CHARITY BALL

BENEFIT OF THE

PHILADELPHIA OSTEOPATHIC HOSPITAL
PENN ATHLETIC CLUB

Saturday Night
Washington’s Birthday
February 22, 1936, 10 P. M.

CHARITY BALL INTERNATIONAL DINNER

Seven P. M.—Grand Ballroom
An ELABORATE FLOOR SHOW with noted
Radio and Stage Stars Participating.
Reservations Taken Now—Tickets, $2.50

GRAND BALL—10 P.M.

Once Again a Nationally Known and Popular Radio
Broadcasting Orchestra Will Furnish the Dance Music

GIFTS

A 1936 Ford Automobile
Auto Radio
Electric Refrigerator
Community Silver
A Trip to Bermuda

HAVE YOU
SOLD YOUR
BOOK?

HELP US TO HELP OTHERS
VOLUME IX

OSTEOPATHIC DIGEST

Published Monthly During the College Year by

THE PHILADELPHIA COLLEGE OF OSTEOPATHY

48th and Spruce Streets

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SCIENTIFIC SUPPLEMENT

WITH THE NURSES

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THE AXONE

THE DEAN'S CHRISTMAS MESSAGE

Subscription—One Dollar per Year

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Managing Editor, François D'Elisçu

48th and Spruce Streets, Phila., Pa.

WITH THE EDITORS

SOMEONE has said that human life is a compact between the noble past, the living and the unborn. We of the present age must be careful to appreciate the true significance of that life. The great purpose of this school, or any other school, so far as it justifies itself as a true school, is that the greatness of the past is brought into the soul of the living student. He should find himself linked with the past as he is destined to be linked to the future and the unborn. There must be no lost sense of values.

WHEN reading Still in his "Research and Practice," we are reminded of a touch by Walt Whitman, who anticipates his critics by insisting that his "Leaves of Grass" are not to be judged as literature at all, and who sums it all up by saying: This is no book! Who touches this touches a man.

"VERITABLY the greatest miracle of it all lies in this: That one of the wisest, most analytical and understanding minds that the medical world has yet produced should have been, not some exalted scientist, safe in the integrity of his own laboratory or institute; not some mighty prelate, with the theological learning of the centuries at his beck and call; not some memorable philosopher dwelling aloof in contemplation of remote stars: the miracle is that Andrew Taylor Still,—this most capacious and technical of human minds should have vouchsafed us in the person of an ordinary physician, who with limitations of station, education, vocation, medium of expression and the rest should nevertheless have achieved such a result." (The Significance of Still.)
In keeping with the declared policy of periodically offering graduates an opportunity to become acquainted with recent developments and advances in the art of osteopathy and its sciences, the Graduate School offers a Special Course in Podiatry for a period of two weeks commencing Monday, January 20th, ending Saturday, February 1, 1936. The size of the class will be limited and all requests, as they are received from osteopathic physicians desiring this special opportunity, will be carefully analyzed from the standpoint of availability of facilities, equipment, clinical subjects and like considerations before acceptance in any case is accorded. The fundamental policy of the educational plan for the Graduate School promises high class, well-rounded instruction in any offering whatever, and such is assured for this particular offering.

This Course has been planned with the idea of presenting the problems of feet in their many phases in a simple and logical manner. With this end in view the hours have been so arranged that the laboratory and relatively few didactic hours are immediately followed by and are intimately connected with clinical sessions illustrating the various points involved. Throughout the Course emphasis will be placed on actual case study.

