because I see the picture as a whole. At home one is so buried in detail that one sometimes does not see the whole picture and the various relationships because of the many views crowding on the screen.

Curiously enough, today, about 50 per cent of all the hospitalized patients in this country are in hospitals for the mentally afflicted. In 1925 there were in the various hospitals of the United States about 324,000 patients with mental and nervous disease, and in 1934 there were about 515,000, an increase of about 191,000 in nine years. Just what is behind this increase? Just what does it mean? Have we made the progress in understanding disease of the nervous system that we have made in our understanding of disease in other parts of the body?

Of the 100 per cent of energy produced in the body, man is in conscious control of only about 25 per cent; about 75 per cent is under unconscious control, and is utilized in maintaining bodily heat, digestion, circulation of the blood, and respiration. Some ten years ago I visited Australia and New Zealand, and while there became very much interested in the work of the late Dr. John Hunter of the University of Sydney, an anatomist, and Dr. N. D. Royle, an orthopedic surgeon. Hunter was descended from the stock of John and William Hunter of England, of whom we all have read. Hunter gave the first adequate explanation I had ever heard of the utilization of the 75 per cent of energy under involuntary control. I was intensely interested in him and I stayed some days watching his work. In his animal experimentation, he used chiefly goats and larger animals, on the theory that if his work were done on animals high in the scale, the facts he found could be better applied to man.

I induced Hunter and Royle to visit the United States, and they gave a number of lectures in this country. As some of you may remember, Hunter, this young man of wonderful promise, only about thirty years of age, ate typhoid oysters in New York and died of typhoid fever on board ship crossing to England, a tragically early close to a valuable life.

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Hunter showed, as others had before him, that 75 per cent of bodily energy is controlled by the sympathetic nervous system. The sympathetic nervous system is a good deal like the man who holds the purse strings, in that he can control what is done. The sympathetic nervous system has its effect largely on the fibers of the little strands of non-striated muscle that run down along the blood-vessels and that act as constrictors in disease, producing the effects we now recognize. On the sympathetic nervous system, the endocrine glands play as do hands and fingers on the keyboard of a piano, to direct bodily energy. Study of the endocrine glands has given us information which has aided in understanding mental disturbances that are due to changes in the vessels of the brain through glandular action and through other channels, not all endocrine. For instance, I was interested in a report from the Royal Victoria Hospital, in Manchester, showing that in the ages between fifty-five and sixty-five the death rate among surgeons from diseases of the heart and vascular system is about three times that among medical men. This fact leads to an interesting speculation. It is true that much of the disability among surgeons is due to the fact that surgery is to a certain extent a handicraft, and that age and anxiety produce reduction in skill; but that is not the most serious consideration. It is a question of responsibility. The keen medical man, as he grows in experience, becomes more valuable as age advances. He is not exposed to the malign influences of anxiety and responsibility to the same extent as is the surgeon. The medical man, so to speak, sees his patient drowning and throws him the best means of relief he has, but the surgeon, in effect, throws the man into deep water, hoping to rescue him before he drowns, that is, in order to give relief, jeopardizes him anew.

Striated muscle is consciously controlled and is responsible for the expenditure of the remaining 25 per cent of bodily energy. A study of the heart shows that it is composed of a peculiar primitive form of striated muscle, but is not directly controlled consciously. Since the earliest times it has been thought that the heart is the seat of the emotions, love, hate, anger, and fear, because of the effect upon cardiac action of emotional states. In considering the high death rate among surgeons, we can understand that the intellectual processes of the surgeon, who rigidly controls his emotions during the time he is operating, and who assumes great responsibility for his patients, is indirectly throwing stress on the heart. And not only the surgeon, but all men who must live under tension, are subjected to cardiac strain.

What I wish to stress is the unfortunate increase in mental and nervous disturbances.

I should like to go back for just a few moments to the early days of surgery of the abdomen. William T. Bull (some of the older men here will remember him) did the first successful surgery of gunshot wounds of the intestine, down at the old Chamber Street Hospital at the Five Points of New York. Shortly after I graduated in medicine, I was in New York for several months and I used to go down with Bull to see this work on gunshot and stab wounds. Shortly after that time Bull reported some of these cases at a meeting of the American Surgical Association. I remember so well that Samuel D. Gross, who was the great surgeon of his time in America (it was shortly before his

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death), congratulated Bull on his results, but he said that what Bull had done might have serious results for mankind, because it would induce many other surgeons to go into the abdomen to try to operate, which would cause more deaths than recoveries.

If we look back, especially those of us who belong to the last generation, we realize that much of our knowledge came from the dead house. We saw disease conditions in the hopeless stage with our thoughts fixed on autopsy findings. It has taken all these fifty years to learn that what a man dies with is not necessarily the direct result of the primary disease, but may be from secondary processes or complications.

It was the same in surgery of the chest. About the only thing of great importance that medicine got out of the Great War was new knowledge connected with surgery of the chest. We used to consider, for instance, that practically all tumors in the lungs were malignant, and there was nothing to be done. Now we know that this is not true. Many of these neoplasms in the early stages are curable, and one lobe of the lung or even one lung can be successfully removed. "Upside-down stomach" (diaphragmatic hernia) is not uncommon. All these things are discussed in the daily press. And whereas we used to see people with chest conditions when they were beyond help, now, little by little, we are beginning to recognize and relieve these disease conditions in the early stages when the patient can be cured.

The same sort of progress is being made in surgery of the head. We are finding that a really extraordinary percentage of brain tumors are benign in the early stages, and when patients are operated on for these tumors they get well and stay well; all sorts of heretofore little understood diseases involving the brain are now diagnosed and cured.

Studies of the function of the endocrine glands of great neurological importance have been developed and are giving marvelous results. On my daily visits to the hospitals, I always go to the neurological section to see the surgeons work. In the past, patients with serious mental disease were placed under custodial care, and they were about as close to a consistent attempt at scientific study and treatment as though they had been put in prison. The so-called (self-appointed) psychologist tried to talk to these patients and then tried to classify the patients' talk. I am not speaking of the medical man, but about those people who are so constantly getting before us in every way, shape and manner, on mental and nervous trouble. I have worked too long in surgery not to believe that we are approaching the time when we shall get many of these mental and nervous patients away from custodial care into real hospital care.

I have faith that we shall see an improvement in these nervous disturbances that apparently are on the increase, because of better diagnosis and early treatment. It is important that medical men should become interested in the study of this problem, that we should try to find out whether it is necessary for all these people to become or to remain insane. Are we not in the same position in the treatment of the mentally afflicted that we were in surgery of the abdomen, when I began fifty years ago, or as we were in surgery of the chest? Day by day I can see the extension of remedial measures to con-

tight enough to cause immediate necrosis of the tissue. I have done this three times in the popliteal space, twice in the arm, and three times in the neck, and it always worked well for me.

The Doctor has mentioned the bunion operation which I did devise once upon a time, and it reminded me that three or four weeks ago I received a letter from a woman who had undergone the operation. She blamed me for the whole thing. (Laughter.) She wrote a letter to me telling me that the operation was no good, that she was very sorry that she had had it, and that she was worse now than she was before. I knew that she was probably disabled because she was probably eating as well as ever and not getting any exercise and probably weighed about fifty pounds more than she should. But many years ago I did get an idea about a bunion operation, but it must be done just right and the surgeon must assume responsibility and not accept it only half-way, because I have seen some very bad results from half-way measures. I don't think the bunion operation should be done on anyone with flat foot. The patient must retain the ball of the foot. I have seen so many x-rays after bunion operations in which the surgeon had taken off most of the metatarsal head. Less than a quarter of an inch should be removed and the toe should be straightened by sutures. The patient must wear a heavy-soled shoe which does not again deform the great toe, or the operation will fail to give relief.

DR. LEIGH: The same motion for Charlie.

. . . The members arose and applauded. . . .

THE CHAIRMAN: Dr. Charles Mayo, I assure you that woman is wrong. We are still doing your operation with very good results.

I want to thank you, Dr. Will Mayo and Dr. Dean Lewis, for coming here. We have enjoyed it very much.

Our next item is a report by the Chairman of the Committee on Disability and Rehabilitation, Dr. Metz.

(Circular M. & S. 170)

ASSOCIATION OF AMERICAN RAILROADS

MEDICAL AND SURGICAL SECTION

REPORT OF COMMITTEE ON DISABILITY
AND REHABILITATION

Dr. G. W. Gale, Jr. (Chairman), Chief Surgeon, St. Louis Southwestern Railway, Texarkana, Ark. (Deceased—March 24, 1935.)

Dr. A. R. Metz (Acting Chairman), Chief Surgeon, Chicago, Milwaukee, St. Paul & Pacific Railroad, Chicago, Illinois.

Dr. J. G. Frost, Chief Surgeon, Chicago & Eastern Illinois Railway, Chicago, Illinois.

Representative from Committee of Direction

Dr. J. R. Garner, Chief Surgeon, Western Railway of Alabama, Atlanta, Georgia

Dr. A. R. Kilgore, Chief Surgeon, Western Pacific Railroad, San Francisco, California.

Dr. F. C. Warring, Chief Resident Surgeon, Western Maryland Railway, Baltimore, Maryland.

NEW YORK, N. Y., May 1, 1935.

TO THE MEDICAL AND SURGICAL SECTION:

Since the organization of this Committee, which has functioned under several names, practically all of the important subjects coming within its purview have been discussed—some of them almost annually. A number of them are and always will be of paramount interest and we feel should be kept constantly before this body.

As we become more careful and painstaking in our physical examinations, both with and without the use of scientific instruments, such important diseases as syphilis of the central nervous system, diabetes, nephritis, focal infections, hypertension, coronary diseases of the heart, aortitis and aneurysm of the aorta and others mentioned in the list given below seem to occur with increasing frequency and all are of the gravest concern when occurring in train service employees and more particularly with those in engine service.

In a measure this report is somewhat in the nature of a recapitulation as well as one to lay emphasis on the important matters that have been discussed in past years.

Vision

The question of disability and rehabilitation as concerns vision is of evident prime importance to the railway surgeon. The recognition of such defects of vision as may be incompatible with the working efficiency of the employee can readily be recognized by certain simple eye examinations that have already been described from time to time by the Committee on Physical Examination. These examinations, in the majority of cases, give us sufficient evidence of the visual acuity of the employee to enable us to determine his capacity for various classes of service in the operation of a railroad. A certain few cases will present ophthalmologic problems that are best referred to the specialist.

