DR. LEO LOEB

Professor Emeritus of Pathology and Research Professor of Pathology in whose honor the Leo Loeb Lectureship was founded at Washington University School of Medicine by the Mu Chapter of Phi Beta Pi Fraternity
Some Aspects of Allergy*

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The term allergy, as defined by Pirquet in 1906, implied an enhanced reaction capacity of tissues acquired through recovery from disease or through treatment with foreign substances. According to this view, therefore, the intensified inflammation of allergy is looked upon as the localized manifestation of a general immunity. But as the numerous varieties of hypersensitiveness have become better known, uncertainty has increased concerning the cause, mechanism and significance of the allergic phenomena. Is the localized allergic inflammation an evidence of a beneficent immunological mechanism for the speedy localization of a foreign agent, or is it an indication of a heightened susceptibility? Many efforts have been made to answer this question but, unfortunately, without notable success, and opinions seem to be about as conflicting as they were a quarter of a century ago.

From the beginning one of the most persistent questions has been the relationship between allergy and anaphylaxis. There exists today a definite cleavage between those who believe in the close similarity or even identity of anaphylaxis and human allergy and those who maintain that the two phenomena, although similar in some details are nevertheless mediated by different mechanisms. Zinsser, on the one hand, takes the position that “all forms of hypersensitiveness represent essentially one and the same basic phenomenon when analyzed with

* Fifth Leo Loeb Lecture, delivered in the Auditorium of the School of Medicine, March 8, 1940.
understanding of superficial variables." Others assume that human allergy differs fundamentally from anaphylaxis and occurs spontaneously under the influence of a genetically determined process unrelated to the ordinary immunological mechanisms. This view, according to Zinsser, practically requires the assumption that man “possesses a sort of immaculately conceived hypersensitiveness that, like his soul, distinguishes him from the animal kingdom.” While it is true that there are obvious differences between the human allergies and experimental anaphylaxis, the many similarities which are becoming increasingly evident as better methods and techniques are used favor the idea that the phenomena may be basically similar or even identical. At any rate, until all aspects of allergy and anaphylaxis have been studied and compared, the true nature and significance of the allergic phenomena will remain uncertain. A solution of these problems is particularly important in view of the fact that the widespread occurrence of hypersensitiveness to so many types of stimuli accounts for so much human misery, inefficiency and disease.

I propose this evening to consider certain aspects of this general problem based on experimental studies of one of the earliest known examples of protein hypersensitiveness, the Arthus phenomenon, and to present findings from human material which seem to substantiate the conclusions derived from these experiments. This phenomenon, as originally recorded by Arthus, in 1903, may be described briefly as follows: If a few cubic centimeters of horse serum are injected into the subcutaneous tissues of a rabbit and the site of injection is examined a day later, practically no local inflammation will have occurred. If, however, the injections are repeated, at intervals of five or six days, eventually, usually after five or six injections, the local inflammation at the site of injection will become increasingly severe, with accompanying edema, hemorrhage and gangrenous necrosis. In other words, the animal will react as if the foreign protein had become toxic or necrotizing. Arthus regarded the phenomenon as a form of local anaphylaxis but did little more to elucidate its essential nature. Three years later a further step was made by Nicolle when he showed that the phenomenon can be produced passively by transfer of serum from a hypersensitive rabbit to a
normal one. This experiment proved, therefore, that the local altered reactivity of tissues is not due to a fundamental change in the tissues themselves but is due rather to a changed property of the serum. The next important step was made when Opie, between the years 1923 and 1929, came to the conclusion that the Arthus reaction occurs because of the meeting of antigen and precipitin within the tissues. The resulting intracellular precipitation, although injurious to the cells affected, as shown by the phenomena of intensified inflammation, edema, hemorrhage, thrombosis of blood and lymph vessels, and gangrene, nevertheless prevents the dissemination of the antigenic materials to the body as a whole. Because of their localization near the site of injection, Opie suggested that “vital organs are protected at the expense of local injury.” Although Opie’s experiments pointed to the parallelism between intensity of the Arthus reaction and precipitin titer of the blood, he was unable to reach a final conclusion because of certain inconsistencies in his data. For example, he noted, occasionally, that during the early stages of immunization a feeble skin reaction occurred at a time when precipitins were not demonstrated in the serum; furthermore, skin reactivity occasionally persisted in an immunized animal after cessation of immunization and after precipitins had apparently disappeared from the blood. He was forced to conclude, therefore, that although the parallelism between skin reactivity and precipitin titer was close, it was not exact. In explanation of this lack of parallelism he pointed out at the time that “the precipitin titer is not an accurate measure of the precipitin content of the serum.” Culbertson, using an analytical method which determined precipitin content verified Opie’s findings and noted a striking parallelism between the precipitin content of the blood serum and the intensity of skin reactivity. Furthermore, he showed that intravenous injection of a desensitizing dose of antigen caused a marked diminution in the precipitin content of the blood and a simultaneous disappearance of skin reactivity, followed later by a concomitant increase in precipitin content and cutaneous reactivity. Finally, he demonstrated that removal of the precipitins from an antiserum by specific antigenic absorption removes the potentiality of such a serum to confer passive sensitization to a normal rabbit.
He concluded, therefore, that "all of the evidence obtained indicates that tissue hypersensitiveness in an actively sensitized animal is dependent upon the formation of antibody in the animal and is reflected by the presence of precipitin in the circulation. The tissue sensitizing substance in an antiserum appears to be inseparable from, and probably is identical with the precipitin."

Despite the conclusions of Opie and Culbertson, several other experienced observers have concluded that precipitin is not the essential antibody responsible for the Arthus phenomenon, and have postulated a changed reaction-capacity of the tissues. Kahn, in particular, concluded that "tissue hypersensitiveness is a more permanent biologic response than precipitin production and that the two phenomena are independent of one another."

These opposing views suggest the possibility that the differences in experimental findings may be due to the different methods employed. For example, several of the workers used complex proteins, whereas Opie and Culbertson used purified ones, particularly crystalline egg albumin. Furthermore, all of the workers except Culbertson used the antigen-dilution method for the determination of the so-called precipitin titer of the antiseraums. This method is basically illogical, and has been shown by Culbertson to be also unreliable and inaccurate. We have found, in fact, that it may fail to reveal the presence of precipitins in a serum in which they can be demonstrated by a more delicate method.

The precipitin test as customarily performed by layering varying dilutions of antigen upon the antiserum is not a delicate quantitative one. Furthermore, it differs from all other serological tests in that the titer is not obtained by serial dilution of antiserum. Instead, a so-called "titer" is obtained by serial dilution of antigen. This is obviously not a titration of antibody, but only of antigen. In order to get around this difficulty we have developed a method whereby the precipitaine potency of an antiserum can be determined by dilution of the serum. The method consists in the absorption of the protein to tiny particles of collodion which then assume, in a magnified form, the properties of the protein itself. When specific antibody combines with the protein-coated particles
the latter agglutinate and the agglutination titer obtained by serial dilution of antiserum enables one to ascertain the antibody-strength of the original serum.

By the use of this method we have been able to show that variations in cutaneous reactivity parallel directly and invariably the precipitative titer of the serum from the animal tested. Furthermore, we have found that removal of the precipitins from an antiserum by antigenic absorption abolishes the ability of that serum to confer sensitization passively to a normal rabbit. We have never observed a positive skin reaction in the absence of demonstrable precipitins in the serum. We have come to the conclusion, therefore, that the local allergic inflammatory reaction is due to the combination within the tissues, of antigen and precipitin.

The question now arises, to what extent can the Arthus reaction be regarded as a prototype of allergic reactions in general, and if so, how can the apparent inconsistencies of human allergy and experimental anaphylaxis be explained? Despite the fact that specific precipitins have been demonstrated in the sera of patients with some types of allergy, in more instances they have not been found. And yet the presence of specific reagins in such sera has been repeatedly demonstrated by the well-known Prausnitz-Kustner reaction. Furthermore, precipitin-containing sera from animals, injected into man, and treatment of these antisera with atopen may remove or diminish the skin-sensitizing property. We know too little about the antigenic character of many of these allergens and of the antibodies which they engender to be certain about the nature of the union between them. It is possible that some precipitative reactions may result in the formation of aggregates so small as to remain invisible under ordinary conditions of testing and yet cause severe disturbances when they occur in living cells. Furthermore, we know too little about the variations in molecular size and diffusibility of many of the allergens and reagins to be sure that they may not unite and flocculate in the tissues of allergic individuals. In fact, we have no generally accepted notion of the functional significance of antibodies at all. Perhaps the most suggestive explanation is the one proposed some years ago by Zinssser. He suggested that antibodies probably arise during immunization
because of the presence in tissues of foreign, non-diffusible colloids, which, if they are to be excreted or utilized, must be converted into diffusible forms. Wells has suggested that antibody-formation may represent a fundamental biological digestive mechanism which has arisen in order to ensure the specificity of the body's proteins. Without such a mechanism the omnivorous human being might soon become a veritable congeries of foreign proteins, depending upon the varying vicissitudes of gastro-intestinal permeability, in which human proteins would have to compete in the bodily protein synthesis with beef and pork and the lowly bean. This would indeed be a shattering blow to the doctrine of pure-blooded Aryanism! But if Wells's idea is correct, the antibody mechanism provides a way whereby all foreign proteins may be broken down into amino acids before their resynthesis into the proteins of the host. And, inasmuch as precipitin is the antibody called forth in response to protein-stimulation, the precipitation phenomenon may be thought of as an initial stage of coagulation in the digestion of the foreign protein, resembling in some respects the coagulation of milk by rennin in the early stages of gastric digestion.

If our assumption of the fundamental significance of precipitin is correct, how may we explain the allergies in which precipitins have not been demonstrated in the serum. There are at least two possible reasons for these negative findings. In the first place the testing methods now available are inadequate, particularly for weak sera. Zinsser has emphasized the point that in a precipitation test an enormous total surface area of colloidal micelles may be present, each micelle of which must react with precipitin molecules. Obviously, if there are not enough of the latter to go around, visible precipitation may not occur. But even under these conditions, enough might occur within a cell to disturb the internal cellular metabolism and cause the liberation of histamine or other substances. In the second place, precipitins might be absent from the serum of an allergic individual and still be present within the cells in a concentration adequate for intracellular injury following contact with an allergen. Weil, a good many years ago, said that the study of immunity is largely a problem of cellular physiology. In other words, conclusions pointing to the paral-
elism between the concentration of precipitins in the blood and the varying intensities of allergic inflammation, as illustrated by the Arthus phenomenon, do not in any way exclude the possibility that the flocculative reactions of specific precipitation may occur even though precipitins cannot be demonstrated in the blood serum. A positive allergic skin reaction is surely a more delicate test than is any test-tube reaction. The importance of the latter lies, however, in its possible ability to demonstrate the kind of antibody concerned, in order that we may understand more clearly the nature of the allergic reactions.

One of the most interesting aspects of allergy is its relationship to immunity. The localizing potentiality of immune tissues is well known and the intensified inflammation, as seen in the Koch phenomenon, has long been regarded as an indication that immunity and allergy are concomitant and probably identical phenomena. Because of the exaggerated conditions under which they are usually studied experimentally, however, or are at times seen clinically, the view has developed that allergic inflammation is too frequently a harmful process and the reverse of immunity. While it cannot be denied that this seems at times to be true, consideration of the fundamental mechanisms concerned suggests, nevertheless, an alternative view. I have pointed out in a recent review that "it is not surprising that antigenic stimuli which, when minimal, cause insignificant tissue reactions may, in an exaggerated form, lead to profound cellular injury or even death; this does not mean that the mechanism itself is at fault. Cellular integrity must be maintained, presumably, by mechanisms inherent in the cells themselves, and any condition, whether natural or artificial, which interferes with these may be expected to be reflected in cellular disturbances which may, at times, be definitely pathological. The fact remains that these effects (edema, smooth muscle contraction, intensified inflammation, necrosis, and reparative sequelae) all follow cellular stimuli; it would seem more logical, therefore, to place the blame for the adverse reactions on the stimulus rather than on the cell. This point of view recognizes, at least, that although a biological process may at times be harmful to the individual, yet, in its more fundamental aspects, it may be protective to the
race.” If, therefore, we assume that precipitins are formed because of a fundamental incompatibility between foreign proteins and the tissues of a given species, the localized injury at the site of maximal reaction can be better understood. And if by such a mechanism the antibodies can combine with foreign proteins in living parasites with resulting localization and destruction, the advantages to the host are obvious even though a considerable degree of local tissue injury ensues. There is, in fact, good evidence to support this supposition. Blacklock, Gordon and Fine have observed that, in experiments with fly larvae deposited in the skin of normal guinea pigs and of ones immune to the larvae, about 80 per cent of the first instar larvae in the latter animals die within 40 hours because of the formation of a precipitate in their gut and on their cuticle. A similar precipitate also formed when the larvae were placed in serum from an immune animal, but not in that from a normal one. They concluded, therefore, that the union of larval antigen with specific precipitin blocked the gut, hampered the normal development of the larva and thus caused its early death. Taliaferro and Sarles have observed a similar phenomenon in infection of white rats with a parasitic worm, Nippostrongylus muris. When larvae of this worm enter the skin of a normal rat they feed, develop and migrate to the blood stream and eventually establish an infestation of the upper gastro-intestinal tract. In immune rats, however, they tend to remain localized near the portal of entry where they are seen as stunted, coiled and immobilized forms with amorphous precipitates formed in the gut and around them. In both examples mentioned, therefore, there is definite evidence that the primary localizing mechanism is an antigen-antibody union with precipitation in and around the parasites and with the inflammatory reaction developing in response to the immune reaction.

We may now turn our attention to the problem of the possible relationship of specific precipitins to some of the allergic conditions in man characterized by known sensitizations to such proteins as eggs, tuberculin and insulin. If these types of allergy are related to anaphylaxis, it should be possible to demonstrate the presence of precipitins in view of the fact that many immunologists believe that anaphylactins and
precipitins are identical. However, most attempts to demonstrate specific precipitins in the sera of human patients have hitherto been unsuccessful, although in a considerable number of instances they have been demonstrated. I repeat, however, that practically all of these tests have utilized the inaccurate antigen-dilution method. If it could be shown that precipitins specific for the particular substance causing the allergic reactions are frequently present in the serum, a causal relationship would at least seem more probable. Furthermore, if it could be shown that removal of the precipitins abolished the allergic sensitivity, proof of the relationship would be more complete.