Following an introductory lecture on the first morning, the basic sciences will be presented and most of the time of the five following mornings will be spent in the Dissection Laboratory, where the Professor of Anatomy will lay necessary foundations by having

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| 4-5 | Radiology | Clinic | Static Deformities | |
| 5-6 | Radiology | | | |

| SECOND WEEK—JANUARY 27-FEBRUARY 1 |

| 8-9 | Pathology | Emergencies and Bandaging | Operative Surgery | Emergencies and Bandaging | Shoes—Lasts and Leathers | Foot Technique |
| 9-10 | Anatomy | | | | | |
| 10-11 | Surgical Operative Demonstration | Pathology | Applied Physics | | | |
| 11-12 | Presentation Clinic | Practice | Presentation Clinic | | | |
| 1-2 | Clinic | Practice | Osteopathic Technique | Bacteriology | Clinic | |
| 2-3 | Surgery | Osteopathic Technique | Shoe Fitting and Visits to Factories | | |
| 3-4 | | Shoe Fitting | | | |
| 4-5 | Anaesthesia | | | Radiology | |
| 5-6 | Bacteriology | | | | |
the matriculants do work themselves on the cadavers. There will also be lectures and demonstrations in Applied Physics (Mechanics) of the Foot, Pathology (Gross and Microscopic), Physiology, Radiology, etc. These sessions will be followed by Lecture and Presentation Clinics covering in orderly fashion various aspects of osteopathic and surgical practice and technique. The afternoons of the first week will be entirely clinical.

The morning of the second week, with completion of essential basic sciences, will be given over to the clinical implications of the previous studies. There will be ample provision for Emergencies and Bandaging, Surgical Techniques and Operations, Orthopedics, Osteopathic Technique and systematic pursuit of the entire field comprising diseases of the lower extremities and feet. The afternoons of the second week will see the matriculant doing actual work in the diagnosis and treatment of foot conditions in the Clinic. Follow-up clinics of cases previously demonstrated and treated will be presented so that the student may have the opportunity of evaluating the various procedures that have been shown. There will be trips to shoe factories, exhibits of lasts and leathers, demonstrations of orthopedic appliances, motion pictures, etc.

A question-box arrangement, throughout the course, will allow the matriculant to express views and opinions, and will encourage an open round-table discussion on the problems which have been previously presented.

SYNOPSIS OF THE CURRICULUM

Number of Hrs.

**Required**

Anatomy (Descriptive and Dissection) .......... 17
Bacteriology .................................. 2
Clinic (Dispensary) ........................... 20
Emergencies and Bandaging ...................... 5
Osteopathic Principles (Applied Physics) ....... 3
Osteopathic Technique ......................... 7
Pathology .................................... 3
Physiology .................................... 2

Practice (including Lecture Clinics) .......... 8
Radiology .................................... 3
Surgery (Operative Demonstration) ............. 10
---80

**Additional**

Shoe Fitting .................................. 2
Lasts, leathers, etc. .......................... 2
Visits (factories) .................. 4
Chirophy .................................... 2
Motion Pictures ............................... 2
---12

Total Hours .................................. 92

TEACHING STAFF

Peter H. Brearley, D.O., Professor of Osteopathic Technique, P. C. O.
Ralph L. Fischer, D.O., Professor of Practice, P. C. O.
Edward A. Green, D.O., Professor of Physiology, P. C. O.
C. Haddon Soden, D.O., Professor of Osteopathic Technique, P. C. O.
George S. Rothmeyer, D.O., Podiatrist, Osteopathic Hospital of Philadelphia
Paul T. Lloyd, D.O., Roentgenologist, Osteopathic Hospital of Philadelphia
Joseph F. Py, D.O., Bacteriologist, Osteopathic Hospital of Philadelphia
Otterbein Dressler, D.O., Pathologist, Osteopathic Hospital of Philadelphia
Ruth E. Tinley, D.O., Professor of Pediatrics, P. C. O.
Leo C. Wagner, D.O., Associate Professor of Pediatrics, P. C. O.
Earl H. Gedney, D.O., Associate Professor of Osteopathic Technique, P. C. O.
John H. Eimerbrink, D.O., Associate Professor of Osteopathic Technique, P. C. O.
William Baldwin, M.A., Associate Professor of Physiology, P. C. O.
Paula M. Elias, D.O., Demonstrator of Anatomy, P. C. O.
Angus G. Cathie, D.O., Demonstrator of Anatomy, P. C. O.
Karnig Tomajan, D.O., Chief Resident Physician, Osteopathic Hospital of Philadelphia
Ralph W. Davis, D.O., Assistant in Anatomy, P. C. O.
Alice Bowden, D.O., Clinical Assistant in Podiatry, P. C. O.
John La Li, D.O., Fellow in Anatomy, P. C. O.

