Information for The University of Chicago War Service

Name in full Hirsch, Edwin F. Date April 9, 1920

Academic title Instructor in Pathology.

		DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	BRANCH
Enlistment		September 1, 1917	1st Lt. Medical Corps, Base Hospital, Camp Grant Ill.	Camp Grant Illinois	1st Lt.	M. C.
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc.	1	February 22, 1918	Captain " " " " "	"	Capt.	M. C.
	2		Served as Pathologist to the Camp, Ward Surgeon,			
	3		Chief of Medical service, later transferred to Chief of			
	4		Laboratories			
	5					
	6					
	7					
	8					
Discharge		April 29, 1919	at Base Hospital, Camp Grant, Illinois.			

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

Include all service of [illegible]
and military

English?

Name in full George Carter Howland Date Jan 20. 1920

Academic title Associate Professor of the History of Literature

	DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	Abbreviations for BRANCH
Enlistment		None			
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc. 1					
2					
3					
4					
5					
6					
7					
8					
Discharge					

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

Note: In reply to questionnaire dated in the spring of 1917 I stated I could qualify as army telegrapher. These questionnaires, I understand, were never classified. On Nov. 7. 1919, in response to an urgent call through the daily press, I enlisted as a telegraph operator, but on account of the signing of the armistice four days later, I was notified by the war department on Nov 15 that my services would not be needed. I was therefore never mustered into the service. Applications to the state department for service as translator or diplomatic agent led to no result.

G.C.H.

Information for The University of Chicago War Service

Information for The University of Chicago War Service

Name in full Edwin Powell Hubble Date May 1, 1920

Academic title Fellow in astronomy

		DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	Abbreviations for BRANCH
Enlistment		April 1917	1st Officer's Training Camp	Ft. Sheridan	Officer Student	Infantry
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc.	1	Aug 15 "	Captain of Infantry, Commanding 2nd Battalion 343 Inf.	Camp Grant	Capt	Inf.
	2	Dec 31 "	Major " " " " " "	"	Maj.	"
	3	Aug 1918	Detached Service, Advance ~~Detachment~~ Section 86th Div, for Overseas Service	France	"	"
	4	Nov 1918	Transferred to 42nd Div. Unassigned Staff Duty	Germany	"	"
	5	Jan 1919	Transferred - Legal Advisor - Reparation Board - Peace Conference	Paris	"	"
	6	March "	" Inspector, "U.S. Army Students in British Universities"	England	"	"
	7					
	8					
Discharge		Aug 20, 1919	Presidio, San Francisco		Maj	Inf.

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

Inclu... ...ing civil
and military

Include all service civil
and military

Information for The University of Chicago War Service

Name in full James Root Hulbert. Date January 27. 1920.

Academic title Assistant Professor of English.

		DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	Abbreviations for BRANCH
Enlistment						
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc.	1					
	2					
	3					
	4					
	5					
	6					
	7					
	8					
Discharge						

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

From Sept. 7 to November 15, 1918 I was a 'civilian volunteer' in the War Department at Washington D.C.

On February 10. 1919 I was commissioned Captain in the Quartermaster Section, Officers' Reserve Corps.

Information for The University of Chicago War Service

Name in full E. Fletcher Ingals Date Jany 20, 1920

Academic title Professorial Lecturer - Laryngology and Otology.

		DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	Abbreviations for BRANCH
Enlistment		1911	Medical Reserve Corps U. S. A.		1st Lieut	Medical
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc.	1	April 1917	Commission issued in M. R. C.		Captain.	
	2		Dr. Ingals was continuously ill in bed			
	3		from October 1917 to April 28th 1918, the date			
	4		of his death, and was never assigned to			
	5		active duty.			
	6		John McDudson			
	7					
	8					
Discharge						

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

Information for The University of Chicago War Service

✓

Name in full: Jens Peter Jensen — Date: April 21, 1920

Then Academic title: Teaching Assistant Department of Political Economy

Now Assistant Professor of Economics and Commerce University of Kansas

	DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	Abbreviations for BRANCH
Enlistment	12/10/18	Reg. I, Co 9, S.A.T.C. U. of Minnesota	Mpls.	Pvt.	

Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc. (1–8)

I do not know whether my case is entitled to being included in the President's report. I was Assistant in the Department of Political Economy. Resigned and became Statistician for the Meat Division of the U. S. Food Administration with offices in Conway Bldg. Chicago.

Resigned from this in October to join S.A.T.C. at U. of M. Minneapolis.

Discharge

Upon being discharged I again entered the position as Teaching Assistant in the Department of Political Economy during the ~~Summer~~ Spring Quarter of 1919 and also during the Summer quarter of 1919.

It may or may not be pertinent that I am to teach in the Department of Political Economy at the University of Chicago during the Summer quarter, 1920.

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

Include all service civil and military

Assoc Prof. of History

The University of Chicago

The School of Education

OFFICE OF THE DEAN
OF THE COLLEGE OF EDUCATION

October 24, 1918.

My dear Mr. Jernegan:

The President's office has asked for a statement of the war activities of all members of our Faculty. Such activities include membership on national and state committees, participation in publications, addresses, and other matters of this sort. Please indicate below the activities with which you are associated or in which you have participated during the past year.

1 Member Illinois State Council of Defense - War History Committee

~~2 Education and the War Article in Encyclopaedia Americana (New Edition)~~

2 World Forces Influencing the United States in Peace and War - Public Lecture. Univ of Chicago Summer Qr 1918.

Dean Miller has requested me to secure a list of the members of the Faculty who made plus subscriptions to the Fourth Liberty Loan. If you made such a subscription please indicate the amount below.

Amount (One Hundred Dollars

Please give these items immediate attention.

Very truly yours,

William S. Gray

Dean

Mr. Jernegan,

Faculty Exchange

3 4 France and America War Lecture, Woodlawn Woman's Club October 1918

4 5. War Aims Course - University of Chicago Autumn ~~Winter~~ Quarters 1918 -

5 6. The United States and the Great War Course - Summer Quarter U of C 1918 University College - Spring & Autumn 1918.

6 Education and the War Cyclopaedia Americana New Edition 1918 vol. IX.

7. Solicitor for Victory Loan

Information for The University of Chicago War Service

Name in full Marcus Wilson Jernegan Date Jan. 16, 1920

Academic title Associate Professor of History

	DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	BRANCH
Enlistment					
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc. 1					
2					
3					
4					
5					
6					
7					
8					
Discharge					

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

Information for The University of Chicago War Service

Name in full Franklin W Johnson Date April 13, 1920

Academic title Principal University High School

	DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	BRANCH
Enlistment	Aug 2	Major, Sanitary Corps			
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc. 1					
2					
3					
4					
5					
6					
7					
8					
Discharge	July 29, 1919				

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

On duty as Chief of Educational Service
U.S.A. Gen. Hospital #3, Colonia N.J.
Oct 1, 1918 – April 10, 1919
On duty at office of Surgeon General,
Washington D.C. Apr 10, 1919 – July 29, 1919

Include all service civil and military

Commissioned as Major, Quartermaster's Section, Reserve Army,
Nov. 20, 1919

Information for The University of Chicago War Service

Name in full Wellington D. Jones Date Jan. 17, 1920

Academic title Assistant Professor of Geography

	DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	Abbreviations for BRANCH
Enlistment		No war service, unless resultless efforts			
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc. 1		in S.A.T.C. be war services.			
2					
3					
4					
5					
6					
7					
8					
Discharge					

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

The University of Chicago
The School of Education
OFFICE OF THE DIRECTOR

January 16, 1920.

My dear Professor Robertson:

I enclose a statement in reply to your recent inquiry about public service rendered during the war. I will secure complete copies of the material here in question and file it with you shortly.

Very truly yours,

Charles H Judd

Professor D. A. Robertson,
Faculty Exchange.

CHJ:K

Information for The University of Chicago War Service

Name in full Charles Hubbard Judd Date Jan 15 1920

Academic title Professor and Head of the Department of Education

		DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	Abbreviations for BRANCH
Enlistment						
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc.	1					
	2					
	3					
	4					
	5					
	6					
	7					
	8					
Discharge						

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

Editor for the Bureau of Education of the Department of the Interior and for the United States Food Administration, of Lessons in Community and National Life, issued in the form of Leaflets (Nos 1-24, October 1917 to May, 1918)

Information for The University of Chicago War Service

Name in full Morris Kharasch Date April 4, 1920

Academic title National Research Fellow

	DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	BRANCH
Enlistment	March 9, 1918,	Trench Warfare Service	Washington, D.C.	Pvt	
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc. 1		Transferred to Ordnance Corps, Chemical			
2		Section, Johns Hopkins Univ, Baltimore, Md			
3		Transferred to Chemical Warfare Service			
4		August 1, 1918. and assigned to			
5		the research laboratory of the			
6		Edgewood Arsenal, Edgewood, Md			
7					
8					
Discharge	December 17, 1918				

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

Recommended for Commission ~~Sept~~ August 25, 1918—

Asso. P. Physics

Information for The University of Chicago War Service

Name in full Carl Kinsley Date April 15, 1920

Academic title

	DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	Abbreviations for BRANCH
Enlistment	1917 1/20	Captain, Signal Corps U.S.A.	Washington	Capt.	S.C.
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc. 1	Jan, 1918	Detailed to Military Intelligence Division General Staff	"	"	M.I.D., G.S.
2	Mch. '18	Put in charge organization of Radio Intelligence Service General Staff	"	"	"
3	Oct. '18	Directed to reorganize the whole telegraph			
4		Censorship, and then to operate (completed reorganization P.S.C. 9th)			M.I.D., G.S.
	Oct. '18	Promoted	Washington	Major	S.C., M.I.D., G.S.
5	Jan '19	Given charge of Research Information Service			
6		for M.I.D. (Genl. Churchill Army member of Committee)			
7	Feb. '19	Made "Chief" of Section (Radio, Teleg & C)			
8		of M.I.D. Genl. Staff.			
Discharge	Aug. 19		Washington	Major	S.C., M.I.D. G.S.