Essentially we are concerned with two requisites: ACUTY and COLOR PERCEPTION. Acuity, although in itself a quantitative thing, is rather difficult to grade in any satisfactory numerical form. An attempt to do this is set forth in an extract from The Transactions of the Section on Ophthalmology, American Medical Association, 1927. The table below is reproduced from this report. This table, giving the corresponding size of letters and visual angles used in ordinary test cards, enables the examiner to express loss of macular perception in percent. The column giving corresponding Snellen notations at twenty feet allows us to use the same determination for distant vision. Where there is marked discrepancy between the percentage central visual perception for near and distant vision, certain ratio calculations are necessary. The reader is referred to the reprint from The Proceedings of the House of Delegates, American Medical Association, 1925, Report of Committee on Eye Injuries (printed together with the extract described above) in which the formula is given for central visual efficiency of the eye in question as:

$$(\text{Percentage near vision} \times 2) + (\text{Percentage distant vision} \times 1)$$

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TABLE FOR DETERMINING PERCENTAGE LOSS OF MACULAR PERCEPTION FOR THE DISTANT AND NEAR TESTS

Snellen Notations at 14 inches A.M.A.	"Diopter" or Meter	Jaeger	Size in Mm. of Letters at 14 Inches	Visual Angle for all Notations	Corresponding Snellen Notations at 20 Feet	Percentage Central Visual Perception	Percentage Loss in Visual Efficiency
14/14	0.37 D.	No. 1	0.502	5	20/20	100.0	0
14/21	0.30 D.	No. 2	0.735	7.5	20/30	91.4	8.6
14/24	0.32 D.	No. 3	0.833	8.5	20/33	89.5	10.5
14/28	0.75 D.	No. 4	1.004	10	20/40	83.6	16.4
14/35	0.87 D.	No. 6	1.255	12.5	20/50	76.5	23.5
14/42	1.00 D.	No. 8	1.508	15	20/60	70.0	30.0
14/49	1.25 D.	No. 9	1.757	17.5	20/70	63.9	36.1
14/56	1.50 D.	No. 10	2.008	20	20/80	58.5	41.5
14/70	1.75 D.	No. 11	2.510	25	20/100	48.9	51.1
14/84	2.00 D.	No. 12	3.012	30	20/120	40.9	59.1
14/98	2.50 D.	No. 14	3.514	35	20/140	34.2	65.8
14/112	3.00 D.	No. 16	4.016	40	20/160	28.6	71.4
14/140	3.50 D.	No. 17	5.020	50	20/200	20.0	80.0
14/168	4.00 D.	No. 18	6.024	60	20/240	13.0	87.0
14/224	6.00 D.	No. 19	8.032	80	20/320	7.2	92.8
14/336	8.00 D.	No. 20	12.048	120	20/480	2.0	98.0

Having a means of expressing percentage efficiency for macular perception, it is necessary to define limits of disability. For entrance into service in all classes, the applicant should present 100% C.V.P. (Central Visual Perception) in each eye, tested separately, without glasses. After acceptance in service, acuteness of vision should be tested at regular intervals. As regards employees in service, to determine defects of visual acuity and to establish rehabilitation in cases where such defects exist requires classification of various occupations and definition of the percentage limits for each. These limits are best ascertained by the Individual Chief Medical Officer. Only general limitations are recommended in this presentation. Employees in engine and train crews, eligible for promotion, should present 91.4% C.V.P., or better, in each eye, with or without glasses. For re-examination, the same group of employees only need evidence a C.V.P. of 83.6%, or better, in each eye, with or without glasses. If at any time such employee's C.V.P. tests 76.5% or lower in either eye, with or without glasses, he should be excluded from active train service and be rehabilitated in some occupation in which visual requirement is less exacting. Employees in other branches of service should show at least 58.5% C.V.P., or better, each eye tested separately, with or without glasses. Below this figure the employee should be excluded entirely from any service concerned with the active operation of trains and be assigned to an occupation where visual acuity is not an important factor. This assumes, of course, that the employee is wearing, at the time of examination, glasses that correct any refractive error he may have. If there is any doubt that his present lenses are satisfactory, he should be re-examined after having new glasses prescribed by an ophthalmologist.

COLOR PERCEPTION can be examined by any of the devices marketed by reliable supply houses. Of these the Ishihara test for color blindness, based on the principle of figures traced in dots on contrasting colors, permits a quick, easy and satisfactory test of color vision. Even illiterates can trace the figures, and malingerers are next to impossible in this method. Color blindness is of two types—Complete and Partial (Red, Green and Blue). Either type constitutes a disability that necessitates removal of the employee from active train service, or any other occupation where color perception must be unimpaired. It should be borne in mind that color blindness can be acquired as well as congenital and for this reason it is just as important in re-examinations to test the color sense as to test the visual acuity.

There are two other defects for which we must constantly be on the alert, which may be overlooked in examining only for acuity and color perception. These are (1) limitation of extraocular movements, and (2) reduction of the size of the field of vision. Gross tests, using the fingers, give hint to any impairment and this can be confirmed by an experienced ophthalmologist. His recommendation should be considered in those instances where there is a question as to the fitness of an employee for his occupation.

Eye Changes in Diabetes

Visual disturbances are rarely found in diabetes insipidus and in most instances are associated with the cerebral complications of this disease, although

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several cases of cataract, retinitis, paralysis of the external rectus muscle have been reported.

In diabetes mellitus inflammation of the cornea, iritis, cataract, retinitis, optic neuritis and optic atrophy, especially retinitis, are not uncommon. Accommodative and refractive changes are of frequent occurrence. Retrobulbar optic neuritis is often noted in those having diabetes who also use much alcohol and tobacco. In diabetic coma, the eyeball may be soft and if so is usually a sign of a bad prognosis.

Pneumoconiosis

Bernardo Romazzini in 1717 published a classical book on Occupational Diseases and brought out in detail, that pulmonary disorders were especially prevalent in employees engaged in dusty occupations. These conditions at present are being brought more and more to the attention of the industrial surgeon for systematic studies.

Pneumoconiosis (pneumon—lung; konis—dust) is a condition that may be caused by any kind of dust entering the lung; but we as railroad surgeons are undoubtedly more interested in silicosis and asbestosis than in the other types.

Silicosis is caused by breathing free silica into the lungs; asbestosis is caused by breathing fine fibres of asbestos which consists of magnesium calcium silicate. Asbestosis is not a common condition but it causes extensive pulmonary fibrosis and takes on a more rapid course than does silicosis. Anthracosis, which is due to coal dust, and siderosis, due to iron dust, are not as serious in causing complications as the other two just mentioned. These fine dust particles which produce these irritative lung conditions are very minute and microscopic in size.

Silicosis, the most common dust disease and which is brought to the attention of the railroad surgeon the most frequently, in general develops very slowly. However, this disease takes from ten to twelve years before the changes in the lung are sufficient to produce clinical findings. The most severe types are found in cases after exposure of from 32 to 42 years. There are, however, cases called "Acute Silicosis" that have been known to develop after exposure of from four months to two years. The acute cases are found in individuals that are exposed to air containing silica which is mixed with free alkali as is found in powder plants where scouring powder is manufactured.

It should be understood that silica is found in the normal lung, but excessive amounts of silica produce connective tissue and this predisposes the individual to tuberculosis. There are many cases of tuberculosis that are not associated with silicosis but are diagnosed as silicosis. This is the miliary type of tuberculosis.

According to McNally, the silicon dioxide content of the normal dried lung tissue averages 1.13 mg. per gm. Any lung containing over 2 mgs. of silicon dioxide per gm. of dried lung tissue indicates undue exposure to a dusty atmosphere. Assuming that these findings are true, the decision of whether silicosis is present or not must be made by the pathologist and not left to the

chemist since the anatomical changes of silicosis are characteristic of the disease and only the anatomical changes determine disability and death.

The clinical picture of the patient, with shortness of breath, must always be considered seriously. The X-ray findings, although very difficult to diagnose accurately, are of great benefit. The history of the patient is probably of the most importance in making an early diagnosis. In dealing with employees on entrance to service our suggestions would be:

- (1) For the physician to take a complete history and make a careful physical examination.
- (2) To take an X-ray film of the chest for lung tissue for diagnosis and future record.

In old employees with a history of working in dust and having the classical clinical symptoms we suggest:

- (1) To make a change in his occupation.
- (2) To take an X-ray of his chest for lung tissue.

In the way of prevention it becomes necessary

- (1) To educate all concerned.
- (2) Get rid of dust.
- (3) Sprinkle the working area with water.
- (4) Have employees wear inhalers.
- (5) Have frequent analyses made of the dust content of the air at different times during the working hours.

Amoebic Dysentery

The subject of Amoebic Dysentery has been previously covered quite thoroughly by this Section. We still recommend the maintenance of meticulous care in the preparations of all foods and strict adherence of the previous instructions to dining car employees. We further recommend in the treatment the use of Chipparo Amargosa (bitter root), a preparation that can be taken both by mouth and by enema. This preparation is non-toxic and can be given in large doses without any toxic effects. Further, this preparation is very efficacious in any type of dysentery. The fluid extract can be obtained from Eli Lilly and Company or Sharpe & Dohme. In some instances the infusion made by boiling the actual Chipparo Amargosa (bitter roots) have given by far the best results.

If results are not satisfactorily obtained by the administration of the fluid extract we advise the use of the infusion. The actual Chipparo Amargosa (bitter roots) can be obtained usually through any large drug concern.

By using either the fluid extract or infusion we overcome the extreme hazard of probably producing a permanent neuritis that so often follows the administration of arsenical preparations. When this does happen many times the neuritis proves to be worse than the amoebic dysentery.

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Pain in the Back

"Pain in the back" in its various anatomical locations not associated with recent trauma or vertebral fracture or dislocation is one of the "worries" that has become a classic to the industrial surgeon. Under so many conditions, the exact cause is so difficult to determine and discouragement is so often encountered that untiring effort must be put forth to arrive at a correct diagnosis, when possible. Although all our diagnostic means, as laboratory tests, X-rays and physical findings, be carried out we must still admit we are at a loss to account for this pain in a vast number of cases.

Probably the most difficult and most frequent of the many pathological conditions or anatomical anomalies causing this pain is arthritis, especially of the proliferative type. The foci of infection are so hard to find and many not be found until great permanent damage has already been done. The small embedded tonsil with the scarlet red line on the margin of the anterior pillar is very characteristic of a diseased tonsil which, in many cases, is the cause of severe arthritis. The tonsil is usually so small in these types of cases that their importance is easily overlooked and unappreciated as the direct cause of this condition. It is advisable to remove the tonsils in all forms of arthritis.