Francis A. Finnerty Elected President of Post-Graduate Class

FRANCIS A. Finnerty of Montclair, New Jersey, was elected President of the Post-Graduate Class now in session two days a week at the Philadelphia College of Osteopathy.

Seventy-five graduate physicians are receiving instruction in various prescribed subjects in addition to a practical course as outlined by Dean Edgar O. Holden, in charge of the graduate school.

Henry J. Hoyer, President of the New Jersey Osteopathic Society was made vice-president and Alfred G. Gilliss, of Merchantville, N. J., secretary.
FOURTH ANNUAL CHARITY BALL
DRAWS EARLY RESERVATIONS
DINNER AND DANCE TO SURPASS LAST YEAR

THE Fourth Annual Charity Ball to be held on Washington's Birthday, Saturday, February 22nd, at the Penn Athletic Club, will surpass any social event ever organized in the College and Hospital. Such elaborate preparations have been made for the International Dinner, the floor show, the theatrical performances and presenting of outstanding personalities, together with the Grand Ball that the Committee, at the present writing, is worried about taking care of the large crowds that are already making reservations for the event. Thousands of invitations have been mailed throughout the State and the immediate response is most gratifying, especially when one considers the magnitude of such an undertaking.

Washington's Birthday is a holiday and this year being on a Saturday, the Charity Ball Committee can announce a genuine week-end. Founders' Day will be celebrated again in the morning in the auditorium of the College with various honorary degrees conferred by the Board of Directors, followed by a Neo and Alumni Luncheon and then the rest for the big Dinner and Dance.

The popularity of the table prizes at last year's Dinner has prompted the Committee to announce a dinner prize for every table which should prove most interesting, because last year's gifts were a distinct surprise to the hundreds present that night. Reservations for dinner can be made now, as the early birds will receive the best tables close to the open space where the activities will be shown. In addition, the early reservations will assure the printing of the guests' names on a special menu dinner program, which will be a distinct holiday souvenir.

Extreme interest is being shown in the gifts that will be presented at midnight. A brand new 1936 AUTOMOBILE, the first prize, or its equivalent in cash, will be presented that night to the lucky contributor who by purchasing this lucky number, made it possible for a clinic patient to continue receiving free services. The TRIP TO BERMUDA, the AUTO RADIO, ELECTRIC REFRIGERATOR, and the CHEST OF SILVER, will create sufficient excitement for those interested in the drawing that night.

It is at this point we announce with deep regret the death of Miss Kathleen Wells, soloist with Peter Van Steeden, who lost her life in an automobile accident recently. It was Miss Kathleen Wells, who, for two years, drew the lucky winners, and hundreds of patrons and patronesses will miss her and her lovely voice.

Books have been distributed to every available point. Because of the tremendous expense involved it is hoped that every individual who has received a book will ask for his fifty contributions from patients and friends and forward the full amount of $5.00 so that the work in our clinics may continue. The more books sold the more patients we can help, and it takes but a little effort to convince anybody that an ailing individual is worth at least ten cents worth of consideration.

The committee has made several trips to New York in reference to securing another outstanding orchestra. It is hoped that in a very short time a well known orchestra will be announced for the Charity Ball. Tickets at $5.00 per couple, are very cheap compared to other Charity affairs where twice that amount is asked with no program comparing to the affair of the Osteopathic Hospital.

Physicians are asked this year to invite their patients and their guests and make it a real big affair. Boxes are available from $50.00 to $150.00 which includes the dinner. With the Yuletide spirit upon us let us take a real Christmas attitude by disposing of our books, purchasing tickets, so that a large amount of money can be realized in order that we may help those who look to us for help!