We have been able, thus far, to test about a dozen serums from patients proved by skin tests to be allergic to egg proteins; in about half of them we have demonstrated the presence of precipitins specific for crystalline egg albumin. In one patient we have found a relatively high concentration of precipitins on two occasions separated by an interval of nine months. In others the precipitins have been present, although in a lower concentration. It would seem, therefore, that the presence of precipitins specific for the substance to which an individual is allergic is more than coincidental and that it probably bears some relationship to the allergy itself. Our explanation for those instances in which no precipitins were demonstrated in the sera is that they were either present in too low a concentration to be detected by the method, or that they were present within the cells and reacted intracellularly with allergen.

We have also tested the sera of tuberculous patients against collodion particles to which a purified tuberculin was absorbed and have found in some instances the presence of specific antibodies. Weit, in Jamaica, has now used the method with several thousand serums and believes that it has epidemiological value because of its ability to detect antibodies to tuberculin in the beginnings of infection. At any rate, the demonstration of the presence of specific flocculating antibodies may offer a better method for studying the quantitative relationship of these to tuberculin tests, to the course of the disease, and to the role of allergy in the tuberculous process.

The problem of sensitization to insulin is an important com-
application in diabetic management, although, fortunately, only a small proportion of diabetics become hypersensitive. Neverthe-
less, when they do, the situation may become serious be-
cause of the accompanying resistance to insulin and the neces-
sity for using larger and larger quantities. Furthermore, the
expense entailed is not a negligible element in the problem.
The fact that these patients react positively to skin tests and
that they sometimes develop generalized urticaria after ad-
ministration of insulin is proof that insulin is allergenic. Al-
thought at first it was believed that beef or pork proteins were
responsible, this idea becomes less probable now that crystal-
line insulin has been shown to cause the same allergic mani-
festations. Some have argued that inasmuch as insulin is a
bodily hormone it would be impossible for antibodies to de-
velop, forgetting that the insulin molecule used in human
therapy is definitely a protein of foreign origin. On theoretical
grounds, therefore, it should be antigenic, and experimental
studies have shown that it is. Fortunately, however, it appears
to be a poor antigen and it is probably for that reason that
sensitization with it has not become more common.
If patients allergic to crystalline insulin are sensitive be-
cause of an antigen-antibody reaction, it should be possible to
demonstrate the presence of precipitins in their sera. That
we have done, utilizing the method whereby collodion particles
sensitized with crystalline insulin are acted upon by anti-sera
from patients hypersensitive to the insulin. In one patient in
particular, an individual remarkably resistant to insulin, an
astonishingly high titer was obtained when her serum was
tested against insulin-coated collodion particles, although the
serum reacted only minimally with particles coated with tuber-
culin protein. The obvious conclusion, therefore, is that when
insulin is injected into the skin of such a patient, the local
union of insulin and its specific precipitin leads to local pre-
cipitation and a correspondingly slower absorption of the in-
sulin. More insulin must then be given to control the hyper-
glycemia and the individual is said to be insulin resistant.
There are, of course, other causes for insulin resistance, but
this furnishes a satisfactory explanation for those instances
in which the patient is definitely allergic to insulin.
These experiments with sera from allergic patients serve to
strengthen the suggestion of Opie that the Arthus reaction may be looked upon as the prototype of allergic reactions in general. If further studies point in the same direction, the problems of desensitization or hyposensitization can be investigated with more assurance that the results will be applicable to human allergy. One of the surprising features of our investigations with human sera is the low concentration of precipitins in the blood serum. This increases the likelihood that methods of desensitization may be improved. Furthermore, it offers an opportunity to determine the precipitin level periodically and perhaps to maintain it low enough to prevent serious clinical allergy, even though skin reactions may still continue positive. Finally the experiments described above furnish additional evidence that human allergy is but a special variety of anaphylaxis.

My main purpose in this presentation has been to show that methods useful for the study of experimental allergy are useful also for the study of human allergy and that the results in both instances point to similar conclusions. It should be possible to investigate many other types of allergy and to determine to what extent specific precipitins are concerned. The need is great because so many pathological conditions are considered to be instances of allergic inflammation, although the mechanisms determining the tissue-changes are not understood. I refer to such conditions as lobar pneumonia, rheumatic disease, tuberculosis, periarteritis nodosa, necrotizing arteritis, arthritis, asthma, serum carditis, glomerulonephritis, etc. Our present day conceptions of the pathogenesis of these abnormalities are, for the most part, vague; they can be made more precise only by the accumulation of more basic information about antigen-antibody reactions in various sorts of tissues.
Cytology

E. V. Cowdry

That part of the Department of Anatomy charged with the teaching of histology and neuroanatomy has been called "Cytology" since I was appointed Professor of Cytology in 1928. In addition to myself there are two Associate Professors of Cytology, Drs. G. H. Scott and James L. O'Leary both of whom have likewise served since 1928. We have no assistant professors, instructors or assistants. The group was larger before budgets were cut owing to decrease in University income from investments.

Histology is by long odds the worst taught subject in most medical schools. It is too much an ordeal of sitting for long hours on a hard stool, of peering through a microscope at brightly colored dead tissues and of trying to make the visions seen correspond with textbook descriptions. We try to promote motor as well as intellectual activity by giving the students simple experiments to perform and we bring into the laboratory an increasing amount of experimental material illustrating changes in structure with differences in physiological activity. Routine lectures are reduced to two a week which is the number that Dr. F. P. Mall used to say that we owe our students. In addition, certain special lectures are given by the members of other departments. This year these were:

Bone Marrow—Dr. Carl Moore
Thyroid—Dr. Nathan A. Womack
Pituitary and Diabetes Insipidus—Dr. Thomas Findley
Motion pictures of Ciliary Activity—Dr. Arthur Proetz
Fluid in the Lung—Dr. Robert J. Terry
Cellular Metabolism of Fat—Dr. David P. Barr
Joints—Dr. J. Albert Key
Evolution and Involution of Prostate—Dr. Robert A. Moore.
Capillaries of Skin—Dr. Felix Deutsch

Our ideals in the teaching of histology are expressed in a textbook now in its second edition as well as in several papers and addresses. Like gross anatomy it is taken by entering
medical students and we have the interesting task of helping them to adjust themselves to a new and exacting environment. Our course is basic and introductory to biochemistry, physiology, pathology and to any understanding of the body in health and disease.

To Dr. James L. O'Leary credit is due for developing a well integrated course in neuroanatomy. By team work with members of the departments of physiology and neuropsychiatry, he has assured himself that the subject is fully covered, unnecessary duplication avoided and special aspects treated by the best qualified persons. The course is made to encourage the students to learn actively by doing instead of passively by simply looking. The embryology of the nervous system is studied, brains are dissected, the course of nerve fibers, cut off experimentally from their cells of origin, is followed, living nerves are stimulated and the results noted, etc. We are fortunate in possessing a good operating room. Patients are occasionally exhibited to the satisfaction and enlightenment of the students.

In his research Dr. O'Leary has the close cooperation of Dr. Peter Heinbecker of the Department of Surgery and Dr. George H. Bishop of the Oscar Johnson Institute. The three men have published numerous papers together. They are an effective triumvirate. At present Dr. O'Leary is investigating the optic cortex and geniculate body.

My own studies have been cytological and have dealt with the responses of cells first to viruses, then to intracellular parasites and recently to carcinogenic substances.

In the first period we made a correlated cytological and physiological investigation of the responses of nerve cells and fibers to the poliomyelitis virus. In this Drs. O'Leary, Heinbecker and Bishop, as well as several other workers, participated. An invitation from the International Health Division of the Rockefeller Foundation to study cytological changes in yellow fever was accepted. With the aid of Dr. S. F. Kitchen cytological evidence was found, in the form of nuclear inclusions, that yellow fever in humans is caused by a virus and that in this respect African and American yellow fevers are one and the same.

In the second period an expedition to East Africa was pro-
posed and financed by the British Colonial Office. The life cycle of the parasite of East Coast fever in tick vectors was discovered. Dr. Arthur Ham participated. Later on attention was directed to the intracellular behavior of leprosy bacilli. Work was done with Drs. Heimburger, Ravold, Williams and Packer, under the auspices of the Leonard Wood Memorial and the U. S. Public Health Service in Puerto Rico, at the U. S. Marine Hospital, Carville, La. and in St. Louis. It was found spectrographically that in developing lesions the phosphorus-calcium ratio increases and the cytological origin of globi was determined.

Cytological studies in experimental carcinogenesis have been made possible by cooperation with the Barnard Free Skin and Cancer Hospital, reinforced by a grant to the Hospital from the U. S. Public Health Service. The program is to integrate all demonstrable changes in the cells and tissues in the epidermis of pure genetic strains of mice subjected to a chemically pure carcinogen (methylcholanthrene) during the period of 80 days in which malignancy develops. Dr. Paletta, Mr. Wicks and others are cooperating and Dr. M. G. Seelig is giving valuable advice. During this first year the work has been organized and attractive leads have been unearthed.

In this brief account I find myself acknowledging gratefully the friendly association of department after department of this school. Space does not permit the citation of further instances except to say that all have helped. The departments of otolaryngology under Dr. L. W. Dean and of dermatology under Dr. M. F. Engman have been lasting sources of strength. They have contributed salaries of people to work with us. This universal support is because knowledge of cells is not only basic in teaching of students but also in experimental and clinical research which are really activities in self-teaching.

Dr. Gordon H. Scott was sent in 1930 to work with Professor A. Policard at Lyon, France. He returned with details of a method of microincineration whereby all of the organic materials are burnt away from a section leaving only the mineral residue. This method, coupled with the frozen dehydration technique, has given rise to observations of fundamental importance in cell chemistry; among these is the idea that the electrolytes are not evenly and uniformly distributed in
Photograph of Electron Microscope developed in Department of Cytology. Like the cathode ray oscillograph this instrument makes use of a beam of accelerated electrons in an evacuated tube. The electron beam either originates from the tissue minerals or traverses a section of tissue and is focused by a series of magnetic lenses. The image is produced by the focused electron beam striking a fluorescent screen. The screen is either viewed directly or photographed. High magnifications are obtainable because of the extremely short wave-length of the electron.

protoplasm as they are said to be in solutions. There are evidences of local concentrations, reservoirs perhaps, of calcium and magnesium in cells.

During the course of this investigation it was necessary to develop the electron microscope as a tool for analysing and locating minerals in cells and tissues. This project was started about 5 years ago and was the first of its kind in this country. Last year Dr. Scott was invited to go on leave of absence to the Johnson Foundation for Medical Physics at the University of Pennsylvania, set up a laboratory, including an electron microscope, and train people for pursuing histochemical studies on nerve.

The development of the electron microscope is being continued. It will be possible with it to examine biological materials at magnifications of 30,000 times or more. The possibili-
ties for investigation of the ultra structure of tissues in health and disease are many. Bacteria and viruses should be especially amenable to study by this means.

Throughout this ten year study of minerals and metals, we have had the generous support of the Rockefeller Foundation, National Research Council, Josiah Macy, Jr. Foundation and several other philanthropic institutions. Cooperation with the Department of Physics, under Professor A. L. Hughes, has been very helpful. Dr. Scott has been generous in aiding other investigators to enter this attractive field. Since the principal difficulty is the complicated apparatus necessary, this has been made in our laboratory and sent at cost to thirteen American and three foreign universities and research institutes.

But research is, of course, not limited to the three of us (Scott, O'Leary and Cowdry) and to our associates who have been mentioned. Many others have cooperated with us or have worked independently in the laboratory. A list follows of those among them who have worked with us for a year or more and have published the results of their studies. They can be regarded as our “research graduates.”

D. M. PACKER, Assistant U. S. Public Health Service—Ordnance Department, Division of Design and Drafting, U. S. Navy Yard, Washington, D. C.

AMAND RAVOLD, visitor—in practice in St. Louis.

J. H. MCMLLEN, Rockefeller Foundation fellow—Department of Physics, University of Kansas, Manhattan, Kansas.

L. R. BOLING, Graduate student—Assistant Professor of Anatomy, Washington University School of Dentistry.

MORRIS SCHAEPFER, Eli Lilly Company fellow—New York State Department of Health, New York.

R. WEISSENBERG, Visiting Professor—Wistar Institute of Anatomy, Philadelphia.

LOUIS L. TUREEN, cooperating member Dept. of Neuropsychiatry.

R. S. SNIDER, Graduate student—Johns Hopkins Medical School.

JACK LEE, Graduate Student—

L. F. HEIMBURGER, visitor—Practice in Springfield, Mo.
P. S. Williams, Rockefeller Foundation fellow—Carter Oil Company, Tulsa, Okla.

M. S. Lucas, Instructor in Cytology—Ames, Iowa.

A. M. Lucas, Assistant Professor of Cytology (Department of Otolaryngology, Chemical Foundation and National Research Council)—Associate Professor of Zoology, Iowa State College, Ames, Iowa.

E. S. Horning, Rockefeller Foundation fellow—Imperial Cancer Research Fund, London.

B. Sharma, Charles R. Crane fellow—Delhi, India.

I. Y. Olch, cooperating member Dept. of Surgery—In practice in Los Angeles.

Douglas Coles, Commonwealth Fund fellow—Government Union of South Africa.

D. H. Kooyman, Research Associate in Cytology provided by Barnard Hospital—Procter and Gamble, Ivorydale, Ohio.

R. C. MacCardle, Research Associate in Cytology provided by Barnard Hospital (now at work).

W. B. Brebner, Milbank Infantile Paralysis fellow—Died from an infection contracted in his research.

W. P. Covell, Milbank Infantile Paralysis fellow—Hooper Foundation for Medical Research, San Francisco, Calif.

W. B. C. Danks, Rockefeller Foundation fellow—Kenya Government Service.

A. W. Ham, Instructor in Cytology—Associate Professor of Anatomy, Toronto.

G. C. Hirsch, Rockefeller Foundation fellow—Professor of Zoology, Utrecht.

Herman Chor, Milbank Infantile Paralysis fellow—In practice in Chicago.