Influenza is also another type of infection that on many occasions leaves its bad after effects in the back, especially in the sacro-iliac region. These different types of infection many times produce osteophytes in the vertebral articular cartilages that cannot be determined by means of X-ray of other means but are present, causing aggravating symptoms. Low grade meningitis and tuberculosis are also types of infection producing back pain. In all cases of pain in the back, the teeth, tonsils, sinuses, chest and gastro-intestinal examinations and studies must be carefully made.

Spondylolisthesis (or sub-luxation) is a much more common condition than was formerly suspected. The weight bearing direction of the body being thrown out of its proper alignment, stretching the ligament attachment of the bodies of the vertebrae, causing severe back pain.

Curvature of the spine due either to postural or by absorption as in tuberculosis also causes pain in the back.

In spondylolisthesis there occurs the depression over the area of the fifth lumbar vertebra, the shortened torso and broadened pelvis. Flexion of the spine is limited, especially in the forward excursion. A lateral Roentgenogram with the ilium slightly angled is essential to make the diagnosis. Care must be taken to throw the ilium out of the direct line or the shadow made by the heavy crest may be so great that the X-ray film may be wrongly interpreted and the Roentgenologist thereby confused in making a correct diagnosis in spondylolisthesis.

Lumbo-sacral neuritis, lumbar muscular spasm, are also quite common conditions one might encounter. Anomalies are quite prone to cause pain, as cervical rib, sixth lumbar vertebrae, thereby increasing the distance between the thorax and pelvis, making a natural weakness. Spinous processes of the lumbar vertebrae being too short for proper muscular attachment of the

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lumbar muscles. Many other conditions may be found, as spinal cord tumors, metastatic tumors, tumors of the kidney, stone in the kidney or ureter, enlarged prostate, advanced varicocele and especially pendulous abdomen, calcification of the ilio lumbar ligament and sacralization of the fifth lumbar vertebra.

Trichinosis is a more common condition than is suspected and a blood microscopic examination for eosinophilia is helpful to make a diagnosis.

We wish to repeat and advise that in conditions causing back pain, it is essential to remove the causative factor. It is necessary to have complete laboratory and X-ray studies, in the X-ray studies special attention to the lateral views.

In regard to treatment the following procedures may be necessary: rest in bed with slight hyperextension of the spine, with a double Buck's extension and traction on the legs; application of body casts and body splints; removal of all foci of infection; injection of some foreign protein; manipulation under anesthesia for sacral region pain; immobilization either by fusion of the lower lumbar and sacral articulations; patient should receive salicylates and iodides by mouth; his diet should be carefully watched and his general physical condition thoroughly cared for.

The condition of "pain in back" is so serious and of such an economic value that too much stress cannot be put upon the importance of its proper management and treatment.

Cardio-Vascular-Renal Disease

An employee in train service who after 40 years of age should at the periodic examination be examined minutely for evidences of early, as well as advanced, cardio-vascular-renal disease.

Blood pressure readings where the systolic is over 170 and the diastolic over 100 should be repeatedly checked. Often after a rest, such as lying down for 15 to 30 minutes, the pressure may be found to be 20 to 30 millimeters lower. If the systolic exceeds 200, the employee should be removed from active service.

Urinalysis should be made a routine part of the examination in all cases of hypertension and if albumin appears constantly in amounts in excess of a 1-millimeter ring in a freshly voided morning specimen, regardless of the systolic pressure, the individual should be given the advantage of complete rest. In borderline cases, examination of the eye-grounds may prove of great value.

In those where a history of dyspnea, oedema, precordial pain and tachycardia, especially after exertion, is given, even though clinical findings are insignificant, an electrocardiogram is invaluable.

On the other hand, cardiac irregularity or enlargement, or evidences of valvular disease may be found in individuals who deny any symptomatology. The danger of allowing such to continue in active train service must not be minimized. Again the electrocardiogram is of value determining the true character of an irregularity of the pulse or the apex beat.

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Fluoroscopic examination of the chest often reveals not only an enlarged heart, but in some individuals where cardiac enlargement was suspected a diffuse widening of the aorta or even definite indications of an aneurysm. The pre-vertebral space with patient in lateral position should be used so that "an aortic knob" may not be thought to be aneurysm. The latter, of course, constitutes a definite hazard to self, fellow-employees and general public and cannot be allowed to remain in active service.

Coronary disease without definite history of anginal attack or absence of positive electrocardiographic evidence may be suspected but not diagnosed. Suspects should be subject to more frequent examination and the electrocardiogram should be resorted to freely.

In summarization, the rule that individuals presenting evidence of cardiovascular-renal disease should be examined at least every six months and preferably every three months should be followed.

At these examination, the following should form a rigid part of the procedure where indicated:

- (1) Condition of heart and blood vessels.
- (2) Electrocardiogram.
- (3) Repeated blood pressure readings.
- (4) Urinalysis.
- (5) X-ray of chest.
- (6) Examination of eye-grounds.

Syphilis

Nothing new can be added on this subject other than to again emphasize the importance of careful observation for evidence of syphilis in routine physical examinations and routine use of Wassermann tests on employees already in service.

Would also recommend the adoption of universal rule of blood examination for all applicants for employment and those with positive blood Wassermanns should be rejected.

Obesity

Obesity is one of our most important and frequent physical defects among railroad employees. This is evident by figures obtained in careful physical examinations made of 7,500 employees in operating service where the findings show that 16% of the men examined were overweight. This is second in a list of physical defects, the first being defective vision.

Employees who carry an excess of weight tend to become sluggish in their physical and mental activities which in turn lessen their physical and mental dependability and predisposes to slow cerebration.

It is a medical observation that diabetes occurs more frequently in individuals who are overweight.

The carrying of excess fat puts extra work on the heart and kidneys, which tends to exhaust prematurely the life of these two vital organs.

Overweight is of a special concern in engineers, who after living an active life as a fireman become accustomed to eating large amounts of food which is necessary for their work. When these men are promoted to engineers and carry on the duties of an easier occupation, they continue overeating, which results in a gradual increase in weight. In more recent years, it has been necessary for a number of these men who are overweight as engineers to return to firing due to reduction of forces, with result that they are easily exhausted and unable to carry on the harder work due to weakened heart muscle and other general disturbances.

It is important that the employees' attention be repeatedly called to the dangers of overweight and that they be given some specific directions of how to correct the condition. With this in view, the Committee is submitting the accompanying folder, which contains the essential information that the men can follow. (Note: Folder follows page 115).

Respectfully submitted,

COMMITTEE ON DISABILITY AND REHABILITATION,

A. R. METZ, Acting Chairman.

DR. A. R. METZ (Chicago, Milwaukee, St. Paul & Pacific Railroad): "Since the organization of this Committee, which has functioned under several names, practically all of the important subjects coming within its purview have been discussed—some of them almost annually. A number of them are and always will be of paramount interest and we feel should be kept constantly before this body.

"As we become more careful and painstaking in our physical examinations, both with and without the use of scientific instruments, such important diseases as syphilis of the central nervous system, diabetes, nephritis, focal infections, hypertension, coronary diseases of the heart, aortitis and aneurysm of the aorta and others mentioned in the list given below seem to occur with increasing frequency and all are of the gravest concern when occurring in train service employees and more particularly with those in engine service.

"In a measure this report is somewhat in the nature of a recapitulation as well as one to lay emphasis on the important matters that have been discussed in past years."

I read this introduction in memory of the Chairman of the Committee, Dr. Cale, as he had written the introduction and had sent out questionnaires to the Chief Surgeons for suggestions. Before having time to complete the work, he had written his introduction and gone to a hospital where he was operated upon and died. It was while he was in the hospital that he sent me this much of the report and the remainder of the Committee carried on and compiled the rest of the report. This is Dr. Cale's final contribution to this Association.

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Acuity of vision has been very well gone into by Dr. Warring who is particularly interested in this subject, and will not attempt to read all of this, but will merely state that it is gotten up with the object of helping the Chief Surgeons or the Medical Officers to have a means of determining the percentage of loss of the acuity of vision.

There were some requests for something on the eye changes in diabetes, and I requested Dr. Virgil Wescott, who is oculist for the Milwaukee Railroad to give a short report on the eye changes in diabetes, which is incorporated in the report.

Pneumoconiosis, as we discussed it in the last meeting, is of increasing importance. Dr. Frost, who has been very much interested and has been alert on the literature up to the present time on pneumoconiosis, has summarized in an article the essential facts that we have, with recommendations which if observed will be all the protection that we can possibly hope to accomplish to avoid pneumoconiosis troubles.

Last year amoebic dysentery received a certain amount of discussion, and Dr. Frost told us about Chipparo Amargosa and some made notes on it, but we felt that for the sake of the permanent record it would be well for him to write a few paragraphs on amoebic dysentery.

Pain in the back has been discussed repeatedly. I think every committee that has been appointed has had an article on pain in the back. Apparently nobody is going to solve it very soon. There are many views as to what produces pain in the back and this is another contribution.

There was also a questionnaire about cardiovascular-renal disease. Former committees have reported on this—and as a result of this questionnaire I have asked Dr. S. R. Slaymaker, who has been teaching cardiovascular-renal disease in Rush Medical College for forty years and has been checking on all our cardio-vascular disease on the Milwaukee Railroad, to put down a summary of his observations, and this article on cardio-vascular disease is a result of his observation and his summary of following the men that he sees repeatedly and, of course, in line with his teachings over many years.

Syphilis is also a problem that is with us and the various railroads are working on this problem which will have to be solved in a way that meets their local conditions.

Obesity is a more frequent physical defect than is ordinarily suspected, amounting to about 16 per cent in a series of 8,000 examinations.

In order to treat this condition effectively on the Milwaukee Railroad, we have devised a special diet list which is printed on a folder similar to a time table and is headed "Time Table for Reducing and Regulating Weight."

When an employee is found who is overweight, he is given this diet with instructions to follow carefully for three weeks and to report his progress.

With the means of this special diet, we are able to give the employee an outline of instructions that he can take home and follow and which will produce the desired results, if observed in a conscientious way.

This time table for reducing and regulating weight is submitted to the Association for whatever use the various roads may see fit to make of it. It can be altered or changed in any way that the various surgeons see fit.

Dr. F. C. WARRING (Western Maryland Railway): Mr. Chairman and Members of the Section: I should like to say a few words in connection with this vision article that is written in this report. I have heard that the impression has been gained by a number of the members of this Section that the idea is to change our records from 20/20, or 20/30 or 20/40, whatever the test may be, to this percentage business that is listed in this report. That is not the wish of the Committee nor the object of the article that is written here.