Kathleen Wells

The lovely voice of Miss Kathleen Wells, N. B. C. and Maxwell House Coffee Hour Vocalist, who thrilled the crowds at the second and third annual Charity Balls of our Hospital will be heard no more. Death in the form of a tragic auto accident during a recent snow storm in Jersey City, N. J., cut short the career of a personality who was destined to attain great heights on the radio.

The entire faculty and student body of the Philadelphia College of Osteopathy and staff of the Hospital express their deepest and sincerest sympathies to the family of Miss Wells. She will always be remembered and endeared in the hearts of all of us. We cherish her memory with Peter Van Steeden and his Orchestra. She was not a performer, she was "just one of us."

Dr. Francois D'Eliiscu,
Director of Charity Ball
HAS PHYSICS ANY FUNDAMENTAL RELATIONSHIP TO OSTEOPATHY?

By WILLIAM BALDWIN, JR., B.A., M.A., Assistant Professor of Physics and Physiology, Philadelphia College of Osteopathy

WITHOUT a doubt, this question must be answered in the affirmative. Careful inspection of the fundamental laws of the functional activity of the body and of many of the instruments used by any physician show that they are taken bodily or with slight modification directly from the laws and the instruments developed by the physicist. Not only for these general relationships but for the very nucleus of its teaching, namely Spinal Mechanics, Osteopathy must turn to the science of Physics. In this very basic idea alone the Osteopath utilizes three very fundamental physical concepts, namely: force, leverage and inertia. Let us look at each of these and attempt to establish an idea of their importance to Osteopathic Technique.

Force, physically defined as that which changes or tends to change the state of rest or motion of a body, is perhaps the most fundamental concept of Osteopathy. No osteopathic correction is accomplished without the application of some force. In this connection we must bear in mind that in the physical sense force is one of the several quantities which have both magnitude and direction. Probably the latter, direction, is the factor least thought of in connection with force by the average individual and yet the Osteopath must realize that the direction of application of a force is perhaps more important to proper technique than the magnitude.

It is not only highly inefficient to apply a force which is not parallel to the plane of motion but also in the case of osteopathic manipulation it is dangerous. One prime factor in Osteopathic Technique is "side bend and rotate" so that when eventually the force is applied it will be parallel and induce motion in a direction parallel to the plane of the surface under treatment.

A lever is a rigid body rotating about a fixed point as an axis, by means of which one may accomplish a gain in speed, a gain in force or change in direction of the force applied. The Osteopathic Physician is primarily interested in the last two advantages named. For example, when he locks the spine in flexion or forward bending, he makes it a rigid body with the contact point as the axis, the force or thrust is delivered at the part above the point of contact which is a greater distance from the axis than the "resistance," i.e., the hand is held under the lesioned vertebra pushing upward, hence by taking advantage of this leverage he has accomplished an increase in the magnitude of the force on the part in lesion and a change in the direction of the force.

Finally, consider the question of inertia, sometimes defined as "the helplessness of matter." More scientifically defined, it is "the tendency of all objects to resist any attempt to change their present state of rest or motion." Everyone at some time has pulled a newspaper from the center of a stack of papers depending upon the "inertia" of the rest of the papers to keep them in place. When the Osteopath makes a spinal correction he depends upon the inertia of the vertebra adjacent to the lesioned one to keep them at rest while he delivers a sudden thrust to the lesioned vertebra thereby producing motion in it.

It is apparent from this brief discussion of these three very fundamental ideas of Physics that a basic knowledge of this science is not only useful but also very essential to the Osteopathic Physician who desires to be individual in his method of treatment. By applying these related physical principles he will be able to work out his own problems of technique.

CHRISTMAS CONCERT TO FEATURE SOLOISTS

The feature of the Christmas Concert to be given by the Musical Society on Tuesday evening, December 17th, at 8:45, in the College Auditorium, will be the playing of the Bach concerto for two violins and orchestra.