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

Had Special Laboratory at Bureau of Standards where I directed & carried on instruction and research in radio engineering.

Include all service civil and military

Name in full HARRY DEXTER KITSON Date Jan. 23, 1920.

Academic title Ph. D. Associate Professor of Psychology, Indiana University.

	DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	Abbreviations for BRANCH
Enlistment	Aug 27, 1917.	2nd Officers training camp Ft. Sheridan			
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc. 1		Commissioned 2nd Lt. Field Artillery Nov. 27, 1917.			
2		Sent overseas at once. Transferred there to Coast Artillery			
3		Corps, being commissioned First Lieut. C. A. C. Overseas			
4		till end of war — one year.			
5		Assigned to Bty C. 53" Art. C.A.C. (Railway guns 400 mm.)			
6		Served at St. Mihiel; Assigned to Staff of 30th Art. Brigade C.A.C.			
7		Served thru Argonne Offensive. " " " " 40th Art. Brigade, C.A.C.			
8		for Metz drive. (Staff Service as Artillery Intelligence Officer).			
Discharge	Dec. 18, 1918.	Fortress Monroe, Va.			

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

Published report of Artillery Intelligence Work sent under separate cover.

Information for The University of Chicago War Service

Name in full Thomas Albert Knott

Date May 18, 1920

Academic title Associate Professor of English

		DATE	(State in full, without abbreviation). RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	BRANCH
Enlistment		Jul. 11, 1918.	Captain, Military Intelligence Division, General Staff, Washington, D.C.	Washington, D.C.	Capt.	M.I.D., G.S.
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc.	1					
	2					
	3					
	4					
	5					
	6					
	7					
	8					
Discharge		June 14, 1919.				

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

One silver service chevron for over six months' service in the United States.

Include all service civil and military

In the winter and spring of 1918 I acted as chairman of the foreign language subcommittee of the War Work Committee of the University of Chicago.

This subcommittee did translation work and censored foreign language newspapers for the Liberty Loan Committee of this district, and for the post office department of the government.

Information for The University of Chicago War Service

Name in full Fred Conrad Koch Date Jan. 20, 1920

Academic title Associate Professor of Physiological Chemistry
Acting Chairman of the department

		DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	Abbreviations for BRANCH
Enlistment						
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc.	1					
	2					
	3					
	4					
	5					
	6					
	7					
	8					
Discharge						

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

No military service rendered
Remained at the University in view of the absence of the chairman of the department

Information for The University of Chicago War Service

Name in full: Karl Konrad Koessler M.D. Ph.D. Date: February 3rd 1920

Academic title: assistant professor expor. Medicin

	DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	Abbreviations for BRANCH
Enlistment	1916-1918	Examining physician Draft Board			
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc. 1		No 15 Chicago Illinois			
2					
3					
4					
5					
6					
7					
8					
Discharge					

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

Information for The University of Chicago War Service

Name in full Preston Keyes M.D. Date Jan 16 1920

Academic title Prof. of Preventive Medicine

		DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	Abbreviations for BRANCH
Enlistment						
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc.	1					
	2					
	3					
	4					
	5					
	6					
	7					
	8					
Discharge						

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

Not in the service

Preston Keyes

Chic. Daily News.
Sept. 11 - 1918

ILY NEWS, WEDNESDAY, SEPTEMBER 1

NAVIGATION SCHOOL IS ACTIVE

Shipping Board Training New Officers to Man Merchant Ships.

Fast as American shipyards are launching ships the United States shipping board is keeping up with them by launching officers for the ships. The free school of navigation at 72 West Adams street, which opened July 10, 1917, will on Sept. 14 have turned out and placed thirteen masters, twenty-four chief mates, seventy-three second mates and eighty third mates, all licensed by the department of commerce. The Chicago school stands fifth among the twenty-three schools in the United States in number of officers graduated.

Men eligible to enter are American citizens between the ages of 19 and 55 who have had at least two years' experience on deck or bridge. A man can be transferred from any draft classification whatsoever and placed in this service. The eleventh session begins Sept. 16 at 9 a. m. The director is Dr. Oliver J. Lee of the University of Chicago.

THE HOME ON A VA

A Line o' Cheer

BEDTIME STORIES.

BY THORNTON W. BURGESS.

ETER IS REMINDED OF AN OLD FRIEND.

When Peter Rabbit reached the dear ld Brier Patch he had a lot to tell Mrs. eter. He was so full of all he had arned about Short-Tail the Shrew that

The Merchant Mariner

DEVOTED TO THE MEN OF THE AMERICAN MERCHANT MARINE

PUBLISHED WEEKLY BY THE UNITED STATES SHIPPING BOARD RECRUITING SERVICE

VOL. 1 BOSTON, MASSACHUSETTS, NOVEMBER 30, 1918 No. 20

DR. LEE FAVORITE WITH HIS STUDENTS

Head of Recruiting Service Navigation School at Chicago Gets Results—Holds Navigator's License.

Dr. Oliver J. Lee, director of the U. S. Shipping Board Free School of Navigation at 72 West Adams street, Chicago, is an expert navigator. Though he has never sailed the seas, except as a passenger, Dr. Lee holds a master's license, for unlimited tonnage, on any *sky.*

Dr. Oliver J. Lee

Dr. Lee belongs to the research faculty of Yerkes Observatory, and knows the bearings of every star in the heavens. He is thirty-seven years old, a graduate of the University of Chicago, and holds the degree of Doctor of Philosophy from that institution. The University of Chicago loaned him to the Shipping Board Recruiting Service for the duration of the emergency.

In spite of Dr. Lee's titles, he is a "regular guy." His "boys," from the few nineteen year olds who have gone through his school, to the lake skippers of twenty years' experience, all take him in as one of themselves.

Every afternoon, after class, there is a line of his students waiting in the ante-room to his office for a chat with their instructor. They bring him their problems, which range all the way from love affairs and mothers-in-law to finances and new uniforms. And in his desk drawer is an ever increasing pile of letters written from aboard ship telling how the new masters and mates of the merchant vessels are making out.

EVENING SCHOOLS TO RECEIVE APPRENTICES

Director Downey of Boston Schools Extends Privileges to Boys In Training—Classes Three Nights Each Week.

The School Commttee of the City of Bos-

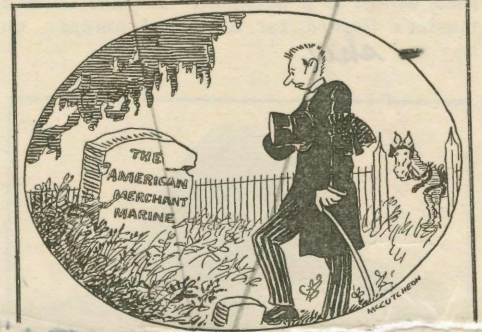
The Flag— The Salty Seas— The Yankee Sailor

By GEO

Illustrated by John T. McCutcheon

ONCE there was a boy brought up in the cornbelt among trickling ditches filled with rain water and that was why he longed for the tang and the salty savor of open seas.

Where do you find the boys reading Clark Russell and Captain Kidd and the good old yo-heave-yo yarns of American tars from the

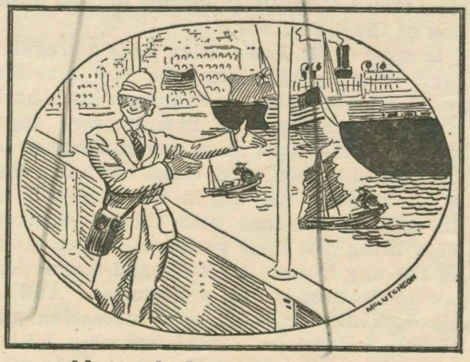


Yesterday

days of Paul Jones down to the New Bedford Clippers? Why, out on the prairies where all the horizons are dry and the only navigation is by skiff.

From the time when I began to wrest money from an unwilling public I became a traveler, and every time I had a chance to travel I hurried to a sea coast and boarded a ship. There is no substitute for salt water. The Great Lakes are extensive and moist, but beyond the curtain of water are no promises of romance and adventure, no strange cities, no lands that are foreign and mystical and heavy with history. I traveled to Europe and out to China and Japan and through the West Indies, and once I went all the way around. In my pampered cruisings, year after year, I saw nearly everything that I wanted to see except the American flag. The American Merchant Marine did not exist except in the books at the library.

Once a few Americans stood on the deck of a passenger boat heading into one of the super-heated parts of India. A scattered ship-



Almost the best news of the war

Information for The University of Chicago War Service

Name in full *Oliver Justin Lee* Date *Jan. 16, 1920*

Academic title *Instructor in Practical Astronomy, Yerkes Observatory.*

		DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	Abbreviations for BRANCH
Enlistment			*Appointed June 1917 by Chairman of*			
	1		*U.S. Shipping Board, Director of U.S. Free*			
	2		*School of Navigation in Chicago. Began*			
	3		*organizing school July 10, 1917.*			
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc.	4		*Resigned July 1, 1919.*			
	5		*During this time my assistants*			
	6		*and I turned out 270 graduates*			
	7		*of the six weeks course in navigation*			
	8		*who were licensed as masters and*			
Discharge			*mates by the Steamboat Inspection*			

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

Service of the Department of Commerce. Each of these men had previously had at least two years of sailing experience. Immediately upon receiving licenses these men were sent out as officers in command of merchant vessels. About fifty happened to be on vessels which were taken over by the Navy, and then received naval commissions of ranks Lieutenant Commanders, Lieutenants (s.g.) Lieutenants (j.g.) and Ensigns.

