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Quarterly

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About the new Quarterly

With this issue, the first number of volume six, the Wisconsin Medical Alumni QUARTERLY dons a new set of clothes which will display in homes and offices of medical alumni around the world.

Contributing to the new look, and the feel, of this and subsequent issues are several changes. Most noticeable, of course, is the new cover design with color, which was done by commercial artist William Pope. On the inside pages a new type face is being used because of its openness and readability. In addition, also, the extra spacing between lines. Even the headlines used to introduce the regular sections, Alumni News, Medical School News, etc., have a new look.

The paper used is much heavier than that used in previous issues, especially the stock used for the cover. With this heavier paper the QUARTERLY should hold up much better in the mails, and, we hope, during the reading.

This month, the art on the cover is an allegory by Tony May. Mr. May, who has done two other covers for the QUARTERLY, took his inspiration from the history of medicine in an article by Dr. Triolo. After some deliberation, the Editorial Board decided not to explain its meaning, but instead will let the alumnus decide for himself. The art within Dr. Triolo's article is also by Mr. May.

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FROM THE MAILBOX

Dear Bill and All Those with Other Names:

To my great regret, I find that I shall not be able to meet my announced deadline of December 25, 1965, for the history manuscript. There are just too many clinicians to describe briefly and with appreciation and too many difficult decisions to make. If I can only hang on a little longer, the hoped for happy day when I shall be able to throw the manuscript on Dr. Mischa Lustok's desk may come a month later, on January 25, 1966. "Dogged as does."

I am happy to report that Dr. Middleton has consented to write a Foreword for the "history." That will please all alumni and will lend color. His spectacles contain more rosy colored lenses than do mine.

Possibly some of the older alumni will remember that silly old street song, of three or more decades ago entitled "Yip - I - addy - I - AA." It runs something like this:

Yip - I - addy - I - A; I - A

Yip - I - addy - I - AA

I don't care what becomes of me

When you sing me that sweet melodee

Yip - I - addy - I - A, I - A

I'd like to holler Hooray!

Sing of joy, sing of bliss

Home was never like this

Yip - I - addy - I - AAA

That is the song I hope to sing next January 25th or if not then, on February 25th. Please come and join me in the chorus—Yip - I - addy - I - AAAA.

Paul F. Clark
Emeritus Professor of
Medical Microbiology

P.S.—A number of letters from some of our two-year medical men have been received. Actually the two-year graduates have been more generous with their letters and expressed good wishes than the four-year graduates. Is that because we were smaller and more closely tied together at that period?

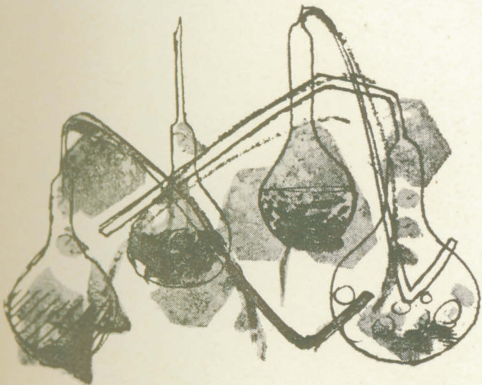
Some of the two-year graduate letters follow:

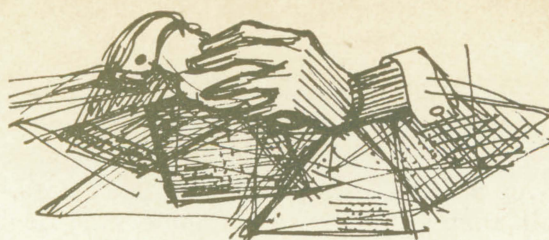
To Dr. Clark: □

During the time when we were in the Student Army Training Corps, (known to some as "Safe At The College"), twelve of us, who were student instructors, were quartered in the dining room of the old Phi Delta Theta House at 620 Lake Street. We had the rank of sergeants and felt somewhat privileged, I suppose. The captain who was our commanding officer was an officious young man recently graduated from the officer's training school at Camp Custer, Mich. One afternoon we all received our inoculations of typhoid vaccine. The next morning most of us felt very badly: headache, chills and a fairly high fever. It was a rainy, cold day and when we received the order to report early in the afternoon to act as a military guard of honor for President Van Hise's funeral, we decided that we were too sick to expose ourselves and we all went back to bed. Imagine the surprise of our young commanding officer when he found us comfortably in the sack after his return from three hours of standing about in the cold rain at the funeral ceremonies. He flew into a rage, had us dress and then stood us up in front of the rest of the company as examples of soldiers who refused to obey orders. He then ordered us to a roofless, half-torn-down barracks where we scrubbed floors for an hour in the rain.

This was the time of the influenza epidemic and the following day all but two of us were in the infirmary with the flu. The sad result was that eight out of 12 in that room died of the flu. I understand that the officer was later court martialed, but I am not sure what his punishment was.

I am very glad to hear that you are still active and hope that you are enjoying the





work. Please give my very best to Mrs. Clark and be assured that I always remember you with great affection.

Herbert B. Wright, M.D.
Cleveland

□

To Dr. Clark:

My time at Wisconsin was longer than most medical students as it was my privilege to be a member of the medical microbiology department for a few years. It was during this time that I really got to know another side of the faculty. The course in medical bacteriology, as it was called in those days, was one of the big hurdles for every medical student. You added to the awesome task by your serious approach to each student and each question. You always tried to get the student to think for himself. Those of us who got to know you better and saw the less serious side to your nature were pleasantly surprised by your keen and delightful sense of humor, and your interest in music. The following incident comes to mind.

Bill Preston and I were at our desks in the room near the top of the stairs. The first we heard was the "Chief" laughing loudly as he came up the stairs to the fourth floor. Since you were so amused, we both thought that we would share the humor and dashed out to meet you. You were laughing so hard that you could barely speak. You would laugh and then point to a cartoon in a magazine you were holding and then laugh again. We both started to laugh with you long before we saw the picture. You gave us the "New Yorker" and pointed to the cartoon. It was a picture of a football field and a huddle of players. The quarterback was angry because one of the biggest men on his team, who seemed to have more of the characteristics of an ape than a human, was not "getting" the signals. The retort of this individual was the caption for the cartoon. It went something like this. "But how can I hear the numbers with Brahms buzzing in my head?"

I have thought of this incident many times and the happy days that I spent with you at Wisconsin.

Horace R. Getz, M.D., '33, Class
Section of Tuberculosis Control
Nevada State Department of Health

□

To Dr. Clark:

Far back over the years, 42 to be exact, I recall with deep gratitude the part that you, Henry Bunting, Harold Bradley and others played so importantly in my life.

I landed in Madison in the fall of 1918, an immature and impoverished veteran of the Navy of World War I. I had the eager enthusiasm about the basic sciences and medicine, but little else. You and the above-named great men sort of took me under your wing and gave me the opportunity to become a happy and, I hope, a useful practitioner of medicine.

There I met my fiancee and this early summer we passed our 42nd wedding anniversary, and I don't believe that any years could have been happier than those we have enjoyed together.

As you may recall, I was at Madison during my first two years of medicine which included in four years of undergraduate work from 1919 to 1923, during which time I assisted in the department of pathology. After my M.D. from Washington University of St. Louis and three years of hospital residence at Henry Ford Hospital in Detroit, I have been a happy and reasonably successful practitioner here in Seattle. I have a host of friends and my life here has been in every manner a happy one.

About ten years ago, I thought of retiring and moved to a 25-acre patch of pasture on the shore of Lake Washington. Marion and I have had nursemaids to a small herd of registered Herefords. The hobby has been extremely pleasurable and not entirely financially profitable. I believe that it has been a stepping stone to ultimate retirement which cannot be postponed for very many years.

years.

I have made no astounding medical discoveries, have published only a very few papers; but if I had to live my life over again, I cannot think of a single detail that I would change.

If Fran Holford is still there, give her an affectionate squeeze for me.

John S. Lingenfelter, M.D., '25
Seattle

□

To Dr. Clark:

Just before I left you, there being only two years at Wisconsin Medical School yet, we had to apply to a school to finish. I had chosen Washington University, Iowa and Illinois, and had used my application blanks and photos on these. Dr. Bardeen called me in

and changed the blanks showing preference for Rush Medical School, and urged me to go there if I could. Respecting him, I applied, but had no photo, so I took a snapshot I had at home in which I was holding an antique Bisque French doll baby life size. I cut off the top rapidly and sent it in. When accepted at Rush, the registrars wanted to know if I was married? No! Well, how's the baby! What baby! Then they showed the photo to me and the last 1/8th inch at the bottom revealed enough to show I was apparently holding a baby, and they were all curious about it. These dolls today are very valuable and my sister in Madison has it.

Robert L. Holcombe, M.D., '26
Highland, Illinois

MOVING SOON?

If you plan to move to a new address in the near future, please let the Medical Alumni Association know where you are going. The association is undertaking some exciting projects, and significant things are happening in the Medical School. If we have your new address, we can keep you informed as developments occur.

Happily, we are one of the few publications that does not require three weeks or a month of notice. We promise to change your address in one day (It doesn't matter much anyway—we only publish quarterly.) The form below is for your convenience. If you lose it, just send a letter. The address is: *Wisconsin Medical Alumni Association, 418 N. Randall Avenue, Madison, Wisconsin, 53706.*

NAME ----- CLASS -----

NEW ADDRESS -----

OLD ADDRESS -----

DATE OF MOVE -----

ANY NEWS -----

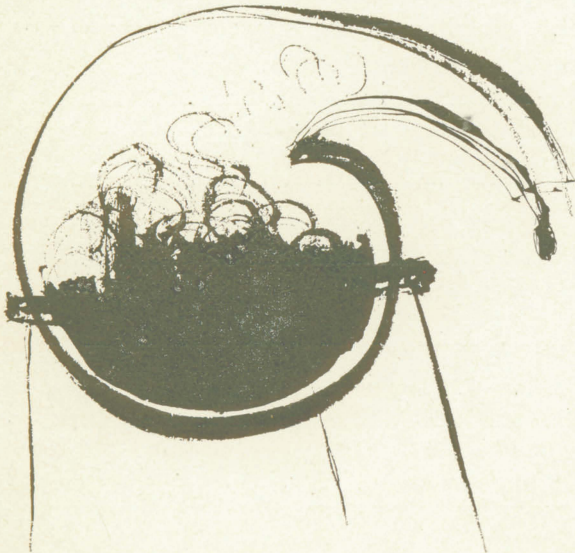
The real attributes

By MISCHA J. LUSTOK, '35
EDITOR

Our Medical School, as well as many others, is concerned with a revision of the curriculum. We, the physicians in community practice, are concerned too.

The principal product of a medical school is the practicing doctor. There must be something wrong with this product. When scientific advances in medicine have given this nation the best health it has enjoyed in history, when the professional skills of the physician have prolonged the life expectancy closely approaching the biblical three score and ten, when technical advances have almost eradicated a host of infectious diseases and are on the threshold of unraveling the complexities of metabolic, genetic, neoplastic and degenerative disorders, when all of these wonders are readily available even in the remote areas of our nation—why is the public image of the doctor in low esteem? Where is the reverence, where is the adulation of the physician of a quarter of a century ago? Where is his erudite status in our society? What is wrong with the product of our medical schools?

The vast accumulation of knowledge in the fields of medically related sciences and its



interdigitation into the total complex of medical discipline have made it virtually impossible for the medical student to absorb and comprehend the experience. The planning of the curriculum has been more concerned with what can be safely left out, than what must be essentially put into the student. The product of the medical school has become a vessel to be filled to maximum tolerance with facts, experimental data, and controlled observations with double blind studies.

Has the student been given time to think? Has he been trained to seek the "what" of observation rather than the results of the observation, the "why" of experimentation rather than the result of the experiment, or the "how" of clinical management rather than the control? Has the striving for a status in the pecking order of grantsmanship of our medical school faculties relegated the warmth and intellectual stimulation of Oslerian rounds to extinction?

We do not deny that the medical student of today leaves his medical school better equipped in the scientific basis of medicine and perhaps better prepared to make intelligent use of the technical modalities than his colleague of years ago, but that is not to deny that the older physician has shown himself fully capable, while engaged in the practice of medicine, to learn twice as much as he knew when he graduated to keep in creditable pace.

What the older physician carried away from his school, what he still has today, and what is obviously lacking in the recent graduate is the warmth of human contact, the empathy with the patient intrusted in his care, the personal interest and deep concern for his patient's welfare, the feeling of responsibility that he can impart, and above all the deep sense of obligation he carries to the community in which he lives and which he properly serves.

We realize that the teachers who have the responsibility for evolving a full curriculum for the medical student of the future are hard pressed to find all the pro-

niches which must be filled with an awesome and overwhelming accumulation of scientific knowledge. Those of us who feel that the profession of medicine is a dedicated calling and a way of life, not just a sterile technique, would humbly suggest that some of the scientific facts may well be left to be learned later and room be allowed in the teaching and learning experience of the medical student to absorb everlasting philosophies and attitudes which lead to a reverent approach to the practice of medicine in the service of man, for it is here that lie the real attributes of the physician.