The solo parts will be played by Mr. Siekierka, of the freshman class, and Mr. Sharlip, our conductor, both members of the Philadelphia Orchestra. It is, indeed, a notable event to have two such well known musicians on our program, but all who know these men are aware of their great interest not only in the science of osteopathy, but also in furthering the cultural side of our college life. No greater evidence of this interest could be shown than their willingness to appear with our orchestra.

In addition to the concert, the orchestra will play other works, and the glee club which has been augmented by some new voices will again present an interesting group of songs.

The Philadelphia County Osteopathic Society is again holding its December meeting on the same night as the Christmas Concert so that its members might have one social meeting during the year.

Following the concert, the County Society will provide refreshments and an interesting social get-together is anticipated.

Dr. Sterrett, President of the Philadelphia County Osteopathic Society, is not only a member of the orchestra, but also one of its most loyal supporters and the Musical Society wishes to express its appreciation for all his favors.

There will be no charge and no cards of admission necessary. All who wish to come are cordially invited to be the guests of the Musical Society of the College, and of the County Society.
S EVERAL weeks ago the writer spent five days in Montreal at McGill University Medical School, studying their layout, distribution, methods, technique, labeling cases, racks, etc., of their Anatomical and Historical Museum which is located in the Medical School proper, and distributed on two floors.

Many classes are held in the Museum. Large circular wooden tables about twelve feet in diameter with a place for the instructor is arranged in such a way that the members of the class can see all the work that is being presented in a most practical way.

The Museum is replete with specimens illustrating all phases of anatomy, such as development, anomalies, structure of bodies, mechanics, surface markings, etc. Much attention has been paid to Osteology and to a series illustrating the development of bones. For instance, they have taken each bone in the body and have shown its development by bones from individuals of varying ages,—the ages usually being the stages when radical developmental changes are taking place—at birth, one year, two years, six-seven years, fifteen-seven years, twenty-one-twenty-three years, thirty-five-forty years and old age.

One of the most ingenious and useful of bone preparations was a human skull. This was disarticulated and mounted on wire supports and wooden blocks so that the skull fitted together. In this way the relationships could be studied. The blocks fitted together so that when the skull was articulated, the base was one complete block. The skull could also be disarticulated. Each one of the skull had its own base or stand to facilitate study of the individual bones.

This method has a decided advantage over the Beauchene skull, where all the bones have been disarticulated and remounted and spaced on a single stand. In the Beauchene type of skull, due to the rigid mounting and spacing of the individual bones, all surfaces cannot be seen, whereas, with this other type of skull, each bone can be studied from all sides.

The Museum in its present form has been existent for about thirty years. A fire destroyed practically everything, excepting two specimens. In spite of this handicap, the collection, along with the Army Medical Museum in Washington, and the Warren Anatomical Museum at Harvard Medical School, is one of the largest on the continent.

The Pathological Museum is housed in the Institute of Pathology, a separate building entirely, and occupies one floor. In the Pathological Museum, much attention has been paid to preserving the natural colors of the specimens, by means of different solutions, known as Kaiserling's and Jore's solutions. Although these solutions are supposed to retain colors for about ten years, there are some organs in which the colors are still perfect after twenty-five years of staining.

The Museum of the Philadelphia College of Osteopathy is still in its infancy having only been in existence for one year. The excellent cooperation of the doctors made possible the acquiring of many valuable specimens. The beneficence of several classes and individual donors is most encouraging. We are gradually getting our cases, jars, and extensive equipment that is necessary to run and build a museum. It is firmly believed, in a period of years, that our museum will rank with the best in the country. Of course, at the present time, we are handicapped for space for our cases and displays, but this need will gradually be met as the institution expands.

The criticism has often been made that museums are out of date and are not used and are only repositories of uninteresting organs which do not show anything of interest. This attitude, I am afraid, only reflects the institution, or its so-called museum. A museum is only useful when the specimens it contains are of practical value and can be used to demonstrate the various subjects under discussion at the time. It is well known that if a student can see and handle a specimen and form a visual picture of it, more information will be conveyed to him and retained by him, than is possible by the mere reading of books or listening to a lecturer.