I enclose two clippings which are representative of many scores which I have on file.

Information for The University of Chicago War Service

Name in full LEMON, Harvey B(race) Date 20 Jany 1920

Academic title Assistant Professor of Physics.

		DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	Abbreviations for BRANCH
Enlistment		August	10 1918 Commissioned directly from civil life			
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc.	1		as Captain Ordnance Department, U.S.A. and assigned to			
	2		duty as military head of Instrument Division of the			
	3		Aberdeen Proving Grounds, Aberdeen Md. At the time of			
	4		commission was acting under the Civil Service as Civil			
	5		executive head of this same orginization since July 1st.	Aberieen Md.	Capt	Ord D
	6					
	7					
	8					
Discharge						

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

We are publishing this year series of papers on Adsorption of Gases by Charcoal carried on at the University before and during avove service by myself and my students at request of the Chemical Warfare Service. This work is that referred to by Millikan, Science, 50, 290, 1919 and separates will be sent to your office as these papers appear.

At the request of the War Department other researches growing out of Proving Ground problems are being carried on at present.

Information for The University of Chicago War Service

Name in full Julian Herman Lewis Date Jan. 20, 1920

Academic title Instructor, Dept. Pathology; Assoc. Member Otho S.A. Sprague Memorial Inst.

	DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	Abbreviations for BRANCH
Enlistment	Nov. 10 1917	Medical Reserve Corps		1st Lt.	
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc. 1					
2					
3					
4					
5					
6					
7					
8					
Discharge					

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

Was not called to active service in order to do investigative work for the Government. Two scientific papers were published in medical journals as the result of this work.

Information for The University of Chicago War Service

Name in full Ralph Gerald Lommen Date April 16, 1920

Academic title Fellow, English, 1916-17, assistant in English.

		DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	Abbreviations for BRANCH
Enlistment		July 3, 1917	Ambulance Company No. 3 (U. of C. unit)	Chicago	Private	
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc.	1	August '17	Transferred to U.S.A.A.C., Allentown, Pa. Assigned to	Allentown		
	2		Section 556, United States Army Ambulance Service	"	"	
	3	March '18	Transferred to Army Medical School, Washington D.C.		Private Med.	
	4	Sept. '18	Transferred to Yale Army Sanitary School.		" "	
	5	Oct 26, '18	Commissioned Second Lieutenant, Sanitary Corps.		2nd Lt	
	6	Nov. '18	Ordered to Camp Crane, Allentown, Pa.		"	
	7	Jan 30, '19	Ordered to Camp Beauregard, La. (Base Hospital)		"	
	8	March '19	Ordered to Camp Lee, Va. (Base Hospital)		"	
Discharge		April 8, 1919	Discharged		"	

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

Three Silver Service Chevrons.

Include all service civil and military

Information for The University of Chicago War Service

Name in full Daniel David Luckenbill Date Jan 24. 1920.

Academic title

		DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	Abbreviations for BRANCH
Enlistment						
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc.	1					
	2					
	3					
	4					
	5					
	6					
	7					
	8					
Discharge						

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

As Mr. Luckenbill is on his way to the Near East I will endeavor to give the desired information which he can verify later should you prefer.

His was home service only.

(1) Served as a private in the 3rd Regiment Illinois Reserve Militia M. Co. Sept 1917 - Jan 1919

(2) In addition to regular work in his own department taught two classes in Mathematics (S.A.T.C) through the fall quarter 1919 at the University of Chicago.

Hegins. Pa. (Mrs. D.D.) Florence P. Luckenbill

Information for The University of Chicago War Service

Name in full Mr. Arno Benedict Luckhardt, Ph.D., M.D. Date Jan.19,1920

Academic title Associate Professor in Physiology.

		DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	Abbreviations for BRANCH
Enlistment						
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc.	1					
	2					
	3					
	4		Military Record, Nil.*			
	5					
	6					
	7					
	8					
Discharge						

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

* Received offer of Captaincy in Sanitary Corps, Autumn 1917. In view of fact that Professor Carlson contemplated entering service refused offer without further consideration to assume responsibilites of Acting Chairmanship of the Department of Physiology during Professor Carlson's absence. Duirng this period the Department cooperated with the Department of Anatomy in giving two courses of instruction to what was known as "Neuro-Surgical Schools of the United States Army" (November December, 1917, and January-February, 1918). An outline of the work given to these two groups of surgeons is enclosed. During the remainder of the war was engaged in teaching and research at the University in addition to the administrative duties as acting Chairman of the Department.

Signed, Arno B. Luckhardt

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Course in Physiology given to two groups of army surgeons during the year 1917-1918.
Jan. 19/1920 A. B. L.

Lecture and Laboratory Schedule of

The Chicago Neurological School

and

Laboratory Outline of the Course

PERIOD I.

Lecture:- Nerve Degeneration and Nerve Regeneration - Splitting and Crossing of Nerves. Physiological Union of Various Types of Nerves.

Laboratory:- Experiment 1.

PERIOD II.

Lecture:- Spinal Reflexes and Spinal Shock.

Laboratory:- Experiment 2.

PERIOD III.

Lecture:- Discussion of Reflexes as an aid in diagnosis.- Upper is lower. Motor Neurone Lesions.- Types of motor paralysis.

Laboratory:- Demonstration: Experiments 3, 4, 5 and 6.

PERIOD IV.

Lecture:- Cerebral (motor) localization with lecture demonstration of a decerebrate rabbit and a pigeon without cerebral hemispheres.

Laboratory:- Experiment 7.

PERIOD V.

Lecture:- Cerebral (sensory) localization - The central Nervous System and the Alimentary Tract.

Laboratory:- Experiment 8.

PERIOD VI.

Reserved for unfinished work, quiz, or conference.

PERIOD VII.

Lecture:- The Physiology of the Cerebellum.

Laboratory:- Experiment 9.

PERIOD VIII.

Lecture:- The Physiology of the Brain Stem, with lecture demonstrations.

PERIOD IX.

Lecture:- The Physiology of the VII and XII Cranial Nerves with lecture demonstrations of animals showing lesions of these nerves.

Laboratory:- Experiment 10.

PERIOD X.

Lecture:- Lesions of the optic, III, IV, V, VI and XI cranial nerves with a discussion of pupillary reflexes.-

Laboratory:- Experiment 11.

PERIOD XI.

Reserved for unfinished work, quiz, or conference.

PERIOD XII.

Lecture:- Cerebral Circulation and the Formation of Cerebrospinal Fluid.

Laboratory:- Experiment 12.

PERIOD XIII.

Lecture:- The Physiological Effects Resulting from Raised Intracranial Pressure.

Laboratory:- Experiment 13.

PERIOD XIV.

Lecture:- The Physiology of the Semicircular Canals.

Laboratory:- Experiment 14.

PERIOD XV.

Lecture:- The Functional Tests of the Vestibular Apparatus.

Laboratory:- Experiment 15 as demonstration.

PERIOD XVI.

Reserved for unfinished work, quiz, or conference.

PERIOD XVII.

Lecture:- The Physiology of Hearing and the Functional Tests of Hearing.

Laboratory:- Experiment 16.

PERIOD XVIII.

Laboratory period covering experiments 17,18,19 and 20.

PERIOD XIX.

Laboratory period covering experiments 17, 18, 19 and 20.

PERIOD XX.

Lecture:- The Physiology of the cervical sympathetic with demonstration on cat of signs of paralysis of the cervical sympathetic. (Experiment 21 (1)).

Laboratory:- Experiment 21 (2).

Exp. 1. Demonstration: Physiological Nerve Degeneration. Anatomical Union of Nerves does not constitute physiological continuity.

Exp. 2. Stimulation of the Spinal Nerve-roots; Spinal Shock. - Anaesthetize a dog with ether and insert a cannula into the trachea. Then turn the animal and place it ventral side down on the operating board. Make a median incision through the skin over the spinous processes of the upper lumbar vertebral. Expose the laminae of the vertebrae by cutting down through the soft tissues along the spinous processes and scraping sideways over the vertebrae. Stop the bleeding from the cut muscles by pressing wads of cotton soaked in warm salt solution against the cut surfaces. Cut through the laminae of the vertebrae with bone forceps and expose the spinal cord for about four inches. Press soft wax against the cut surfaces of the bones to stop the oozing of blood into the spinal canal.

Strands of nerves will be found coming out of the cord and taking their courses downward. On inspecting them closely the strands will be found to consist of two parts, the upper part being the posterior and the under part the anterior nerve-root. Carefully separate the parts of the strands on the same side of the cord and pass fine ligatures under two posterior nerve-roots. Tie one nerve-root near the cord and cut it on the central side of the ligature; tie the other root further away from the cord and cut it on the peripheral side.

Now give the animal only enough ether to keep it "half-narcosis." Stimulate the cut nerve roots with light tetanizing shocks and observe through which muscular responses can be evolved. Now find two anterior nerve-roots on the other lateral half of the cord and likewise ligate, cut and stimulate them. The presence of sensory nerve fibres in the dura mater itself which extends along the nerve strands for a little way may give rise to a muscular response, if there is a spread of the stimulating current on to the dura. A stimulation of the dura must be avoided. It could be obviated by stimulation of the nerve-roots inside of the sheaths of the cord. If this latter procedure is followed, however, greater care must be exercised in handling the delicate nerve-roots.

Now expose the cord at the fourth dorsal segment. Arrange for a blood pressure tracing. Again elicit reflexes by stimulation of the central end of a posterior root. Now transect cord at the fourth dorsal segment. Immediately after transection again stimulate central end of the posterior root. Are the reflex effects obtained? What effect did the transection have on the general blood Pressure? Is there any relation

between the drop in general blood pressure and spinal shock?

Exp. 3. Demonstration of a Dog with completely transected Spinal Cord.