What this percentage is intended to do is to give the Chief Medical Officer of the railway company, the Chief Surgeon, or Medical Director, or whatever his title is, an idea of the approximate percentage of acuteness of vision of an employee so that he can convey it to his management. In quite a number of instances, especially where a man is aging and refractive error cannot be corrected, it is a nice thing to be able to tell your management that this man has only 50 per cent of acuteness of vision and to tell the employee that he has only 40, 50 or 70 per cent efficiency and induce him to get better glasses to correct this low percentage of efficiency that he has.

I have brought with me one of each of the charts of the distant vision. On our railroad we make our medical examiner make the notation whether the man reads 20/20, which is 100 per cent, or whether he reads 20/60, which is 70 per cent. We don't have him handle the percentage. That is all done in the office of the Chief Surgeon. The chart is arranged in the same way with the Snellen notations, with your 14/14 and your 14/21 which is 100 per cent and 91.4 per cent, respectively. In this pamphlet you will note how to attain the percentage of efficiency in one eye. This information is mostly gathered from the Ophthalmology Section of the American Medical Association. They submitted a report along this line to guide the different compensation commissions in developing the percentage of loss of vision on account of injury, but we can use the same thing in our test for acuteness of vision.

As I say, this percentage is for one eye. It says, "Percentage near vision." We will take, for instance, a man who reads 14/28 on the Snellen Notation. That is 83.6 per cent efficiency. To make it easier to calculate in the mind, we will say that a man has a near vision efficiency of 80 per cent. We multiply that by two, that is a two-fold value, and then we add his distant percentage of efficiency. We will say his distant vision efficiency is 90 per cent. In other words he would have a total percentage then of 250 and we divide that by 3. That would give him 83.3 per cent efficiency of vision in that one eye. If you get the visual efficiency in both eyes, the good eye has a three-fold value. In other words, we will take a man who has lost one eye. His other eye is 100 per cent. Naturally you would think that he has only 50 per cent efficiency with just one eye, the other one being enucleated, but that is not the case. You give a three-fold value to the good eye which is 100 per cent. That means 300 per cent and you divide by four the three-fold value for the good eye and that gives the man a visual efficiency of 75 per cent, which is a little more than 50 per cent.

That is my idea in bringing this report to you. This is all American Medical Association work that has been developed, as I said, by their Ophthalmology Section, and I think it will be a great help to us men.

THE CHAIRMAN: Is there any further discussion on this?

DR. WEBB: The question of diabetes has been brought up in the last two reports and this problem has caused me a good deal of worry. I do not treat diabetes, but I read the reports of the committees and I am constantly wondering just what to tell our management about the diabetic cases.

I recently asked Dr. A. E. Cardle, who is the director of the Outpatient Department Clinic of the Minneapolis General Hospital, to talk to our surgeons on diabetic problems among railway employees, and in order to prepare him for the address and in order to give him something of the problems of railroad surgeons I gave him our transactions for the last ten years and asked him to look them over and incorporate them in his paper, so that our doctors might get the benefit of the transactions and his special knowledge of diabetes. His patients are all charity patients and in consequence are somewhat comparable to railway employees who are on duty. They may be more difficult in some instances, but the railroad employee also has difficulty in following diabetic regimes. He recently wrote me a letter expressing his ideas as the result of studying these transactions and also his recommendations.

The time is growing late. I should be glad simply to place this in the transactions, in order to let the rest of you have the benefit of it or read it to you, just as you desire.

... Dr. Webb read Dr. Cardle's conclusions. ...

THE CHAIRMAN: Members of the Section: You have heard Dr. Cardle's conclusions. He has summarized all the work that we have done on diabetes here for ten years, and his opinion is so different from most of our opinions in the handling of these railroad men that I believe this should go before the Committee of Direction before we incorporate it in the minutes of our meeting.

Upon motion regularly moved, seconded and carried, it was voted that the report of the Committee be received as a Progress Report and that Dr. Cardle's conclusions be referred to the Committee of Direction.

THE CHAIRMAN: Is there any further discussion on this subject?

THE CHAIRMAN: The next item on the program is the report of the Committee on Medical Aspects of Air Conditioning of Cars. Just before they make this report I want to say that when I appointed this committee last fall they seemed to object to it, they seemed to think that the Medical Section has no business to look into this air conditioning of cars. I was rather criticized for it, but I insisted on appointing a committee because I think we have a great deal to learn about air conditioning.

Dr. Dowdall is not here. Dr. Crowder will tell us about the research work at the Pullman plant.

DR. CROWDER: I had no knowledge that I was to furnish a report. Some time ago Dr. Dowdall called me up and asked me if I could help him with this report and I told him I would be glad to do that. We discussed in what way

he would like to have me do it and he finally suggested that after he had made what report he was able to get together he would ask me to discuss it and add such things as I thought might be interesting, chiefly in regard to the work that I have been doing on our own cars. I told him I would be glad to do that, but in the main I would be talking off the record because I had no material ready that I considered in condition to publish at that time. That is the way it was put, and I am a little embarrassed now to be called upon to present a report.

However, I have some charts covering several phases of the subject that I think may be of interest to you and with your permission will present them as lantern slides and discuss their significance.

I want to say in the first place that what we are attempting to do is to create comfort in air conditioned cars. If we don't succeed in doing that we have not arrived at our goal. In general we all know when we are comfortable, but we rarely know why we are comfortable. I have been impressed this morning with the fact that we need something of an expert in ventilation for our right-hand window here. It is closed until we all get so hot we can't bear it any longer, then it goes nearly to the top and pretty soon half of us are shivering, then down it goes again to the bottom. That is not good ventilation. It needs to stop somewhere along in the middle, so that we will get enough but not too much effect on temperature and air motion. So do we need to stop somewhere along in the middle of what we might do in cooling or heating cars.

The essential elements that go into the making of comfort are three: they are temperature, the rate of motion in the air and its humidity. Other things may come into this to be sure: the amount of our activity, the amount of clothing we wear, the amount of hidden or unknown radiant heat which is reaching us from without or is being abstracted from us by the presence of cold surfaces, but these are incidental and in the main are quite beyond the control of those who create the conditions. In the main also, they tend to fall into seasonal groups with a fairly fixed status. So I think it is necessary for us to analyze into its elements the condition that we have actually produced and see if we can find that happy combination that suits us most exactly, then try to reproduce these elements regularly or as regularly as we can.

For such an investigation we depend chiefly upon three instruments: the Sling psychrometer, the Velometer and the Katathermometer. The sling psychrometer gives us accurate temperature on both the wet and dry bulb basis from which we can compute humidity. The velometer is a new instrument which consists essentially of a very delicately balanced vein between two permanent magnets, the inertia of which is overcome by exceedingly small air motions. Heretofore we have had to depend upon the anaemometer to register air motion and no anaemometer has been built which can be depended upon to register with accuracy under about 100 feet of lineal flow per minute. The velometer will register down to about 15, and it registers directly on a dial so that the reading is quickly made. The katathermometer is a very valuable instrument which is designed for the measuring of the rate of heat loss from a body warmed to the normal human temperature. It

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registers that loss in millicalories per second per square centimeter of the surface from which the heat is being lost. The rate itself is important, but quite as important as that from the analytical standpoint is the fact that from it we can compute the rate of motion in the air involved.

Our comfort is dependent almost entirely on the thermic relation of the body to its surroundings which is modified by the temperature, humidity and motion these instruments are designed to measure. I should like to read an excerpt from one of the reports that I have made to our officials covering that point, because I think it may make the point clearer than I am able to express it now.

"It cannot be too often restated that the basis of comfort is thermal and that all of the influences above listed, from temperature and humidity to clothing and exercise, are almost entirely thermal in their effect. The body makes heat at a constant rate under a given activity and environment; it must be removed as fast as it is made—not faster and not slower, for the temperature of the body must remain constant if the person is to retain his sense of well-being. If the body could make no adjustment of its own to the stimuli of its environment, this would require a very definite, specific, and constant set of surroundings. But the body can do a great deal—automatically, unconsciously, and without distress. When conditions so demand, it can make heat a little faster or a little slower, it can send more warm blood to the skin and the respiratory mucous membrane for the quicker dissipation of heat, it can slightly or profusely moisten its surface. By means of these physiologic changes, it can meet a variety of conditions which, by adding the purely artificial elements of exercise and clothing, may be spread over a very wide range. But without artificial changes, the range is still considerable and the person remains comfortable so long as the physiologic adjustments successfully maintain a constant body temperature without exaggerating those adjustments to the point of consciousness. When they fail in this, some sort of distress arises. As known effects we feel too cool or too warm, but of exactly the same origin are the vague sensations of discomfort in which we say the place is stuffy or the air feels dead. If we could understand it better we would say we are having difficulty in disposing of our body heat at the proper rate and in consequence our mucous membranes are congested, our scalps and skin are too full of blood, or even that we are beginning to have a little fever, which often is an actual fact. Air temperature a few degrees lower, or air motion a little more rapid, would change our oppressive feeling to one of comfort, simply and wholly by so changing the environment that it will take heat from the body more readily and relieve us of the exaggeration of the physiological adjustment designed to bring more heat to the surface. If odors come into this picture—and they may, especially on the too warm side—their effect is almost entirely psychological."

That is by way of setting the background to what I consider the essential elements of the problem we need to investigate from the hygienic standpoint, or we may say from the standpoint of comfort. I won't attempt to go over

anything like the whole of the work we have done, because it has come now to cover a rather wide field. But there are a few things that I think may be of interest and the first of these has nothing directly to do with the thing in hand here, but is one that Dr. Nilsson asked me to present after he had seen a certain chart.

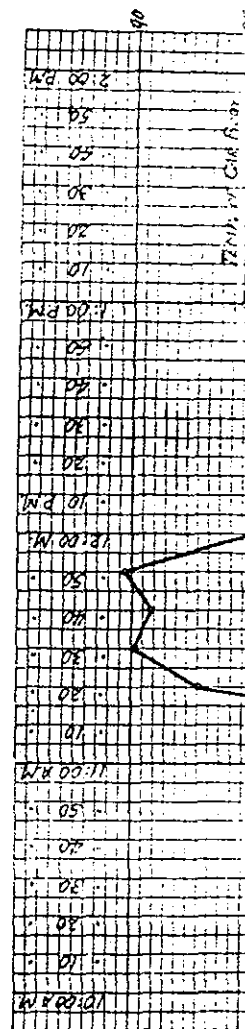
A few years ago, when we first began experimenting with this question of cooling cars, it was suggested that we might use dry ice (carbon dioxide snow), allowing it to evaporate and get its cooling effect simply by putting it into a compartment that was occupied. Complimentary supplies of this were sent over to certain of our officials and they used it as suggested.