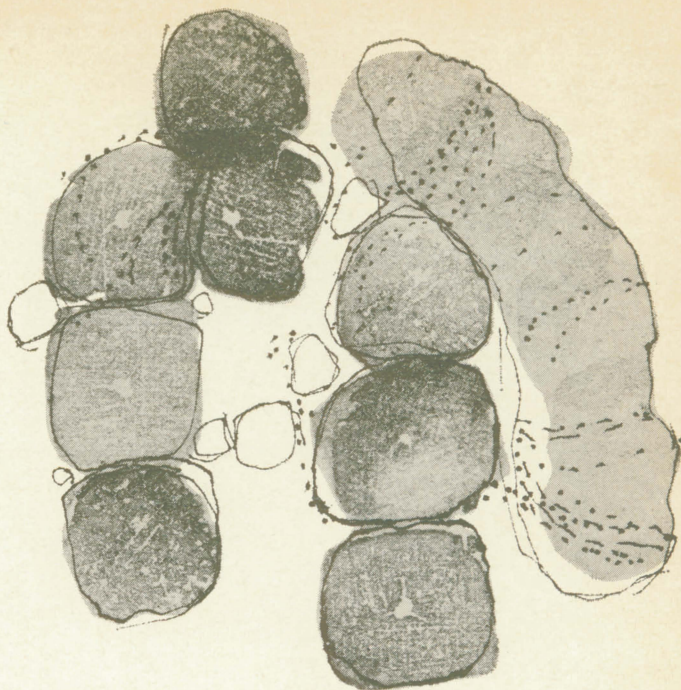
When we again assume the posture of sincere involvement with the traditional covenant of our healing art, when we again become sincerely interested participants in the flow of our communal life, when we again dedicate ourselves to human and moral values, and in this setting bring our vast technical skills to those who place their trust in us, then, and only then can we expect to regain the honored place which has been our heritage.

Our objectives

BY HERBERT W. POHLE, '38
PRESIDENT

While driving home one recent evening, I had abundant opportunity to ponder a question I'd been asked earlier in the evening—"What are the objectives of the Wisconsin Medical Alumni Association?". I was returning to Milwaukee from Green Bay where I had attended a most successful Upstate Meeting of the Association. Here more than 40 busy physicians had taken the time and made the effort to attend a dinner and spend an evening with their colleagues. They had come to meet the new dean, Peter Eichman, and to see their former teachers, Otto Mortensen and Herman Shapiro. The fellowship and the renewing of old friendships would have made it a worthwhile effort, but there was more of significance to the meeting.

Assistant Dean Thomas C. Meyer gave a report on the Medical School's plans—some already in operation—for bringing every Wisconsin physician in to closer contact with the Medical School teaching community. These plans include the exciting prospect of even returning for "preceptorships" at the



University Hospitals to reorient us in the academic world.

Dean Eichman then outlined the present position of our Medical School and discussed the issues presently confronting us. The plan for the medical school of tomorrow was clearly drawn.

Then there followed a stimulating question and answer period. The breadth of the issues covered, the depth of the questions posed, the frankness of the answers given, left no doubt that these physicians had gathered for really one reason—they had a strong attachment for their School. They had a genuine concern for its future. They wanted to be reassured that Wisconsin would always be in a position to accept only one kind of student—the best! They wanted to be certain that Wisconsin will always be equipped to train and graduate only one kind of Doctor—the best! By his straightforward discussion, Dean Eichman left no doubt that he shares these objectives.

When the meeting finally broke up, it was apparent that these alumni had learned much about "what goes on in Madison." They had a better grasp of the issues that confront the Medical School administration. They again felt that they were a part of the University effort. They know their support is fundamental to the success of the Medical School. But just as important, Dean Eichman took away from the meeting a clearer picture of the issues as "seen from the other side." This is a picture he could have gotten in no other

way! The force that brought the School and the alumnus together was your Alumni Association. Projects that grow out of this experience will be the expression of the Medical Alumni Association at work. Strengthening these bonds in both directions—acting as the vehicle for translating ideas into action—these are our objectives!

The dean's corner

BY PETER L. EICHMAN,
DEAN

The first eight months as dean have been very exciting and stimulating. There is a sense of ferment, movement and anticipation in the faculty. The new library building provides a reminder of our progress and unity with the Alumni. We are looking forward to occupying it in about seven or eight months. There is much speculation concerning a long-range major building program: We may be constructing some clinical buildings near the Veterans Administration Hospital, and at the time of this writing, it is planned to submit the program to the Regents in January.

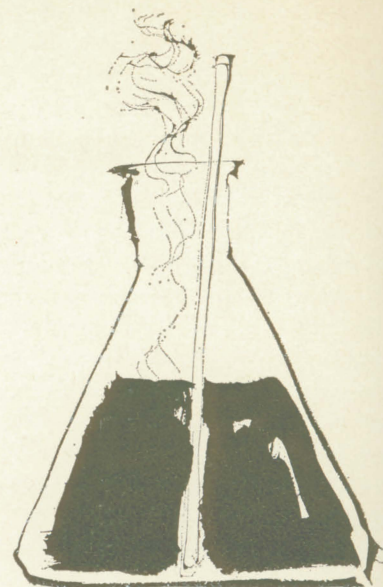
I had an interesting visit with the alumni in Green Bay. I was most impressed with the enthusiasm, the warmth and loyalty expressed by these men. Some came as far as 60 miles away for dinner. Dr. Mortensen and Dr. Shapiro accompanied me, and we were quite proud to have Regent James Nellen in our midst as an alumnus.

I believe we will have some major news for you in the next month or two regarding expansion and the new building. Until then . . . best wishes and a good year in 1966!

Southwest correspondence

BY JACKMAN PYRE, '37
SOUTHWEST CORRESPONDENT

H. Thompson Avey specializes in internal medicine in Oklahoma City, with a "hobby" of gastroenterology. He left Madison in 1939 and following his postgraduate work has remained there, except for two years (1951-1952) spent in Anchorage, Ala., as chief of the medical service of the USAF 5005th Hospital. He says his hobbies are "talking about fishing and hunting with occasional brief



trips to the field and streams to get material for talking." Makes me wonder much work he got done in Alaska.

Dr. Avey is associate professor of medicine at the University of Oklahoma Medical School, and mentions Dr. Mark Johnson, member of the Board of Regents of the University of Oklahoma and treasurer of Oklahoma State Medical Society, who interned at Madison. He states that Loyd Conrad, a cardiologist and fulltime professor of medicine at the University of Oklahoma Medical Center, took an internship at Madison as a consin General. Also, he says, Jack Kuh, a gynecologist in that city, interned at W.G.H. They all "thoroughly enjoyed having Middleton here as guest professor of medicine from July, 1963, through July, 1964.

He has written several papers having to do with gastroenterology and is active in community affairs as the youth program committee of the YMCA, the advisory board of the Visiting Nurses Association of Oklahoma City and, is a past president of the Bar Memorial Hospital, and past president of Oklahoma Society of Internal Medicine.

A. Edgar Robinson of Salt Lake City, Utah was a second-year resident at W.G.H. in anesthesiology, in 1954-1955. I could not gather from his letter whether he gradua

from Wisconsin or not. He states that Harry Wong and Ronald J. Szymanski, associates of his in anesthesiology, are also from Wisconsin. He has four children, the oldest five years old and, his hobbies are family, home, boating and camping.

Eugene J. Faux does not tell me what year he interned at Wisconsin. He is a psychiatrist at the Utah State Hospital in Provo, in charge of the children's unit. He is past president of the Utah Psychiatric Association, editor of "Provo Papers," has five boys, likes music, golf, fishing and writing.

Richard Toll is a relative newcomer to Tucson. He graduated from the University of Wisconsin Medical School in 1954, spent three years in the Army, three years in general practice in Shawano, three years doing a roving orthopedic residency in Salt Lake City and then came south. He married Ann McDonald of Madison and has girls age 14 years and 18 months and a boy age 10. He tells me that right now his hobby is studying for orthopedic boards. He is an able, busy and popular orthopedic specialist in this fast growing City of Sunshine.

Senior class report

BY GLENN L. WHITECOTTEN,
SENIOR CLASS PRESIDENT

Shortly after entering medical school, I can remember observing seniors greeting one another as they returned from preceptorships. In each instance, the sentence, "I had a wonderful time," began the conversation. Having myself recently completed the preceptorship quarter, I join those who have enjoyed and benefitted from their experiences.

The preceptorship is in many ways the most profitable assignment of our medical education. It is during this time that we gain an intimate glimpse into the types of lives for which we have been preparing. Our training has provided us with a fund of information, but quite frequently it bears a somewhat disunited or disjointed character. During the preceptorship, however, many situations yield themselves to the pooling of the information gained through our university training.

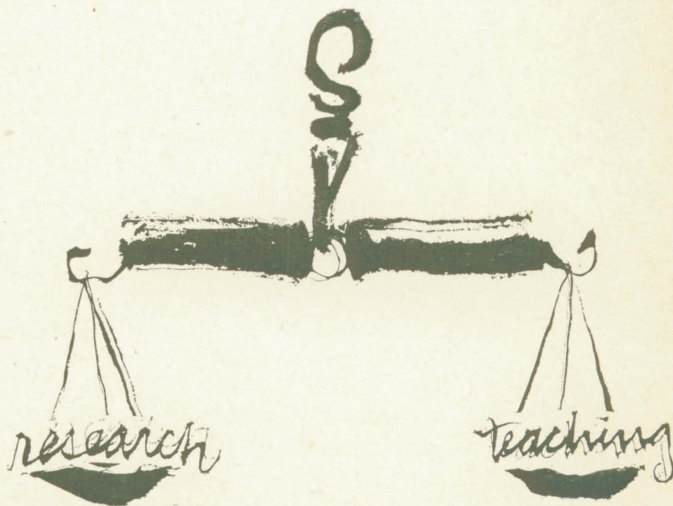
For the first time, we are given the oppor-

tunity to follow the patient not only through his hospitalization, but through subsequent outpatient and office visits. Indeed, it affords us the opportunity to observe that vast quantity of patients who do not enter the hospital for treatment. In many instances we are made to feel that the treatment of the patient is our responsibility rather than that of the attending physician, and that the physician is serving in a consulting capacity.

Most gratifying, perhaps, is the intimate association that many of us have gained with our individual preceptors and their fellow physicians. Frequently at the university, the team spirit is somewhat diluted before it reaches us as it perfuses from the attending physician to the resident to the intern and finally to the student.

During the preceptorship, however, there frequently are no residents or interns thus making the physician-student relationship the more intense and rewarding for the student. The value of the preceptorship program is, I believe, that the student gains significantly in self-confidence; he gains a good deal of self-respect for his capabilities in handling a number of medical problems.

In closing, I would like to thank the preceptors and their associates for the many kindnesses shown to us during our brief stay with them.



Directory is published

After a year and a half of preparation, the Wisconsin Medical Alumni Directory was published in December and mailed to all dues-paying members of the Association. The book contains 168 pages of listings. Another 14 pages contain lists of class representatives and Association officers, background about the Association and its programs, and tables and charts which show distribution of alumni by geographic location and by primary specialty. Also included are four pages of pictures.

There are more than 4,500 listings of two- and four-year graduates, and of former members of the University Hospitals house staff. Listings for those who returned questionnaires include year of graduation; marital status; home and office addresses; certification by specialty boards, if any; the specialty in which the alumnus is practicing; type of practice; and any honors and awards the alumnus wanted mentioned.

The book will be revised periodically, but between revisions address changes will be made by printing gummed labels which will be sent to each alumnus who owns a copy. The labels can be pasted over the original entries.

At its December meeting the Board of Directors decided that the directories would not be sold, but would be given only to alumni who pay dues and to recent graduates who request that their dues be waived.

After a recommendation by the Council of Class Representatives, which met during Alumni Day, 1965, alumni attending the annual business meeting voted an increase in dues. The new schedule: free membership for the first year after graduation, \$5 for the first five years and \$10 thereafter. On request, dues are waived during the first three years out of school.

Fall meeting report

More than 130 alumni attended the Medical Alumni Association's annual fall meeting in Madison October 23, and then spent the afternoon at the Wisconsin-Ohio State football game. Dr. Peter L. Eichman, dean, began the program with a short report, and was followed by Dr. Thomas C. Meyer, assistant

dean, who told about the Medical School long-range aims in postgraduate education.

The scientific program included a presentation by Dr. Helen Dickie, who spoke "Eosinophilic Pneumonitis," and a talk by Dr. Louis W. Chosy, instructor in medicine who spoke about "Emerging Respiratory Hazards in Industry."

Dr. Chosy said that newly-developed types of resinous glues and adhesives and certain types of paints now coming into widespread industrial and public use can contribute to respiratory problems—sometimes severe ones—for those working with them. Since 1960 Dr. Chosy and Dr. John Rankin, professor of medicine, have studied more than 300 persons from scattered Wisconsin industries who became ill after contact with the new compounds.