A new plan will be presented in the dissecting room. A supporting rod will be stretched between the walls in the alcoves. Individual bones will be hung by a mechanical arrangement to afford more study in that field.

Special attention will be placed on skulls. As soon as suitable specimens are available they will be mounted as a whole as with the separate bones of the skull. A complete lecture on the skull with all parts labeled will be on exhibition.
PHILADELPHIA FURNISHES EDUCATIONAL IMPETUS TO GRADUATES
LANCASTER ORGANIZES P. C. O. ALUMNI

By D. B. THORBURN D. O.

SOME months ago in the Digest under the title "Opportunity Ahead" there was made historical mention of the rebuilding of the walls of Jerusalem and the fact that, through organization the builders could carry on their work until the sounding of the warning trumpet bade them drop their tools and protect what they had built from hostile tribes.

The article was written in the college paper for the profession. It is interesting to see that the first to give a concrete example of this state of preparedness for emergencies was the college itself.

The profession in New Jersey were successful in passing their bill. All honor to them for their persistance in the face of discouragement. They won their fight. No better evidence of the value of organization is possible. But—the new law required two years work in an accredited school for those who were to take advantage of the privileges of the bill. There was just one place that could do this so far as I could find.

It took a great deal of intense preparation to prepare for this sudden influx of graduate students. It took a separate faculty and a careful planning to give a complete course and yet avoid interference with the regular curriculum. But it was done. To the credit of the post graduate students be it said that they wanted no short cut to knowledge. They wanted a bang up course with everything that the law demanded and then some. And they got it too.

The spirit of Philadelphia has matched that of New Jersey and a fine post graduate course results.

There is another side to this to which we must take thought. Many more applicants have requested admission to this course than the college could conscientiously admit to it. These applicants will be forced to wait their turn. Many practitioners from other states, hearing that such a post graduate course was to be given, made application for admission. Unfortunately these also had of necessity to be refused.

Two conclusions are inevitable. The first is that fine as the college and hospital buildings are there isn't enough of them. The other is that Philadelphia is being recognized as the natural leader of Osteopathic education in the East. The profession is placing this responsibility squarely up to the Philadelphia College and the college is willing to accept it. The thing that we, as graduates of this school, must take thought to is how it can be made ready to accept it. That is something that the not too distant future must decide.

One of the greatest lessons of the depression has been that not only is osteopathy a true philosophy but that the fact is being recognized by the people at large. Osteopathy has weathered the trials and tribulations of the last six years. It is the youngest member of the therapeutic family and as such one would have expected so heavy a burden to prove almost fatal to the adolescent. On the contrary, if you don't mind a mixed metaphor or two, we find osteopathy sailing along with all sail spread prepared to take full advantage of the great days ahead.

Osteopathy now is developing by leaps and bounds, our school must not only keep up but must set the pace. That the school recognizes this is evident in many ways. An outstanding one is the museum that is being developed and that appeared in the exhibition at the A. O. A. Convention at Cleveland. Another one of the many is the new osteopathic prenatal and obstetrical clinic just opened in North Philadelphia. Any one visiting the college will be very thoroughly convinced that the dean and his faculty are aware of their responsibilities.

What we need now is better organization of its alumni! The question has always been as to whether it was possible to organize groups so widely separated. The Philadelphia graduates situated in and near Lancaster, Pa., have shown one practical way. They have formed a very live alumni association of their own under the leadership of Dr. George Gerlach, First Vice-President of the Alumni Association.

There should be many of these organizations in this section of the country and we believe that there will be. The capabilities of a single alumni association attempting to guide alumni activities throughout the East are too limited. The time has come when the college should have an official alumni representative in every sizable locality and in any osteopathic organization whatever.

We need this more comprehensive organization to aid in the future of Osteopathy and the future of the Philadelphia College. These representatives will shortly be appointed.

Osteopathy has many of the proclivities of any other adolescent and one of them is growth. We just can't stop it if we wanted to. When A. T. Still turned Osteopathy over to the world it proved to be the birth of an infant that was too lusty to be suppressed by any other school of therapy. It was the kind of a child that grows so fast it couldn't get into his big brothers trousers quickly enough.