I had an inquiry or two from chief surgeons to whom the same thing had been proposed, asking what the effect would be. I didn't know the answer. I did find out that we can cool only about twice as rapidly with a given poundage of solidified carbon dioxide as we can with solidified water; that is to say, that ice is about half as efficient a cooling agent through its absorption of latent heat as is carbon dioxide snow. So, costing ten times as much, solidified carbon dioxide would be at least five times as expensive as the use of ice in similar conditions. I said in my reply to the chief surgeons who asked this question that I thought there should be some arrangement made for leading away the carbon dioxide gas that would be liberated by the evaporation of the snow, but that I wasn't sure it would do any harm if left alone.

I put a man in a drawing room in a sleeping car starting on a four-hour trip, with 25 pounds of dry ice, and directed him to close the door and tear off the wrappings from the ice immediately on starting. Then every ten minutes for the balance of the trip he was to take wet and dry bulb temperature readings and collect a sample of the air for future analysis. At the same time the porter outside was to take the temperature in the car. The outside temperature at the start was 75 degrees and it gradually rose to 82.

The first hour he was to have all the ventilators closed and the blow fan was to remain quiet; that is, the air of the room was to remain quiet and the snow be allowed to evaporate at its natural unsaided rate. The second hour he was to direct the blow fan over the ice to increase evaporation; the third hour to open the ventilators, leaving the fan on; and the fourth hour to turn off the fan and still leave the ventilators open.

The original temperature of the room was 76 degrees and the proportion of carbon dioxide in the first sample was eleven parts per 10,000 of air. After ten minutes the temperature had fallen two degrees and the CO₂ had increased to 90 parts per 10,000. The temperature remained nearly constant through the first hour while the CO₂ increased to between two and three per cent, as is clearly shown in the chart. In the third hour the increased evaporation caused by turning on the fan and directing a current of air over the ice caused a further drop of temperature to 72 degrees, but, as you will note, the CO₂ increased to a little over five per cent. In the third and fourth hours, due to the action of the ventilator in renewing the air of the room, there was a rapid and pronounced drop in the proportion of CO₂ to well below one per cent and a corresponding rapid increase of temperature to a maximum of 82.



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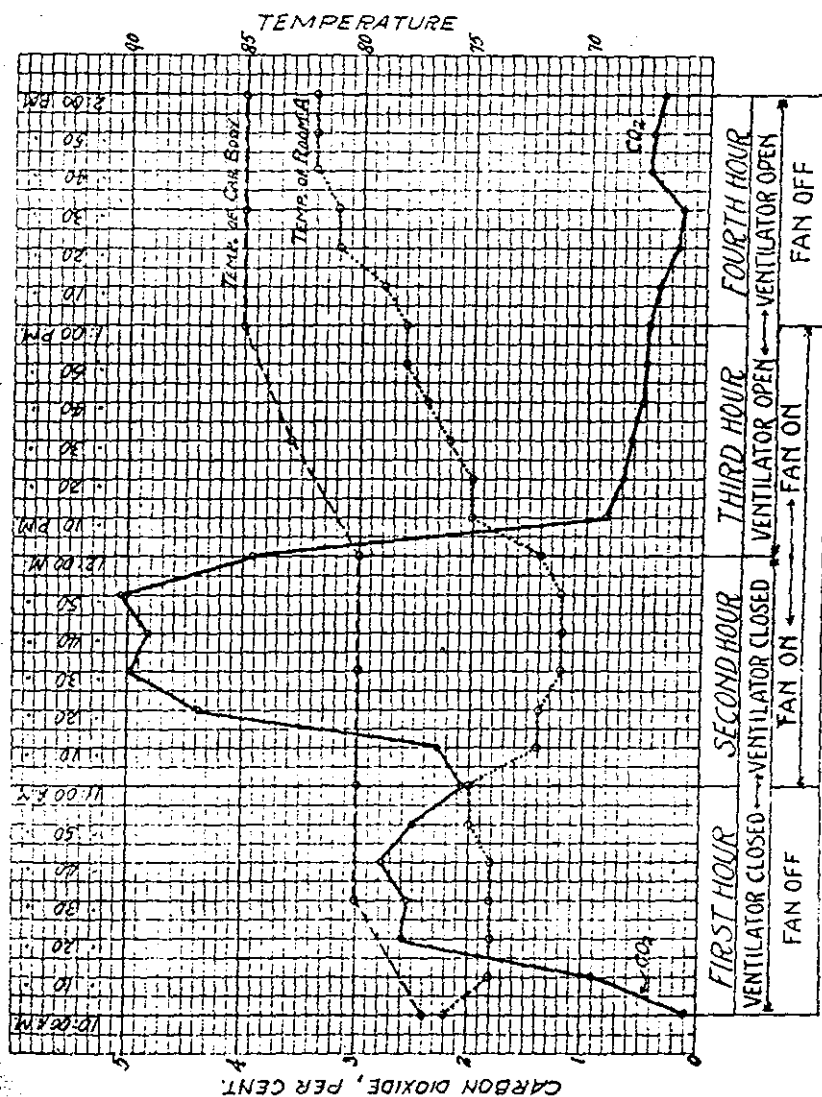
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When CO₂ gets up to that 5 per cent we are getting into a place where we might look upon it as moderately dangerous. It would not kill anybody, but it certainly is not a condition that one would turn people loose to ride with. As a matter of fact my investigator, who knew little about the details of what might be going on, came back and told me that he got "awfully nervous" on this trip.

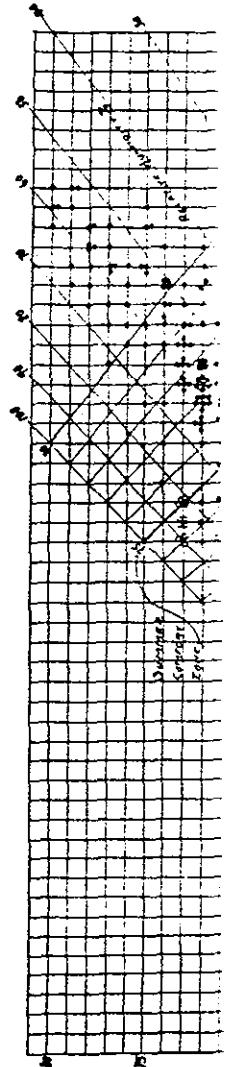
When asked just when this happened, he said, "About when I turned the fan on the ice, about the middle of that second hour."

You see what happened. That is when he got 5 per cent of carbon dioxide in his air. He was really suffering from air hunger, he was being mildly suffocated. In the third hour the symptoms cleared up.

The several curves give you all the facts. Temperature is indicated at the right, CO₂ at the left. The room started at 76 degrees. During the first hour, when evaporation was not very fast, it only came down two degrees. During the second hour, when evaporation was rapid, it came down three degrees more, making a total fall of five. At the same time the temperature in the rest of the car rose three degrees, so that we had a final difference of nine degrees between the car body and the room, which is probably the best result that can be looked for by such a plan, and even that was obtained by such an amount of evaporation and such limitation of air renewal as to create a condition bordering on the actually dangerous.

All this is merely in passing. It has nothing to do with processes of air conditioning as commonly carried out. But if the question comes up to any of you again, I think it is finally and definitely answered that we must not depend upon any such process as the direct evaporation of carbon dioxide snow to keep us cool.

The next chart is one which shows the comfort zone on the "effective temperature" basis. It is made from observations in cars. Dry bulb temperatures are shown by the vertical lines, wet bulb temperatures by the horizontal lines, and relative humidity, which is a function of the two temperatures, by the rising diagonals. When the dry bulb and the wet bulb temperatures are the same, we have 100 per cent of humidity, 50 and 50, 55 and 55, 60 and 60, and so on. The downward sloping diagonals are designated effective temperature or equal comfort lines. The effective temperature is not an actual temperature; it is a line passing through all those combinations of temperature and humidity which will give to the human body an equal sense of warmth. The lines start at those points where the dry and wet bulbs coincide and slope downward to the right into higher dry bulb regions as humidity decreases. At all points along these lines, wherever they cut through particular combinations of the dry bulb and the wet bulb, the sense of warmth is presumably just about equal. The lines have been determined by careful observation of many persons under fixed conditions and at rest. Their defect for our purpose is that they do not take into consideration changes in the rate of air motion and other variables having an effect on the rate of heat loss. They probably give rather too great a weight to the element of humidity under ordinary conditions. But in practice they work quite well and this method of charting the results of numerous observations has proved to be very useful.



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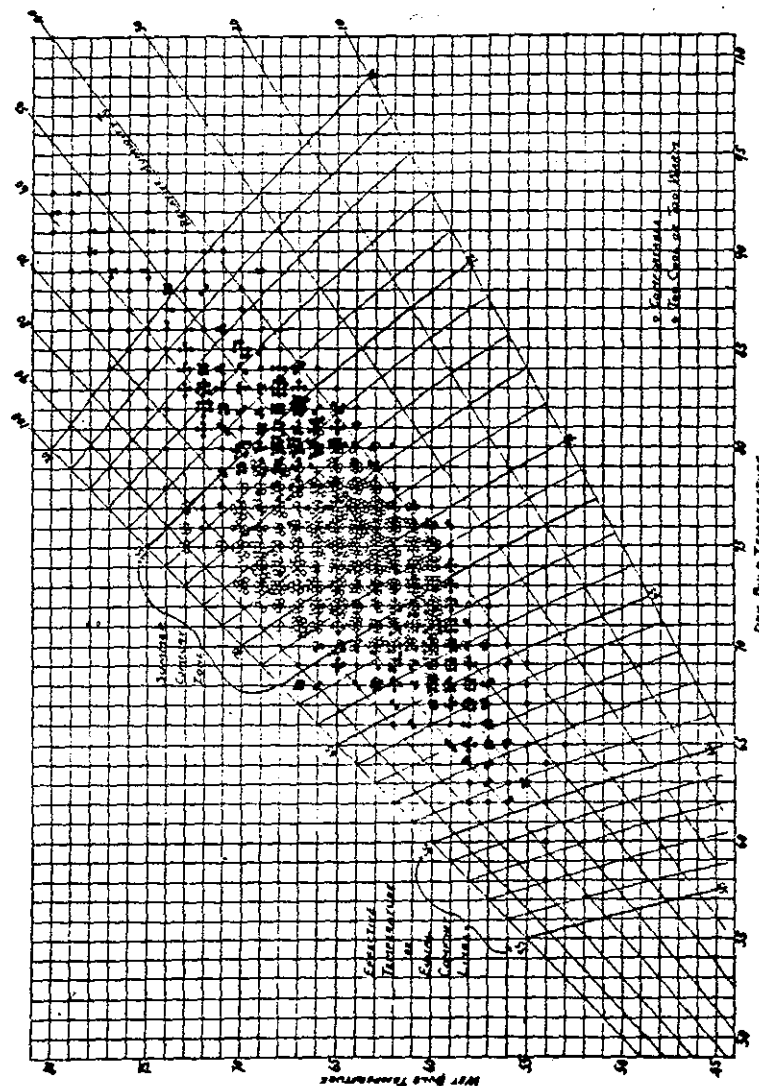
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--- COMFORT RECORD,