We are proud of the medical students who, despite the heavy teaching schedule, have received inspiration and have made the time to carry on productive research. The following have published very creditable papers and we watch their subsequent careers with interest.


L. E. Rector—Resident in Pathology, Peter Bent Brigham Hospital, Boston.
J. E. MIKSICEK—Resident in Psychiatry, St. Elizabeth’s Hospital, Washington, D. C.
W. E. PATTON—Practice in Little Rock, Ark.
B. S. PRUETT—Practice in St. Louis.
E. F. PEARSON—Practice in Springfield, Ill.
JAMES L. DOENGES—U. S. Public Health Service fellow, Wayne University Medical School, Detroit.
B. L. CANAGA, JR.—4th year student.
Can Carcinoma of the Pancreas Successfully Be Treated by Surgery?

FRANK GLENN, '27
Assistant Professor of Clinical Surgery, Cornell University Medical College and New York Hospital

DaCosta,¹ in 1858, reported a series of patients dying from carcinoma of the pancreas. He quoted King as describing, in some detail, a patient with the same disease in 1827. In the years between 1860 and 1890 unusual progress was made in abdominal surgery in which, however, the surgery of the pancreas did not share. A few surgical triumphs such as the removal of the islet adenomas and the extirpation of large cysts were achieved² but the more common disorders of the pancreas, such as acute pancreatitis and carcinoma, remain unsolved surgical problems. The total number of surgical removals of carcinoma of the pancreas reported to date might seem to justify the attitude of early French surgeons that the pancreas was an organ of *noli me tangere.* Is such an attitude tenable today? Why has this policy persisted? May we anticipate progress in the surgery of the pancreas or must we be content to accept Osler's³ statement that carcinoma of the pancreas is hopeless? In an attempt to answer these questions there follow a review of the clinical problem, the morbid anatomy as revealed at operation and postmortem, a survey of the various attempts in experimental surgery to add to our therapeutic measures, and finally an evaluation of the treatment accorded this condition with particular reference to the present status of the surgical therapy.

Perhaps the most frequent complaint associated with carcinoma of the pancreas is midepigastric pain. At first it is not marked and tends to occur in paroxysms but as the tumor increases the pain becomes severe, boring or grinding in character, extending through to the back. Jaundice often accompanies the pain. It is persistent and gradually increases in intensity. In the majority of instances there is a palpable gall bladder. The patients experience a progressive loss of weight and weakness. Very often from the beginning there is ex-
treme anorexia. With the appearance of the jaundice the stools are clay colored and often bulky due to the lack of absorption of fat from the gastrointestinal tract. A palpable midepigastric tumor is not a frequent finding but does occur. In the latter course of the disease, in addition to marked cachexia there may be ascites and edema of the lower extremities, the result of pressure upon or invasion of the portal vein or vena cava. Now and then one sees patients in whom the first symptoms are due to metastatic lesions such as involvement of the brain, bones or intrathoracic organs. The lapse of time between the onset of the first symptom and death varies from a few weeks to almost three years. When a patient, whose diagnosis has not been confirmed by microscopic section, survives for a longer period it is doubtful if a carcinoma is present. It would appear that starvation is a common cause of death in this malady.

The early diagnosis of carcinoma of the pancreas is in large part dependent upon its being looked for. Unfortunately, no single symptom or physical sign is pathognomonic of this disease and, as emphasized by McCaughn, laboratory data are of little value in making a differential diagnosis. One should suspect carcinoma of the pancreas in those patients who have epigastric symptoms of discomfort, pain, anorexia; who exhibit fatigue, weakness and loss of weight; and who remain undiagnosed after careful investigation. Such patients deserve an exploratory operation. A patient suffering from carcinoma of the pancreas thus diagnosed would more often than not be in the early phase of the disease, and hence be a better subject for operation. Those symptoms most frequently presented as diagnostic of tumor of the pancreas are late manifestations of the disease. Not only may the tumor have extended beyond the limits of surgical removal but changes may have taken place in both liver and pancreas which render operative procedures hazardous.

Although generally looked upon as a rare type of malignant growth, carcinoma of the pancreas annually accounts for four to five thousand deaths in this country. This is of slightly less importance than deaths due to malignant disease of the lungs and pleura combined. Ewing and others report that carcinoma of the pancreas makes up from 1.7 to 2 per cent of the
deaths due to carcinoma encountered in large autopsy series. In 1938, 4,906 deaths were reported as being due to carcinoma of the pancreas among a total of 155,568 ascribed to carcinoma in the United States. For the year 1935, according to a study made by the Metropolitan Life Insurance Company, there occurred 129,063 deaths among the white population in the United States, the result of carcinoma. Of this number 3,940 were ascribed to carcinoma of the pancreas. Of the total malignant tumors of the pancreas 2,199 occurred in men and 1,741 in women. Only .45 per cent of these patients were under 25 years of age; 6.8 per cent were between 25 and 44; 77 per cent were between 45 and 74 years of age; and 15 per cent were over 75. In the various clinical studies of malignant lesions of the pancreas reported there has been a remarkable similarity in the average age incidence, which ranges from 55 to 60 years.

At post-mortem examination the pathologist finds that the carcinoma usually involves the head, body or tail of the pancreas primarily. Duff, in a careful review, estimates that 30 per cent of the malignant tumors are found in the body and tail of the pancreas. It is frequently credited with occurring in the presence of biliary tract disease but this association is by no means constant. There may be extension of the tumor diffusely throughout the gland or there may be what are apparently independent tumors, varying in size from a few millimeters to as large as 11 or 12 cm. in diameter. Generally the tumors are hard and nodular. Metastasis to the regional lymph glands occurs in 90 per cent of the cases coming to autopsy. Retroperitoneal lymph nodes, mediastinal and even supraclavicular nodes may show involvement. Metastasis to the liver occurs in over 50 per cent of the patients. This is not, however, the cause of jaundice, which is usually due to the invasion or compression of the common bile duct and almost invariably occurs if the primary tumor be in the head of the pancreas. There is a tendency to extension into the duodenum and into the pylorus where ulceration may take place. Occasionally the small intestine and large bowel may be involved. At autopsy, peritoneal seeding is present in less than half the cases. Ascites apparently bears little relationship to this but is more often the result of involvement of the portal vein and
vena cava. Skeletal metastasis occurs in 20 to 30 per cent of the patients, seemingly with a predilection to the spine and ribs, although extension to all the bones of the body has been recorded. The nervous system does not escape metastatic involvement of these tumors. The brain, spinal cord and intrathoracic nerves have been found to be the site of secondary tumor growth.

On microscopic examination, tumors of the pancreas may be divided into two main groups. The first and by far the most common is the cylindrical cell adenocarcinoma arising from the duct system. The cells vary from high columnar to low cuboidal with varying staining properties. These tumors tend to slight fibrosis and may undergo cystic degeneration. They are looked upon as being slower in growth than the second type, which arises from the parenchyma. In the latter the cells are large and granular, sometimes fatty, resembling those of the pancreatic alveolae, as pointed out by Ewing. In addition to these two types there are the rare tumors, including the islet cell carcinomas, which should not be confused with the benign adenomas of the islet cell type.

Claude Bernard concluded in 1856 from his experiments that the pancreatic juice was essential for normal digestion. Later investigators, Schiff, Cohnheim and others who followed, were not in agreement. Nemier correctly observed that pancreatectomy is followed by a loss of fat and nitrogen in the stools. Biondi, in 1896, reported a series of experiments in which the transected portion of the pancreas and duct of Wirsung were transplanted into the duodenum without success. Lombroso, in 1908, wrote that when the external secretions of the pancreas were completely excluded digestion was interfered with but this was not incompatible with life. Pratt, Lambson and Marks in 1909 demonstrated that animals deprived of the external secretion of the pancreas showed a markedly diminished absorption of fat and nitrogen as evidenced by large residues in the stools.

Degenerative changes of the liver in pancreatectomized animals were reported in 1924 by Fisher and by Allen, Bowie, McLeod and Robinson. Hershey and Soskin (1932) confirmed these experiments and in addition demonstrated that death of the animal could be avoided if phospholipids such as
lecithin and choline or raw pancreas were included in the diet. Since then this work has been repeated by others. Dragstedt and his coworkers,20 in 1936, isolated from the pancreas what they believed was a fat-metabolizing hormone; it prevented liver changes and permitted survival in depancreatized dogs. This hormone is contained in an extract of the pancreas called lipocaic and, as prepared by him, is effective on oral and subcutaneous administration. According to a recent article by Dragstedt,21 lipocaic is almost free from lecithin and choline. Chaikoff, Connor and Biskind22 in 1938 reported a series of experiments with five year survivals following pancreatectomy in which a special diet supplemented by insulin was used. They demonstrated that there is a sequence of changes in the liver; namely, fatty infiltration, hyaline degeneration and atrophy of the hepatic cells at the periphery of the lobules and fibroblastic proliferation ending with the typical fibrotic lesion of cirrhosis.

Coffey,23 in 1909, successfully transplanted the transected end of the pancreas into the jejunum in dogs and observed that over a period of thirty days' survival there were no changes in the pancreas proper. In 1934, Tripodi and Sherwin24 first successfully transplanted the pancreas into the posterior wall of the stomach. In 1938, Person and Glenn,25 with slight variation in technic, reported a series of experiments in dogs in which the head of the pancreas was resected and the end of the remaining transected portion transplanted into the stomach. These two groups of investigators demonstrated that in dogs the pancreas could be transplanted into the stomach without danger of immediate acute pancreatitis or peritonitis and that the transplanted pancreas retained its function, showing no signs of atrophy. They were in further agreement that lipid deposition and degeneration of the liver is definitely prevented by preservation of the external secretion of the pancreas so that it may be utilized in the gastrointestinal tract. In summary of the experimental work it may be said that although there is a great deal of disagreement among a large number of investigators as to detail, it is commonly agreed that complete loss of the external secretion of the pancreas results in liver damage followed by death. The significance of these experiments is apparent when one inves-
tirates closely the liver changes observed in many of the pa-
tients whose gastro-intestinal tract is deprived of the external
secretion of the pancreas by growths of the head of the pan-
creas, carcinoma of the ampulla of Vater or partial pancreatec-
tomy with ligation of the pancreatic duct. For, in these pa-
tients, liver changes such as described above are often seen.

Surgical therapy directed at carcinoma of the pancreas con-
sists of two types of operative procedures; the first palliative,
the second curative. The palliative operations have as their
purpose the establishment of a communication between the
gall bladder and the intestinal tract for the relief of biliary
obstruction. Cholecystogastrostomy has been the operation of
choice. The palliative operations are not without immediate
danger; in fact various writers reporting case series empha-
size that palliative operations are associated with a high mort-
tality, generally estimated at 20 to 30 per cent. This is not
to be ascribed to the operative procedure but rather to the
debilitated condition of the patient. Unfortunately, following
such palliative procedures, cholangitis frequently develops. In
a liver already damaged from lipid infiltration and hyaline de-
generation, the addition of an infection may result in hepatic
failure and death. However, there can be little doubt that
certain patients owe a prolonged survival period to cholecysto-
gastrostomy which fortunately was not followed by a cholangi-
tis. Whipple feels quite definitely that the incidence of as-
cending infection is diminished by employing a cholecystoje-
junostomy on the Roux principle, in which the fundus of the
gall bladder is anastomosed to the cut end of the jejunum. A
study of many case series leads one to the conclusion that
palliative operations as a whole do not extend the life expect-
ancy although in the individual case they may appear to do so.

The second, the curative type of operation, provides for the
direct extirpation of the tumor. The most successful of these
to date is that evolved by Whipple, Parsons and Mullins, which consists of a block resection of the duodenum and head of the pancreas. This procedure is carried out in two stages. the first consists of establishing a cholecystojejunostomy and a posterior gastroenterostomy. At the second stage of the operation, the duodenum and the head of the pancreas are re-
sected and the divided end of the remaining pancreas closed
over after ligating the duct. To date less than 20 such operations have been carried out associated with a rather high operative mortality.

In the majority of patients carcinoma of the pancreas is diagnosed late, that is, there has already been extension beyond the local confines of the tumor in from 80 to 90 per cent. This disturbing fact justifies a grave prognosis for any carcinoma of the pancreas. The associated jaundice, liver damage and pancreatic impairment are problems of major significance. The necessity of conserving the external secretion of the pancreas is becoming less controversial. It would appear desirable, therefore, in a direct attack upon this disease to remove completely the tumor and to preserve the function of the remaining pancreas both for its internal and external secretions. This is by no means new for it was held by Desjardins in 1907 that radical surgery directed at the pancreas was dependent upon the restoration of a communication between the remaining pancreas and the intestine. This was the basis for a two-stage procedure suggested by him for radical removal of a malignant lesion in the region of the head of the pancreas. These two stages consisted of (a) the reestablishment of the continuity of the intestinal and biliary tracts, and (b) resection of the duodenum and the head of the pancreas and restoration of the flow of pancreatic secretions by pancreaticojejunostomy.

The accomplishment of such a procedure has not, so far as I know, been described. Because of the success of transplanting the end of the transected pancreas into the posterior wall of the stomach in dogs, as done by Tripodi and Sherwin and Person and myself, it is proposed that for those tumors in the distal half of the pancreas resection en bloc with the adjacent duodenum and regional lymph glands be done. The transected end of the remaining portion of the pancreas may then be transplanted into the posterior wall of the stomach, thereby conserving the external secretion of the pancreas by directing it into the gastro-intestinal tract. A new pathway for the bile may be established by cholecystogastrostomy or cholecystoenterostomy. A gastrojejunostomy is then made to reestablish the continuity of the stomach and intestine. The surgical procedure necessary for the accomplishment of this requires
a maximum of skill exercised under optimum conditions. The bleeding tendency associated with jaundice can, if the liver is not extensively damaged, be controlled by the administration of glucose, transfusions, bile salts and vitamin K. The liver may be additionally protected by the use of lipocaic or other similar pancreatic preparations. With the patient adequately prepared and presumably protected from a bleeding tendency and impending liver failure, surgical removal of the tumor may be attempted. Such a surgical procedure, extensive as it is, should be completed in one stage. The postoperative course will undoubtedly be a trying one. However, utilizing the same armamentarium that has been employed to prepare the patient, namely, glucose, transfusions and vitamin K, one may anticipate some measure of success.