Exp. 4. Demonstration of a Dog with a hemisected Spinal Cord.

Exp. 5. Demonstration of decerebrate rigidity.

Exp. 6. Practical absence of shock in the lower animals and in the young of mammals.

Exp. 7. Stimulation of the Cortical Motor Areas in the Dog. - Have an inductorium set up with a single cell to deliver tetanizing shocks; connect a pair of fine, but not sharp-pointed, electrodes with the secondary. Etherize and insert a tracheal cannula in a dog. Then fasten the dog, belly down, on a holder and put a large pad under the neck to support the head. Clip the hair over the scalp. Feel for the condyles of the lower jaw and lay a string taut between them across the top of the head; stretch another string between the outer canthi of the eyes; the crucial sulcus is just back of a line midway between the two strings. Now make a medial incision through the skin down to the bone, and reflect the flaps on either side. Detach as much of the temporal muscle from the bone as is necessary to get room for two trephine holes, the internal borders of which must not be less than 1/4 inch from the middle line so as to avoid wounding the longitudinal sinus. Carefully work the trephine through the skull, taking care not to press heavily on it at the last. Raise the two pieces of bone with forceps, connect the holes with bone-forceps and enlarge the opening as much as may be necessary to expose all the motor areas. Press soft wax against the cut edge of the bone to stop bleeding.

Now unbind the limbs on the side opposite to that on which the brain has been exposed. At this stage the anaesthesia should be very light. Apply the stimulating electrodes successively to the areas for the hind and fore limbs. Contractions of the corresponding groups of muscles will be seen if the narcosis is not too deep. Movements of the head, neck and eyelids may be called forth by stimulating the motor areas for these regions. Stimulation in front of the crucial sulcus may also cause great dilatation of the pupil, the iris almost disappearing. The dilatation takes place almost promptly, and is greatest on the side opposite, but the pupil on the same side is also widened. Even after section of both vago-sympathetics in the neck, a slow and slight dilatation, greatest perhaps on the same side, may be caused by cortical stimulation

Repeat the whole experiment if necessary on the opposite side of the brain.

In the course of his observations the student will perhaps have the opportunity of seeing general epileptiform convulsions set up by the localized excitation. They begin in the group of muscles represented in the portion of the brain directly stimulated. After the convulsions have been sufficiently studied, they should again be induced and the stimulated motor area rapidly excised during their course. In some cases this will be followed by immediate cessation of the spasms.

Stimulation of the cerebellum. - On the same animal expose one side of the cerebellum. Stimulate the cerebellum and observe what muscular movements are thus evoked. How do they differ from those caused by stimulation of the cerebral cortex? Explain.

Exp. 8. Demonstration: Action of the vagi and splanchnics on the Stomach and Intestines. - The Nervous Control of the Colon.

Exp. 9. Demonstration:

(1) Complete removal of the cerebellum in the pigeon. (Immediate Effects).

(2) Unilateral Removal of the Cerebellum in the Rabbit. (Immediate Effects).

(3) Permanent Effects (Dog) following Unilateral lesions of cerebellum.

(4) Effects following Removal of the Motor Cortex in the Dog.

(5) Effects following the Removal of the Occipital Cortex in the Dog.

(6) Experimental Jacksonian Epilepsy.

Exp. 10. Study of the Physiology of the Hypoglossal and Facial Nerves.

Etherization and tracheotomy.

1. Hypoglossal Nerve. The operator makes a median skin incision about 1 3/4 inches long over the junction of the thyroid cartilage and hyoid bone. After dissecting through the fascia a longitudinal incision, parallel to the skin incision, is made through the mylohyoid muscle 1/4 inch lateral to the median skin incision so as to avoid a hemorrhage arising from

section of the longitudinal vein which runs in the median line over the surface of the mylohyoid muscle. Avoid cutting into the longitudinal fibres of the geniohyoid which lies beneath the mylohyoid muscle. On reflecting the mylohyoid laterally the large hypoglossal nerve will come into view. Isolate the nerve as far as possible towards its exit from the cranial cavity and section it. Put a ligature on the peripheral end and stimulate with a tetanizing current:

a) Towards which side does the tongue point? Towards which side is the concavity of the raphe directed? What muscle is concerned in the protrusion of the tongue? What muscles are thrown into action when the tongue is pulled backward and upward? Towards which side does the tip of the tongue point?

b) Isolate the other hypoglossal nerve and repeat the observations. Then stimulate both nerves simultaneously and note the effect.

2. Facial Nerve. Turn the dog on its side and, after cutting away hair, make a skin incision about one inch long parallel with the course of the facial nerve. Feel for the stylomastoid process and by means of scissors and probe dissect through the dense fascia which lies about the nerve and above the parotid gland. Isolate and ligate the nerve close to its exit from the stylomastoid foramen and cut the nerve on the central side of the ligature. Stimulate the peripheral end of the nerve or its individual branches with a weak tetanizing current and note the effect on the muscles about the mouth, on the muscles about eye, and on the muscles of the ear. Repeat observations on other facial nerve.

Exp. 11. Demonstration:

(1) Unilateral Section of Optic Nerve.
(2) Dog showing effects following section of III Cranial Nerve.
(3) Dog showing Effects following section of the VI Cranial Nerve.
(4) Dog showing effects following section of the XI Cranial Nerve.

Exp. 12. Demonstration:

Mechanical Factors Influencing the Cerebrospinal Fluid.

Exp. 13. Demonstration: The following outline of this important experiment is given so that the class can follow more readily the various steps in the demonstration.

A Study of the Effects of Increased Intracranial Pressure on the Blood Pressure and the Respiration.

Etherixation and tracheotomy. Arrange for a respiratory tracing. Arrange for a blood pressure tracing from the left femoral artery. Isolate carefully both vagi and place lifting ligatures under them. Turn the animal on its side and make a median incision through the skin from the root of the snout to the great occipital protuberance. Reflect the temporal muscle from the calvarium. Expose the dura by taking out a circular piece of the calvarium by means of a trephine. Remove the exposed dura. Screw into the trephine opening a metal cannula provided for that purpose. Insert into the cannula a rubber stopper provided with a T piece. Connect one arm of the T tube through rubber tubing with a percolator. Connect the other arm of the T tube with a mercury manometer. Fill the whole system through the percolator with physiological salt solution heated to body temperature. Arrange the manometer on the drum so that the zero pressures (arterial and intracranial) are taken from the same base line. Allow the flag tracing the intracranial pressure to write a little in advance of the flag recording the arterial pressure.

1) Take a normal blood pressure and respiration tracing with the intracranial pressure at zero.

2) Raise the intracranial pressure gradually until the intracranial pressure is slightly higher than the blood pressure.

3) If the arterial pressure rises higher than the intracranial pressure raise the percolator so that the intracranial pressure barely exceeds the arterial pressure. Determine how high you can raise the arterial pressure by this method.

4) Lower the percolator and allow the intracranial pressure and arterial pressure to return to normal. Now,

5) Bring about a sudden rise in the intracranial pressure by raising the percolator rapidly to a point exceeding the blood pressure and note the effect.

6) Allow the blood pressure and the respiration to return to the normal and repeat 2), 3), 4), and 5) after having sectioned both vagi.

7) Section spinal cord in upper thoracic region and repeat 2) and 3). *

Exp. 14. Study of the Effect of Stimulation of the Vestibular Apparatus of the Dog.

Etherization and tracheotomy. Make an incision behind the ear over the most prominent part of the mastoid process which can be felt as a slight prominence just below the point where the linea nuchae superior turns forward towards the processus zygomaticus. Remove the musculature attached to and covering the mastoid process. A small trephine hole is made in the mastoid and the plug of bone removed exposing the spongy diploic bone. The latter can be removed with a currette or chisel if found necessary until the white, shining, hard otic bone is seen. The horizontal and posterior semicircular canals lie under cover of the exposed capsule of the otic bone and are accessible to the various forms of stimuli which will be employed. As soon as the eye reflexes have disappeared stimulate the semicircular as follows:

1) Press a pointed piece of ice against the exposed otic bone. Note the deviation of the eyes. In what direction is the nystagmus? Note whether or not the position of the head affects the deviation of the eyes or direction of the nystagmus when cold is applied to the otic bone (semicircular canals).

2) Attach a piece of rubber tubing to a percolator bottle. Put a small cannula in the end of the rubber tubing. Fill the percolator with hot 0.9% NaCl solution. With dog's eyes in a normal position allow a stream of hot salt solution play on the otic bone and note the results.

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* References:

"Concerning a definite regulatory mechanism of the vaso motor center which controls blood pressure during cerebral compression", Harvey Cushing, Johns Hopkins Hospital Bulletin, XII, 1901, p. 290.

"Some Experimental and Clinical Observations Concerning States of Increased Intracranial Tension", Harvey Cushing, American Journal Medical Sciences, New Series, 124, 1902,p.375.

"The Blood-Pressure Reaction of Acute Cerebral Compression, Illustrated by Cases of Intracranial Hemorrhage", Harvey Cushing American Journal of Medical Sciences, New Series, 125, 1903, p. 1017.

3) Try to change the deviation of the eyes and the direction of the nystagmus by alternately applying ice and hot salt solution to the otic bone.

4) Make a median skin incision over the lower cervical and upper thoracic vertebrae just large enough to permit insertion of an indifferent electrode. Now close the skin incision with sutures allowing the post of the indifferent electrode to project above the skin. Attach wire to post and connect with 2-3 dry cells. Attach a different electrode to remaining pole from dry cells by a wire. Stimulate the semicircular canals through the different electrode by pressing the latter into the trephine hole and thus completing the circuit. Note the deviation of the eyes and the direction of the nystagmus. What pole was used to obtain the results? Now stimulate the canals with the other pole by changing the wiring. What is the effect of stimulating the semicircular canals with a constant current? *

Exp. 15. Further Study of the Effects of Stimulation of the Semicircular Canals in Man and Dog under more nearly Normal Conditions.