The chart is simply a detailed record of many observations of comfort and discomfort taken in cars under all sorts of conditions. The little open circles indicate that the observer voted the conditions entirely comfortable. The black dots indicate that he felt a little too warm or too cool, or in some way that the air did not feel quite comfortable to him. There is indicated on the chart what has previously been determined as the limits of the comfort zone under summer conditions. Our findings correspond in general to this zone, but tend to find their limits a degree or so lower on the effective temperature basis. It will be clear, however, that between 72 and 75 degrees of dry bulb temperature, comfort was nearly universal and quite so at the mean between those limits. Toward these limits sensations of discomfort crept in more and more, and a little beyond them was universal. You will note that at dry bulb temperature 75 there are no black dots anywhere within the chart. The 75 degree line splits the predetermined comfort zone about from corner to corner. This is in summer time and not in winter. In winter the comfort zone lies at a temperature about four degrees lower, whether rated on the dry bulb or the effective temperature basis, as can be equally effectively shown by another chart made from our winter observations.

In the beginning, we tried to cool cars to about 71 degrees. You can see that 71 is right on the edge of our summer comfort zone, and it is often uncomfortably cool in our experience. If we happen to drop a little below that, we are always chilly and passengers register complaints of chilliness. So after the observations from which this chart was made up, we changed our aim to 75 degrees which gives a reasonable leeway in each direction and has in fact improved conditions very greatly; very little discomfort arises, and then it is only of a very minor sort.

I have said that in the winter time we need a little lower temperature, in order to maintain comfort, than we need in summer. (Here a new chart was shown, not reproduced herein.) Then we are nearly always too warm at 75 or 76. We have found in fact that 71 is then about the middle of our comfort zone, and so in the winter time our thermostats are set to call for that degree. It is generally about right, in spite of the lower humidity that then obtains, as the chart will show.

In the summer time, the relative humidity of the cars averages about 60 per cent. It is automatically reduced to that by the precipitation of moisture on the cooling coils. In the winter, it averages between 25 and 30 per cent, because of the deficiency of moisture in the outside air, still it is rather higher in absolute water content than the outside air by reason of additions from natural evaporation within the car. We don't attempt to control it otherwise—or rather we have attempted, but with rather unhappy results from the sweating and frosting of windows and other cold surfaces. I do not believe humidity plays any considerable part in comfort except when we approach its very high or very low limits or unless temperature and air motion are what they should not be. And temperature and motion are much easier to control than is humidity itself. This is particularly true in railway cars.

One of the problems we early ran into was the problem of a stuffy berth. Here is a chart showing two sets of conditions, one in summer and one in

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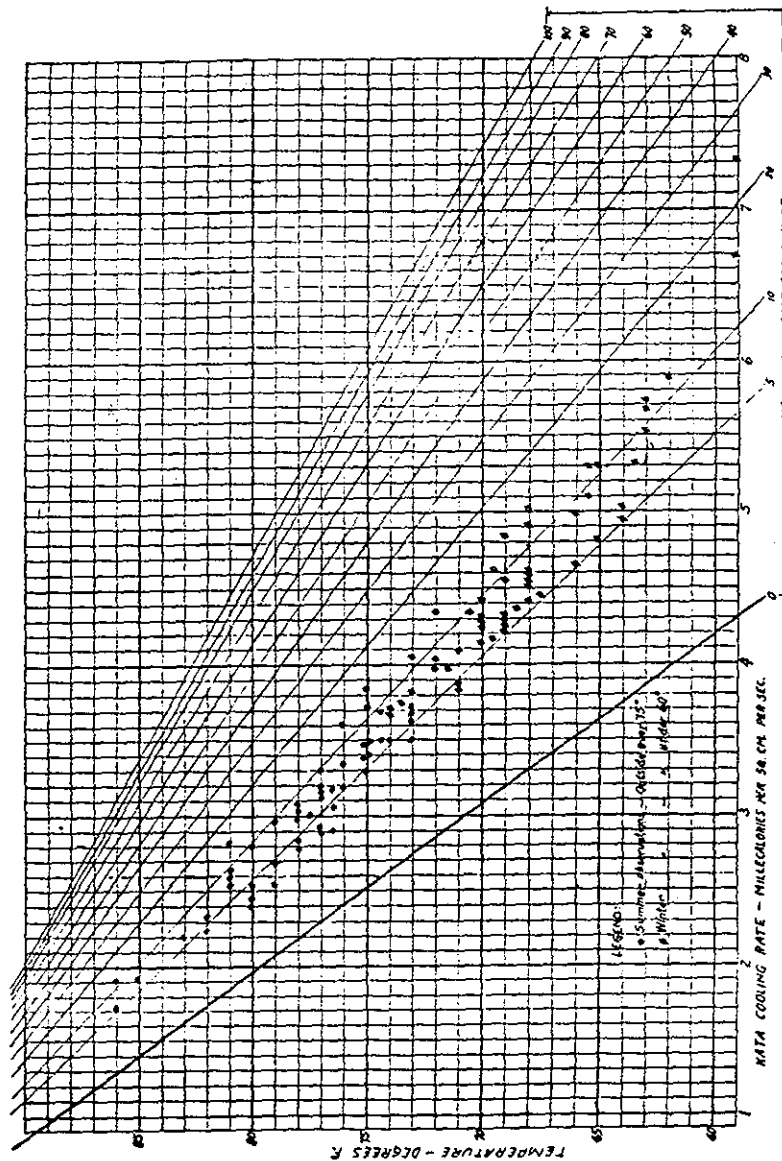
uffy berth. and one in

winter. (Slide shown here, not reproduced.) The black bars represent the difference in temperature as between the aisle and the berth. You will see that under summer conditions, that is, at a temperature above 75 outside, the berths averaged 78.5 degrees and the aisle averaged 71.4, a difference of seven degrees. The car was as it should be. The aisle was 71, the point at which we aim to keep it during the night in summer time, but the berths were too warm for comfort. In the winter time, on the other hand, all other conditions remaining the same, except that we are dealing with outside cold, we find very little difference between the temperature of the berth and the temperature of the aisle; in fact, sometimes the temperature is 3 or 4 degrees lower in the berth than in the aisle. The average difference was less than one degree. If the temperature of the car is right in the winter time, then the temperature of the berth will be right, but in the summer not at all.

We recognized in this a condition that needs a remedy. What could we do about it? The berth gets plenty of air to keep its breath contamination at a relatively low and entirely safe level—that has been fully determined—but still it is not swept out by advancing copious air currents as are other parts of the car and its air becomes overheated when the outside wall is hot. In winter the wall is cold and abstracts heat constantly, in summer the reverse is true. But the occupant of the berth is the really potent source of heat. If all he gives off were retained in the berth and lodged in its air—if none were carried away through the walls and there was no change of air at all—the temperature would rise at the astonishing rate of about three degrees per minute. So after all, our adverse figure represents a lag of only about two minutes of time, after which heat is abstracted as fast as it is formed. Nevertheless, the actual temperature increase and the relatively small rate of air motion in the berth puts some strain on the heat eliminating function of the occupant in hot weather and calls for a remedy.

Numerous plans have been tried to supply a remedy for this condition, some of them, which are now being extensively applied in practice, with quite satisfactory results. We have drawn air out of the berth and blown air into it by various methods which I shall not attempt to describe, but I will show you some of the results. In the investigation of the berth, the katathermometer has become our most useful instrument. It may be unfamiliar to many of you and some explanation will be in order, which I shall read from another of the reports that I have made. But before beginning the reading let me show another slide which will enable you to follow better.

"The katathermometer was originally designed to measure the rate at which a body at the normal temperature of the human body will give off heat to surrounding air of a lower temperature. It is essentially just a spirit thermometer, but having a very large bulb the surface area of which has been accurately determined and registering only between 95 and 100°. In use, the bulb is warmed to somewhere above 100° and hung free from solid contacts in the air that is to be tested. The time required for its temperature to fall from 100 to 95 is taken by a stop watch. From this time and a certain factor to which the instrument has been calibrated, the heat loss can be computed in millicalories per second per square centimeter of bulb surface.



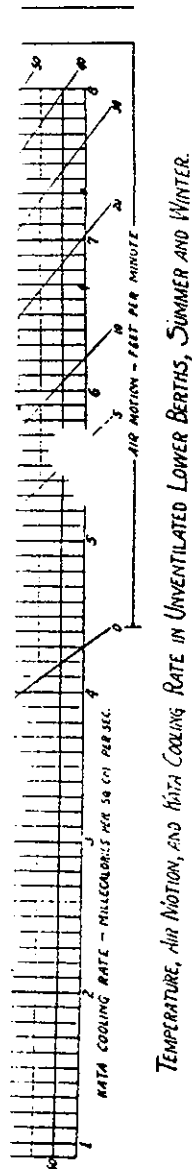
TEMPERATURE, AIR MOTION, AND KATA COOLING RATE IN UNVENTILATED LOWER BERTHS, SUMMER AND WINTER.

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This is the kata cooling rate, represented by the vertical lines of the chart. The heat loss being sustained at the approximate temperature of the human body, it was supposed that the result could be applied directly to the body itself; but due to various protective influences it was found that the human body loses heat at a somewhat slower rate than it is lost from the kata bulb. The two are, however, consistently and continuously comparable and, since the rate of heat removal from the body is the chief determinant of our sensory response to the surrounding air, the kata cooling rate has been found to be a fairly accurate indicator of the comfort of the conditions it measures.