The new materials are highly "reactive" only while they are first being used, Dr. Chosy said. After a glue dries, it is no longer



reactive and causes no one any trouble. These compounds have many industrial uses. They are used in adhesives which bind metal to metal or effectively encase electrical circuits. However, people who work with the glues often develop a burning of the eyes and a congestion of the nose and throat.

In almost every case they studied, Dr. Chosy said, the affected person's ailments were initially diagnosed as sinus trouble, pneumonia, chronic bronchitis, or asthma—all of which may be side effects of exposure to polymer compounds. With added exposure, respiratory problems may become more severe, resulting in ear infections, sinus inflammation or bronchial pneumonia. He said the full range of exposure effects is not completely understood.

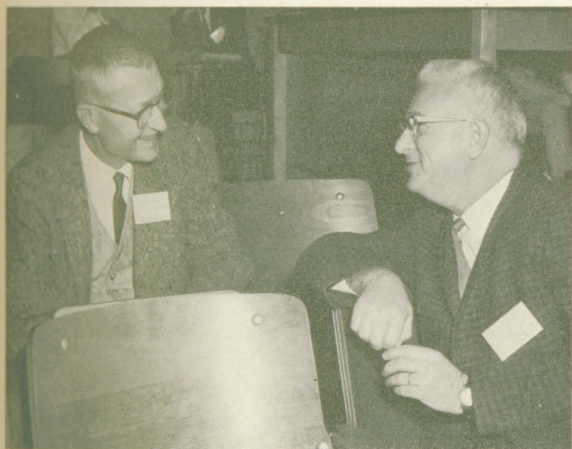
The best treatment for exposure is to keep away from the compounds, Dr. Chosy said. This poses a special problem for the workman whose job requires contact with the resi-

nous materials. Complete recovery may require prolonged absence from exposure, and re-exposure, even after "recovery," starts the problems over again, often quicker than the first time.

Not only industrial workers may have these problems. Dr. Chosy pointed out that these polymers may be encountered by the scientist in his electronics lab, the sportsman repairing his fiberglass boat, or even someone painting his house.

Most persons studied by Drs. Chosy and Rankin have recovered completely, though recovery was very slow in some cases. Many of those affected were not able to return to their old jobs until production changes were made, resulting in better ventilation or use of different types of resinous materials.

Already, many users of the new chemicals have become more careful, Dr. Chosy said. In some cases, industries have switched to safer compounds. When plants where the



In the photo on the far left, Dr. Einar Daniels, right, chats with another alumnus before the scientific program gets underway at the Fall Meeting.

Dr. M. C. Borman, left in picture above, and Dr. F. P. Larme were among those at the Fall Meeting.

Dr. Louis Chosy is in photo at right.





Dr. and Mrs. Paul F. Doege, left in photo above, discuss the Fall program with Dr. Hanno Mar. Dr. Stephen Copps, left in photo above, and Dr. D. Cline, drink coffee during program intermission at the Fall Meeting.

resinous compounds are used are well-ventilated, workers usually are not affected. Dr. Chosy thought that contact with the new materials could conceivably become an increasing problem for the man on the street. The compounds are used in a variety of products, such as epoxy paints, enamels, lacquers, and glues which are designed primarily for home use. These products have labels which warn that good ventilation is needed when they are used.

Opinion poll on program

Alumni who attended the Homecoming meeting October 23 were polled as to their thoughts about the annual Alumni Day program. Questionnaires went to 110 alumni and 42 replied. The questionnaires asked respondents to rate five factors in order of their importance in motivating them to attend the Alumni Day program. (Of the 42 who answered, 33 had attended Alumni Day in recent years.

The factor which motivated most to attend was the attractive, stimulating program. Second was interest in learning of Medical School progress and development. Third was

interest in seeing classmates and friends. Fourth was to attend a class reunion, and fifth was interest in visiting old teachers.

Asked if they would be more or less likely to attend Alumni Day if the program featured Medical School and Alumni speakers solely, 17 said they would be more likely to attend; 19 said they would be less likely to attend; and six had no opinion. They were asked whether they would be more or less likely to attend if the program featured nationally-known speakers. Twenty-five said more likely, 12 said less likely and five had no opinion.

In answer to another question as to whether the program was a factor at all in inducing a return for Alumni Day, 29 said it was a factor and 13 said it was not.

Only 10 of those answering the questionnaire thought that the time of year the program is held should be changed. Two suggested March, two suggested April, three said in the fall; one said non-winter; another said winter; and one said it would be better any other time of year than May, the usual date.

Thirty-seven of the 42 said they would be more likely to attend if their class

holding a reunion. Two said it would not be a factor and three had no opinion. As to whether more or fewer reunions should be held (5, 10, 15, 20, 25, 30 and 35 year classes with ~~no~~ reunions this year), eight said there should be more, eight said there should be fewer, 13 said the present number was fine and 13 had no opinion.

Finally, the alumni rated the factors most important in motivating them to attend the October 23 program. Most were motivated by an interest in learning of School progress and development. The second most important factor was the football game; third was the program; fourth was interest in seeing classmates and fifth was interest in visiting teachers.

The Board of Directors will welcome all suggestions and comments about the Alumni Day program. They may be sent to the Board at 418 N. Randall Avenue, Madison.

Dr. Middleton honored

The University of Pennsylvania's alumni magazine, *The Pennsylvania Gazette*, recently paid tribute to "Men of Medicine." A special section honored alumni of the Pennsylvania School of Medicine, and among the 14 alumni honored for bringing "distinction to themselves and their University" was Dr. William S. Middleton, a 1911 medical graduate of Pennsylvania.

The item about Dr. Middleton said, referring to his former position with the VA, that "as a practicing physician, as a historian of medicine, as a dean of a famous medical school, he carried a rich cargo of knowledge

and skills to his job as leader of the largest hospital system in the world."

They added that in his field, "Dr. Middleton is known as a clinical internist and a teacher. He has served as visiting professor at four universities; five honorary degrees have been conferred upon him. A prolific writer, he has published more than 250 papers relating to disorders of the blood and blood-forming organs, lung and cardiovascular systems, and to the history of medicine."

Meeting plans underway

Plans for the four remaining meetings of the Association this year are rapidly taking shape. The four meetings include the Ninth Annual Fall Winter Meeting in Milwaukee, the meeting in LaCrosse in conjunction with the annual convention of the State Medical Society, Alumni Day, and the annual meeting in conjunction with the American Medical Association convention in Chicago. A short report on each follows:

Herbert Giller, '47, program chairman for the Milwaukee meeting, which will begin at 6 p.m., Friday, February 11 at the University Club, has completed his planning. Dean Peter Eichman will discuss both "The Effect of the Regional Medical Complexes on the Practicing Physician," and "Plans for the University of Wisconsin Medical School." A discussion period is scheduled following his reports.

In addition, Dr. Thomas C. Meyer, assistant dean for postgraduate medical education, will report on a "New Program in Postgraduate Medical Education." His report includes demonstrations of the latest equipment and devices used in the program. Several senior faculty members of the Medical School also will attend.

Menu for the evening is either prime ribs of beef or fish. Registration blanks were mailed in December. Any alumnus who has not received a blank, but who is anxious to register, may write the Association at 418 N. Randall Ave. A check for seven dollars, which includes dinner and gratuities, should be enclosed and food preference noted.

The meeting in LaCrosse with the State Medical Society is scheduled for May 10, according to Dr. Silas Evans, '36, program



chairman. Dr. Evans said that Dr. Robert Ramlow, '43, of the Gundersen Clinic, LaCrosse, is handling local arrangements.

The LaCrosse meeting will be held in the evening for dinner at Walt's, at 3rd and Mississippi, and wives are invited. Names of the speakers will be announced in mailings and in the next issue of the QUARTERLY.

Alumni Day is scheduled for Thursday and Friday, May 26 and 27, a week later than usual, this year. The Council of Class Representatives is scheduled to meet Thursday, and then that evening the classes of 1961, 1956, 1951, 1946, 1941, 1936 and 1931 will hold reunions in Madison. Most of the representatives of these classes are already making preparations for their reunions.

The Friday program includes sessions of talks, the annual business meeting, and the evening banquet. Another highlight of Alumni Day will be tours of the William S. Middleton Medical Library, which will be finished but probably not furnished by the end of May. Since 1966 marks the 10th anniversary of the Association, a special extra edition of the QUARTERLY will be published, probably giving a pictorial review of the Association's first 10 years, including developments at the Medical School.

The final meeting of the 1965-66 year will be at the University Club in Chicago during the annual AMA convention, which will be held June 26 to 30. Dr. Bernard i. Lifson, '49, is handling arrangements.

A bequest and a gift

The Medical School acquired in December a valuable collection of books, which were given by a prominent alumnus, and a bequest of \$78,000 for the Middleton Medical Library.

The books were given by Dr. Milton J. Senn, '27, professor of pediatrics at Yale University. The collection includes some 16th Century items and some first editions of Oliver Wendell Holmes. Dr. Senn, who lives at 972 Prospect St., New Haven, Conn., received in 1961 the Medical Alumni Citation.

Dr. Senn has also received the C. Anderson Aldrich Award of the American Academy of Pediatrics. More details about his gift will be published in the April 15 QUARTERLY.



Dr. Thomas C. Meyer

The \$78,000 bequest from the estate of G. Paul Miller, who at one time was a Mason auto dealer and later was in the investment business in Chicago, can be used for the new library for unrestricted purposes: construction, equipment, furnishings, books, etc. Mr. Miller died in Florida in 1959, and the bequest was held in trust for his wife until her death or remarriage. She recently remarried.

Upstate meeting report

Nearly 40 northeastern Wisconsin medical alumni heard Dean Peter L. Eichman and Assistant Dean Thomas C. Meyer discuss trends in medical education, plans for expansion of Medical Center facilities and new developments in continuing medical education at the Upstate Meeting in Green Bay, November 17.

During a candid discussion period following the formal presentations, Dean Eichman indicated that he views the preceptorship program as an important and continuing s

ment of the curriculum. He commented on the regional medical center programs, which he said should not be viewed as a threat to the practitioner. The dean also talked about admissions requirements, curriculum studies and many other aspects of medical education and Medical Center programs.

Green Bay alumni Charles Benkendorf, former house staff member, and Robert Wochos, '44, made excellent arrangements for the meeting, particularly in providing an enthusiastic group of alumni from eight or ten northeastern Wisconsin communities: Keith Keane, '43, from Appleton; Donald Jeffries, '47, and Roger Cantwell, '20, from Shawano; Ray Groendahl, '38, from Seymour; Lawrence Kaner, '56, of Two Rivers; Robert Douglas, '55, from Neenah; Henry Rahr, '58, from Luxemburg.

President-elect of the Association, D. J. Freeman, '52, was there from Wausau, and President Herb Pohle, '38, arrived from Milwaukee in time to greet the first arrival. The large Green Bay contingent was headed by Regent James Nellen, '39. Associate Dean O. A. Mortensen and Clinical Professor Herman (Murph) Shapiro, were up from Madison.

The success of this ninth annual Upstate Meeting reinforced the desire of all participants to continue these regional get-togethers, which needn't be restricted to Wisconsin. The new alumni Directory indicates sizeable colonies of Wisconsinites in many states. Any alumnus interested in arranging an alumni meeting in his community is welcome to contact the alumni office for aid and assistance.

Dr. Van R. Potter, professor of oncology and chairman of the faculty library committee, watches the Middleton Library take shape.



Dr. Crow honored

Former Acting Dean James F. Crow, now professor and chairman of medical genetics, has been appointed the University's second John Bascom professor. The professorship, named for the University's fifth president, was established to identify and reward excellence in teaching undergraduates and in scholarship.

Bascom professors are chosen from among faculty members who have permanent tenure and have held professorial rank at Wisconsin for five years. They also must have earned distinction in teaching undergraduates, done scholarly research in depth, and kept abreast of developments in their fields.

Before coming to Wisconsin in 1948, Dr. Crow taught at Dartmouth College. He now is especially interested in research in effects of inbreeding, causes of hybrid vigor, and the genetic effects of radiation.

Dr. Crow was president of the Genetics Society of America in 1960 and of the American Society for Human Genetics in 1963. He also is a member of the Society for Study of Evolution, the Biometric Society, Phi Kappa Phi and the National Academy of Science.

Computer-taken histories

Nearly everyone has been sabotaged by a machine—slide projectors are notorious for turning slides upside down; candy machines take money and keep the candy; and auto engines always quit at the busiest intersections—but not everyone has experienced a machine which “talks” back.

Patients at the allergy clinic of University Hospitals are having just such an experience with a computer which is being used experimentally to take their medical histories. Since the computer is, oddly enough, a pleasant machine, most patients enjoy the conversation.

If the patient responds “no” to a question like “Have you ever had an asthmatic attack?”, the computer answers, “I’m glad to hear that.” When an interview is finished, the computer summarizes the patient’s answers by teletype for medical charts.

The machine, a Laboratory Instrument Computer (LINC), “talks” by flashing its questions and comments on a small television-

like screen. It has been in use since March 1965, and more than 100 patients have talked to it so far, using a typewriter keyboard to get messages to LINC.