Give a small dog (4kg.) a subcutaneous injection of 1/8 grain morphine sulphate. Fasten a small cat board to a rotating chair (lab. stool). After the animal has become stuporous, tie the animal loosely to the cat board.

I. Rotation Test.

1. Man. One member of the group volunteers to sit on the large rotating chair. He is now rotated to the right or left at a uniform speed for 10 complete revolutions. The rate should be about 2 sec. per revolution. Note the direction of movement of the head and body with respect to direction of rotation of the chair. Note primary nystagmus at beginning of rotation.At the completion of the 10th revolution the chair is suddenly stopped and the movements of the eyes noted. In what direction is the after-nystagmus when the person is rotated to the right? To the left? Is the nystagmus intensified by looking in the direction of the nystagmus? Is it diminished by looking in the opposite direction? What effect has rotation of the chair in the opposite direction on the intensity of the mystagmus? How long does the after-nystagmus persist? What subjective sensations does the observed person experience? If the observed person is very susceptible to the rotation test a person not so easily affected

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* Reference:
"The Effects of Stimulation and Extirpation of the Labyrinth of the Ear, and their Relation to the Motor System". Part I. Experimental, J. G. Wilson and F. H. Pike, Phil. Trans. Roy. Soc. London, Series B. Vol. 203, pp. 127-160.

sitting on the observed person's lap can observe the primary nystagmus during rotation, i.e., the nystagmus occurring during rotation of the person observed. See if you can detect primary nystagmus. If so, what is its direction with respect to direction of rotation which induced it? Note number of rotations necessary to effect a well marked nystagmus.

2. Dog. Repeat the rotation test on the morphinized dog.

II. Caloric Test.

1. Cold. Irrigate the ear of the morphinized dog by sticking a cannula coming from a percolator filled with water at 16% C into the external auditory meatus so that the stream of cold water reaches the tympanis membrane and the surrounding tissue. What is the direction of the nystagmus?

2. Heat. Irrigate with water at 43°-44° C. Results?

III. Galvanic Test.

Shave the skin over the mastoid region and shoulder of one side. Put the indifferent electrode to 2-5 dry cells on the skin of the shoulder and then apply the different electrode to the mastoid process. Attempt to elicit nystagmus first with the positive and then with the negative pole as the different electrode. Results?

IV. Demonstration of dog suffering unilateral destruction of the semicircular canals. In what respects do the signs differ from dog suffering unilateral removal of the cerebellum?*

Exp. 16. Laboratory demonstration of Erb's Motor Points.

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*References:

1) Diseases of the Nose, Throat, and Ear - Medical and Surgical - Ballenger, 3d edition, 1911.

2) Deutsche Otologische Gesellschaft, 20te Versammlung, 1911: Funktionelle Prüfung des Vestibular-apparates, R. Barany und K. Wittmaack.

3) Beitrage sur Theorie, Methodik, und Klinik der kalorimetrischen Funktionsprüfung des Bogengangapparates, Brunings, Zeitsch. f. Ohrenheilkunde, 63-64, 1911-1912, p. 20

Exp. 17. The Artificial Eye. - For demonstrating the dioptrics of the eye an apparatus consisting of two parts is provided. The part A has an outer box containing another box which can be slid lengthwise in it. At the back of the outer box there is a window of ground glass which represents a retina. The inner box has an aperture in front which can be fitted either with a spherical or a toric lens to represent a cornea. Just back of the cornea there is a rotatory diaphragm whereby pupils of different sizes and shapes can be brought into the visual axis. There are three lenses, one marked RE, one MA, and the third, a stronger one, marked SA, which can be set in the inner box just behind the pupil. *

(a) Put the spherical lens in the aperture at the front, turn the diaphragm so as to bring the larger circular pupil in place, and set the lens marked RE in place in the inner box. Shove the inner box into the outer box to the primary position, that is, with the line marked E just even with the front rim of the outer box. With this arrangement of A the ground glass is at the principal focus of the refracting system; that is, it is so placed that parallel bundles of light rays that enter the box will come to a focus on the glass. A, therefore, now represents a relaxed (unaccommodated) emmetropic eye which besides has no astigmatism and has a dilated pupil. An emmetropic eye is one which, when unaccommodated, brings light which impinges on the cornea in bundles of parallel rays to a focus on the retina. Now take A to the window and direct it toward a distant well illuminated object; a fairly distinct inverted image of the distant object will be caught on the ground glass plate. Turn the diaphragm so that the smaller circular pupil is brought into place; the image becomes sharper but fainter; why? Direct the eye toward a near object; its image will be blurred; it can be made more distinct by replacing the RE lens within the box by the lens MA or SA with greater refracting power; this shows that an emmetropic eye, when viewing a near object, the light from which reaches the eye in bundles of diverging rays, must accommodate, increase its refractive power. In the eye of man and most animals an increase in the refracting power of the eye is effected by increasing the curvature of the lens.

All other positions of the inner box, that is, when E is slid in or out, represent ametropic eyes. Any eye which, when relaxed, does not bring bundles of parallel rays to focus on its retina, that is, any eye that is not emmetropic, is an ametropic eye.

(b) Put the RE lens back in the eye. On putting the inner box back do not shove it in to the primary position, but leave E

* RE = relaxed emmetropia; MA = moderate accommodation; and SA = strong accommodation.

<u>Exp. 17</u>. The Artificial Eye. - For demonstrating the dioptrics of the eye an apparatus consisting of two parts is provided. The part A has an outer box containing another box which can be slid lengthwise in it. At the back of the outer box there is a window of ground glass which represents a retina. The inner box has an aperture in front which can be fitted either with a spherical or a toric lens to represent a cornea. Just back of the cornea there is a rotatory diaphragm whereby pupils of different sizes and shapes can be brought into the visual axis. There are three lenses, one marked RE, one MA, and the third, a stronger one, marked SA, which can be set in the inner box just behind the pupil. *

(a) Put the spherical lens in the aperture at the front, turn the diaphragm so as to bring the larger circular pupil in place, and set the lens marked RE in place in the inner box. Shove the inner box into the outer box to the <u>primary position</u>, that is, with the line marked E just even with the front rim of the outer box. With this arrangement of A the ground glass is at the principal focus of the refracting system; that is, it is so placed that parallel bundles of light rays that enter the box will come to a focus on the glass. A, therefore, now represents a <u>relaxed</u> (unaccommodated) <u>emmetropic</u> eye which besides has no astigmatism and has a dilated pupil. An emmetropic eye is one which, when unaccommodated, brings light which impinges on the cornea in bundles of parallel rays to a focus on the retina. Now take A to the window and direct it toward a distant well illuminated object; a fairly distinct inverted image of the distant object will be caught on the ground glass plate. Turn the diaphragm so that the smaller circular pupil is brought into place; the image becomes sharper but fainter; why? Direct the eye toward a near object; its image will be blurred; it can be made more distinct by replacing the RE lens within the box by the lens MA or SA with greater refracting power; this shows that an emmetropic eye, when viewing a near object, the light from which reaches the eye in bundles of diverging rays, must accommodate, increase its refractive power. In the eye of man and most animals an increase in the refracting power of the eye is effected by increasing the curvature of the lens.

All other positions of the inner box, that is, when E is slid in or out, represent <u>ametropic</u> eyes. Any eye which, when relaxed, does not bring bundles of parallel rays to focus on its retina, that is, any eye that is not <u>emmetropic</u>, is an <u>ametropic</u> eye.

(b) Put the RE lens back in the eye. On putting the inner <u>box back do not shove it in to the primary position, but leave E</u>

* RE = relaxed emmetropia; MA = moderate accommodation; and SA = strong accommodation.

about one-half inch outside of the rim of the outer box. The position now represents (relaxed) myopia, a state of refraction in which distinct images of near objects only can be had; the objects must be so near the eye that whatever light from them enters the eye and is brought to focus on the retina impinges on the cornea in bundles of divergent rays. Turn the eye toward an object within a few feet of the eye; an image, more or less distinct - depending on the distance of the object - will be obtained. Turn the eye toward a distinct object; its image will be blurred. The image can be made more distinct by setting a suitable concave lens before the eye.

(c) Shove the inner box in from the primary position. The position now represents relaxed hypermetropia, a state of refraction in which the light, that can be brought to focus on the retina, must impinge on the cornea in bundles of converging rays. Turn the eye toward a distant object; its blurred image can be made distinct by setting a suitable convex lens before the eye. It can also be made more distinct by replacing the RE lens within the box by the MA or SA lens, this shows that a hypermetropic eye even in viewing a distant object, must accommodate for it.

(d) Set the RE lens in the inner box, turn the largest pupilinto place, and put the inner box in the primary position. Put a disc perforated with two holes in front of the cornea. Now direct the eye toward a distant object; there will be a single fairly distinct image on the retina. Now replace the RE lens by the SA lens, put the inner box in the primary position and then direct the eye toward the same distant object. There will now be two blurred images on the retina; why? Cover one of the holes in the disc; the image on the opposite side of the retina will disappear. Why the opposite side? Now remove the disc; direct the eye toward an object so near that a distinct image of it can be obtained on the retina. Put the disc back in front of the cornea and get an image of the same near object; it will still be a single image. Now replace the SA lens by the RE lens, put the inner box in the primary position and direct the eye toward the same near object; two blurred images of the object will appear on the retina. Cover one of the holes on the disc and the image on the same side will disappear. Record carefully the results obtained in this experiment by closing one of the holes to compare them later with the results obtained by covering one of the holes in the card when performing Scheiner's experiment on the natural eye.