"Obviously, the lower the temperature of the air the more rapid the cooling will be. Obviously, also, moving air makes the cooling faster—a breeze increases the kata cooling rate. We all know this; we blow on the soup (we don't, but others do) or on any hot body to make it cool more quickly, we get in a breeze to cool ourselves. But a perceptible breeze means air motion in the neighborhood of 100 lineal feet per minute. It is not so generally known that slow and imperceptible currents act like the breeze, and with equal vigor within their spheres. It is a fact, nevertheless; such currents have profound effects on the cooling rate of the body and on body metabolism. And since our sense of well-being depends so largely on these functions—on the nice adjustment of heat loss to heat production—they are of great importance in ventilation problems, whether specifically considered or not.

"From the observed kata cooling rate and temperature, the speed of these slow currents can be quite accurately determined. Long before they have reached the point of becoming known to ordinary perception or being directly measurable by ordinary instruments, they have the effect of pushing the kata rate up—more rapidly at the lower temperatures, more slowly at the higher, but with mathematical regularity. The successive diagonal lines of the chart will indicate how this is. Temperature being known by direct determination, the kata rate gives us the motion when proper calculations are applied. Temperature and motion are the elements which, together with humidity, determine the thermic relation of the body to its surroundings, and therefore determine our comfort. On the kata rate alone we may construct a fairly dependable comfort chart. It does not take in the effect of humidity; but humidity is really of little importance except at such extremes of temperature or of humidity itself as we generally do not have to deal with.

"English investigators have found that a kata rate of about 6 is necessary for the comfort of the moderately active body and that it matters very little how the rate is brought about; high temperature and a sufficient breeze or low temperature and stiller air are, within reasonable limits, equally effective. But the English live constantly at a lower temperature than we do. We have found for the resting body, such as that of a passenger, a kata rate of 4 is usually the low limit consistent with comfort. It is occasionally a little lower; but generally below kata rate 4 we get the sensations of oppression, stuffiness, or whatever it may be called that go constantly with failure to eliminate body heat at a sufficiently rapid rate." The chart shows the kata rate determinations in the series of lower berths shown on the preceding slide. "As will be seen, the summer and winter groups of lower berth observations, where the

records were almost constantly of discomfort and comfort, respectively, divide quite sharply between kata rates 3.5 and 4; and we can see at once upon what these rates depend. Being so informed, we can see also what changes are needed in summer—a decrease of temperature or an increase of motion—and the extent of the changes necessary. Of course, the high kata rates sometimes observed in the winter were accompanied by chilliness if one remained uncovered; but that is not considered undesirable for sleeping. One simply unrolls the extra blanket.

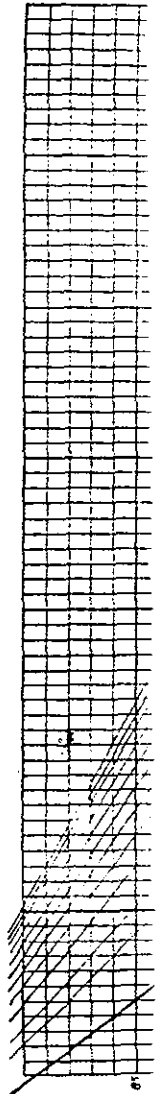
"The kata rate, and with it the relative comfort, may be changed by changing the temperature or by changing the rate of air motion. Conversely, the kata rate may be kept constant with a changing temperature, if air motion is properly altered. Following the kata line 4 vertically through the chart, this rate is found to be produced by five feet of motion at 70°, by about 18 feet of motion at 75°, by about 50 feet of motion at 80° and by various combinations between. These combinations will all give the same rate of cooling and about equal sensations of comfort. On the other hand, following a particular temperature line across the chart horizontally, it is seen how rapidly the cooling rate is increased by increasing the motion of the air. At 75°, still air gives us a kata rate of about 2.8, which is always uncomfortable; five feet per minute of motion brings the kata rate up to 3.3, still a little uncomfortable; eighteen feet brings it to 4, where comfort generally begins; thirty feet to 4.5, and fifty feet to 5. At 80°, it requires some fifty feet per minute to bring us to kata rate 4; but having the fifty feet, 80° would still be comfortable for the inactive body. We have sometimes experienced entire comfort in the open car, where air motion is relatively high, at 80° and over, but never in the closed berth, where the rate is very much less.

"If my explanation has been adequate, the usefulness of determining the kata rate will be apparent. It enables us to answer questions as to how far we must reduce temperature in the berth, leaving the air rate as it is, or how much motion we must have, leaving temperature unchanged, in order to maintain a rate of cooling commonly associated with comfort."

We may now go on with the experimental results of some of our installations. The experiments were carried out in cars run into a closed room where the temperature was maintained at 85 to 100 degrees, thus simulating summer conditions. Many of them have been repeated on the road in service.

(A series of slides were shown here, of which only one is reproduced.)

Here is a car in which cool air was fed directly into the berth by a downward branch from the main supply duct. At the left, the black dots, is shown a short series of measurements with the duct to the berth closed off; at the right, the open circles, is a series with the berth duct open. As you will see, the effect was to raise an original kata rate of just over 3 to an average of just under 5, and discomfort was replaced by comfort. The result was accomplished both by lowering the temperature and by increasing the air motion. Either the observed decrease of temperature or the observed increase of motion, either acting alone, would have increased the kata rate to an average of about 4 and would have increased the comfort materially; the two acting together were ample for our purpose.



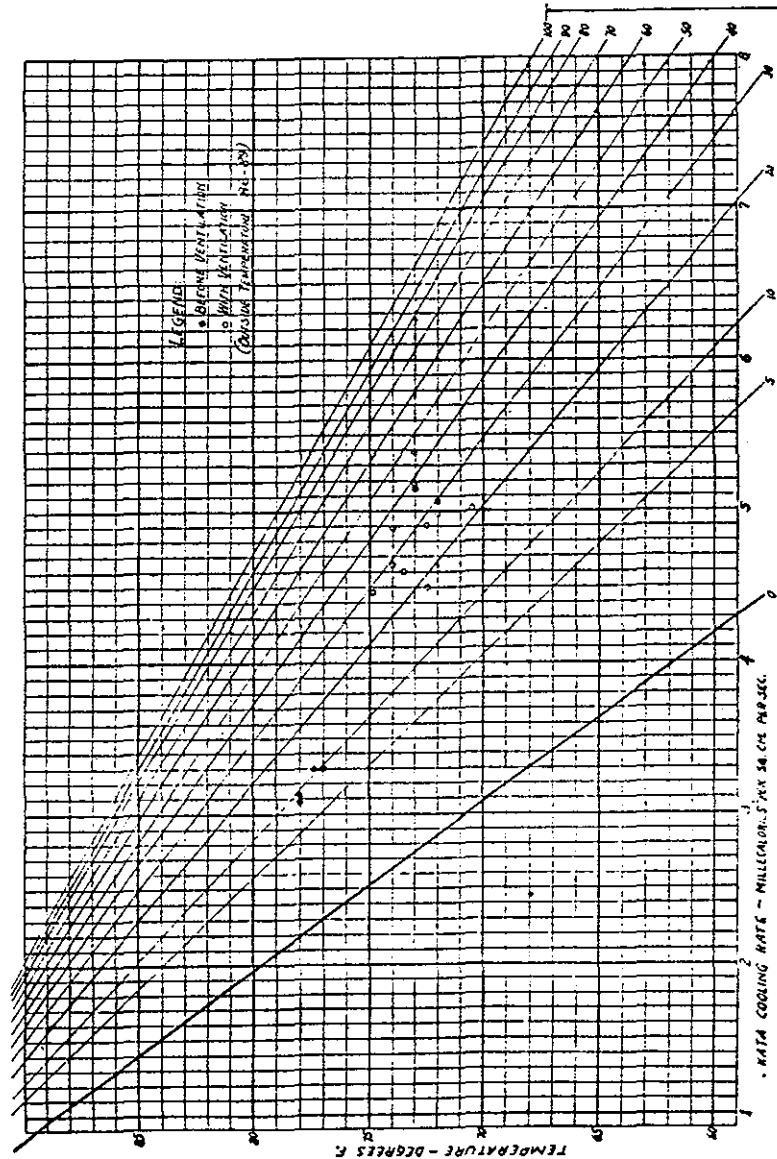
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EFFECT OF BIRTH VENTILATION ON TEMPERATURE, AIR MOTION AND KATA COOLING RATE, CAR CENTISYLVIA.

DR. FROST: Have you made any bacterial determinations?

THE CHAIRMAN: I can answer Dr. Frost that we have been doing that work on the Union Pacific and we have made several.

DR. CROWDER: No, we have made no bacterial determinations. Personally, I don't look upon it as important at all. There is very little possibility of the air transmitting infectious diseases. We need contact, direct or indirect, to bring that about. The presence of an infected individual is the important thing. We do filter the air in the course of handling it, and must take out a lot of bacteria because we take out a lot of dust; but there is exceedingly little chance that the bacteria filtered out could be a source of disease. A dust expert of the federal public health service advised me that he looks upon the dust of cars as of no hygienic significance.

THE CHAIRMAN: I guess the Doctor misunderstood me. I didn't want him to close yet because I have one or two things I want to bring out.

First I should like to ask if any of you have any complaints about these air conditioned cars. (No response.)

DR. PLUMMER: I haven't had any complaints, but this might be interesting information. There is a doctor in Chicago whom I know who told me he knew of five cases that people travelling in air conditioned cars had suffered from colds which they attributed to the air conditioned cars.

THE CHAIRMAN: Personally I don't think there is any doubt about it. I rode from New York City about a year ago in one of these air conditioned cars and changed at Chicago and I got into a car that was pre-cooled down to 75 with a temperature of 102 outside. Everybody said, "Isn't this wonderful?" The next morning it wasn't so wonderful. We all had severe colds and I am sure it was because there was too big a drop in the temperature from 102 to 75. I don't think there is any question in the world about it. I am sure you are going to have these colds unless you have these things changed. There can be only ten or fifteen degrees difference.

Supposing this Freone leaks, what is going to happen to your passengers? I took the trouble to look this up. Here is the answer I received:

"Dining cars, observation cars as well as chair cars and coaches have been equipped with air conditioning apparatus, the majority requiring a refrigerant known as 'Freone'. This refrigerant is odorless and boils at 21.7 degrees Fahrenheit. It is practically non-toxic. The Bureau of Mines' Report No. 3013, page 15, paragraph 7, states:

"In so far as the results of animal experiments serve as a measure of hazard to persons, the investigation described in this report has shown that the possibility of public health and accident hazard resulting from exposures to the Freone when used as a refrigerant are remote." I think that is something we should know. "It will not burn nor explode and has no effect upon foods, flowers, furs or fabrics."