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Present Concepts of Iron Metabolism and Their Clinical Implications

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Our knowledge of iron metabolism is admittedly far from complete. Progress has been delayed because methods of sufficient sensitivity to measure and trace the minute amounts of iron which participate in certain phases of its physiological activity have been slow to develop. Yet experimentation during the past two decades has provided us with an infinitely more complete picture of the way in which the body handles iron. It is the function of this review to describe these developments, to direct attention to their clinical implications, and to indicate how they help clarify some of the problems of iron therapy.

Factors Which Influence the Absorption of Iron

A. Gastric Acidity

Iron's first important stopping place in the body is in the stomach. Recent work makes it appear likely that only ionizable iron can be absorbed from the intestinal tract. It apparently is one of the functions of the free hydrochloric acid of gastric secretions to ionize that portion of ingested iron which is capable of being ionized. A few years ago Dr. Elvehjem and his co-workers called attention to the fact that not all of the iron in food can be used for hemoglobin synthesis. Some of it is bound in such firm organic linkage that the gastric free hydrochloric acid cannot dissociate it from its chemical union. This portion is not absorbed from the intestinal tract. Only that fraction of food iron which is ionized in the acid gastric juice is available for absorption. The percentage of ionizable iron in foods varies from about 20 per cent for some of the leafy vegetables to 100 per cent for egg yolk. This demonstration by Dr. Elvehjem has more than academic interest in that it invalidates all previous estimations of the number of milligrams of food iron which must be ingested each day to keep us in positive iron balance, and demands that these
figures be restated in terms of milligrams of ionizable food iron. A similar explanation applies to the question of the relative therapeutic value of inorganic and organic iron compounds. In the organic forms, iron is frequently bound in such a manner as not to be released or ionized under the physiological conditions which prevail in the stomach and upper intestine. Hemoglobin and hematin are classic examples of this type of compound. The iron contained in them cannot be assimilated. There are other organic forms of iron, however—simple salts of iron with organic radicals like ferrous gluconate and ferrous glutamate—which are as therapeutically active, and as readily absorbed as are similar inorganic forms. The whole emphasis in the debate which occurred ten or more years ago about the relative efficacy of inorganic and organic iron in the treatment of the hypochromic anemias was incorrectly placed. It is important only that the iron be in an ionizable form; the inorganic or organic nature of its union is irrelevant except as it influences this property.

Gastric acidity, however, does more than aid in the ionization of food or medicinal iron. It helps to keep it in solution. Most iron salts are precipitated as insoluble compounds when their solutions approach neutrality (above pH 5.0). This is particularly true for ferric salts but, in association with other digesting foods stuffs, applies to the ferrous as well. Insoluble compounds are formed with phosphate, amino acids, proteins, et cetera. Normal gastric acidity prevents this change in the stomach and delays its occurrence in the duodenum.

B. Reduction and Alkalinization of Iron in Small Intestine

When iron reaches the intestinal tract, it is subjected primarily to two influences: (1) the reducing action of the intestinal contents which tends to reduce any trivalent iron to the ferrous form; and (2) the alkaline intestinal juices which favor the formation of insoluble compounds as mentioned above.

The reducing action of the small intestine is of importance to this discussion because there is considerable reason to believe that iron is absorbed largely, if not entirely, in its ferrous form. Absorption can be studied most directly when the increase of iron in serum is measured after a standard test
dose—a technic roughly comparable to that of the glucose tolerance curve. It can be shown very easily that one must give three or four times more ferric iron than ferrous in order to produce a comparable increase in serum iron values. If strong reducing substances are given together with the ferric iron, however, the absorption is quite as good as with an equivalent dose of a similar ferrous salt. These observations provide clear, objective confirmation for the clinical experience of the past few years which has noted that optimum therapeutic effect is provided by much smaller doses of ferrous iron than of ferric. They also suggest that the iron of ferric salts must be reduced to the divalent state before it can be taken up by the intestinal mucosa.

The next question to be answered is this: if the intestinal tract can reduce ferric iron, then why isn’t the absorption equal to that produced by ferrous forms? Explanation is provided by the fact that the intestinal juices are also alkaline and begin to precipitate iron as soon as the reaction of the material delivered from the stomach has been raised to a pH of 5.0 or above. The precipitation of ferric iron is particularly prompt. Only that portion of ferric iron can probably be absorbed, therefore, which is reduced before it is precipitated. We are presented here with a second possible explanation for the greater absorption produced by divalent iron. The intestinal mucosa itself may be no more willing to accept ferrous iron than ferric, but does so because ferrous iron is precipitated less readily and is therefore available to it over a longer period of time.

This concept of what happens to iron in the intestinal tract, while not proved, is probably fairly accurate. Not only does it offer an adequate explanation for the fact that ferrous salts are effective in much smaller doses than are the ferric, but it indicates why such large doses of iron as are used clinically are necessary. Physicians and pharmacologists have been troubled by the fact that only 3 to 5 per cent of administered iron is actually used for hemoglobin synthesis. Why, then, is it necessary to employ doses that are at least 10 to 20 times greater than the amounts of the metal actually utilized by the body? A logical explanation is provided by the simple phenomenon of precipitation. The iron solutions are probably
changed so rapidly to a pH of above 5.0 after they reach the duodenum that only a very small proportion can be absorbed before insoluble compounds are formed. This is, however, probably not the whole of the explanation since Fowler and Barer, and Brock and Hunter have shown that much larger quantities of iron are retained by the body during a period of iron therapy than are used for actual hemoglobin synthesis. The function, if any, of this “extra” iron is not known.

Ferrous and ferric phosphate are among the insoluble iron compounds formed in the intestinal tract. That this combination has special significance has been pointed out by Dr. Diamond and others, for with it phosphates as well as iron are removed from availability to the body economy and cannot be absorbed. It is theoretically possible that such large quantities of phosphate might be trapped in this manner as to disturb the normal relationship between calcium and phosphorus sufficiently to cause rickets. This result has actually been produced experimentally in laboratory animals, but only in rare instances is it likely to be of importance in the production of human rickets.

C. The Site and Mechanism of Absorption

It is thought that the absorption of iron takes place largely in the duodenum. Observations have recently been completed which offer convincing evidence that the mucosa of the jejunum, and to a lesser extent that of the ileum, is likewise able to participate in this assimilation process. It is not known, however, exactly how the absorption takes place. Some workers have postulated that iron merely diffuses into the bloodstream through the intercellular spaces between the mucosal cells; others have concluded that the epithelial cells of the mucosa take an active part by ingesting iron just as they do lipid material. It has been suggested repeatedly that the anion to which iron is attached plays an important role in determining the absorbability of the metal. The statement has been made, for instance, that ferrous chloride is more completely or more readily absorbed than are other ferrous salts like sulphate or carbonate. If comparison is made, however, of the serum iron absorption curves produced by equivalent amounts of different ferrous salts, all seem to be absorbed equally well
as long as they possess the properties of being readily soluble and easily ionized.

Intestinal pathology or irritation may interfere with iron absorption, particularly when it causes enough increased motility to sweep the iron digest mixture past the absorbing portion of the intestinal mucosa at a rate that is too rapid to permit optimum assimilation. During fever and general metabolic disturbances there is also diminished absorption of iron. Patients with advanced nephritis or with terminal leukemic manifestations have never shown significant increases in serum iron after large doses of iron salts by mouth. Subjects who give normal serum iron absorption curves one day have been placed in a fever cabinet the next and the test repeated during the period of induced fever. No absorption seems to occur.

D. The Adequacy of Iron Reserves

The suggestion has repeatedly been made by various investigators that the intestinal mucosa might be able to accept or reject iron according to the needs of the body. This idea has been restated and crystallized within the past year by Hahn and Whipple, who postulate that this willingness or refusal to absorb iron is one of the principle regulatory mechanisms of iron metabolism. When we analyzed the question of selective iron absorption with the serum iron absorption curve technic used in all our studies, however, we obtained data of conflicting character. Some observations tended to confirm, others to deny this possibility. It is difficult to believe that the cells of the intestinal mucosa can function so as to absorb iron selectively only when it is needed by the relatively distant organs of utilization and storage. Fowler and Barer, as a matter of fact, noted that several of their normal subjects retained as much as 6 to 9 gms. of the metal during a 30-day period, while taking 3 gms. of ferric ammonium citrate daily. This figure is made more significant when it is recalled that the circulating hemoglobin of the normal average adult contains only about 2.5 gms. of iron. Yet it is true that iron-deficient individuals will often show greater retention of iron than will normal persons. It is entirely possible that this results not from any selective absorption by the mucosa, but rather from the greater rate at which iron might diffuse into
the blood stream when the iron in serum is low (as it is in the iron deficiency anemias). Since the problem is wholly unsettled, however, and has no obvious therapeutic implications, further consideration of it here does not seem necessary.

**Iron Transportation and Storage**

Iron is transported in serum or plasm and stored largely in the liver, spleen, kidneys, and bone marrow. The way in which iron is transferred from plasma to the organs of storage, the form in which it is deposited there, the cells chiefly responsible for the storage, and the mechanism of remobilization of iron are matters about which there is little exact information.

Pediatricians have a very good reason for being interested in the question of iron storage. It has been demonstrated that the iron stores with which the normal human infant is provided at birth are accumulated largely during the last trimester of pregnancy. Premature infants, therefore, are born without at least a portion of this reserve which normally helps to tide them over the first few months of rapid growth and low food iron intake, and this deficiency at least contributes to the development of nutritional anemia. Iron deficient mothers, likewise, are not able to spare their fetuses all the iron that would be necessary to permit the full complement of prenatal storage. Infants born to them are more likely to develop severe anemias during the first year of life. But if iron therapy is begun in these mothers as late as the eighth month of pregnancy, the fetal iron stores are built up to approximate the normal before delivery at term occurs.

**Factors Which Control the Utilization of Iron**

In discussing iron utilization, we must remember that iron not only serves as a component of the hemoglobin molecule, but is also present in myohemoglobin (the pigment of red muscle), in the nucleus of all cells, and in the respiratory enzymes. But for all practical purposes we are primarily concerned with the use of iron for hemoglobin synthesis. It may be stated parenthetically that we are fortunate that this is so since so little is known about the factors which control iron
metabolism in its relation to these other three functional associations.

A. Factors Necessary as Component Parts of the Erythrocyte

For the sake of completeness, it is necessary to emphasize that iron could not be used for the manufacture of hemoglobin unless the other component parts of the hemoglobin molecule were also available (protoporphyrin and globin). Similarly, the material from which the red cell stroma or membrane is made must likewise be present. It is not certain, however, that any of these factors are ever sufficiently deficient in the human to be directly responsible for failures of iron utilization.

B. Substances Which Stimulate Red Cell Maturation

The synthesis of hemoglobin apparently takes place within the developing red cell. If erythrocytes, therefore, fail to differentiate from endothelium in the bone marrow and a true aplasia of erythroid elements develops, no factory is provided for the putting together of hemoglobin, and iron is not utilized. Similarly, if the red cells fail to mature, the manufacture of hemoglobin is impaired. It is interesting to note that many workers have suggested that iron may have some function to perform in helping to stimulate the maturation of the normoblast to the mature erythrocyte. The evidence in support of this statement is, however, by no means conclusive.

C. Catalysts of Hemoglobin Synthesis

To most of us, liver and copper seem much more intimately related to problems of iron utilization, probably because they have been so widely used therapeutically in conjunction with iron. A number of years ago, Dr. Whipple and his associates observed that dogs made anemic by a systematic program of bleeding and fed a carefully standardized diet, produced more hemoglobin when given liver and iron together than when given iron alone. The additive effect could not be explained on the basis of the extra amount of iron provided by the liver. This “secondary anemia” liver principle was precipitated by 70 per cent alcohol from an acidified aqueous extract of whole liver and could be concentrated in this manner. It is entirely distinct from the antipernicious anemia fraction. Its chemical
nature and mode of action are unknown. Dr. Elvehjem has suggested that its effectiveness is due solely to the copper it contains, but this contention has been vigorously denied. While the “secondary anemia” liver fraction may make the response to iron therapy more prompt, it apparently does not make it any more complete.

Copper, without question, is necessary for iron utilization. The Wisconsin University group of investigators has shown that animals can absorb iron in the presence of a copper deficiency; they can store it; and they can mobilize it from the storage depots. But unless copper is present, they cannot use it for hemoglobin synthesis. The site of action of copper would seem to be in the bone marrow where it probably serves as a catalyst to make possible the assembly of the hemoglobin molecule. The practical necessity for using copper in the treatment of iron deficiency or hypochromic anemias as they occur in the human, however, is by no means so clearly established. Since only minute quantities of copper are necessary, and since the metal is so widely distributed in nature, it is difficult to believe that copper deficiencies ever occur in the adult. It is unfortunate that chemical methods of analysis of sufficient sensitivity to establish or eliminate this possibility have not as yet been developed. We have observed a number of adult patients with hypochromic, microcytic anemia who received copper and iron together after they had first been given iron alone for a two or three week period. In no case was there a second reticulocyte response or any evidence of a more rapid hemoglobin regeneration. The limited diet of infants, however, makes it theoretically more possible for copper deficiencies to occur in them. A number of investigators have claimed more rapid hemoglobin formation with iron and copper combined; others claim to have observed additional rises in hemoglobin with copper after the response to iron alone had stopped. It would seem fair to say that probably not many children develop copper deficiencies. The routine use of copper and iron preparations seems unwise. They should be reserved for those cases in which the response to iron alone is unsatisfactory.