The remainder of Exp.17 should be done in a dark room with the additional use of the B part of the apparatus. The B part of the apparatus is likewise made up of a box within a box. On the front side of the inner box there is an aperture fitted

with a convex lens. Inside of the larger box there is a lamp and in front of that a glass plate, the surface of which being rough acts as a new source of light, when the plate is illuminated from behind. When the inner box of B is at the primary position the glass plate is at the principal focus of the lens so that light from the glass plate will emerge from B in bundles of parallel rays. If, therefore, we wish to simulate in a dark room rays of light coming from an object at great distance, it can be done by illuminating a figured ground glass screen in B with its inner box set in the primary position. If we want a luminous near object in the dark room, the screen may be transferred to the slip on the outside of B, just in front of the lens. If it is desired to have light emerge from B in bundles of converging rays, this can be done by illuminating the screen inside the box with the inner box drawn out from the primary position; with the inner box shoved in from the primary position light will emerge from B in bundles of divergent rays. These two latter possibilities, however, as well as those attachments to the apparatus that have not been mentioned yet will be made use of in Exps. 18 and 19.

(e) Place the SA lens in A, which should be set in the primary position and have its smallest pupil in place. Put the glass plate with the cross shaped figure on it outside of B in front of its lens and set B about one metre away from A, or at such distance that the sharpest possible image of the cross can be caught on the retina A. Now put the larger pupil of A in place; the image in A is now not quite so sharp, though more luminous; why? Put the ring-shaped pupil in place; the image is now almost blurred; it can be made sharper by shoving the inner box in a little to bring the retina a little nearer to the front. Why must the retina be brought nearer?

(f) Place a red glass in front of the cross and adjust A so that the image in it is distinct. Now replace the red glass by a blue one and note the effect on the sharpness of the image. Adjust A so as to make the blue image sharper and explain the adjustment.

(g) Substitute for the Spherical corneal lens the toric lens, putting the greater curvature of the toric lens in the vertical plane. The eye is now astigmatic (see also Exp. 19). The horizontal arms of the cross are now wider than the vertical arms; Why? Correct the astigmatism by properly placing a suitable lens, which will be provided, before the eye.

Exp. 18. - Opthalmoscopy.

(1) For studying the principles of opthalmoscopy first use the same apparatus as in Exp. 17 in the dark room. Here part A represents an observing eye, and the part B an observed eye. The same states of refraction as were represented in A by the different positions of the inner box apply also to B in

corresponding positions of its inner box. Put the glass plate with the black letter on it inside of B and turn on the light. With the inner box in the primary position B represents a relaxed emmetropic eye, from which any light reflected by the retina emerges in bundles of parallel rays. With the inner box pulled out B represents a myopic eye from which light reflected by the retina emerges in bundles of converging rays. With the inner box pushed in B represents a hypermetropic eye from which light reflected by the retina emerges in bundles of diverging rays. In opthalmoscopy the observing eye must adapt itself to bringing to focus on its retina light coming from the retina of the observed eye.

(a) Direct Opthalmoscopy.

(1) Set B as a relaxed emmetropic eye and place A before it to catch the emerging light. It will be found that in order to get a distinct image of the retina of B on the retina of A, the latter must also be set as a <u>relaxed</u> emmetropic eye. Light comes out of B in parallel bundles, so A must be set so that bundles of parallel rays represented to it come to a focus on its retina. (See Fig. 1, Diagram III).* This illustrates that in opthalmoscopy by the direct method, if B is emmetropic and relaxed and A is emmetropic, the latter must also be relaxed. The image in A is inverted, that is, in a natural eye it would be seen erect. Measure the size of the image in A.

(2) Now set B as a myopic eye; the image in A becomes indistinct. To make it distinct either of two things can ne done; the converging rays from B can be made parallel before entering A by putting a suitable concave lens before the latter; or A can be so set that the converging rays striking its lens will come to focus on its retina, that is, it may be set to a corresponding degree of hypermetropia. This shows that if B is myopic and A is emmetropic, the latter will need a concave lens before it, but if A is hypermetropic to a degree corresponding with B's myopia, A will not need a lens. If, however, the hypermetropia of A is of lower degree and the myopia of B is low, A will even need a convex glass. Try out all of these cases on the model using the test lenses where necessary.

(3) Now set B to hypermetropia and A to relaxed emmetropia. The image in A is not distinct. To make it so, the diverging rays from B can be made parallel by using a convex lens, or A can be so set that the diverging rays will come to focus on its retina, that is, set to a corresponding degree of myopia.

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* You will find a framed copy of this Diagram hanging in the laboratory (Room 11).

This shows that if B is hypermetropic and A is emmetropic, the latter, remaining relaxed, can use a suitable convex lens, or without the lens it can perhaps accommodate just right, but that if A is myopic to a degree corresponding to B's hypermetropic, A will not need a lens. Consider the cases where the myopia of A and the hypermetropia of B do not correspond in degree and try them as well as the foregoing out on the model.

Consider also and try out the following cases:-

(4) B is emmetropic and A myopic.
(5) B is emmetropic and A hypermetropic.
(6) Both A and B aré myopic.
(7) Both A and B are hypermetropic.

(b) Indirect Opthalmoscopy. - Set B as a relaxed emmetropic eye and fix a convex lens of 16 diopters in front of it. Place a white screen on the visual axis and it will be found that the screen catches a distinct inverted (real) image of about 6 cm. from the convex lens. Illuminate the figure on the back of the screen.

Set the E lens in A and place and arrange A so that a distinct image of the figure on the back of the screen is caught on the retina of A. Now remove the screen; a distinct image of B's retina will now be seen on A's retina, but it is now erect. (See Fig. 2, Diagram III). Of course it is not essential that B be set as an emmetropic eye. Change B from emmetropia to ametropia and it will be found that very little readjustment of A will be required to make the image in A distinct. If B is made myopic, the rays passing through the convex lens will be converged a little nearer to it; if B is made myopic, the rays passing through the convex lens will be converged a little nearer to it; if B is made hypermetropic, convergence will be a little further away from the convex lens, and in both of these cases A may have to be reset accordingly.

The foregoing illustrates that in opthalmoscopy, by the indirect method, the rays of each bundle emerging from the observed eye are converged by a convex lens to a point between the two eyes whence they diverge to the observing eye, which must therefore adapt itself to bringing divergent rays to focus on the retina, or in otherwords, the observing eye must accommodate as for an object placed where the rays from the observed eye are converged to by the convex lens. The image in A being erect it follows that by a natural eye it would be seen inverted. Compare the size of the image in A with that obtained by direct opthalmoscopy.

(2) Opthalmoscopy with Thorington's Artificial Eye.- In a dark room fasten an eye to a stand and place beside it, a little back of it, and at the same level, a lamp.

(a) Direct Method. - Set the eye to emmetropic by pulling out the back part to 0. Take an opthalmoscope and turn the wheel on it so that 0 is at the aperture. Put the aperture before the pupil of your own eye and bring your eye up to within three or four inches of the lens of the artificial eye into which light from the lamp should be reflected. Relax your accommodation and if your eye is emmetropic, a distinct, enlarged and erect view of the fundus of the eye will soon be obtained. If your eye is ametropic, find by trial which lens on the wheel has to be put at the aperture to enable you to see clearly. If your eye is myopic, you will need a concave lens (red numbers). If your eye is hypermetropic, you will need a convex lens (white numbers).

Now set the artificial eye to myopia and see what lens is needed to enable you to see the fundus distinctly. Of course that depends (See (1) (a) (2)) on the refraction of your own eye as well as that of the observed eye. Set the artificial eye to hypermetropia and make the necessary correction (See (1) (a) (3)), or you may accommodate to enable you to see the fundus.

(b) Indirect Method. - Place your eye with the opthalmoscope before it at about two feet from the artificial eye. Take the convex lens in your left hand and hold it about two inches in front of the artificial eye and reflect light into it. Accommodate your vision for a point about three inches in front of the convex lens. No correcting lens for the observer is needed - except perhaps in cases where his eye is hypermetropic, or he does not have a wide range of accommodation; he may then be helped by a convex lens. Why? Compare the picture as to magnification, extent of the field and position with that obtained by the direct method.

(3) Opthalmoscopy on the Natural Eye. - Let A be the observer and B the person whose eye is to be examined. A and B sit facing each other. Close to the ear of B on the same side as the eye to be examined is a lamp. For a clinical examination the eye should have a drop of a 0.5 per cent solution of atrophine put into it. This paralyzes the iris muscles, leaving the pupil dilated, and thus permits more light to enter and more to emerge from the eye, but most important of all it forces accommodation to a steady relaxed state. This latter condition can, for class work, however, be sufficiently effected usually by having the person fix his gaze on a distant object during the examination.

(a) Direct Method. - A should know how much, if any, ametropia his eyes have, so that he can, before starting the examination, have it corrected by the proper lens at the aperture of the opthalmoscope. He takes the mirror, looks through

the aperture and reflects light into B's eyes. A red glare, the so-called "reflex" from the choroidal vessels is now seen. A then brings the mirror to within about three inches of B's eye. If A's eye is emmetropic, or, if not so, is properly corrected, and if B's eye is emmetropic and both eyes are completely relaxed, the retinal vessels of B's eye can now be seen. If they cannot be seen readily, B's eye is most likely ametropic and A must take measures in accordance with (1) (a) to enable him to see.

(b) Indirect Method. - Here it is not so much of importance that the accommodation of the observed eye be relaxed (See (1) (b)) as it is that it be kept steady. B should fix his gaze far off. If his right eye is under examination, he should also direct his visual axis just along A's right ear to make it easier for A to get a view of B's optic disc. With an opthalmoscope before his eye A moves back to about 18 inches from B, takes a biconvex lens of about 16 diopters in his left hand and places it about 2 inches in front of B's eye, keeping it steady by resting his little finger on B's forehead. A now reflects light into B's eye and accommodates his vision as if looking at an object about 2 1/2 inches in front of the lens. It makes very little difference what the refraction of B's eye is, if it is kept steady. A should see the fundus distinctly, if the latter is not strongly hypermetropic. If A is hypermetropic or does not have a wide range of accommodation, a convex lens before his eye may be needed.