I think that is worth knowing.

Some of you men have tunnels that your trains go through. I wonder if you have any trouble about that. Our tunnels out West are long tunnels and we have stationed at each end one of these large oxygen tanks with inhalers. I have had them for years because the men working in these tunnels after the trains pass through could become overcome with smoke. We have never had any serious accidents, but I think it is a good idea to have your oxygen tanks placed where they can readily be had.

. . . The Chairman read letters of complaint. . . .

THE CHAIRMAN: We have never had any lawsuits, but a few complaints have come in.

On the other hand, I have talked to business men who have had hay fever and they tell me that they have never had an attack while they were riding on our cars and it relieves them for two or three days after leaving the cars. Seriously, I believe it is something that the doctor should look into. Coming over from Chicago one of our doctors and his wife had to change sleepers, because of the odor in the air conditioned car. They thought it was fresh paint, but the car had not been painted. It was the opinion of some that the strong odor was due to the spray used on the intake paper ventilators or screens (Fly Tox or some similar preparation).

DR. MILHOLLAND: Regarding complaints from passengers travelling in air conditioned cars—I think I stated this at one of our committee meetings—probably you know that the B. & O. is rather a pioneer in this air conditioning process on trains, and we have received three complaints. I looked up the record very closely before attending this meeting. But the complaints arose through the fact that passengers were promised air conditioned cars and they didn't get them. There have been two of them who made claims against the company, but we have never spent one nickel in the settlement of any claim because of any discomfort or disease or cold or what not arising from passengers in air conditioned cars or from the aggravation of preexisting conditions.

THE CHAIRMAN: Is there anything further?
Do you want to close, Doctor?

DR. CROWDER: I just wish to speak of those letters. We can duplicate them, but you can duplicate complaint letters about nearly everything that was ever put on a car. Out of the millions of people who travel, one here and there will say something is wrong or that anything is wrong. No matter what item you pick up, there will always be that fellow. I will say, however, that whenever you feel a draft that is uncomfortable, that is wrong. I don't care who feels it or where he feels it, that is not good air conditioning whether it is in a car or elsewhere. You may feel a breeze that is perfectly comfortable and pleasant, but if it makes you feel chilly it is a draft, and that is wrong.

There have been drafts in our cars and in the cars of any of the rest of you who have conditioned cars, of course. There have been other times when the opposite complaint was made—too hot, stuffy, no air, all dead, all sorts of terms they use—but both have been very few and there have been many commendations.

What we are trying to do is to analyze all these conditions on the basis of what the temperature, the air motion, and the humidity are when people feel comfortable or the reverse, and to see if we can find out just what conditions we ought to try to maintain and to avoid. If we can do that we will be better air conditioners.

We found out before we had finished the first season that we were cooling cars too much. We shouldn't try to cool them to 71 in the summer time. We should not try to cool them below about 76 after we have become acclimated to summer conditions, because if we do we will get chilliness quite often.

I don't believe that it is necessary to base the amount of cooling we should do on the outside temperature. We don't base the amount of heating we do on the outside temperature in winter. We have found that about 71 is nearly always comfortable then, regardless of whether the outside is fifty above or zero. And when we learn all about air conditioning in summer, I believe a definite set of conditions will be found that will give nearly universal comfort, when combined with a dry bulb temperature of approximately 75. There is no more reason for saying that because it gets five degrees hotter outside we must have it five degrees warmer inside than there is to say we should drop our inside temperature five degrees every time it gets five degrees colder outside. That plan will not maintain comfort. For the ordinary human being with ordinary summer clothing there is a fairly definite place where he will find comfort. We must find the place.

THE CHAIRMAN: I should like to read a couple of communications before proceeding to the next item on the program.

"Please extend to your Association my regrets at being unable to meet with you on the 10th and 11th.

"It was my intention to be at this meeting, in fact had requested reservation at the Chalfonte Haddon Hall, but at the last minute some matters have arisen which makes it impossible for me to attend.

"I assure you that I am most anxious to cooperate in every way possible with the organization.

"Respectfully,

"W. J. LANCASTER, M.D.,
Superintendent and Medical
Director, Atlantic Coast Line."

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From the National Railways of Mexico:

MEXICO CITY, May 30, 1935.

J. C. CAVISTON, Sec'y,
Medical and Surgical Section.

Dear Sir:

"With the aim of avoiding all obstructions regarding to the Medical Congress that the Pan-American Medical Association has organized and which is scheduled to begin on next 18th of July, we have agreed to postpone the Pan-American Railway Surgeons Congress which has been announced for the 1st of July.

"I take pleasure to communicate with you the above hoping that postponing the date will result in the benefit of both Congresses.

"In due time and after the end of the meeting of said Pan-American Medical Association, I will advise you the exact date of celebration, trying to leave a reasonable rest to all physicians of America, for which reason and after the 18th of next August I shall take pleasure to address you again notifying you the date on which the First Pan-American Medical Railway Congress will take place.

"Very cordially yours,

"F. J. CAMPOS L.

Chief Surgeon."

Next is the report of the tellers as to the result of the election.

DR. J. W. GHORMLEY (Delaware & Hudson Corp.): The result of the vote for the Officers, Committee of Direction and Committee on Nominations, is as follows:

For Chairman of the Section, Dr. J. R. Garner; for First Vice-Chairman, Dr. D. B. Moss; for Second Vice-Chairman, Dr. Duncan Eve; for the Committee of Direction, Dr. S. B. Taylor, Dr. A. R. Metz and Dr. F. C. Warring; for the members of the Nominating Committee, Dr. O. B. Zeinert, Chairman, and the other four members are Dr. L. A. Ensminger, Dr. A. M. Hume, Dr. S. C. Plummer and Dr. R. A. Woolsey.

THE CHAIRMAN: Dr. McCombe and Dr. Plummer, will you escort the new Chairman here, please?

. . . Drs. McCombe and Plummer escorted Dr. Garner to the rostrum. . . . (Applause.)

THE CHAIRMAN: Dr. Garner, you have been duly elected Chairman of this Section, the highest honor that this Section can bestow upon you. I wish you and the Section success during the coming year, and I hope that you will receive as much pleasure in being Chairman the coming year as I have had in the past year. (Applause.)

. . . Dr. Garner assumed the Chair. . . .

THE CHAIRMAN: Mr. Retiring Chairman and Fellow Members of the Association: In bestowing upon me the honor of electing me to this position, I feel very deeply the confidence, privilege and responsibility that you place on me. My predecessors in this position have done a most remarkable work.

This Section is unquestionably one of the most important Sections in the entire organization. I think that we are probably beginning to be appreciated each year a little more than we were formerly. The Surgical Departments are no longer looked on as merely a means of treating injuries, but our real work is in preventing them and in raising the manpower standards of the railroads. It has brought us forward and made the management appreciate our services more than they did formerly when we were merely looked upon as curative agents.

We have very much to do in the future, and during the year that lies ahead of us I shall endeavor to my utmost to keep pace with the chairmen who have preceded me and particularly the one who is just retiring who has given us one of the most excellent years of chairmanship that I have known and I have never missed a meeting since the first one when this Association was organized in Boston. I hope that at the end of the year I will have been able to have accomplished as much as Dr. Nilsson has.

I thank you for the honor bestowed upon me and, I shall do my utmost to serve you in the way that I feel you justify being served, in compensation for the honor that I have received. I certainly thank you. (Applause.)

DR. BARTLE: I have been connected with this Section I think, now, for five or six years on account of the position which I hold, representing a much interested railroad in this Section. During this period there is no one who has commanded any greater personal respect than the retiring Chairman, a man of pleasing personality, a man of culture, and a man of ability. He has been uniformly courteous. He has been very indulgent when we have become obstreperous. He has guided our ship on an even course, and we owe to him a vote of thanks and appreciation which I am pleased at this time to offer.

I think I represent the opinion of the entire Section when I move you, Mr. Chairman, that we vote Dr. Nilsson, our retiring Chairman, a sincere vote of thanks and appreciation for the splendid service that he has rendered, uniformly courteous, sacrificing his time and coming to our Eastern Cities rather than having our committee go to meet him. The wonderful contribution he has made to the progress of this Section will be a matter of history and I think we should be deeply appreciative of it.

THE CHAIRMAN: The Chair feels that your motion is very timely and with a second. . . .

DR. JOHN MCCOMBE (Canadian National Ry.): May I second the motion and just draw the attention of the Section to the courageousness of Dr. Nilsson. For instance, if it wasn't for Dr. Nilsson's courage we wouldn't have had the Committee on Medical Aspects of Air Conditioning of Cars with its very excellent report. Dr. Nilsson is also largely responsible for the report of the Committee on Fractures because he gave Dr. Webb every assistance. I think that report is one of the best committee reports we have had. In our own Committee on the Revision of the Physical Standards he was always with us, always helping us no matter where we met. He did the same thing for all the

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other committees, and I think all the members have seen by the addresses we have had, the lectures we have had, and the reports of committees, what a good chairman Dr. Nilsson has been.

In seconding the motion I would ask for a standing vote.

. . . The members arose and applauded. . . .

THE CHAIRMAN: Dr. Nilsson, we certainly appreciate your services in the past and this is an open and visible expression of that appreciation.

DR. NILSSON: Thank you very much.

THE CHAIRMAN: Gentlemen, is there any miscellaneous business to come before the Section?

DR. ARTHUR A. HEROLD (Louisiana & Arkansas Railway): I feel a little timidity in saying anything about this meeting, but there is a matter which I should like to bring up—I will take only about a minute—as a question that I think this Section might consider. I don't know how these gentlemen feel but a good many other men in my section of the country who have local surgeons and division surgeons working under them have had this same experience.

As you know during the last few years reciprocal transportation among railroads has been cut down a great deal. I am not speaking for myself personally but I am speaking for the men under me. I believe many roads have nearly entirely done away with courtesy transportation to surgeons of other roads. I realize that this has been greatly abused in the past and I also realize that the railroads have had hard times, but I don't know of any men who have had a harder time than surgeons and physicians, and I feel that we might ask for some amelioration, excepting in some manner the medical men employed by the roads of the country.

I want to lay this before you and if any of you feel the same way, I would move that the Committee of Direction take this matter up and see if we cannot get some relief.

THE CHAIRMAN: Doctor, the Committee of Direction will look into that without the necessity of a motion.

Is there any other business?

DR. BARTLE: I move that we adjourn.

. . . The motion was seconded and carried and the meeting adjourned at 1:20 p.m.

J. C. CAVISTON,
Secretary.

DR. J. R. NILSSON,
Chairman.