Within the past year, Fouts and his associates have called attention to the relationship between vitamin B₆ and iron utili-
Dogs fed a B₆ deficient diet developed a hypochromic microcytic anemia which failed to respond to iron. When crystalline vitamin B₆ was given, however, there was prompt hemoglobin regeneration. The mechanism and site of action are not clear. No clinical recognition of this type of disturbance in iron utilization has yet been made.

D. Infection and Metabolic Disturbances

Just as infections, fever, and metabolic disturbances interfere with the absorption of iron, so do they also interfere with its utilization. This can best be demonstrated with the use of parenterally administered iron. It has been shown that iron deficient animals or patients use injected iron quantitatively for the synthesis of hemoglobin so that there is a 100 per cent return. In the presence of an infection, utilization is much less complete. Dr. Robscheit-Robbins and Dr. Whipple observed this in their standard anemic dogs. There is no known way in which to correct the faulty utilization except to treat the pathology which produced it.

The Excretion of Iron

The amount of iron excreted by the kidneys is very small. Until recently it was thought that the major responsibility for iron excretion was shared by the liver (bile) and by the colon. This was denied, however, in 1937 by McCance and Widdowson, who described experiments which tended to demonstrate that the ability of the body to excrete iron except by hemorrhage was exceedingly limited. Confirmation of these studies has come from two or three different laboratories. Hahn and Whipple carried the interpretation one step further. They postulated, as has already been stated, that since iron deficient animals seem to absorb iron less readily than do the normal, and since iron once in the body is excreted only very slowly, if at all, the body protects itself against overloading with iron by failing to absorb it except when needed. These ideas about iron excretion are not to be considered as having been established beyond question, but they must be accepted temporarily as part of our “working basis” conception of iron metabolism.

Out of this work has come one important clinical deduction. If iron is not excreted by the body in appreciable amounts,
then iron deficiencies may develop only under two circumstances: (1) when there is rapid growth with increase in blood volume as during infancy and childhood, and (2) in the presence of hemorrhage. Once an individual has attained his full physical growth, poor dietary intake and poor absorption could not, in the absence of hemorrhage, cause a hypochromic anemia to be produced. This interpretation accounts admirably for the fact that about 90 per cent of all iron deficiency anemias in adults occur in women. Their menstrual loss keeps them in precarious iron balance. In rapidly growing children, however, there is need for additional iron as the blood volume increases and dietary inadequacies or poor absorption which interfere with the required assimilation of iron are of greater etiological importance.

Before this discussion is terminated, statement should be made of the fact that there are two, and only two, clinically recognizable criteria of iron deficiency: (1) hypochromia of the red cells, and (2) low serum iron (below .050 mgm. per cent). The second of these two is difficult to determine and is primarily reserved for use in clinical investigation. Hypochromia, then, must be the one outstanding finding without which the diagnosis of true iron deficiency cannot be made. Many of the therapeutic failures attributed to iron are in reality not failures at all since iron is so often used indiscriminately in the absence of hypochromia. It is not reasonable to expect replacement therapy to be of value unless there is need for the replacement. The one indication for iron therapy is the existence of an iron deficiency.

It has been emphasized that our information is still far from complete and that interpretation of our collected data is often highly controversial. As the more complete story unfolds, it is to be expected that our present therapeutic methods will be altered and improved.
The Homer G. Phillips Hospital

T. K. Brown, '24,
Chief of Staff

When it was decided last spring that Washington University Medical School would take over the duties of furnishing a staff to the Homer G. Phillips Hospital, Dean Philip A. Shaffer, after several conferences with representatives of the colored staff of the hospital, set out to organize a white visiting staff from Washington University School of Medicine. This staff was to act in a supervisory capacity over the colored staff and assume responsibility for the proper care of the colored indigent patients of St. Louis.

The Homer G. Phillips Hospital was the outcome of one of the items of the $87,000,000 Bond Issue of 1923. It had been planned to spend $1,000,000 on the development of a colored city hospital. The location of the hospital and the plans for construction were agreed upon during the administration of former Mayor Henry W. Kiel. However, several years elapsed before the hospital was actually constructed. This was during the administration of Mayor Bernard F. Dickmann. When the hospital was finally completed, it cost a total of $3,160,000, and is one of the largest and finest equipped hospitals for the care of colored patients in the United States.

Mayor Dickmann also announced that in so far as it is possible to secure efficient service the management and practice in the hospital shall be placed in the hands of colored people.

The hospital was dedicated February 22, 1937, and opened for patients on June 1, 1937. The institution is devoted exclusively to the treatment of indigent colored sick and injured of the city. The total bed capacity is 685. It is modern and fire-proof in construction throughout. It is situated on a plot of ground covering four and one-half acres and is in the 2600 block, north on Whittier Street.

In addition to the training facilities for doctors and nurses and the treatment of patients according to the best present-day practice, the hospital also gives employment to approximately 500 people, whose yearly salary is in the neighborhood of $367,000.
The equipment is that of a very fine general hospital. There is also included a physio-therapy department which Dr. Frank Ewerhardt is going to undertake to develop and use to its fullest. The pathology department, which is under the supervision of Dr. J. Owen Blache, gives complete laboratory service to the hospital. The X-ray department is under Dr. E. W. Spinzig and Dr. W. E. Allen, Jr. During the past year this department took care of 11,000 patients.

There are unlimited opportunities for the study of various problems which are associated with the colored race. Opportunities are also given for post-graduate training of colored physicians in St. Louis and the vicinity. Most of these colored physicians have taken advantage of the opportunity that is presented to them by the development of this very fine hospital. The house staff at present consists of 52 colored physicians who are given one of the finest opportunities that is available anywhere in the United States for hospital training. This hospital takes approximately 50 per cent of the colored graduates in the United States annually. The training is such that it is acceptable to the various American Boards.

Washington University took over the service on July 1, 1940, for the first time since the organization has been in its new quarters. The co-operation of the superintendent, Dr. Oral S. McClellan, and the medical director, Dr. Henry E. Hampton, has been excellent, and it is felt that there has been definite improvement in the service of the hospital in recent months. During the fiscal year of 1938-1939, 10,571 patients were admitted and 210,940 hospital days were given. During this time the mortality was 1,033. The post operative death rate was .7 per cent, the general mortality for the hospital being 11 per cent. Autopsies were obtained on 43 per cent of available cases during the year. It must be realized that the mortality is unusually high because so many colored patients do not present themselves for hospital care until they are in the terminal stage of their disease.

The maximum number of cases taken care of on any one day by the hospital in the past year was 653. The average number of patients daily is 575. The number of births during the past year in the hospital was 1,277, with a fetal mortality of four per cent, the maternal mortality being .1 per cent. Six
hundred sixty major operations and 702 minor operations were performed during the past year, with a postoperative mortality of .7 per cent. The house staff performed 67 per cent of the operations. This is the policy of the staff in regard to the training of the house staff, that they obtain the majority of operations done in the hospital. Anesthesia was given to 1,455 cases with no death. The type of anesthetic used depends upon the wishes of the operator.

It was decided to admit cases alternately to the colored staff service and the white staff service, and that the white staff physicians could be called upon for consultation on any and all cases and were responsible for the proper care of all cases. At the present time the staff is made up of 55 white and 41 colored physicians.

Dr. Leo Gottlieb is in charge of the medical service, which is composed of 128 beds, with a great variety of the diseases found in the colored race. He and his staff have given liberally of their time and have held weekly conferences which have been very valuable to the house staff and visiting staff. There is adequate opportunity for clinical research on this service as well as material for the teaching of students from the University. Dr. David P. Barr has frequently taken active part in these conferences.

General surgery is under the supervision of Dr. Robert Elman and he has been carrying on some clinical research and conducting weekly conferences, which have been very valuable to the staff. Over 2,000 admissions annually occur on this service.

Dr. Rioch has given a considerable part of his time to the neuropsychiatry department and is bringing a well trained resident to the service this coming year. He desires to do considerable research work in this department as time goes on.

The gynecological service has 57 beds. This supplies very interesting material for two classes in gynecology weekly, to which the staff members are invited. Dr. Arneson acts as consultant in all cases of malignancy. Abortion cases were formerly treated with supportive treatment and sulfanilamide, and the average stay in the hospital was from eight to ten days. We have now instituted a more active treatment with the intrauterine culture and douche method as used on the
Washington University service and without the use of sulfanilamide, which very seldom is indicated. The average stay is now five days. Sulfanilamide has been found to be of no value in the treatment of anaerobic infections and since some 95 per cent of cases are due to anaerobic bacteria, one sees little opportunity for the use of sulfanilamide in the treatment of puerperal infection.

The obstetrical service has 51 beds, with an average of 120 deliveries per month. Most of these patients have had very little prenatal care. The contracted pelvis is frequently seen and we are preparing to study the pelvis by means of X-ray in a rather routine way in the near future to try and determine just exactly what the pelvic measurements are in the colored alone. Probably more Cesarean sections will be indicated. We have one teaching class in obstetrics weekly to which the staff is invited. We also have a monthly conference of obstetrics and gynecology at which time we summarize the cases and report mortality.

It is hoped that the teaching material in the hospital may be used for post-graduate instruction when such courses are offered.

We have had excellent cooperation from the laboratory service, under the direction of Dr. Blache, and are attempting to restrict unnecessary routine tests so that more time may be given to necessary tests in the laboratory. It is interesting to note that the Kahn was positive in 25 per cent of the cases tested last year. The gonococcus fixation test was positive in two thirds of the cases upon which it was run. Further effort must be made to control venereal disease in this particular group of patients.

Many steps are being taken to improve the out-patient department, to which over 63,000 visits were made in the past year. During last year approximately 13,000 new patients were admitted.

The tumor clinic of the hospital has been accepted by the American Surgical Association this past year, and holds bi-weekly meetings on cases with tumors and cancers, and the attendance at these meetings has ranged between 40 and 60 physicians. Dr. Spinzig is chairman of the tumor committee and conducts the tumor clinic. We appreciate his efforts very
much, in view of the fact that most colored physicians have had very little experience or training in the field of cancer.

A blood bank is in use in the hospital and during the past year 51 liters of blood were given from this source. One death occurred following one of these transfusions and was probably due to embolism. Three reactions occurred (febrile).

The second annual meeting of the Medical Institute for Physicians was held March 27-29, 1940 at Homer G. Phillips Hospital, sponsored by the Mound City Medical Forum, St. Louis Health Division, the Tuberculosis and Health Society of St. Louis. Several out of town speakers were invited to the meeting.

We have not spoken of all the services or all of the individuals who have given us service. However, we thank them most sincerely for what they have done. The Mound City Medical Forum, which represents the colored physician of St. Louis and vicinity, has given us the fullest cooperation in our efforts to improve and organize the service of the hospital.

Our purposes are:

1. The best possible medical care for the indigent colored patients of St. Louis.
2. Adequate training of the house staff so they can soon go out and take care of the colored patients of this country in various localities.
3. The further training of the visiting staff, both white and colored.
4. Research on various clinical problems which may improve the health and happiness of the colored patients of our community.
Elisha Hall Gregory

PROFESSOR OF SURGERY, 1870-1905

Dr. Elisha Hall Gregory was born in Logan County, Kentucky, September 10, 1824, the son of Charles and Sophia Pleasants (Hall) Gregory. Both of his parents were natives of Fredericksburg, Virginia who had emigrated to Kentucky in 1820 and who moved to Boonville, Missouri in 1833. Here the boy grew up and was educated. He studied medicine with Dr. F. W. C. Thomas of Boonville, beginning in 1844, and then practiced in that region until he came to St. Louis where he graduated from the Medical Department of St. Louis University in 1849. He first became demonstrator of Anatomy and later adjunct in Surgery at the St. Louis Medical College, then succeeding Dr. Charles A. Pope as Professor of Surgery, held the latter position at Washington University School of Medicine until 1905 when he became Emeritus Professor of Surgery.

He held every office of honor within the gift of the profession. He served on the St. Louis Board of Health and on the Missouri State Board of Health. Both in 1871 and in 1886 he was president of the St. Louis Medical Society, and in 1883 president of the Missouri State Medical Association. He was elected president of the American Medical Association in 1886. On April 15, 1845 he was married to Miss Jael Smallwood, and they had twelve children, one of whom, Elisha Hall Gregory, Jr., graduated from the St. Louis Medical College in 1885.

Dr. Gregory died on Sunday, February 11, 1906 at Ormond, Florida at the age of 81 years, after serving as surgeon to St. Louis Mullanphy Hospital for more than fifty years. In private conversation he expressed his true sentiments when he said: "My greatest pride is that all the honors which I have held have been bestowed on me by my profession." Among these honors was the degree of LL.D., bestowed on him by St. Louis University.

When the St. Louis Surgical Society was organized in 1892 he was elected its first president and served in that capacity until his death. A copy of his inaugural address was recently
discovered and republished in the 1940 Annual Booklet of that society. The address is here reprinted for the edification of the alumni who have not yet had the privilege of reading it.

The St. Louis Surgical Society — Its Objects and Aims
(Delivered Feb. 10, 1892)

Gentlemen:

Dr. F. J. Lutz is the founder of our society. My pride in being its first president is only equalled by my wish for its future success. I feel that the ability, energy and enthusiasm of its members is a guaranty of a lustrous history. Whilst we strive with our might to advance our noble profession, let us be just ourselves and ever mindful of our exalted and delicate relationship to the public. A noble profession should inspire nobility in its votaries.

Our city contains a number of surgeons, who in point of culture, practical skill and reputation are unsurpassed, and to unite them into one harmonious whole for the benefit of all, should be the aim of this association. We hope to make this organization an altar upon which we may monthly lay our contributions to surgical science, thus showing to the world that we are earnest and zealous laborers in the interest of human progress and human suffering. We live in a fast age. Our heritage has come to us in pleasant places and under a propitious sky. Progress stares us everywhere in the face. The surgical profession was never so busy as at the present moment; never so fruitful in great and beneficent results or in bold and daring exploits. The best minds are at work in perfecting our knowledge and placing it upon an immutable basis. Theory has given way to fact. The whole field of surgery is undergoing revision. Operative surgery challenges the admiration of the world. Therapeutic surgery, too, is making rapid strides; surgical pathology was never more zealously or more successfully cultivated. New avenues are constantly being opened, and the importance of the study of pathology in its relation to practical surgery, is daily becoming more and more apparent. In short, in whatever direction we cast our eyes, nothing but the most substantial encouragement greets our vision, and urges us on to increased exertion.