It will be readily understood that direct opthalmoscopy, but not indirect opthalmoscopy, can be used to detect and measure ametropia. This is more conveniently done, however, by retinoscopy.

<u>Exp. 19</u>. - Retinoscopy or Skiascopy, the observation of the movements of the shadow in the pupil of an eye when a mirror reflecting light into it is rotated, furnishes not only a method of detecting and measuring ametropia, but is also used to detect and measure astigmatism.

(1) Direction of Movements of the Shadow in the Pupil and of the Illuminated Field of the Retina.

(a) The B part of the apparatus used in Exp. 17 is set up as a hypermetropic eye. Take a position with your eye just one metre in front of the eye. Turn on the light and let a fellow student set the lever on the front of the eye so that the pupil of the eye appears as a disc of light to you. Now let him move the lever slowly so that the illuminated part of the retina of B moves to the left side; the disc of light will move off of the pupil and will also move toward the left, or the

shadow which follows the disc of light will move toward the left. Set the eye as an emmetropic eye and the direction of movement of the shadow and the illuminated field will be found to be the same. Fig. 3 on Diagram IV shows why this is so.

(b) Now let him draw out the inner box little by little and move the lever each time. At first the shadow in the pupil will move in the same direction as the illuminated field, but soon a position will be reached where movement of the lever causes the disc of light to disappear all at once, no movement of the shadow can be made out. Now place the white screen in the position of your eye and it will be found that a distinct image of the latter on the retina is formed on the screen; the light from the retina leaves the eye in bundles of converging rays which cross each other one metre from the eye and evidently the condition in which the light disc disappears all at once is that in which the light converges just to the observing eye. With the observing eye at one metre distance such an observed eye has one diopter of myopia. Fig. 5on Diagram IV illustrates why the disc of light disappears at once.

(c) Set the eye back to emmetropia, put a convex lens of one diopter before the eye, place your eye just one metre away and repeat what you did in (b) after you found the position in which the light disc disappeared all at once. The results will be just the same and for the same reasons.

(d) With your eye in position one metre from B and the latter set as it was at the end of (b) let your fe low student pull the inner box out further and move the lever. It will be observed that now the disc of light moves off of the pupil and the shadow grows in the direction opposed to the direction of movement of the lighted part of the retina. The eye represents one with myopia greater than one diopter. Fig. 4 on Diagram IV explains the observation.

These observations show that in retinoscopy: When the light which comes out of the eye is in divergent or in parallel bundles, or in bundles whose rays converge to a point back of the observing eye, the shadow on the pupil moves in the same direction as the field of illumination of the retina is moved; when the emerging light is in bundles whose rays converge just to the observing eye, the light disc disappears all at once; when the rays of the emerging light converge to a point between the observed and the observing eye, the shadow movement is in a direction opposite to that of the movement of the illuminated field of the retina. It is also shown that an eye with myopia of one diopter corresponds in its refraction to a relaxed emmetropic eye with a convex lens of one diopter before it.

(2) Dependence of the Direction of Movement of the Illiminated Field of the Retina on the Kind of Mirror used. - Set up the A part of the apparatus with a lamp beside it. Hold a large plane mirror in front of A at about three feet from it. Reflect light into the eye. Let a fellow student view the retina of A from behind. Now rotate the mirror slowly to the left and he will observe that the lighted field on the retina moves toward your left, or in the same direction as the face of the mirror is rotated. Now hold a large mirror with a concave surface before B and rotate it slowly toward the left; the lighted field will now move toward the right or in a direction opposed to the direction of rotation of the face of the mirror. This shows that with a plane mirror the lighted field of the retina moves in the same direction as the face of the mirror is rotated, but with a concave mirror it moves in the opposite direction. This holds good of course for any state of refraction of A; try this out too. This difference is due to the fact that the immediate source of light from which the retina is illuminated is not on the same side of the mirror in the two cases. With a plane mirror the immediate source of light is a virtual one (virtual image of the ultimate source of light, See Fig. 1, Diagram IV) and is back of the mirror so that on rotation of the face of the mirror toward the left it moves toward the right. With a concave mirror the immediate source of illumination is a real image (of the ultimate source of light, See Fig. 2, Diagram IV) that is in front of the mirror and hence moves toward the left when the face of the mirror is rotated.

(3) According to (2) the direction of movement of the lighted field of the retina, while it is not affected by the refractive state of the eye, depends on the kind of mirror used. From this and from (1) it follows that for a given eye the direction of movement of the shadow in the pupil depends on the kind of mirror used. Set up a Thorington's eye as in Exp. 18.

(a) Set the eye for emmetropia. With a plane mirror before your eye take a position just one metre from the observed eye. Reflect light into the eye and observe the pupil as a disc of light. Now rotate the mirror slowly to the left; a shadow will move across the pupil in the same direction as the face of the mirror is rotated. Now put a concave mirror before your eye and rotate it slowly toward the left; the shadow in the pupil will now move toward the right or in the direction opposed to the direction of rotation of the face of the mirror.

(b) Set the eye for mypermetropia and repeat (a); the results will be the same.

(c) Make the eye strongly myopic and rotate a plane mirror before it; the direction of movement of the shadow is opposed to that of the face of the mirror. Rotate a concave mirror before the eye; the direction of the shadow movement is the same as that of the face of the mirror.

(d) Now set the eye at myopia 1. In this position light from a point on the retina leaves the eye in a bundle whose rays converge to a point one metre from the eye. Perform retinoscopy with a plane mirror; the disc of light disappears all at once. With a concave mirror it does the same. This condition, where the light leaving the observed eye converges just to the observer's eye is the only one in which a plane mirror and a concave mirror give a like result; under any other condition, or whenever a movement of the shadow is to be seen, the results with the two kinds of mirrors are opposed to each other.

(4) Detection of Ametropia. - Set up a Thorington's eye. Put your eye at just one metre distance and perform retinoscopy with a plane mirror. One of three things follow, viz: (a) the shadow moves in a direction opposed to that of the face of the mirror; (b) there is no shadow movement, the disc of light disappears all at once; (c) the shadow moves in the same direction as the face of the mirror is rotated.

According to (1) (d) case (a) must be a condition in which the light coming out of the eye comes to focus at a distance within one metre of the eye. The eye is myopic and, we can say at once, to a degree greater than one diopter.

According to (1) (a) and (b) it cannot be said at once whether the eye in case (c) is hypermetropic, emmetropic, or myopic to a degree less than one diopter. Put a convex lens of one diopter just before the eye and perform retinoscopy.

(i) If the light disc disappears all at once, the convex lens is now bringing the light coming from the observed eye to a focus at a distance of one metre from it. According to (1) (c) the eye must be emmetropic.

(ii) If the shadow moves in the same direction as the face of the mirror, the convex lens does not bring the light to focus within one metre; the eye must be hypermetropic.

(iii) If the shadow moves in a direction opposed to that of the face of the mirror, the lens is now bringing the light to focus within one metre; the eye must be weakly myopic, or to a degree less than one diopter.

(5) Measurement of Ametropia. - This is done by determining the strength of lens needed by a relaxed eye to form a refracting system equivalent to a relaxed emmetropic eye. It is evident, however, that to do this by retinoscopy it would be of

no avail to make the refracting system such that the light from the retina leaves the refracting system in bundles of parallel rays because that condition cannot be distinguished directly from some others by retinoscopy, namely, hypermetropia and myopia of less than one diopter. There is one state of refraction which gives a distinctive result with the retinscope, namely: when the light emerging from the refracting system converges to the observer's eye, which being at a known distance from the refracting system, enables us to say what the refracting power of the system is (See (1) (b)). The method then is to find by trial what lens must be set before the eye under examination to cause the light disc in its pupil to disappear all at once when the observing eye is at one metre distance from it. The refracting system, made up of an eye with such a lens before it, has a refracting power plus 1 and, knowing the strength of lens necessary to make it so, we can calculate what strength of lens would have been necessary to cause the light leaving the eye to leave the refracting system in parallel bundles. Remember that the refracting power of a convex lens is expressed by a numeral with a plus sign, of a concave lens by a numeral with a minus sign. The refractive power of the lens needed by an eye to form an emmetropic refracting system is calculated by algebraically subtracting +1 from the lens, found by retinoscopy, necessary to bring the light from the eye to focus at one metre. Examples.

(a) It is found necessary to set a +1 lens before an eye to make the light disc disappear all at once; (+1 - (+1) = 0%) this means that no lens need be put before the eye to make light from it go out in parallel bundles of rays, the eye is emmetropic.

(b) It is found necessary to put no lens before the eye to make the light disc disappear all at once; (0) - +1) = (-1); this means that a concave lens of one diopter must be put before the eye to make the light go out from the refractory system in parallel bundles. The eye has one diopter of myopia. Since it requires a lens of minus sign to neutralize the ametropia of this eye it is evident that to express the measure of the ametropia the opposite sign must be used, hence the eye has ametropia +1.

(c) It is found necessary to put a -1 lens before the eye; (-1) - (+1) = (-2); a concave lens of two diopters must be put before the eye to form an emmetropic system; the eye has myopia of 2 diopters or an ametropia +2.

(d) It is found necessary to put a +2 lens before the eye; (+2) - (+1) = (+1); a convex lens of one diopter must be put before the eye to make it an emmetropic system; the eye has hypermetropia of 1 diopter, or ametropia -1.

A fellow student sets a Thorington's eye at an ametropic unknown to you. Determine by means of the retinoscope and correcting lenses the degree of the ametropia.