Dr. Warner V. Slack, who directs the experiment, said that histories taken by the computer compare favorably to histories taken by physicians. Eventually, LINC will be able to interview even blind patients with the aid of earphones.

In addition to its use for patient histories, LINC is also helpful in the Hospitals’ clinical laboratories, where it processes laboratory calculations, quality control data and collects data for lab procedures. Dr. G. Phillip Hicks, director of the LINC program in the clinical labs, said that the computer is especially useful because of its flexibility. It can be readily modified to conform to an experiment, whereas other systems frequently require modification of an experiment to conform to the computer.

LINC takes a patient's history.





Miss Madeline Apple, registered nurse in the eye clinic, is pleased with the clinic's new home.

form to the computer.

LINC costs less than \$1 an hour to operate, and it can store up to 262,000 test results. All the laboratory data for six months can be stored on two magnetic tapes the computer uses for memory files.

New quarters for clinics

Two University Hospital clinics, eye and urology, moved last fall into newly remodeled quarters, which have enabled both to solve some space and equipment problems.

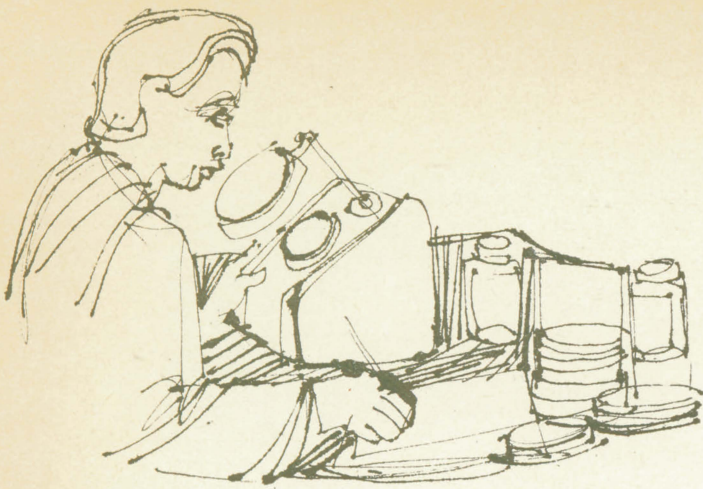
In its old quarters the eye clinic's lack of space and equipment meant that each patient examination was done in several stages, usually by several different residents and attending staff physicians. In its new facility, in the first floor connection between SMI and Wisconsin General, it has six examining rooms for refraction, visual field examinations, and for complete study of the eye with slit lamp biomicroscopy, tonometry and direct and indirect ophthalmoscopy.

In addition, the ophthalmology staff can

now do electroretinography examinations, for which space and equipment had never been available in the old facilities. The new area also includes a special room for use of medical students in their study of the extensive collection of stereoscopic external and fundus photographs which has been part of the ophthalmology course.

Urology's new facility, on 2 Center of Wisconsin General, is used for diagnostic procedures, x-rays, minor surgery under local anesthesia, and for outpatient checkups. The move of this clinic relieved congestion within the 5N operating rooms and permitted the urology division to expand its operative schedule.

The area on 5N will remain the site of all major surgery necessitating general or spinal anesthesia, as well as diagnostic procedures or minor surgery that requires an anesthesiologist or the assistance of operating room personnel. For years, all urology outpatients scheduled for special diagnostic procedures or x-rays had to go into the 5N operating room area—a situation which caused great concern to the late Drs. Erwin Schmidt, John



Wear Sr. and O. Sidney Orth.

Urology's new facilities include two cystoscopy rooms with x-ray tables, a storeroom, a darkroom, a dressing room, and an examination-treatment room.

The work at McArdle

At the Medical School's McArdle Laboratory, where the facilities of a new 11-story building are devoted to basic cancer research, 12 professors, 40 technicians and 33 post-doctoral and 25 graduate students are studying the exact nature of cancer from three broad approaches.

Dr. Harold P. Rusch, '37, professor and director of oncology and director of the McArdle Laboratory, said that one of these approaches is to find out why a cancer cell fails to repress mitosis. Why a normal cell changes to a cancerous cell.

Since cancer may be prevented by removing the cause or by interrupting the changes that lead to cancer, it is important, he said, to understand the biochemical nature of changes which make normal cells into cancer cells. Dr. Roswell K. Boutwell of the McArdle staff has found that cellular changes leading to cancer occur in two stages. By applying doses of a carcinogenic agent to the backs of experimental mice, he found that one application did not cause cancer, but that it did initiate a change in the cell which may result in cancer. If that cell then comes into contact with non-cancer producing substances, such as croton oil, which he used, the result is cancer. If only croton oil is applied, cancer is not started.

The first stage is called "initiation" by Dr. Boutwell; the second, "promotion." He has been able to conclude that the carcinogen

causes some kind of cell mutation. The cell is quiescent until it comes into contact with the promoter agent, which starts the cancerous growth. The hope is that understanding the process will eventually allow physicians to stop or even reverse the action of a carcinogen, or at least contain its effects with the affected cells.

Two other McArdle investigators working within this approach are Drs. James A. and Elizabeth C. Miller, a husband-wife team. They are studying what happens to cancer-producing chemicals in various body tissues. The Millers have discovered that the carcinogen administered is changed into many new chemicals, one of which is the true carcinogen.

They also have found some of these carcinogens become attached to certain proteins and nucleic acids of the cells, a process which probably causes the cancer, Dr. Rusch said.

Another researcher on the staff, Dr. Howard Temin, has shown that the Rous Sarcoma virus, which produces cancer in chickens, will also produce cancer in normal cells removed from the chicken and grown in a tissue culture. By using the tissue culture, Dr. Temin has found that the virus is "lost" in the DNA of the cell nucleus.

Dr. William F. Dove is also studying ho



viruses affect cells to change growth characteristics, but is using a simpler type virus which attacks bacteria and affects the growth rate. According to Dr. Rusch, studies such as Dr. Dove's are vital to an understanding of how the genetic material of the virus gets into the host cell and causes permanent changes which are inherited by other cells through mitosis.

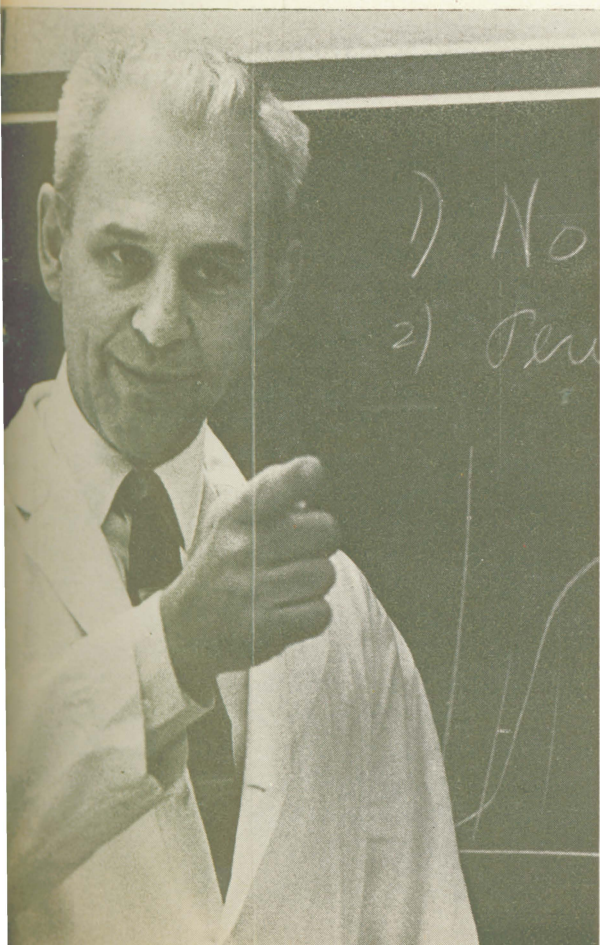
Other McArdle scientists are attacking the cancer research problems from another approach, in the area of genetic studies. What does a cancerous cell pass to its offspring? What is the exact nature of cellular processes? They hope that understanding these processes will lead to suggestions for inhibiting the growth of cancer.

Taking this approach, Dr. Gerald C. Mueller has been growing human cancer cells in vitro in order to investigate substances which

inhibit or initiate cell division. Dr. Wacław Szybalski is investigating substances which inhibit the normal "unraveling" of the "strands" of DNA in the cell nucleus.

A biochemist on the McArdle staff, Dr. Charles B. Kasper, is studying the chemical nature of the protein material in the cell's nucleus. In addition, Dr. Rusch has discovered that certain proteins responsible for cell division are formed within a few minutes immediately prior to cell division. For his research, he uses a large multinucleated cell (**Physarum Polycephalum**) in which nucleus division is synchronous.

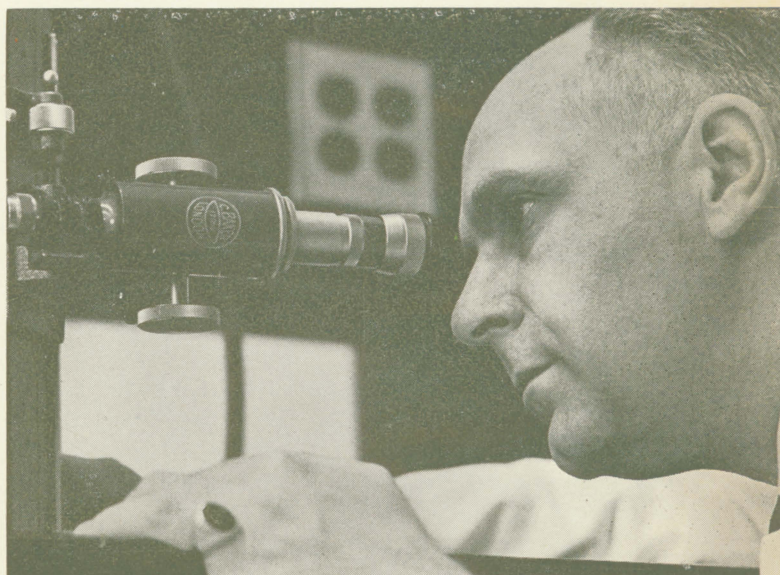
The McArdle investigators taking a third approach to the study of cancer are searching for differences between normal and cancer cells. Dr. Rusch said that if a clear and reproducible difference can be shown, it would be possible to correct the changes by

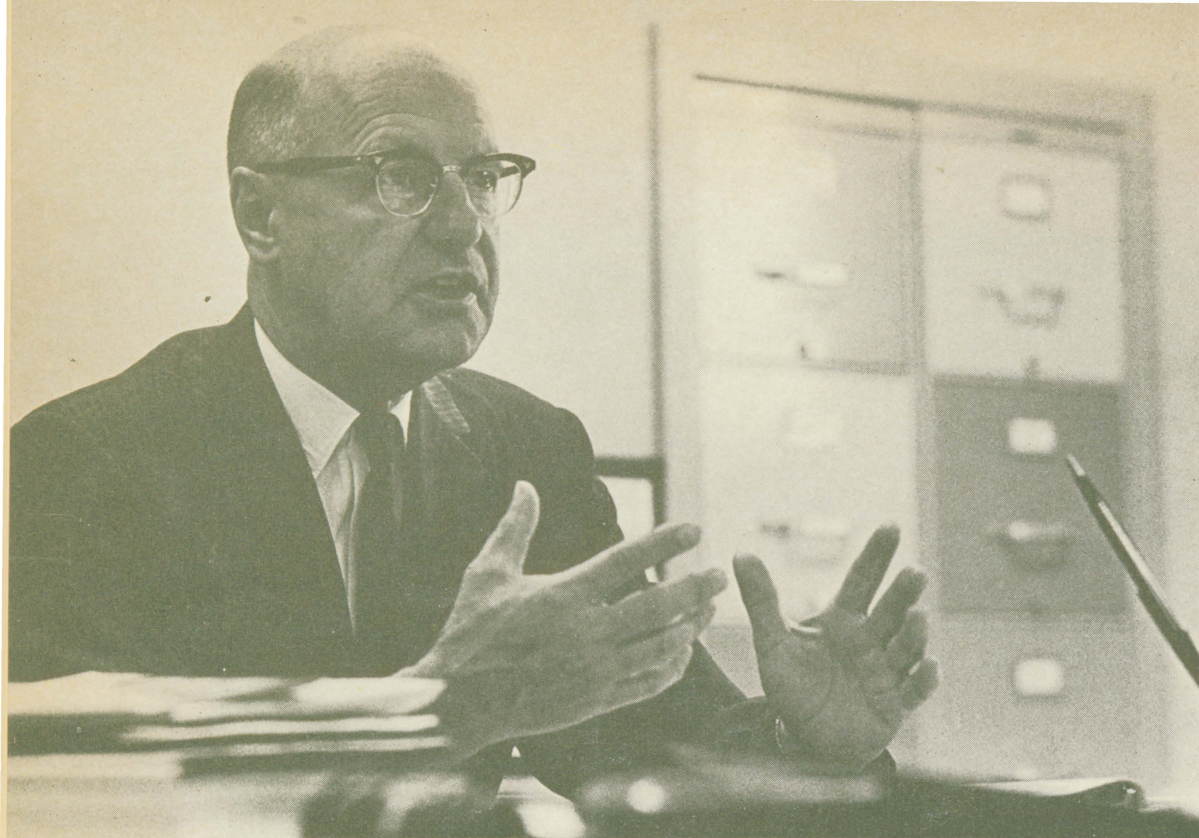


In photo at far left, McArdle investigator Charles Heidelberg works with an inverted microscope.