Every department of life is full of examples of the power-
of association in the accomplishment of great purposes, while
the illustrations are almost as numerous of the failure of indi-
viduals to attain those ends, because they work unaided and
alone. They may be conscious of great ability, they may be
enthusiastic workers in the department to which they have
devoted themselves, but in the end they are disappointed, fre-
quently because misanthropic, and complain that they are mis-
understood and misrepresented, when the truth is their failure
is not due to envy or misconception, but to the fact that they
have overestimated their independent effort, and do not seek
the companionship, the sympathy and co-operation of others.

Advance in surgery can be more surely made by associa-
tions, such as ours, than by any individual efforts of men. The
life of one man is too short, and his field of labor too narrow
for him alone to hope to settle many of the varied problems
of our science. The day is past when the dictum of one man,
no matter how exalted he may be, is received without question.
The desire now is to know what the mass of thinking men in
our profession believe, teach and practice, and what is the
result of the combined intelligence of the profession. Few
discoveries of value have been obtained by the observations of
one man; at the first glance they may thus appear, but when
critically examined they will seem to have been gradually ac-
complished and are the outcome of the labors of many years
and many patient workers. After a time some giant in the
profession seizes upon the unarranged material supplied by
the workers; groups and arranges it and one of the mooted
questions in surgery is solved.

Our patience is often tried in many ways; we have to elimi-
nate the rubbish with which we are too often flooded by igno-
rant and ambitious contributors. Fortunately the task is an
easy one here. It is more difficult to know when to reject
materials presented by skilful and unscrupulous workers who
to gratify their own personal vanity, make false returns of
their labors. While these people mislead the younger and do
incalculable mischief they are suspected from the beginning
by the older and more experienced surgeons and sooner or
later are detected.

I have mentioned only a few of the difficulties by which we
are surrounded. Their influence over the true man, the true
surgeon should be to make him more patient, inspire him with more zeal and teach him more plainly the value of cooperative work. The end in view is to save human life, and to lessen human suffering, and for this he can afford to be patient. We know that each succeeding generation will correct some errors of the past and the truth be more and more nearly approached. Surgery has for its basis scientific researches and depends for its progress on scientific observations. Acting in unison and in harmony, without regard to personal aims or individual ambition, but animated by the desire for the progress and development of surgery and concentrating all our power to this end we have every thing to encourage us to believe that the advance of surgery will be more rapid in the future than in the past.

But we can not as surgeons alone hope to determine many of the questions which must arise in our calling. We need and must accept the work of the biologist, the patient disclosures of the pathologist and the chemist, and I might add, that of every known science and art, a knowledge of which the surgeon may some day find of use; indeed there is no calling which demands wider or more comprehensive information.

Again the elevation of the moral as well as the scientific status of our profession is one of the duties we owe to ourselves and the work, and the oftener we meet together, the fewer the professional bickerings and jealousies; old friendships are confirmed, new ones made, and a greater tolerance, charity and good will prevail.

Further, let us not suppose that the formation of a surgical society means a divorce from medicine. Far from it, for the principles of medicine embrace those of surgery. The foundation stones of medicine interpolate with the laws of nature and as the “Vis Medicatrix Naturae” is the basis of successful therapeutics, so the natural haemostatics in the plentitude of nature’s provisions furnish the foundation of operative surgery. But for this ample provision for regeneration and repair, all medicine and surgery would alike be vain. Diseases after all are but injuries, and their results. Inanimate agencies damage but once; animate agencies, with their cunning methods, protract the injury indefinitely; both are alike opposed
by the vital energy and their effects counteracted by the vital resources. All diseases, other than trauma and tumors are poisoned wounds and their consequences.

Permit me again to thank you for the honor conferred, and to congratulate you on our successful inauguration with the promise to cooperate in every effort to advance the interests of our society.

Northwestern Announces New Medical Bulletin

The Quarterly welcomes to the field of medical school publications the Quarterly Bulletin of the Northwestern University Medical School. The new Quarterly Bulletin takes the name and resumes the volume sequence of a previous Bulletin which discontinued publication before the World War. Many eminent figures in medicine are found among the contributors to the earlier Bulletin. An announcement of resumption of publication states that “the contents of the Bulletin will consist essentially of original scientific articles not elsewhere published.” Dr. Michael L. Mason is the editor.

Class of 1920, turn out for the 20th anniversary reunion at the Medical Alumni Banquet, June 1.
News of the School

Dr. L. W. Dean to Retire

Announcement has been made that Dr. L. W. Dean will retire in June as the head of the Department of Otolaryngology in the School of Medicine. Dr. Dean will continue activities in the Department as Professor Emeritus and expects to give his energies chiefly to research.

Dr. Dean, long one of the outstanding figures in American Otolaryngology, came to Washington University in 1928 from the University of Iowa School of Medicine where he had been Dean and Head of the Department of Otolaryngology. He succeeded Dr. Greenfield Sluder, his life-long friend, and proceeded to develop the Department which was already well and favorably known under the guidance of Dr. Sluder. In his hands, the Department has developed into one of the outstanding centers of the world for research and teaching of this specialty.

The work of many of the staff has found its way into the standard literature of otolaryngology and has received recognition here and abroad. Dr. Dean, himself, was the recipient of the DeRoaldes medal of the American Laryngological Society for outstanding service to laryngology. When this was awarded in 1937, there were only three others in existence, it being the highest honor at the disposal of the American Laryngological Society. Dr. Dean was president of the Society in 1924. Dr. Dean is also a fellow of the American Otological Society, the American Laryngological Rhinological and Otological Society, the American Academy of Ophthalmology and Otolaryngology and the Société de Laryngologie des Hôpitaux. At one time or another he has presided over most of these bodies. He is a member of the American Board of Otolaryngology and Editor of the Annals of Otology, Rhinology and Laryngology.

Dr. Dean has always been active in research and in the stimulation of the research proclivities of others. He has interested himself first in the various phases of sinusitis in children and it is due largely to his efforts that this disease has been recognized in infants and young children at an early age when
preventive treatment is so important to the future life of the individual. In recent years, Dr. Dean has concerned himself chiefly with problems of nasal allergy, and he organized a group in the Oscar Johnson Institute for the study of this disease from biological as well as clinical angles. This group has distinguished itself, and its findings are frequently quoted in the literature.

Perhaps the greatest service which Dr. Dean has rendered to otolaryngology, lies in a long line of well trained men now practising the country over, who have begun their careers under his administration. His long experience in graduate education finally culminated in the unique graduate course now being given in Washington University. Planned only a few short years ago for a group of fifteen members, the im-

Dr. L. W. Dean
mediate demand was so great that the number was promptly doubled. At present the group of thirty is annually selected from a large list of applicants.

It is hoped that Dr. Dean will continue to interest himself in these courses and that many long years of life will be granted him in which to continue his fruitful activities.

**Dr. T. E. Walsh Named Professor of Otolaryngology**

Appointment is announced by Chancellor Throop of Washington University of Dr. Theodore Edwin Walsh to the professorship of otolaryngology in the Medical School as the successor of Dr. L. W. Dean who is retiring from the directorship of the department.

Dr. Walsh will assume his duties in Washington University on July 1, 1940. He is now assistant professor in surgery (otorhinolaryngology) at the University of Chicago. Dr. Walsh was born in Calcutta, India in 1900. When six years old he was sent to England for his schooling. He was a student in Cheltenham College and in 1919 entered King’s College of Cambridge University from which he graduated in 1921. His medical study was done at St. Thomas’ Hospital in London. After serving a residency at the Royal Hampshire County Hospital, he served as medical officer on board ship in cruises to Australia, New Zealand and South Africa. For three years he was assistant medical officer in Kuching, Sarawak Borneo, the country administered by the Rajah Brooke.

Dr. Walsh came to the United States in 1928 and has been a member of the staff of the University of Chicago since that time. For the last twelve years he has devoted himself to the study of diseases of the ear, nose and throat and has contributed important and fundamental knowledge with regard to the factors in immunity of the tissues of the nose and throat to bacterial infections.

Dr. Walsh will have charge of the administration of the department and of the conduct of teaching both to undergraduate medical students and to graduate physicians preparing themselves for specialization in diseases of the ear, nose and throat. The principal laboratories of the department are located in the Oscar Johnson Institute which is devoted primarily to studies in the field of eye, ear, nose and throat.
Dr. L. W. Dean, who for twelve years has been in charge of otolaryngology, will as emeritus professor continue active participation in the conduct of graduate instruction.

**Jackson Johnson Scholars Named**

Announcement has been made by Chancellor Throop of the following appointments to Jackson Johnson Scholarships in the School of Medicine for the session 1940-41. Appointment to these scholarships is regarded as a special honor, representing selection from a large number of applicants from 64 colleges located in 26 states of the United States, Hawaii and China. The selections represent students regarded as especially qualified by ability and aptitude for the study of medicine.

**RICHARD ARTHUR JONES**, Westminster College, Fulton, Missouri; now assistant in the department of biology in that institution. Home address 1402 Silverton Place, Richmond Heights, Missouri.

**EDWIN KREBS**, University of Illinois, Urbana, Illinois; a member of Phi Beta Kappa and Sigma Xi. Home address 405 West California Street, Urbana, Illinois.

**ABRAHAM DAVID KREMS**, University of Washington, Seattle, Washington; received his B.S. degree in 1937 from that institution and is a candidate for the Ph.D. degree in Pharmacology in 1940; a member of Sigma Xi. Home address 1607 East Jefferson Street, Seattle, Washington.

**HARL WOOD MATHESON**, University of Illinois, Urbana, Illinois; candidate for the A.B. degree in 1940. Home address 204 South Goodwin Street, Urbana, Illinois.

**JAMES GRIFFITH OWEN**, Monmouth College, Monmouth, Illinois; assistant in the department of biology; candidate for the B.S. degree in 1940.

**Postgraduate Courses Offered in Near Future**

*Obstetrics and Gynecology*, June 3 to June 29.

A four-weeks’ course in obstetrics and diagnostic gynecology, designed for those doing general practice, has for its object to provide a thorough grounding in the modern practice of obstetrics and gynecology. For those desiring to enter the practice of obstetrics and gynecology as a specialty the
course will furnish a sound basis for further work in this field.

Anatomy, June 11, for six weeks.

Dissection. Any of the following parts may be elected for study: head and neck, thorax and upper limb, abdomen and pelvis, lower limb. The course is offered for those desiring to review the subject.

Otolaryngology, September 23, for nine months.

The purpose of the course is to prepare the student for a residency in otolaryngology or for work with a preceptor. The curriculum is not arranged with the thought of making him a finished otolaryngologist. It is prepared so as to build a firm foundation for his development as a clinician. The instruction is not confined to the basic sciences. Those subjects are included in the curriculum which will best prepare him for his work as an interne.

The theory and practice of otolaryngology are studied; operative surgery and bronchoscopy are taught in the dead house and on animals. Particular attention is given to the methods of examination of patients and to diagnosis. The problems of defects and the management of the deaf child are emphasized.

Ophthalmology, October 1, for eight months.

The purpose of the course is to provide a good foundation in ophthalmology on which the student can build further, preferably by ophthalmic internships or by study while engaging in practice. Approximately one-fifth of the time is spent in the study of fundamental sciences as they pertain to ophthalmology.

For further information and application, write to the Registrar's Office.

W. McKim Marriott Scholarship in the Medical School

Gift of C. V. Mosby, Through Alumni Association

A new yearly fellowship named in honor of Dr. Marriott has been established in the Medical School by Dr. C. V. Mosby of the C. V. Mosby Company, publishers of medical books. The stipend accompanying this scholarship is $500, which will provide one year's full tuition in the Medical School for the recipient. Those eligible for the scholarship are students who show
a special promise in pediatrics. The annual award will be made by the chancellor on the recommendation of the dean of the Medical School and the professor of pediatrics.

The gift of this scholarship was made through the Medical Alumni Association. It is highly appropriate that a scholarship, secured by the Alumni Association and established by Dr. Mosby, should be named in honor of Dr. Marriott who gave long and distinguished service as professor of pediatrics and dean of the School, and whose fundamental contribution to infant nutrition was published by the Mosby Company.

The first appointment to the Marriott Scholarship will be made for the session 1940-41.

Dr. Zapffe Visits School

Dr. Fred C. Zapffe, secretary of the Association of American Medical Colleges, visited the School as a representative of the Association on Monday, Tuesday and Wednesday, March 4 to 6. He spent some time in each department of the School, conferred with department heads, and observed the activities of almost all departments. While here, and again in a written memorandum later sent to the dean, Dr. Zapffe expressed a very high opinion of the Medical School. Having visited all other medical schools, his comments and suggestions are based on wide experience and are very helpful.

The Departments

Physiology

Dr. Harmannus D. Bouman, assistant in the out-patient section of the department of ophthalmology, University of Amsterdam, will spend some months in the department of physiology conducting electrophysiological studies on neuromuscular impulse transmission, employing techniques that have been developed in this School.

Dr. Yngve Zotterman, adjunct professor of physiology in the Karolinska Mediko Kirurgiska Institutet, Stockholm, Sweden, spent two weeks in St. Louis familiarizing himself with the electrophysiological studies in progress in this School. During his visit he gave two lectures, one for students and faculty on “The Excitation Mechanism of the Chemoreceptors of the Carotid Body” (with gramophone demonstrations) on
Tuesday, February 13th, another before the "Neurological Institute" of this School on "Electrophysiological Studies of Touch and Pain."

**Bacteriology and Immunology**

Dr. Louis A. Julianelle spoke before the American College of Physicians meeting in Cleveland, April 3, on "The function of Listerella in infection."