Exp. 20 - Astigmatism (Regular).

(1) Look at a figure showing a number of lines radiating horizontally, vertically and in intermediate directions from a common center. First fix the figure at such a distance that one can comfortably accommodate. If astigmatism is present, all the lines cannot be seen with equal distinctness at the same time, but they can all be successfully accommodated for. Next, bring the figure to the near-point of distinct vision for the horizontal and neighboring lines. Probably the vertical lines will be blurred and cannot be made as distinct as the horizontal by any effort of accommodation. If the eye is distinctly astigmatic, the difference will be marked.

(2) Use the opthalmometer provided in the laboratory. This instrument is an improvement on Helmholtz's opthalmometer in that with it astigmatism can be detected directly, and it does more than measure the distance apart of two images on a curved surface. With it, by proper adjustment, the radius of curvature of a reflecting surface can be read off directly.

Raise or lower the chin rest until the upper bar of the head-rest is just above the patient's eyebrows, his head resting exactly vertical. The eye not to be examined is covered with a blind. The patient looks steadily into the opening of the tube with his eye wide open. The height of the instrument having been adjusted, a clear image of the mires is obtained by focusing. The tube is then turned horizontally, slightly to the right or left until the two images of the mires are close together and equally distinct. Rotate the outer tube until the long meridian lines of the image are exactly in line with each other. If there is no astigmatism, this will be seen at all axial positions; if there is astigmatism, at only two positions. An axis having thus been obtained, the graduated disc on either side of the tube is rotated until the shorter lines or spurs of the image also unite, forming a perfect cross with the longer ones, and the adjustable pointer on the left-hand disc is made to coincide with the stationary one and a reading taken. Now rotate the outer tube of the telescope rotating in the sleeve or collar , through 90 degrees; the long axial lines of the images will be in alignment without further adjustment. But if the eye is astigmatic, the short lines will not. By rotating the graduated disc on which radii of curvature of the cornea in various meridians are read off, the short lines are made to coincide, so

A fellow student sets a Thorington's eye at an emetropic unknown to you. Determine by means of the retinoscope and correcting lenses the degree of the emetropia.

<u>Ex. 20</u> - Astigmatism (Regular).

(1) Look at a figure showing a number of lines radiating horizontally, vertically and in intermediate directions from a common center. First fix the figure at such a distance that you can satisfactorily accommodate. If astigmatism is present, all the lines cannot be seen with equal distinctness at the same time, but they can all be successfully accommodated for. Next, bring the figure to the near-point of distinct vision for the horizontal and neighboring lines. Probably the vertical lines will be blurred and cannot be made as distinct as the horizontal by any effort of accommodation. If the eye is distinctly astigmatic, the difference will be marked.

(2) Use the ophthalmometer provided in the laboratory. This instrument is an improvement on Helmholtz's ophthalmometer in that with it astigmatism can be detected directly, and it does more than measure the distance apart of two images on a curved surface. With it, by proper adjustment, the radius of curvature of a refracting surface can be read off directly.

Raise or lower the chin rest until the upper bar of the headrest is just above the patient's eyebrows, his head resting nearly vertical. The eye not to be examined is covered with a blind. The patient looks steadily into the opening of the tube with his eye wide open. The height of the instrument having been adjusted, a clear image of the lines is obtained by focusing. The tube is then turned horizontally, slightly to the right or left until the images of the mires are close together and equally distinct. Rotate the outer tube until the long meridian lines of the images are exactly in line with each other. If there is no astigmatism, this will be seen at all axial positions; if there is astigmatism, at only two positions. An axis having thus been obtained, the graduated disc on either side of the tube is rotated until the shorter lines or edges of the images come into perfect cross with the longer ones, and the adjustable pointer on the left-hand disc is made to coincide with the stationary one and a reading taken. Now rotate the outer tube of the telescope together with the mires or cells, through 90 degrees; the long axial lines of the images will be in alignment without further adjustment. But if the eye is astigmatic, the short lines will not. By rotating the graduated disc on which radii of curvature of the cornea in various meridians are read off, the short lines are made to coincide, as that a perfect cross is again formed, and the graduating is read. The difference between this and the previous reading, i.e., the difference between the two pointers, gives the difference in the curvature of the cornea in the two meridians. The images of circles which form the outer portion of the mires are oval in ordinary astigmatism.

Exp. 21. Study of the Cervical Sympathetic.

(1) Signs of Paralysis in the Cat After Section of the Cervical Sympathetic.

Before operating observe the eyes of the cat and note any difference of size or shape. Isolate one cervical sympathetic nerve under aseptic conditions and section the nerve. Make the median skin incision of the neck as small as possible. Allow for recovery from the anesthetic and compare:

a) Size of the pupil of the right with the left eye.
b) Width of the palpebral fissure on the two sides.
c) Temperature of the right and left ears.
d) Position of the nictitating membrane on each side.
e) Prominence of the eyeball on each side.
f) Appearance of the conjunctiva on both sides.

Measure as accurately as you can the width of the pupil on each side. Instill into each conjunctival sac several drops of a 2% cocaine solution. How does it affect the size of the pupil on the two sides. Allow 3/4 hour to elapse from time of instillation of the cocaine till making observation. Instill cocaine every other day during the next week and note the effect on the size of the two pupils. *

(2) Study of the Physiology of the Cervical Sympathetic.

Etherization and tracheotomy. Do not wet or handle the ears. Isolate the cervical sympathetic on one side. In the cat (and rabbit) this nerve though within the vagus sheath is a distinct nerve anatomically. Place a lifting ligature under the nerve. Hold up the ear to the light so that the blood vessels can be clearly seen. Now ligature the nerve. A transient constriction of the arterioles may be seen to take place the moment

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* Specific References:
Über Morbus Basedowii, Landström, Nordiskt Medicinskt Arkiv, 40, 1907, p. 153. Über die Anatomie der glatten Muskulatur der Orbita und Lider, speciell die Membrana Orbitalis Musculosa, Krauss, Münch. Med. Wech. 58, 1911, p. 1993, Sept. 19.

of ligation. The constriction soon gives way to a dilation. Why? Preserve the upper end of the nerve and stimulate with a weak tetanizing current. Note:

a) Effect on the size of the vessels of the ear; on the temperature of the ear.

b) Size of the pupil.

c) Nictitating membrane.

d) Movement of the eyelids? Change in width of the palpebral fissure?

e) Movement of the eyeball independent of the movement of the eyelids.

f) Movement of the hair. It may be necessary to strengthen the current to elicit movement of the hair.

g) Isolate sciatic nerve on each side and stimulate central end with a tetanizing current noting effect on pupil. - Explain.

In conclusion, we will endeavor to demonstrate the possibility of crossed or alternating paralyses by lesions involving different parts of the brain stem. To accomplish this the animal is put on its side and brain exposed with bone forceps and trephine. Hemorrhage is controlled with soft wax and elevation of the head. The cerebral hemispheres are now removed. Now stimulate the crus cerebri and pons on one side and note effects. Explain. - Explore floor of the fourth ventricle electrically. Locate nuclei of origin of X, XI, XII nerves, etc.

Information for The University of Chicago War Service

Name in full Leverett S. Lyon Date 1-23-20

Academic title Ass't Professor in Com'l Organization

	DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	BRANCH
Enlistment		Assistant to Editors in writing and			
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc. 1		compiling "Bulletins on National			
2		and Community Life" for the			
3		United States Food Administration			
4					
5					
6					
7					
8					
Discharge					

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

The School Review | The Elementary School Journal | Supplementary Monographs

EDITED AND PUBLISHED BY
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Jan 17-

My dear Mr. Robertson:- I have no "war record" except extensive participation in all publicity campaigns through the Four Minute Men.

R. L. Lyman

Information for The University of Chicago War Service

Name in full Julian W. Mack Date

Academic title Prof. of Law

		DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	Abbreviations for BRANCH
Enlistment			Chairman Comm. on War Risk Insurance Laws - appointed by			
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc.	1		Advisory Commission to Natl Council of Defense &			
	2		by Secy of the Treasury June 1917.			
	3		Member Board of Inquiry on Conscientious Objectors			
	4		appointed by Secy of War 1918			
	5		Umpire Natl War Labor Board appointed by			
	6		President 1918.			
	7					
	8					
Discharge						

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

Include all service civil and military

Information for The University of Chicago War Service

Name in full Earl Northup Manchester Date April 23d,1920

Academic title Head of the Reader's Department, Harper Memorial Library, University of Chicago.

		DATE	(State in full, without abbreviation) RANK, BRANCH of SERVICE, and ORGANIZATION, specifying Co., Reg., and Div., or similar designation of unit	LOCATION	Abbreviations for RANK	Abbreviations for BRANCH
Enlistment		1918 Jan 15	Camp Librarian, Library War Service, American Library			
Promotions, Transfers, Offices held, e.g., Co. Comdr., Adj., etc.	1	to Mar 29	Association, at Camp Cody, Deming, New Mexico.			
	2					
	3	1918 Sept 23	Camp Librarian, Camp Grant, Rockford, Ill, Library War			
	4	to October 1st	Service, American Library Association,			
	5	1919	Transferred to Overseas Branch of same service on			
	6		Dec.17th. Port Representative, of A.L.A. with			
	7		Headquarters at Bordeaux, France(Base Section 2)			
	8		Jan.10 to September 8th,1919.			
Discharge						

State in detail military exploits performed, honors and marks of distinction conferred (including service chevrons), and any items of interest concerning your service, such as position of instructor in special subject, etc.

Service in the camps in the U.S. involved the development and administrat tion of the Camp Library with its numerous branches.

Service in France included the forwarding of books received at Bordeaux to A.L.A.headquarters in Paris and the subsequent distribution of these books to the men in the large camps and billeting areas in Base Section 2.

Include all service civil
and military