In middle photo, Professor Gerald C. Mueller of the McArdle staff.

Dr. Wacław Szybalski, below, measures the viscosity of DNA, using Zimm's viscometer.





Director of McArdle is Dr. Harold P. Rusch, '37.

adding the missing substances.

Dr. Henry C. Pitot, who follows this approach, has shown that the stimulus which initiates the formation of enzymes in normal cells will not do so in cancer cells. Dr. Van R. Potter, also taking this approach, is concentrating on the study of the biochemistry of cancer cells. One of his most interesting findings is that all malignant cells tend to lose their separate identity to some degree, which is not true with benign cells. Now he is looking for a chemical connection to explain the difference between the malignant and benign cancer cells.

Aside from the three approaches, all the McArdle staff are interested in cancer chemotherapy. "A prime aim of all cancer researchers," Dr. Rusch observed, "is to find a chemical which will cure cancer in all parts of the body when fed or injected into a patient."

Dr. Charles Heidelberger, on the basis of studies done on the differences of the biochemistry of normal and cancer cells, thought that an altered or "fraudulent chemical" would interfere with the normal synthesis of DNA. As a result of his explorations, he de-

veloped the chemical 5FU, which has been used successfully in many patients.

Unfortunately, big developments like 5FU are rare. Dr. Rusch feels it will be a long road to travel before finding answers to what cancer is and what goes wrong with normal cell biology. But, he points out, we have come a long way already.

Research honors program

In an effort to attract more high caliber students to medicine, the Medical School began in 1961 a program which would combine medical training and research experience. So far, eight students have joined the program and one has been graduated. They are studying for an M.D. with Research Honors, for a combined M.S.-M.D. with Research Honors or Ph.D.-M.D. with Research Honors.

Students need a B average or better to join the program and to stay with it. They receive stipends proportional to the time spent in research and non-medical courses. These stipends go up to \$300 a month.

fulltime research.

Funds for the stipends come from an NIH training grant administered by the Medical School committee for student research, research honors and scholarships and awards. However, some of the students, because of the excellence of their research, have been able to attract their own support.

Research Honors candidates, who hopefully will later work in academic medicine, must meet the formal requirements for the M.D. degree. However, they are allowed to split the first, second and/or the third years between medical courses and research and non-medical courses. In addition they are expected to commit summers and elective time to research or special courses, and they may be permitted to do research in lieu of some clinical experience, such as the preceptorship.

The program is not without problems, and these are under careful study. It prolongs the students' years in school to as high as six or seven years. Eric Jacobson, who is working on a combined Ph.D.-M.D., is finishing his second year of Medical School, but will not have his degrees before 1970. In addition, the basic science departments are reluctant to commit research space to the M.D.-Ph.D. students for a prolonged period of time in face of competition from other graduate students.

Of the students who joined the program, Don Lee Bradke, who received an M.D. with Research Honors in June, 1965, is the only one who has graduated. He did his research under Dr. David Slautterback, in anatomy.

At least two of the students, Jacobson and Michael Kappy, who are working toward the Ph.D.-M.D., will be supported by grants from the American Cancer Society until they finish their work. Both are working under the direction of Dr. R. L. Metzenberg, of physiological chemistry.

Three of the students in the research honors program will have received M.S. and M.D. degrees when they finish. William C. Summers who is working under Dr. Waclaw Szybalski, of oncology, has received his master's degree in radiology, and is supported now by an NIH training grant to the department of oncology.

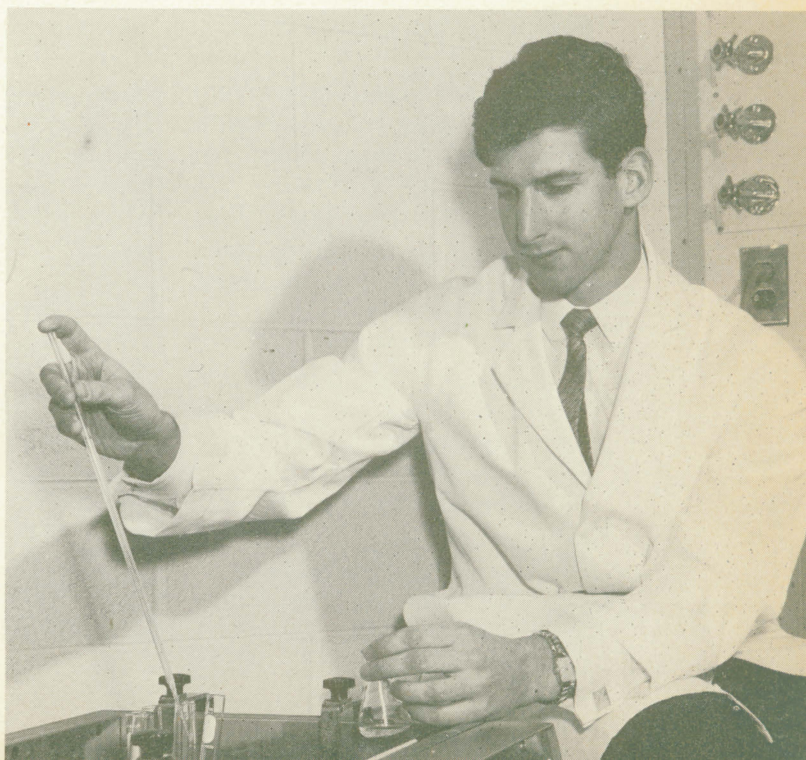
Robert House, working under Dr. R. C. Herrin, of physiology, also is working to-

ward the M.S.-M.D. degrees, and Dennis Maki, who was in research fulltime in the summer of 1963 and the year 1963-64, received an M.S. in physics and now is in Medical School fulltime. He worked under the direction of Dr. W. H. Dennis, physiology, and had support from a Life Insurance Medical Research Fund fellowship.

Lawrence Tomasi is working under Dr. S. E. Kornguth, neurology, toward the M.D. with Research Honors, and is supported by the NIH training grant. Tom Wegman, under the direction of Dr. Oliver Smithies, medical genetics, has support from the Life Insurance Medical Research Fund. He also is working toward the Ph.D. and M.D. with Research Honors.

The faculty committee responsible for the research honors program is chaired by Dr. Henry C. Pitot, oncology. The other members are Drs. O. A. Mortensen, anatomy, J. L. Sims, medicine, Oliver Smithies, medical genetics, R. C. Wolf, physiology, and C. N. Woolsey, neurophysiology.

Research honors candidate Eric Jacobson works on his research project.



ALUMNI CAPSULES

Dr. Joseph H. Shimpa, '19, retired about December 1 as chief of the medical service at the V.A. Hospital, Cheyenne, Wyo. His new address is 2946 Kelley Drive, Cheyenne 82001.

* * *

Among the alumni recently inducted into the American College of Surgeons were George F. Woodington, '53, Beloit; Paul J. Radlet, '55, Madison; John B. Wear Jr., '54, Madison; and James D. Whiffen, '55, Madison.

* * *

A 1956 graduate, Dr. John Kieraldo, who recently moved to 2004 Edgewood Drive, Palo Alto, Calif., has been in association with the Palo Alto Medical Clinic since July, 1964, in general and vascular surgery.

* * *

Reappointed to the State Board of Public Health in October was Dr. William H. Studley, '29, of Milwaukee. His reappointment was made by Wisconsin Governor Warren P. Knowles, and confirmed by the state Senate.

* * *

After her recent retirement from the post of city health director of Kenosha, Wis., Dr. Margaret E. Hatfield, '27, returned to Elkhorn, Wis., where she lived before moving to Kenosha in January, 1960.

* * *

Continuing his travels, Dr. Milton H. Erickson, '28, Phoenix, Ariz., addressed the Ontario Chapter of the College of General Practice of Canada recently on "The Role of the General Practitioner in the Problems of the Adole-

scient," on "Hypnosis in Medicine," and on the "Nature and Control of Pain by Hypnosis."

* * *

Dr. George Burgermeister, '62, recently became associated with two other physicians at their medical clinic in Beaver Dam, Wis. He had spent two years with the U.S. Public Health Service in Portland, Ore.

* * *

A move to California was made this summer by Dr. William E. Acheson, '53, who had practiced in Valders, Wis. He opened his new office at 505 N. Mollison Ave., El Cajon, Calif., 92021. He lives at 9410 Loren Drive, La Mesa, Calif. Dr. Acheson has a solo general practice.

* * *

A 1964 graduate, Dr. Fred Bannister, began practicing in Chetek, Wis., last summer after completing his internship at Los Angeles County Hospital.

* * *

Dr. Charles L. Jahn, '61, recently joined the pediatrics department of the Quisling Clinic, Madison. He did his internship at Children's Orthopedic Hospital, Seattle, Wash., and then served a three-year residency at University of Wisconsin Hospitals. Before joining the clinic, he worked on a special research study of virus diseases in children as part of a special postdoctoral research fellowship at the University.

* * *

New assistant professor of medicine at Yale University School of Medicine is Dr. Leon E. Rosenberg, '57. Since 1959, he has been with the National Cancer Institute.

He has received more than

\$100,000 in grants from the Public Health Service and the Hartford Foundation for the genetics section of the Yale department of medicine.

* * *

Dr. T. W. Tormey Jr., '63, of Madison, has been appointed by the Wisconsin government to serve on the State Board of Medical Examiners.

* * *

A 1958 graduate, Dr. Gerald C. Gant, '58, is a teaching associate with the Medical School's anatomy department and Dr. George P. Steinmetz, '56, is associated with the surgery department. Dr. Steinmetz did his internship at the University of Pennsylvania and his postgraduate work in surgery at the University of Washington.

* * *

A prominent alumnus, Edward J. Van Liere, '20, emeritus dean of the West Virginia Medical Center, has just published "The History of Medical Education in West Virginia." It is available from the West Virginia University Library.

* * *

Dr. John A. Thranow, '63, has assumed the practice of Dr. William E. Acheson, '53, who moved to California (see item above) from Valders, Wis. Dr. Thranow served his internship and a year of surgical residency at the Crosse Lutheran Hospital at the Gundersen Clinic, La Crosse.

* * *

Dr. Leslie M. Klevay, '61, recently completed the requirements for the Doctor of Science degree in nutrition at the Harvard School of Public Health, and joined the U

versity of Cincinnati College of Medicine as an assistant professor of environmental health and instructor of medicine.

His new address is 1120 Hillcrest Ave., Cincinnati, Ohio, 45334.

* * *

Dr. John A. Buesseler, '44, an ophthalmologist at the University of Missouri Medical School, completed four weeks of paratrooper training at Fort Benning, Ga., late in the summer. He was awarded the Parachutist's Badge after five qualifying jumps.

He is entering Cornell University as a candidate for the Ph.D. in business and public administration, and will have a sabbatical leave from Missouri. He and Mrs. Buesseler will reside at 20 N. Triphammer Rd., Apt. G2-1, Ithaca, N.Y., after February 1, until they return to Missouri in 1967.

* * *

Regretfully, we have the following deaths to report:

Earl V. Hicks, '32, in September, in New Glarus.

Vincent Russo, '61, in October, in Milwaukee.

Otis M. Wilson, '28, in August, in Wausau.

Mrs. Homer Montague, wife of the head of the Medical School photography department, in November, in Madison.

Memorials, which will be used to support allergy research of Dr. Charles Reed, may be sent to the Medical School.

Al Bookhout, who had been embalmer for the anatomy



John A. Buesseler, M.D.

department from 1938 until 1962, when he retired, in November, in Madison.

* * *

Dr. William B. Hildebrand, '39, Menasha, has been elected chairman of the medical advisory board of the Sears-Roebuck Foundation. For two years, he has been a member of the board as a representative of the Midwest.

In recent months, he also has been named a member of the national advisory committee of the Medic Alert Foundation, Turlock, Calif.

* * *

William Hildebrand, M.D.



Dr. Bernard i. Lifson, a psychiatrist of Skokie, Ill., an active alumnus, and class representative for the class of 1949, recently was moved to poetry when his fifth child turned out to be his first daughter. Shortly after the birth he penned:

After months of anticipation,
Imagine our supreme elation.
Clarice's circumferential girth
Precipitated into birth.
First came head, then shoulders wide,
Chest, abdomen and then,
—oh pride.
While nervous father and mother were kissing
We suddenly noticed something missing.
Anxiety and trepidation,
Fear and horror of drug mutation.
In our confusion and mental whirl,
Our O-B man announced,
"It's a Girl!"
Now what had she taken?
Was it Abbott
Or Searle—
Or was it—what? Did he say "Girl"?
Slowly, slowly I came to
Lifted myself off of floor
Looked at my pink newborn daughter
Quote the obstetrician,
"Evermore."
7# 6 oz. of pink female
Fair skin, blue eyes, thin blonde hair
Face and features just like mother
Disposition just as fair.
The **four boys** greeted her with derision;
Of course there'll be no circumcision.
Return to reality will be quite slow;
We're on cloud nine with Suzanne Jo.
Date of Birth: Columbus Day.
Mother's condition: A-OK.
Father bragging, having a ball.
Future problem—Oedipal.