**Ophthalmology**

Dr. Meyer Wiener, ’96, was guest of honor January 20 of the Research Study Club of Los Angeles and spoke on the development of corneal transplantation and its present status.

**Pathology**

Dr. Leo Loeb was recently made an honorary member of the French Society of Endocrinology. Others similarly honored were: Drs. Cannon (Harvard), Corner (Carnegie Institute and Johns Hopkins) Evans, (University of California) and William MacCallum (Johns Hopkins).

**Obstetrics and Gynecology**

Dr. Willard Allen, newly appointed professor and head of the department, arrived March 4 to take up his duties.

**Surgery**

Dr. Robert Elman spoke before the Kansas City Academy of Medicine in January on "Certain Surgical Aspects of Protein Metabolism."

Dr. J. M. T. Finney, emeritus professor of surgery at Johns Hopkins School of Medicine, was a recent visitor at the School, and at Dr. Sachs' request, took over his Thursday noon surgical clinic. Introduced by Dr. Sachs, who is his former student, Dr. Finney spoke of the beginnings of antiseptic surgery and of aseptic surgery, both of which came in his early medical career, and of the development of brain surgery since his days as a third year student at Harvard Medical School. It was on Dr. Finney’s surgical clinic at Hopkins, at the same hour on the same day, that our now famous Thursday surgical clinic was modelled.

Dr. John Mulholland, assistant dean and assistant clinical professor of surgery at New York University Medical School, recently spent two months observing methods of teaching in the department of surgery of Washington University.
Dr. Fuang Satyasanguan, instructor in surgery at the Chulalankarana University, Bangkok, Siam, arrived here in October to spend a year on a Rockefeller fellowship observing work in the department of surgery.

Dr. C. C. Chang, of the Peiping Union Medical College and Dr. H. Uchiyama, assistant professor of surgery, Kyushu Imperial University, Fukuoka, Japan, are other recent visitors in the department.

**Otolaryngology**

Dr. C. H. Ling of Peiping Union Medical College is a research fellow in otolaryngology.

Dr. M. F. Arbuckle, was a guest speaker before the Ophthalmological and Otolaryngological Section of the Houston Academy of Medicine, when he gave a paper entitled “Bronchoscopy as an Aid in the Diagnosis and Treatment of Pulmonary Disorders.” The following day, March 16th before the Sedgwick County (Kansas) Academy of Medicine on “Diseases of the Pulmonary Tract.” Prior to this, Dr. Arbuckle had, with Dr. Warren Cole, ’20, been on the program of Annual Spring Clinical Conference of the Dallas Southern Clinical Society.

**The Displacement Method of Sinus Diagnosis and Treatment**


The first edition of this book, published in 1931, contained the physiological, physical and anatomical basis on which the displacement procedure was founded. Chapters were devoted to various solutions used in both treatment and diagnosis. The radiological technique was considered in detail in respect to apparatus, positions and interpretation of x-ray films. Case records were given to illustrate certain points in the diagnosis and treatment of sinusitis embodying the application of the principle of displacement.

Since 1931 there has been a wide acceptance of the displacement method resulting in an appearance of many articles on the subject both in textbooks and in the laryngological and
radiological literature. These have been condensed and incorporated in the second edition, and the bibliography has been brought up to date.

The work on the displacement method was awarded the Casselberry Prize of the American Laryngological Association in 1931.

L. W. D., Jr.

Medical Library

Early in March the Library had a very interesting visit from Dr. Fred C. Zapffe, Secretary of the Association of American Medical Colleges.

The following books are recent additions to the library:
Goldstein, K. The organism. N. Y., 1939.
Heffron, R. Pneumonia. N. Y., 1939.
Homans, J. Circulatory diseases of the extremities. N. Y., 1939.
Jones, C. M. Digestive tract pain. N. Y., 1939.
Kleitman, N. Sleep and Wakefulness. Chicago, 1939.
Lewis, G. M. and Hopper, M. E. Introduction to medical mycology. Chicago, 1939.
Liljencrantz, E., ed. Cancer handbook of the Tumor Clinic, Stanford University School of Medicine, 1939.
Reed, C. I., Struck, H. C., and Steck, I. D. Vitamin D. Chemistry, physiology, pharmacology, pathology, experimental and clinical investigations. Chicago, 1939.
Washburn, F. A. Massachusetts General Hospital, its development, 1900-1935. Boston, 1939.

The following books have been given to the library:
American Association for Advancement of Science. Mental Health. 1939. Gift of Dr. Whitehorn.
Nagel, Charles. Speeches and writings, 1900-1928. 2 volumes. Gift of Dr. Shaffer.
Churchill, Fleetwood. Essays on the puerperal fever, 1850. Gift of Dr. E. Lee Dorsett, from the library of his father, Dr. Walter B. Dorsett.

One hundred years of medicine and surgery in Missouri. St. Louis, 1900. Gift of Dr. E. Lee Dorsett.

Dr. David P. Barr has presented his three volume work, "Modern medical therapy in general practice," to the library, where it is now available for reference.

The Medical Alumni Association

Medical Alumni Banquet

This year's Alumni Banquet will be held on Saturday evening, June 1, at which time the Senior Class will be our guests. An interesting program has been planned, and you can rest assured that there will be no long-winded speeches, political or otherwise. The evening will be devoted to a reunion. Come one, come all, and enjoy rehashing the pranks you pulled while you were in School.

W. U. Alumni Dinner at American Medical Ass'n, New York

Arrangements are being completed for a Washington University Medical Alumni dinner at the American Medical Association meeting in New York City. The dinner is scheduled for Wednesday evening, June 12, the hour and place to be announced later.

Dr. Scott Johnson, '24, 3 East 85th Street, New York City, is in charge of arrangements. Please make reservations with him as early as possible.

Members of the class of 1920 are particularly urged to attend the class reunion at the annual Alumni Banquet on Saturday evening, June 1. You will receive further notification later.
Geographical Distribution of Washington University Medical Alumni—Total Number, 2545. Legend—
Upper Figure: Total Number of Alumni in State. Lower: Number of Alumni graduated since 1930.
Locations and Openings for Practice

The following have been called to our attention by alumni, town officials, or, in some cases, by the local druggists.

Fayette, Missouri. Situated between Kansas City and St. Louis. Has 20-bed hospital. Doctor wants assistant to start in before May 15 at beginning salary of $200, to be increased to $400 at end of two years if satisfactory. Inquire of Dr. Wm. A. Bloom, Lee Hospital, Fayette.

Altamont, Illinois. Alumnus wants an assistant who will later take over his practice. Inquire of Dr. Harry Schumacher, '17.


Point Arena, California. Inquire of Dr. C. E. Edwards, 811 35th Avenue, San Francisco. (Alumnus.)

Springfield, Missouri. Inquire of Mr. Hobart McBride, 540 Commercial. (Druggist.)

Donnellson, Illinois. Inquire of Mr. Harry L. Krummel, Jr., Secretary, Civic and Community Club.


Lorimer, Iowa. Population 900. Inquire of Mr. William Carpenter, 4937 Forest Park Blvd., St. Louis. (College of Mortuary Science.)


Blackwater, Missouri. Inquire of Morgan's Drug Store.


Lathrop, Missouri, and Blue Springs, Missouri. Populations 1000. Inquire of Dr. W. Wallace Greene, Professional Building, Kansas City, Missouri.

Oakdale, Illinois. Four miles from Washington County oil fields. Inquire of J. Finley Towers.

Trenton, Illinois.

Dr. Bert Bradford, '35, wrote in January that there was an internship available in Kanawha Valley Hospital, 110 bed general, approved by A. M. A. Communicate with him, Medical Arts Building, Charleston, West Virginia.

Come to the Medical Alumni Banquet, Saturday night, June 1, and meet your old friends.
Alumni News

Dr. Clarence E. Edwords, St. L. ’74, 811 35th Avenue, San Francisco, in general practice, is a consultant for Children’s Hospital, San Francisco; in 1918 received a citation for public health work from Surgeon General Rupert Blue, P. H. S.; has published: “Campfires of a Naturalist,” D. Appleton & Co., 1892; “Bohemian San Francisco,” Paul Elder Co., S. F., 1914; and is the author of the following manuscripts now in the hands of the publisher: “Bohemian Memories,” “Houseboat Bohemians,” “Old-Time Negro Cookery.” Dr. Edwords writes that, in his 87th year, he is still active but has given up his country work at Point Arena, California, which he mentions as a good location for practice.

Dr. George Vinyard, Mo. ’75, celebrated his ninetieth birthday at his home, Jackson, Missouri. The three-day festivities in his honor culminated with a dinner on March 5, attended by seven of his nine children with their families. Dr. Vinyard has been prominent in Missouri medicine all his life. Though active and in good health, he is now retired, except for an occasional visit to some of his old patients.

Dr. J. F. Roberts, Mo. ’77, Bolivar, Missouri, was honor guest at a banquet and gathering held December 13 by the Dallas-Hickory-Polk County Medical Society on the occasion of his eighty-ninth birthday. Dr. Roberts is an alumnus of both Missouri and St. Louis Medical Colleges and at the editors’ request, he wrote the following for the Quarterly:

“After having studied medicine under Dr. John W. Farmer, a pioneer physician, at my home town of Bolivar, another medical student and I made ready to attend medical college at St. Louis. We boarded a train at Springfield at 7 p.m. and reached St. Louis at 7 the next morning, October 8, 1871. It was the day of the Great Chicago Fire.

“That day we viewed the old St. Louis Medical College at the corner of 7th and Clark, and visited the office of the dean of the School, Dr. John T. Hodgen and of his partner, Dr. H. H. Mudd. There we matriculated and signed up and received cards of admission to the lectures and hospital attendance. We attended lectures at the college each day and twice each week visited the hospital clinics. The faculty were practically all well qualified in their line, and in my opinion were equal to those of any college in the country, both as lecturers and in clinical work. Dr. Hodgen was a very fine surgeon and forceful lecturer. I saw him demonstrate his wire suspension splint for fractured femurs. I also saw many of his operations, the last of which was a laryngotomy. He asked another student and me to remain overnight with his patient, which we did, cleaning the inner tube as needed.

“Dr. E. H. Gregory was a very benevolent, fatherly teacher whose good deeds towards students made him the idol of the whole student body. He was always ready to help financially or otherwise any students who called on him with their problems.

“Dr. John J. McDowell, our demonstrator of anatomy, was a son of
Dr. Joseph McDowell, who, with Dr. John Moore, established the first medical college west of the Mississippi. Dr. John J. was a very likeable teacher and a fine anatomist.

"After the end of the term at the St. Louis Medical College in March, 1872, I returned to Bolivar and for a while practiced at Halfway, Missouri, and from 1872-1876 practiced as an undergraduate at Lewisville, Texas.

"In October, 1876 I entered the Missouri Medical College, which was located at 21st and Christy Avenue. The enrollment that session of 1876-77 was about 175 students. After the final examination in March, 1877, the commencement exercises were held at the old St. Louis Library building on 7th Street. Dr. H. Tuholske gave the class farewell address, and distributed diplomas to about 75 graduates.

"At the time I attended medical college very little laboratory work was done. Immunization against diseases such as typhoid, diphtheria, tetanus, rabies, or any contagious diseases was of course unknown. Bacteriology and biology were very much less understood and only to a limited extent were they taught as sciences."

_class of 1881 has a reunion._ Men may come and men may go, but the class of 1881 is immortal. The 59th annual reunion of the class of 1881 of the St. Louis Medical College, held at the home of Dr. Max Starkloff, found all four St. Louis members present, as they had been last year: Drs. Amand Ravold, 80, James Dickson, '80, Willis Hall, 83, and the host, Dr. Starkloff, 80. The absence of Dr. William V. Guttery, now 91, only other living member of the 44 original members, brought out that he had been too busy with his practice at Middletown, Illinois, to attend. All five doctors are, in fact, actively engaged in practice.

Dr. A. H. Hamel, St. L. '90, who this year is completing 50 years in the practice of medicine, was honored at a reception March 7 at the home of his son, Ellis H. Hamel of Webster Groves. Dr. Hamel was born 73 years ago in De Soto, Missouri, and practiced there for 17 years after graduation from St. Louis Medical College before moving to St. Louis. He has practiced here ever since. He served his country during the World War, is a past president of the St. Louis Medical Society, and of the Missouri State Medical Association. Dr. Hamel will continue in his active practice of medicine.

Dr. John H. Burleson, Mo. '90, Nix Professional Building, San Antonio, is another golden jubilarian, whom the School is proud to claim. He wrote recently: "The practice of medicine has been good to me and a wonderful experience and pleasure all the way. I practice ophthalmology as a specialty and have the certificate of the American Board of Ophthalmology; also have been president of the Texas Ophthalmological Society, and of the State Medical Association." Dr. Burleson is also still in active practice.

Dr. Stuart Lee Baysinger, Mo. '90, Rolla, Missouri, is also celebrating his 50th year in practice. Born in Grand Tower, Illinois, in 1869, he practiced in several small towns in Missouri and Illinois, moved to Rolla in 1900, and became the leading citizen of the town. He was appointed on the Board of Curators of the University of Missouri in
1906, and reappointed in 1912 and 1918. At the end of his last term he was appointed professor of hygiene and student adviser, which positions he held until his retirement two years ago. Dr. Baysinger has been a delegate to the State Medical Association, and for six years was a delegate to the American Medical Association.

F. L. Whelpley, '02, at a recent meeting of the Board of Trustees of the State Hospital at Goldsboro, North Carolina, was reappointed superintendent of the hospital for another 6 years.

T. A. Lawler, '06, Taylorville, Illinois, has been in practice there ever since his internship at City Hospital. He has two sons.

William Abney, '08, recently entered the U. S. Army with the rank of captain, and at last information was located at C. C. Camp 3733, Berryman, Missouri.

Oscar J. Raeder, '08, 270 Commonwealth Avenue, Boston, was last year made full professor in charge of the department of psychiatry at Boston University Medical School. He is continuing as instructor in the department of psychiatry at Harvard Medical School and chief of the department of neurology in the Cambridge Hospital. Mrs. Raeder, in addition to being the mother of five, is president of the Dedham League of Women Voters and has a Master's degree from the University of Iowa. To Dr. Raeder we owe most of the news of the New England group contained in this issue.