Reflections on the Origins of Experimental Oncology

By

VICTOR A. TRIOLO, PH.D.

Wer sich mit einer Wissenschaft bekannt machen
will muss sich auch mit deren Geschichte beschäf-
tigen. GOETHE

*a*ccording to Garrison's **History of Medicine** (4th ed., 1929), the "seminary" or seminar plan for history of medicine, founded upon the pioneer teaching method of Doctor James Finlayson of Glasgow, was introduced at Wisconsin in 1909 by Doctor William Snow Miller. Since the Finlayson plan was initiated contemporaneously at Johns Hopkins by Sir William Osler and at Harvard by Harvey Cushing, Doctor Miller's seminar is a well-established institution in American studies on history of medicine. The scope of these studies has broadened considerably since Doctor Miller convened his first seminar. It is now possible for us to view with a degree of historical perspective, aspects of medical science which were not yet imagined in 1909. Experimental oncology ranks among

these new fields created at the end of the first decade of the twentieth century.

Beginnings of Oncology

A century ago many traditional beliefs in pathology were becoming outmoded. Disease causation no longer appeared to be answered satisfactorily by "humoralism" and other etiologic concepts of ancient vintage. W

Dr. Triolo was awarded a Ph.D. (1962) in history of medicine at Wisconsin; he joined the staff of the McArdle Laboratory as a postdoctoral fellow. His research interest is the history of experimental pathology, especially cancer research. He will take up new duties at Temple University Medical School, Philadelphia, in 1966.

This is a slightly revised version of Dr. Triolo's address before the William Snow Miller Medical History Seminar, December 9, 1964 at the McArdle Laboratory for Cancer Research.

new clinical and laboratory evidence—the invention of more reliable lenses for microscopes prefigures this development—pathology began to assume exact proportions. In 1838 Johannes Mueller published his findings on the microscopic structure of tumors, a work which inaugurated the era of modern oncology. Mueller's studies contributed importantly to Rudolph Virchow's monumental conception of the cellular basis of normal and pathologic tissue productions in the **Cellular Pathology** (1855).

a less fortunate result of Virchow's prodigious research in oncology (**Die krankhaften Geschwulste**, 1863-67) suggested that all tumors grew from undifferentiated elements of the connective tissues. As early as 1852 Robert Remak postulated that epitheliomas were of exclusive epithelial origins (of a morphogenically distinct germ layer), a conclusion borne out in the extensive investigations of Carl Thiersch (1865) and Wilhelm Waldeyer-Hartz (1867-72). Virchow's all encompassing connective tissue theory still persisted, though with ever diminishing vigor, through the 1860's and 1870's. There were faint stirrings of new difficulties in 1856, when Theodor Billroth described vascular tumors, long known as **cylindromas**, which in later years were found to be endothelial formations. Knowledge of other tumor species, especially of the pleuroperitoneal linings, lymph spaces and pia mater, by 1880, gave rise to the endothelioma group, the histogenesis of which remained sufficiently uncertain in the closing years of the nineteenth century that they were characterized variously as connective tissue or **histoid** (derived exclusively from mesoblast) tumors or as epithelial or **organoid** (derived from mesoblast, epiblast and hypoblast) tumors, according to the preferences of the individual systematist. Nevertheless, a fairly reliable groundwork in tumor taxonomy was established at the turn of the century.

Five Theories of Cancer Causation

Dismissal of the humoral pathology allowed for more rational approaches to the etiology of neoplastic diseases. Thus Virchow, in 1858, cognizant of many earlier reports on the eruption of tumors at sites exposed to prolonged irritation (in 1775 Sir Percivall

Pott detected the high incidence of scrotal cancers, through constant soot exposures, among chimney sweeps; twenty years later Samuel Soemmerring first noted the unusual frequency of labial cancers in confirmed pipe smokers), proposed that certain tissues susceptible to external functional stimuli of long duration readily underwent neoplastic alterations. The **irritation** theory, supported by numerous clinical data in the 1870's, was not accepted universally by pathologists, many of whom insisted that trauma and related effects merely were extrinsic factors in the production of cancer.

Workers such as Thiersch assumed that cancer resulted from more deeply rooted biological irregularities. Thiersch inferred from his anatomic evidence that aging brought about senile, regressive alterations of the connective tissues. Thus it appeared that a predisposition toward cutaneous cancers in the aged proceeded from epithelial hypertrophy following involution of the stroma. In the face of diminished stromic resistance, actively proliferating epithelium established a zone of new growth, continually pressing its advantage against the stroma, forming the nucleus of a neoplasm. Thiersch's theory of **senile disposition** (1865), or growth energy imbalance, was opposed, for example, by Waldeyer, who in 1867 concluded that the production of epithelium, contrasted with the interstitial connective tissue, often tended to diminish with advancing age (e.g., in glandular atrophy); in this case the epithelial structures tended to lose their proliferative vigor and become subjected to a replacement fibrosis through increased activity of the connective tissue. Such exceptions seriously weakened Thiersch's theory.

*O*ne of the first "reconciling assumptions" in the history of oncology was advanced in 1874 by Julius Cohnheim, who suggested the hypothesis of **embryonic rests**. Cohnheim argued that some defect or irregularity originating in the embryonal anlage became the focal point of tumor formation. The theory specified that an overproduction of cells occurred frequently in organ morphogenesis. An excess of cells detached some time between differentiation of the germinal layers and completion of the organ primordia was

capable of emerging as a new growth by virtue of the embryonal capacity for proliferation within these cells. Vascular complications, inflammatory hyperemia and other sources of trauma, were likely participants in the growth disordering of embryonic rests. Cohnheim's view found wide favor. The numerous occurrences of congenital and early post-natal tumors had long been recognized. For example, malignancies stemming from both local malformations, such as nevi and warts, as well as from more generalized organic irregularities, appeared to be attributable to the causes assigned by Cohnheim.

However, gaps in Cohnheim's hypothesis became apparent. It did not relate well to the formation of carcinoma from the standpoint of the epithelial theory. Furthermore, isolated tissue-rests or superfluous embryonal masses did not give way invariably to neoplastic growths, nor was there obvious reason why they should. In 1894 Hugo Ribbert communicated research results which attempted to rescue Cohnheim's proposal through more circumspect analyses of tumor pathogenesis. Ribbert assumed initially that regular growth was determined by the coordinated and balanced development of its cellular components. Should the cell become partly or completely detached at some point in the correct sequences of tissue construction, it would continue to proliferate in a variety of atypical ways. The extent of withdrawal of the cell from its typical relationships, expressed as **tissue tension**, became the standard of growth deviation in tumorigenesis. Ribbert attempted to summon experimental evidence for the occurrence of abnormal growth pursuant to the release of tissue tension through the alleged production of enchondrosis in a rabbit.

Ribbert's hypothesis led pathologists to scrutinize closely the abnormal character of neoplastic cells—Ribbert himself pointed to the usually bizarre appearances of these species, and Gustav Hauser suggested (1890) that the neoplastic alteration was intimately referent to a loss of normal physiologic function in cells by virtue of derangements in the cellular and nuclear dimensions, chromatin content, mitotic behavior and protoplasmic character. These ideas were taken up by David von Hansemann, who in 1890 asserted that each **asymmetric karyokinesis**, resulting

in the formation of disproportionate daughter cells, signified an altered state of cellular differentiation which conferred upon the progeny growth potentials differing from cells following a regular mitotic course. Hansemann accumulated cytologic data for his theory of **anaplasia** which suggested separation of cancer cells, having an abnormally poor chromatin complement (**hypochromatism**), from other atypical cell formations having an excessive chromatin complement (**hyperchromatism**).

The five theories of cancer causation examined above show numerous complications in outlook. Although they provided no firm answers, the course of investigations on cancer was steered more certainly by the evidences summoned in their support. As early as 1889 pathologists such as the Briton John Marshall considered summations of the cancer problem in terms of the "anarchic" life of the neoplastic cell, made possible through the "mystery of mysteries which lies within the nucleus." However, proper weapons were not yet available for a massive research assault on the wayward cell of cancer.

Origins of Experimental Cancer

In September, 1876, Matislav Aleksandrovich Novinsky, succeeded in transferring canine veneral sarcoma (anaplastic epithelioma?) from one dog to another. The experiment became firmly established in the next host and Novinsky reported his results in an obscure medical journal. Only in 1885 was Novinsky's work given additional impetus and widely publicized by Arthur Nathan Hanau, who achieved the propagation through several generations of a carcinoma of the vulva in rats. This research was expanded by Professors Leo Loeb (Chicago) and Carl Jensen (Copenhagen): the former succeeded (1901) at accomplishing 150 consecutive transfers of a cystic sarcoma of the thyroid in rats and the latter, between 1895 and 1903, was successful at propagating through nineteen generations an alveolar carcinoma in mice. New tumor-lines in mice were established shortly after 1905, notably by Borrel at the Pasteur Institute, by Ehrlich at the Frankfurt Institute for Experimental Therapy, by Bashford under the auspices of the British Imperial Cancer Research Fund and by Gaylord at the New York State Cancer Laboratory (Buffalo). The beginning

a fruitful alliance between the cancer scientist and the mouse dates from these times.

By 1910 experimental pathologists had resolved two relevant problems of importance, namely (a) the **structural** origins of the newly available animal tumors and (b) their **authenticity** as neoplasms. For example, the proof that mouse neoplasms were true cancers and the evidence for the malignant character and heterogenous distribution of these growths, gave a firm basis for a comparative experimental approach to the problem of malignant growths in humans. Further standardization was initiated in 1909 when the first inbred strain of mice (DBA) was established by Clarence C. Little. Investigators now were in a position to undertake controlled studies on tumor-host relationships, such as the influences of the genetic **soil**. Thus Ernest Tyzzer, as early as 1902, began his revealing studies of heredity in relation to the development of tumors in mice (Later contributions, especially by Maude Slye about 1920, suggested, though prematurely, that the incidence and inheritability of spontaneous tumors in mice was comparable to that in human cancer.) Such was the enthusiasm over these new research tools, that by 1910 many workers in cancer thought it likely that experimentation with the propagable tumors of animals would yield an immediate outcome in active immunization against cancer in man.

New methods of research attract talent from many quarters. So cancer research, especially after 1910, began to enlist the services of specialists — microbiologists, geneticists, biochemists, among others. Clinical studies also moved at an accelerated pace, especially through increasing recognition of occupational and other cancers resulting from the hazards of modern civilization (e.g., lung cancers in the Schneeberg miners in 1879; bladder cancers among aniline dye workers in 1895; dermal cancers in X-ray operatives in 1902). It is not possible in the time remaining to document the contributions of each of these new specialties as they remodeled the foundations of modern oncology. Two examples will serve as a demonstration of the bridging of older perspectives to newer concepts in experimental oncology.

Theory of Viral Mediation

The first experimental system to achieve a highly organized status within cancer re-

search came from the pre-existing framework of classical microbiology. By 1885 the role of microorganisms (the **contagium vivum**) was firmly implicated in a considerable number of specific diseases, and the sweeping tide of early success in bacteriology engulfed research interests in most European and American medical departments, as Professor Clark has shown in **Pioneer Microbiologists of America** (1961). As early as 1880, there were faint suggestions that cancer also belonged to the family of infectious diseases. (Actually, suspicions of cancer infectivity permeated the older history of oncology, especially through reports of the so-called **cancer a deux** (transmission between marital partners) or through supposed "cancer houses" and "cancer districts" (transmissions within families and communities)).

A "cancer bacillus" was allegedly isolated by Schleuren in 1887; shortly thereafter the medical literature became filled with similar reports. However, the microbial theory of cancer was seriously reappraised by 1890, at which time it was found to be entirely deficient owing to the general failure to culture suspected infectious agents upon nutrients media as well as to the inability to reproduce new growths from inocula. Active support for the infection theory came from new reports, after 1890, of protozoan and yeast-like organisms in human cancer tissues. (An announcement that the "cancer parasite" had been isolated by Harvey Gaylord in 1901 received wide acclaim in the lay press). In these cases, also, further research failed to satisfy the fundamental conditions of **Koch's Postulates**.

Successive claims for other cancer parasites (e.g., mycetozoa by Baylord and Feinberg (1902); spirochetes by Gaylord and Calkins (1907); nematodes by Fibiger (1913); cestodes by Bullock and Curtis (1924)) also achieved temporary notoriety. The forcefulness of the cancer parasite trend is especially evident in the case of Johannes Fibiger, who in 1913 was awarded a Nobel Prize for his work on rat tumor induction by the parasitic worm **Gongylonema neoplasticum**. There is clear irony in the Fibiger affair. Although his findings were not widely accepted nor could they be duplicated exactly by others, he received the only Nobel Prize thus far awarded for cancer

studies. Today this current is largely stilled: nevertheless, parasite irritation is thought to produce chronic changes which may terminate in cancer. The extraordinary frequency of carcinoma of the bladder among Egyptians afflicted with Bilharziasis, detected by Reginald Harrison in 1889 and validated by Carl Goebel in 1905, falls into this category of cancer causation.

Yet the infection theory set into motion a sympathetic resonance in other corners of cancer research. Investigations by Demitri Ivanovsky (1892) uncovered an agent from tobacco mosaic disease, an agent able to pass through filters which trapped known bacteria. The "filterable virus" of tobacco mosaic disease (TMV) also was reported, though independently of Ivanovsky, by Van Berinjinck. Other agents, such as *vaccinia* (which had been isolated and successfully grown upon rabbit cornea by Gorini (1900) and Funck (1901), excited the search for viruses. Gaylord's cancer parasite studies, in addition, seemed to indicate the presence of a virus similar to that of variola. However, in 1904, Amedee Borrel, largely on the basis of studies with contagious avian epithelioses, suggested that the causative agent of cancer and a number of highly infectious diseases, all with specific yet homologous cell inclusions, might be a factor commonly associated with these ultimate products of cellular decomposition.

Borrel could not justify conclusively the existence of a "virus cancreuse" merely through analogy with the infectious epithelioses. Nor could Wilhelm Ellerman and Oluf Bang, both of whom in 1908 successfully transferred fowl **leukosis** among chicken stocks by means of cell-free filtrate: the nature of leukosis was uncertain in 1908. More convincing evidence was gathered subsequently at the Rockefeller Institute by Doctor Peyton Rous, who in 1910 was presented with a Plymouth Rock hen bearing a large growth on its right breast. Doctor Rous did the most logical thing—he excised part of the tumor, implanting a portion into the left breast of the same fowl and similar portions into the breasts of two other hens of the same parent stock as the original tumor-bearing fowl. These procedures were entirely consonant with those meticulously employed in research on the propagable neo-

plasms of dogs and rodents.

After two weeks, one of the implanted fragments had taken root and grown in new host. Doctor Rous succeeded in transmitting this tumor to other fowl—it was necessary to use hens of the original host line—and these growths retained similar histological appearances and biological properties through successive generations. The next step followed as a matter of course. Doctor Rous prepared a cell-free, bacteria-free filtrate of the chicken sarcoma. Inocula of this filtrate into healthy fowl almost was as effective in eliciting neoplasms as direct tumor tissue implants. (Cell-free preparations of canine and rodent tumor tissue, inoculated into animals of the same species, failed repeatedly in other, earlier researches such as Loeb's; however, the accomplishment of Ellerman and Band reaffirmed confidences in this experimental procedure). Although Doctor Rous gathered evidence that the transmissible agent probably existed as a definite particle and that its activity was temperature-dependent, he termed his discovery a "self-perpetuating parasitic organism," rather than "virus," pending more detailed data. It was safe to assume, tentatively, that the infective entity behaved as a chemical stimulus toward altered cellular growth.

These and later reports by Doctor Rous and his associate, Doctor James Murphy, were read with caution, even skepticism. Many untested possibilities still existed. Carefully devised studies by Doctor William Ewart Gye and his associates, reported in 1925, attempted to unmask biochemically the agent, now known as the Rous sarcoma virus (RSV). Filtrate-dilution experiments, measurements of activities at varying pH and temperature and differential centrifugation of RSV culture samples (and those obtained from leukosis-infected tissues), indicated the presence of a self-multiplying submicroscopic particle and an accessory chemical factor. Similar experiments with propagable neoplasms of mice and rats yielded less encouraging results: e.g., only unfiltered cultures were transmissible in the case of spindle-cell sarcomas of mouse strain 37/S.

Doctor Gye then attempted species-to-species transfers (first with a filtrate of the J

sen rat sarcoma; later with a filtrate of human adenocarcinoma) of the alleged "Rous accessory chemical." These experiments gave specious results. Nevertheless, his accumulated findings suggested that a specific virus (or viruses) underlay the processes of cancer. However, under experimental conditions, the virus alone was insufficient. A prosthetic chemical factor was required to weaken the cell and render it susceptible to virus infectivity. The virus then provoked the cell to unlimited proliferation. So stated **Gye's Hypothesis.**

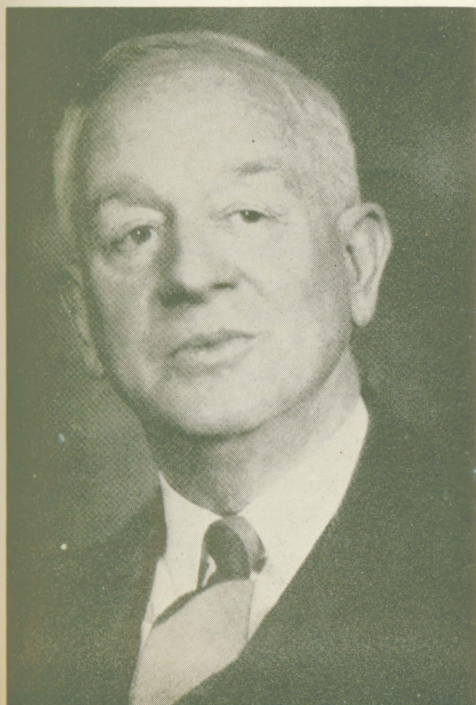
Gye's virus theory, as a "reconciling assumption," since it attempted to close the etiologic breach between the spontaneous fowl sarcomas and leukoses and the apparently non-infective tumors of other species (including man), revived interest in oncogenic viruses, if through nothing else than controversy. His experiments were far from flawless and his inferences were hardly unimpeachable. Murphy argued that the spontaneous fowl neoplasms contained a direct,

perhaps non-living, "transmissible mutagen," although he could find no evidences of such in two transplantable sarcomas in fowl by injecting tar and embryonal tissues. (Here we see the general confluences of the virus and chemical irritation theories and Cohnheim's hypothesis.) Then in 1933 Doctor Richard E. Shope demonstrated that rabbit warts (papillomas) were transmissible through cell-free filtrate. At the same time, the staff of the Jackson Memorial Laboratory (Bar Harbor, Maine) noted an extrachromosomal influence in the etiology of breast tumors in mice—an outcome of the long experiences of Doctors Clarence C. Little and Leonell Strong with the development of inbred strains of mice with varying degrees of genetically mediated susceptibility to cancer.

In 1934 foster nursing studies in mice were undertaken by Doctor John J. Bittner, following the communication of Little and Strong. Two years later, Bittner demonstrated a "milk factor," a virus-like material, transmitted through nursing by female mice of a high breast cancer frequency to mice of a low breast cancer frequency. Korteweg in a 1936 paper reported that a disposition to cancer of the mammary gland in mice was transmitted from mother to daughter along extrachromosomal ways. This author suggested three possible modes of transmission: ovular plasm, during intrauterine life and by means of the mother's milk. Korteweg did not pursue the third lead until 1940, at which time the "Bittner milk factor" was under intense investigation.

About 1940 the study of oncogenic viruses began to achieve a fairly secure outlook. New materials were being made available; e.g. chicken lymphomatosis transmitted by filtrate was reported by Jacob Furth in 1936; in 1938 Balduin Lucke communicated a similar transmission of frog kidney carcinoma. A new biochemistry had arisen in the foreground of research into regular and atypical pathways of animal metabolism (Embden-Meyerhof scheme of glycolysis (1919); tumor glycolysis under aerobic conditions (Warburg, 1932); Krebs tricarboxylic acid cycle (1937). This presaged novel possibilities in the biochemistry of viral carcinogenesis.

Portrait of Peyton Rous, M.D., courtesy of the Bulletin of the New York Academy of Medicine, Vol. 35, 1959.



Theory of Chemical Induction

As indicated earlier, nineteenth century pathologists were well aware of the involvement of environmental hazards, particularly those of occupational circumstances, with neoplastic diseases. Thus soot was the first in a long procession of harmful chemical products indicted by clinical histories of cancer victims. Cancer fatalities among chimney sweeps, liable to total body exposure to soot, were so striking that this trade was among the first to come under stringent Parliamentary regulation (George III, 1788; William IV, 1834; Victoria, 1840). The Industrial Revolution considerably worsened matters. John Aryton Paris, in 1822, pointed to the devastating effects of arsenical fumes in the copper smelting works of Cornwall and Wales, noting ". . . that smelters are occasionally affected with a cancerous disease in the scrotum, similar to that which infests chimney sweepers." (In 1888, John Hutchinson implicated arsenic, used therapeutically for psoriasis, as a predisposing cause of keratosis and cancer.)

The increasing requirements of dyestuffs for the burgeoning textile industry (after the 1856 discovery by William Henry Perkin of **Mauve**, the first aniline type), and by-products in the manufacture of coal gas to light the lamps of Europe, brought additional dangers. As early as 1880, acute hematuria, stranguria and cyanosis were noted in workers of the German aniline dye industry, and in 1895 Ludwig Rehn discovered two cases of papillomas and one of carcinoma of the bladder among a group of 45 men employed in the preparation of fuchsin. Crytoscropy, introduced in 1887 by Max Nitze, soon uncovered similar cases. Liability to scrotal cancer among workers of the paraffin industry was cited in 1874 by Richard von Volkmann. Finally, the use of tobacco, censured soon after its importation into Europe, in the terms of King James I (1610) as an evil, "both offensive to the nose and harmful to the lungs," was suggested also as a cause of cancer by clinicians, such as Thiersch (1865), who detected pathologic alterations of labial and oral tissues exposed incessantly to tobacco juices.

This recital of events is part of the evidential background for Virchow's theory of **external functional stimuli**. The irritation

hypothesis suggested the possibility that cancer ought to be reproducible in animal tissue exposed to the chemical stimuli apparent in environmental carcinogenesis. An 1883 report by an investigator who administered croton oil injections to a rabbit, alleging development of lung neoplasms, is the first of these attempts. Arthur Hanau, once again, was the first to clearly cross this threshold of experimental studies. Hanau (1889) prepared preparations of gas and coal tar upon the scrotum of white rats as well as upon the skin, vulvae, nipples, and secreting and non-secreting mammae of dogs, maintaining these applications for several months; this treatment resulted only in a chronic dermatitis in the animals. Hanau's work was repeated without success, in 1894 by Maurice Cazin. Hanau and Cazin failed, most likely, because of their unfortunate choice of experimental subjects—had they chosen mice, even today, the era of **chemical carcinogenesis** would well have dawned a quarter century earlier. A xylol-paraffin solution applied to the crushed skin of a guinea-pig elicited atypical growth after 10 weeks, according to a report by Adolph Brosch. However, experiments begun about 1905 by Bernardt Fischer-Wasels, showed more promising results. Fischer-Wasels found that Sudan III, in solution with phenol and especially Scarlet Red, injected into the ears of rabbits, induced epithelial metaplasia of a neoplastic character. Encouraging signs also came from other quarters. Wacker and Schmincke (1900), applied tobacco tar to the ear in rabbits; Bayon (1912), who injected gas-wood tar into the ear of a rabbit; and from Virchow (1913), who applied soot to the ear or scrotum of rabbits. Each of these authors reported atypical epithelial proliferations, not clearly malignant.

Now the time seemed ripe for deliberate studies in chemical carcinogenesis. These were undertaken in 1914 by Professor Katsusaburo Yamagiwa, a former student of Virchow, and Koichi Ichikawa, who repeatedly administered coal-tar applications to the internal surface of the rabbit's ear, a site at which spontaneous tumors had never been observed in this species. (Rabbits, likely chosen for this work, also were chosen because the inner portion of the ear offers

fairly large area with not much hair and the rabbits could neither lick the painted tar, remove it with their paws or by rubbing against the bedding and cage. Moreover, it was easy to peel off the dried tar before reapplying fresh tar.)^{*} The inventiveness and patience of Yamagiwa and Ichikawa were repaid with success. After several months, papillomas appeared and subsequently (1915) the Japanese workers recorded the development of three carcinomas in the tarred animals.

Now began a most fascinating chapter in the history of cancer research, a chapter too detailed to be recounted here. Among other things, the length of the tarring period was found to be crucial. Prolonged tarring of mice also gave conclusive results, but rats were found to be among the most refractory of laboratory species. Nevertheless, with the available materials a wide variety of growth irregularities in tar-evoked cancer were immediately studied. As early as 1924 organic chemists were brought into these investigations to find a specific agent having unique carcinogenic activity. This search, despite the misgivings of many, proved among the most fruitful.

As early as 1913 studies by Ross and Cropper implicated cyclic hydrocarbons of the anthracene group, distilled from gas works-tar and tested upon human WBC, with carcinogenic activity. A variety of tars, especially known to be carcinogenic to laboratory animals, were examined in the early 1920's by E. L. Kennaway, among others. Although industrial and experimental evidence showed that the carcinogenic factors came off in high boiling point fractions, the specific agent (or agents) eluded detection. In 1924 Professor Kennaway reported the formation of a cancer producing substance from isoprene (2-methylbutadiene), actually a mixture of compounds, chiefly aromatic. Although potent fractions were recovered, it was necessary to put each through the time consuming test of direct application to animal tissues.