H. E. Kleinschmidt, '09, 50 W. 50th Street, New York, modestly writes about himself: "I have no news—plunged into public health during the war and haven't come to the surface yet. Being a medical black sheep will surely not interest your readers."

Frederic Hagler, '10, 20 Maple Street, Springfield, Massachusetts, has been in practice there since 1920, principally doing surgery. An F. A. C. S. since 1922, he is president of the Hampden District Medical Society, treasurer of the Springfield Academy of Medicine and president of the Wesson Memorial Hospital Staff. The Haglers have two daughters, one a senior at Radcliffe, the other a high school student in Springfield.

A. A. Skemp, '17, La Crosse, Wisconsin, is in general practice. He writes: "Happy, but a bit cynical. Wonder about some of the old timers, Drew Luten, Fred T. Murphy, Borden Veeder, and all the rest. What has happened to Clarence Brown, Wattenberg, Schumacher, O'Hora, Moran, etc.? How many have gone to heaven? Editor's note: So far as we know, all except O'Hora (died October 29, 1936) are still alive and going strong."

Lloyd J. Thompson, '19, is associate clinical professor of psychiatry, Yale Medical School, and director of the Psychiatric Service in the community. For the past year and a half he has been psychiatrist in the prenatal clinic of the New Haven Hospital, seeing all the primiparae from the point of view of mental hygiene. He says that the idea grew out of his experience in obstetrics in the Barnes Hospital some years ago.

Grider Penick, '20, is associate professor of gynecology at the University of Oklahoma School of Medicine. He writes: "I am not a prolific writer. It is my conviction that medical literature, at least the
clinical part of it, is filled with too many non-authoritative articles. I have had only seven published in journals." The most recent one he mentions is "Remarks on the Widespread Misuse of Endocrine Products in the Treatment of Gynecological Conditions." South. Med. J., 32: 994, 1939.

Charles M. Gruber, '21, professor of pharmacology, Jefferson Medical College, Philadelphia, has been elected Supreme Archon of Phi Beta Pi Fraternity, to succeed Duff Allen, '19, the present incumbent. Ralph Kleinschmidt, '21, is stationed at Aba, Belgian Congo, Africa, where both he and his wife are missionaries.

Leslie Smith, '23, interned at Barnes and Children's Hospitals, and since then has practiced at Ogden, Utah, limiting his practice to pediatrics in which field, we understand, he has had signal success.

W. P. Neilson, '27, 501 W. Randolph, Enid, Oklahoma, by unanimous vote of the members present, was elected president of the Garfield County Medical Society, and took office January 25.


L. N. Claiborn, '27, is in private practice, doing general and plastic surgery, and is a clinical assistant professor of surgery in the Yale Medical School. Married, has two children, a son, two and a half, and a daughter of nine months.

A. Norman Arneson, '28, and Mrs. Arneson are receiving congratulations on the birth of a son and first child March 8.

C. L. Hudiburg, '28, writes: "I think that most of my alumni friends know that I am practicing obstetrics and gynecology in Wilmington, Delaware, that we have a 19 months old son who we think is unsurpassed. . . . Sorry there is no more news. . . . I wish that any alumnus who gets near here would stop for a visit—I long for news from all the rest."

Joseph T. Maher, '28, after several years of association as a staff member of Koch Hospital, has been appointed superintendent of Madison County Sanatorium, Edwardsville, Illinois. He is specializing in chest surgery.

Abraham I. Kaufman, '29, has been in the Public Health Service since his internship year. For the last nine years he has been stationed at the U. S. Marine Hospital, Chelsea, Massachusetts, where his work is confined to infectious diseases of the genitourinary tract and to the out-patient department. Is happily married and has one daughter, Bernice Frances, aged 9.

E. C. Schmidtke, '31, and Mrs. Schmidtke (Helen Pauley), St. Louis, are the parents of a son, Richard Peters, born March 20.

John C. Wilson, '32, 311 South First Street, San Jose, is in general practice; has a girl 5, and a boy two an a half.

Wilburn J. Wilson, '33, Eccles Building, Ogden, Utah, has been in practice in Utah ever since completing his internship. He is doing general work with an emphasis on surgery.

Dr. and Mrs. C. G. Drum (Helen Aff, '34) are the parents of a baby girl born December 7.

E. R. Bohrer, '34, West Plains, Missouri, is vice-president of the
South Central Counties Medical Society. A son and second child was born to the Bohrers on March 1.

Bert Bradford, '35, writes that he is on the visiting staff of Kanawha Valley Hospital, Charleston, West Virginia, which has recently been approved by the American Medical Association for internship. He suggests that if any members of the graduating class would be interested in an appointment, they write to him. He reports that there are five Washington University Medical graduates in Charleston, three in practice, and two still in hospitals.

Albert H. Krause, '35, is general surgeon at S. B. A. Hospital, Topeka, Kansas. He has been there since September.


James D. Morrison, '36, is associated in the practice of ophthalmology with his father, Dr. William Robert Morrison, 208 N. Broadway, Billings, Montana.

William Y. Burton, '36, has accepted an appointment as professor of radiology at the University of Oregon Medical School, Portland. The Burtons are leaving in the late spring for their new home.

Henry W. Edmonds, '36, is research fellow in pathology in the department of obstetrics of Harvard Medical School.

Barnard C. Trowbridge, '37, has entered the practice of otolaryngology and bronchoscopy in association with Dr. Evan S. Connell, 707 Commerce Trust Building, Kansas City.

John Miksicek, '37, is a junior medical officer, resident in psychiatry, at St. Elizabeth's Hospital, Washington, D. C.

Henry J. Lane, '35, is instructor in the Out-Patient Clinic for Ear, Nose and Throat at Stanford University School of Medicine, and is consultant in Ear, Nose and Throat to the Out Patient Clinic, Children's Hospital, San Francisco.

Nathan R. Kahn, '36, announces the opening of his office at 255 Eastern Parkway, Brooklyn, New York. His practice is limited to pediatrics.

Wallace E. Allen, '36, lieutenant (junior grade) U. S. Navy, is at present assigned to duty with the U. S. S. Lexington, the Navy's largest carrier. He expects to leave April 1 for 6 months' duty at Honolulu.

Warren B. West, '36, 905 S. First Street, Champaign, Illinois, has entered practice and is radiologist for the Burnham City Hospital, Champaign, and the Mercy Hospital, Urbana.

William R. Young, '36, is assistant professor of pediatrics at the University of California Medical School and Hospital, San Francisco. He is a first lieutenant in the Medical Reserve.

Orwyn H. Ellis, '36, announces the opening of his office in the Wilshire Medical Building for practice limited to diseases of the eye. He served an internship, assistant residency and residency in the depart-
ment of ophthalmology at Washington University.

Edward A. Miller, '36, is resident surgeon at the Arizona State Hospital, Phoenix.

Carl W. Smith, '36, recently moved from St. Louis to enter practice in Dubuque, Iowa. He has opened an office in the Roshek Building. Dr. and Mrs. Smith have two children.

Ellsworth H. Trowbridge, '36, is resident in neuropsychiatry at the Massachusetts General Hospital, Boston, and has a one year appointment, beginning September 1, as one of the chiefs at Boston Psychopathic Hospital. Following that he expects to enter practice in Kansas City. He is a first lieutenant in the Medical Reserve.

Philip Mountjoy, '37, and Mrs. Mountjoy are the parents of a son and first child, John Robert, born May 14 last year.

Robert Rutherford, '37, has opened an office for practice in Carlinville, Illinois. Mrs. Rutherford, nee Dorothy Dickey, ex. '39, has become a leading matron of the town.

John B. Bourland, '37, 4902 Swiss Avenue, Dallas, Texas, is working in obstetrical and gynecological pathology at Baylor University School of Medicine. He has an appointment, effective July, 1940, to July, 1942, as resident on obstetrics and gynecology, Kensington Hospital for Women, Philadelphia.

Dorothy Gill, '38, (Mrs. Henry Edmonds) after a six months' service at Willard Parker Hospital in New York City, is now a resident on contagion at Belmont Hospital, Worcester, Massachusetts, and is a frequent visitor to Boston where Dr. Edmonds is working.

Loren F. Blaney, '38, completed an internship in medicine at the Yale University School of Medicine, is now working in the department of medicine there.

Robert Brookes, '38, leaves in April for New York where he has an appointment at the Neurological Institute.

Marion Dakin, '38, is a house officer at the Bellevue Hospital, New York City.

Warren F. Smith, '38, has an appointment in surgical pathology at Barnard Skin and Cancer Hospital, and an appointment, effective July 1, at the Royal Victoria Hospital, Montreal.

Ernst Zander, '39, is in the medical department of Winthrop Chemical Company, 170 Varick Street, New York City.

In Memoriam

Albert Edward Adkins, Mo. '87, Norborne, Missouri, died in January, aged 80.

Cyrus Hilary Anderson, Mo. '98, Elgin, Illinois, died December 18, aged 70.

John A. Bowles, '07, Tacoma, Washington, died in February.

Benjamin F. Brittain, Mo. '88, Putnam, Texas, president of Eastland Callahan Counties Medical Society, died November 26, aged 74.

George O'Bryant De Bar, Mo. '74, Eugene, Oregon, died January 27, aged 90.

Charles Nash Dawson, '25, Black Earth, Wisconsin; served during the World War; died December 26, aged 41.

Andrew Jackson Fitzgerrell, Mo.
William Francis George, St. L. '89, San Benito, Texas, died in February, aged 74.

Robert Lee Hardwick, Mo. '86, Mount Vernon, Indiana, for many years county health officer. Died January 5, aged 76.

Franklin P. Hulen, Mo. '85, Wichita, Kansas, died in December, aged 77.

Alexander Crump Kirby, '17, Little Rock, Arkansas, assistant professor of pediatrics at the University of Arkansas School of Medicine; served during World War, formerly on advisory council of the maternal and child health division, and consultant to the state board of health. Died November 4, aged 47.

Otto L. Rohlfling, Mo. '96, St. Louis, died November 14, aged 64.

Argolis O. Varner, Mo. '82, Union Star, Missouri, died in December, aged 87.

Student News

Basketball

In the Intramural League for graduate students, the Medical School contributed four teams, but the dentists' team came out on top, winning five games out of six. The Junior and Frosh medical teams were tied for second place with the biologists — each team won three games and lost three. The sophomore medics and the lawyers each won two games while the Seniors, showing their age, managed to win only one game.

Because of the interest shown in the Basketball League, the Intramural Department plans to have a similar set-up for softball and the medical students have already indicated that they will participate.

Rugby

The medics opened defense of the City championship with a close victory over a new team in the league — the Hips Athletic Club. This year the medics are depending on the younger students as many of the seniors who formed the nucleus of the two championship teams have reached the age of discretion. As in the past, the St. Louis champions will meet the Chicago Northernns in the St. Louis Public Schools Stadium. The Chicago team has several former football stars on the team, including All-American Jay Berwanger. We keep our fingers crossed.

A. M. S.

On April 11 the A. M. S. will present Dr. Julius Jensen, who is to give an illustrated discussion of Medical History. Dr. Jensen's talk has been presented before several lay groups and has always met with an enthusiastic reception. The Medical School Auditorium is the scene for this lecture which will be given at 8:00 o'clock in the evening.

Senior Journal Club

The Senior Journal Club has had meetings each month with exceptionally good turn-outs. Dr. Hartmann and Dr. Hobbs have presented papers and recently Dr. Graham discussed British Medicine.

In Memoriam

PAUL GILSTER, '41

On the 26th of January, Paul Gilster succumbed to an attack of bacterial endocarditis. Throughout the
ten months of his illness, although aware of its seriousness, he main-
tained a high morale.

Marriage
Russell Jackson Crider, '40, to Jane Alger, December 29, 1939.

Medics' Wives Meet to Form Society
On Thursday evening, March 28, about 45 wives of medical students
and interns met at the Washington University Nurses' Residence. Ten-
tative plans were made for organizing a permanent society to be
known as the Dames' Club, or by a similar name.

The guest speaker for the evening was Mrs. Helen Vance Wil-
liams, style writer for the Globe Democrat, who discussed styles and
plans for an economical wardrobe. Refreshments, contributed by mem-
bers of the group were served, and Mrs. Arthur Gilson, guest of honor
of the evening, poured.

Three more meetings of the club are scheduled for this school year. Of-
icers for the coming year are to be elected at the last meeting.

Wives of students and of W. U.
men interning in St. Louis are wel-
come to these meetings.

Virginia Merrill.

See your old friends at the Alumni Banquet, Saturday even-
ning, June 1.
PLEASE CONTRIBUTE NEWS for the Quarterly and Information for the Alumni Office using the following form as a guide and sending your response to Mrs. Nancy O'Leary, Washington University School of Medicine.

Full name (print) .................................................................

Class of ......................

Office address: number and street, town and state ..............

Membership in medical and other scientific societies and offices held .................................................................

Field of work (as general practice, ophthalmology, public health, pathology, teaching, investigation, etc.) .................................................................

Connection with hospitals and schools .................................................................

Army and Navy (branch and rank) .................................

Papers published in present year (title, journal, volume, pages, and date) .................................................................

Books published (give full title, publisher, place, date, number of pages, illustrations) .................................................................

(OVER)
Editor or associate editor of medical or other scientific journal. Election to honorary societies (name of society and date of election). Honorary degrees, citations, medals, prizes

Member of scientific expedition, medical survey

Recipient of fellowship or of grant-in-aid of investigation

Connection with or activity in any other province of medicine not covered by the above

Have you a son or daughter entering the School next year?

Recent marriage—name, date and place

Recent birth—sex, date

Death—name, class, date of death, place

Desirable location for practice: town and state, number and street

Remarks

Write a letter of 200-250 words to the Quarterly for publication.

Please donate to the Library of the School of Medicine copies of books and reprints of papers you have published. You will confer a benefit to the Library and help to establish a record of the literary contributions of our graduates and faculty.