Research ingenuity came to the fore when Professor Kennaway and his associates found

that highly carcinogenic fractions of tar showed characteristic fluorescence spectra. This suggested that spectroscopy could be substituted for the mouse skin test, a saving of months for each experiment. In this way the first chemically pure carcinogenic hydrocarbons were reported in 1930 by the Kennaway group—first the weak carcinogen, 1,2-benzanthracene, then its spectroscopically related derivatives, the potent 1,2,5,6-dibenzanthracene, 3,4-benzpyrene and methylcholanthrene. The research horizons opened by this advance may well be imagined, especially after 1940 when the availability of radioactive "labels" permitted exact charting of carcinogen activity in the metabolic processes.

brief mention should be made that research on carcinogenic compounds of the aminoazo family (aromatic amine series) also was vigorously prosecuted, especially after 1930. Following the footsteps of Fischer-Wasels, Schmidt (1924) noticed that Scarlet Red, fed to mice as an *in vivo* fat stain, induced extensive proliferation of the hepatic epithelial cells. Professors Tomizu Yoshida and Takoaki Sasaki were to add significantly to this work when, in 1935, they reported o-aminoazotoluene (AAT) (part of the Scarlet Red molecule) as a hepatocarcinogen in rats. Subsequent testing of many related compounds added new carcinogenic aminoazo compounds to the research roster, especially through Doctor Riojun Kinosita's 1937 demonstration that p-dimethylaminoazobenzene (DAB), added in precise amounts to diet of rats, elicited epithelial cancer in rat livers. Doctor Kinosita thus provided a direct tool for later research on metabolism (e.g. carbohydrate) in experimental tumor induction.

As a rule, the historian should not transgress the boundaries of his art. After 1940, historical perspectives in cancer research are lost in the march of current events. Greater convergence of certain problems, e.g. in carcinogenesis, become evident in the course of modern biochemistry. Even thus we perhaps may see in these events the fulfillment of John Marshall's prophecy that the answer to cancer is to be found in the "mystery of mysteries which lies within the nucleus of the cell."

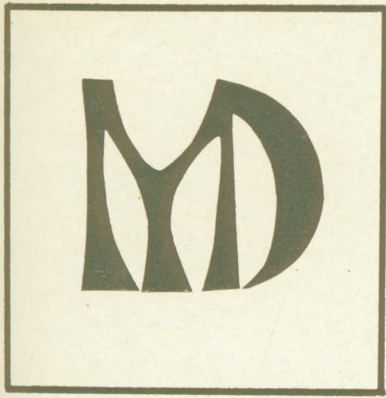
^{*}Personal communication from Dr. Riojun Kinosita, City of Hope Medical Center, Duarte, California. Dr. Kinosita was prominently associated with Yamagiwa and Ichikawa in these studies.

Some Educational Problems For the Medical School

BY ROBERT D. COYE, M.D.
ASSISTANT DEAN



Recently I had the tedious job of looking over almost all of the pathology texts now in print. As could be expected, there was an impressive variation in size, style, point of view ("science" of pathology versus "practical" pathology, etc.), beauty of illustration, and cost. For example, the range in size was from a 27.5 x 20.5 x 7.0 centimeter manual weighing 4.15 kilograms to a 20.3 x 13.0 x 2.0 centimeter lump weighing only 50 grams. Similar ranges were noted for other parameters. If asked by a student which of these he should pick as a text, the answer would probably be something like, "Well, I'm sorry but I can't help you much." Some of these are too big and others are too small. Some are a bit out of date. Some are too long and dull and others put too much emphasis on research. The other members of the pathology department probably wouldn't agree with my choice of a text anyway. It depends largely on what you are interested in and besides, who knows what you will be needing in the way of pathology five years from now." The long-suffering student may well feel he's being denied access to the "straight dope" for lack of inter-



on the teacher's part, but the chances are that no one teacher, and certainly not the faculty as a whole, has a clear view of what, where, when, how much, and from whom medical students should learn. The straight dope just isn't on the shelf for sale as it was in the good old days, if it was then.

The effect of not having clear cut educational goals and the means to reach them (which I would take to be a fair definition of a good curriculum) was nicely documented several years ago in an intriguing report on how medical students determine what they should study. The freshman class began by trying to "learn everything" through late hours of study and elaborate systems of note-taking and cross indexing. They rejected this approach as totally unsatisfactory shortly after the first exams, and began next to study what was "important to becoming a doctor." This approach was gradually abandoned as it became clear that identifying these "important" bits of knowledge was beyond their ability. They then decided, quite early in medical school, to study what the faculty wanted them to study. This was never a very satisfactory solution because the faculty was by no means in agreement about what they should study. The message seemed to be that the faculty calls the tune, but some form of orchestration is required to make the music fit for student dancing. For a variety of reasons it appears that the traditional system of teaching a student to become a doctor is failing to do the job as well as it has in the past.

The reasons for this have been looming up over the horizons for some time. The first and most important reason is the famil-

iar information explosion. The fantastic increases in knowledge, in all fields, which is both pertinent and relevant to medical education has resulted in a serious time-information dilemma. Nothing is more pathetic than the teacher with three hours worth of valuable information and only one hour to present it. Decisions about what to leave in and what to leave out are frustrating and continuous. There are only two real alternatives here: either cut out some of the material and hope that the student will not suffer too severely, or, lengthen the time required to complete the M.D. degree and teach more than the current schedule allows. The second alternative runs against the grain of present thinking; it is worth noting, however, that the average medical graduate spends several years in residency and other post-graduate training—certainly far more than he did previously, and this in effect, increases the total time of medical education.

Thus the entire responsibility for medical education is no longer necessarily met within the four-year medical school program, and it may be reasonable to consider rather drastic reductions in curriculum time if we assume that the student will continue to learn long after we in medical schools have stopped teaching. It is also of interest with respect to the information-time dilemma, that savings may be made through more efficient teaching and learning. The advent of George Miller's book, "Teaching and Learning in the Medical School" focused the attention of many faculty members on the educational process, and there have been some very interesting and productive experiments in this previously neglected area. Similarly the arrival of the teaching machine and programmed instruction have caused fermentation in the academic pot, and they give promise of making some forms of learning much less expensive in terms of both student and faculty time. However, it is basic to both

the concepts advanced by Dr. Miller and to the application of programmed learning that the objectives of the teaching be specified before really effective teaching can result. This detailing of educational objectives which appears to be the *sine qua non* of good teaching is an extremely difficult and laborious undertaking and will require a great deal of effort on the part of the medical faculties who attempt to improve their curriculum by the use of these techniques.

The second reason for the curricular changes which are presently underway (or underfoot according to some) is related to the information explosion and has to do with the proliferation of areas of specialized knowledge. The problem here is that there are now sizeable numbers of faculty members whose training and interests just don't match the classical department structure, and fitting their contributions into a traditional department-oriented curriculum is therefore awkward at best. Just as they are frequently outside the traditional departmental interest boundaries, they are frequently outside the main stream of traditional medical education. Frequently a blend of two departments is required to express a faculty member's interests. For example, at Wisconsin, roughly 25 per cent of the fulltime medical faculty now hold joint appointments either between two Medical School departments or between a Medical School department and a department elsewhere in the University. Obviously this type of interdisciplinary interest has many advantages, but at the curriculum level it makes it difficult to use the departmental structure to teach an area of subject content. Recently a guest speaker commented that at his school one aspect of genetic coding was explained to the same group of students by seven different departments.

This realignment of faculty interests outside of the orthodox departmental boundaries has been expressed in changes in teaching at other universities, as, for example, at Western Reserve through the use of subject committees, or as at Colorado, where they have recently instituted an integrated course in Cell Biology during the first year of medicine. This trend has reached its limit in one school—recently the new medical school in San Diego decided to dispense with the whole concept of departments in basic sciences! It



seems clear that as the area boundaries of medical knowledge become progressively more difficult to define in terms of the classical departmental structure, there will be less and less teaching done by departments isolated and totally independent structures.

As if these factors weren't enough to consider with when we go back to the drawing board for a new curriculum, there are at least two more which have a sizeable impact. The student applying to medical school no longer comes from the "pre-med" major as he did in the past. He has frequently been exposed in college to new concepts, methods, and approaches to problems in biology. His transcript may show "biological systems" or "cell development" instead of "general biology" and "embryology." And these aren't just new names for old products. They are new ways of understanding biology which will necessitate corresponding changes in what we teach in medical school. Another pertinent student characteristic is the diversity of choices open to him both before the time of admission to medical school and during his time in medical school. The numbers of "suitable" first-year students for a pre-med major have increased enormously. Engineering, mathematics and

netics are a few recent examples in our school. And while in medical school he has not only the standard choices of general practice, medicine, surgery, pediatrics, etc., as in the past, but also can elect fields which did not exist 10 years ago, or may combine two or more of the standard occupations to create a new "specialty." The exposure of the student to the wide variety of medical occupations which have developed has whetted their appetites for more than survey courses or introductory lectures in these areas. A curriculum in tune with the times should be able to take advantage of this kind of motivation of the part of the student, and match him with one of the faculty members with similar interests. This implies a change in the traditional pattern toward greater freedom for the student to elect his education, and more thought on the faculty's part to select the basic educational program to be required of medical students.

Still new and difficult to evaluate, but of obvious importance in curriculum planning is the constellation of factors which are changing the patterns of medical care and practice. It hardly needs saying that the increasingly important role of the hospital, the rapid development of medical care plans, the increasing numbers of older patients with rehabilitation problems, the rapid growth of clinics and group practices, the urbanization of the population, the support of medical education by the federal government and

such programs as the heart-stroke-cancer centers all will have their effect on what kinds of doctors we are called on to produce in the future. At present the medical schools are less the movers than the pawns in this area, but some schools are beginning to respond to this challenge with programs which have as a common denominator the utilization of the entire community's health oriented facilities as a part of the medical school. These programs may include other schools in the university, the community hospitals, the public health and welfare agencies and others as educational resources pertinent and relevant to the needs of the medical students. The implications of this emerging trend to expand the activities of the medical schools beyond their existing walls should be of more than casual interest for those responsible for educating the doctors who will still be in practice in the year 2,000.

To construct a curriculum which will take into account these factors would tax the wisdom of amphitheater of Solomons. No one in his right mind believes that any solution can be more than temporary and infinitely improvable. It is nevertheless necessary work—in the words of Satchel Paige, "Don't look back—someone may be gaining on you."

Dr. Coye, an associate professor of pathology, is also assistant dean of the Medical School, with responsibility for the curriculum.

ORDER VOLUME OF MIDDLETON PAPERS

The class of 1935, celebrating its 30th anniversary with a reunion last year, honored Dean Emeritus William S. Middleton by publishing a hard cover volume of 17 of Dr. Middleton's papers on medical history. The class will sell the books at \$6 a copy and use the proceeds to finance a worthy class project in the new library.

Enclosed is my check for \$_____ for _____ copies of the book of Middleton Medical History papers. Make checks payable to: Wisconsin Medical Alumni Association, Inc.

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AUDIT REPORT

Warren Randy, certified public accountant, has submitted the annual audit report for the Wisconsin Medical Alumni Association, Inc. In his report he states:

"In my opinion all of the disbursements

were appropriate to the purposes of the corporation as outlined in the Articles of Incorporation and as promulgated by the Board of Directors."

The report follows.

SUMMARY OF CASH RECEIPTS AND DISBURSEMENTS

Receipts	July 1, 1963 to June 30, 1964	July 1, 1964 to June 30, 1965
Dues Received	\$ 9,388.00	\$ 9,715.00
Class of 1944 Project	2,795.00	750.00
Class of 1945 Gift	—0—	3,394.00
Library Donations—Class of 1955	—0—	372.00
Sale of Middleton Medical History Essays	—0—	690.00
Total	12,183.00	14,921.00
Expenditures		
Salary—Executive Director (1)	2,708.29	2,291.00
Printing—Alumni Newsletter	2,694.45	4,099.00
Other Printing and Stationery Costs	636.32	400.00
Postage	94.96	1,027.00
Repairs and Plates for Addressograph	—0—	135.00
Board of Directors and Committee Meetings	17.81	29.00
Other Meetings (2)	689.78	(3) 1,535.00
Audit	125.00	175.00
Miscellaneous	14.45	7.00
Fund Raising Expense	160.00	77.00
Awards	1,000.00	1,000.00
University of Wisconsin for Medical School History	2,000.00	5,500.00
Insurance	—0—	181.00
Contribution to UW Premedical Association	—0—	100.00
Funds turned over to UW for Class of 1944 Project	—0—	3,470.00
Total	10,141.06	20,030.00
Excess of Receipts (Disbursements)	2,041.94	(5,108.00)

(1) Paid through July, 1964.

(2) Of this amount \$595.78 was the deficit for Alumni Day, 1964.

(3) Of this amount \$934.31 was the deficit for Alumni Day, 1965, and \$333.00 was in payment of additional expenses for Alumni Day, 1964.