Finally—in Philadelphia anyway—the time came when he had to have a new suit of his own. And certainly the present arrangement there is as fine as any osteopathy has had so far. The trouble, if you can call it that, is that the youngster is still growing. But promising children can grow up to be something very peculiar unless they are watched and helped.

It is hardly fair to throw the whole burden of the scholastic development of osteopathy upon the colleges. The profession in the field is of course doing everything in its power to ad-
vance osteopathy in respect to its laws and in standing with the public. They are doing this by joining their osteopathic organizations and presenting a unified front to attacks from other camps. They maintain public relation bureaus to properly inform the public about osteopathy and to make answer to the adverse and untruthful propaganda which finds its way into various publications.

Osteopaths are appearing before the public with greater frequency and are making a very good impression. They are making a good impression largely because of two things. First, because osteopathy is a true philosophy that will hold up under public scrutiny. The second reason is that osteopaths are recognizing the fact that a man may have learning above his fellows but, if he has not also learned to exhibit it properly, the public never finds it out and the reaction of the public to osteopathy and to us personally is a matter of some importance. The fact that the Philadelphia College gives instruction in public speaking is a fact significant of many things.

Now all these activities in the field are extremely laudable. They help osteopathy to take a higher place with the public. Incidentally, they help the osteopath concerned to do the same thing. When a man helps osteopathy in practice he is pretty certain to be helping himself. But when he helps his college whether financially or with personal service he is performing an act which is far more altruistic than most things he does. He is helping osteopathy, he is assisting

students to gain in osteopathic knowledge and through his personal contact he is helping to pass on the vital traditions of the founder as they color the great canvas of osteopathic accomplishment.

H erefore there has been a rather one-sided relationship between the college and the profession. The college appreciated fully that it depended upon the profession for support. But the latter enjoyed a feeling of detachment from things collegiate that made it take a rather cavalier if not, actually at times, a fault-finding attitude toward them. A few experiences like the present graduate school is bound to alter any remainder of this attitude. The cheerful efficiency with which the Philadelphia College met a very pressing need is bound to make an impression. And the whole affair brought out the fact that the profession recognizes its need for post graduate work and will take the work as soon as the school is equipped to give it.

The college is earnestly soliciting the interest and support of its graduates. The first step in answering this solicitation is to pay our alumni association dues of two dollars. This two dollars includes a year's subscription to the Osteopathic Digest. It will be a gesture that we will appreciate and withal an inexpensive one; the Digest alone is worth that much. It will cost you only two dollars to become a good alumni.

Pay your Alumni Association Dues
Now, the Digest is Included!
Members of Class of 1935 send in your address and picture of the College will be forwarded.

College Announces New Movie Film

THE Department of Publications and Publicity of the College announces a new 16 mm. movie film that has just been completed. Pictures of the college, hospital, students and departments at work were carefully filmed to give prospective students an opportunity to see the place before their own inspection.

Dean Edgar O. Holden Will Entertain at Informal Christmas Dance

THE entire student body, faculty, nurses and physicians, in the field have been invited by Dean Edgar O. Holden to attend his annual informal Christmas party and dance to be held at the Hotel Pennsylvania, on Wednesday night, December 18th.

The festivities will start at nine P. M. and continue until one A. M.

Dr. George S. Rothmeyer Discusses Basketball Injuries

BASKETBALL injuries can be just as serious as football injuries, and strapping of the ankles should be applied before a game and removed after a game," stated Dr. George S. Rothmeyer, physician and surgeon at the Philadelphia College of Osteopathy, in addressing a large number of athletic coaches and physical directors in the college auditorium, relative to the care of athletes and athletic injuries.

"The seriousness of the sprained ankle is greater than the average coach or athlete realizes, because the sprain may be responsible for a permanent injury to the ankle or foot. Basketball players are subjecting their ankles to severe strain throughout the entire game.

"A knee condition may become involved, as a sprained ankle may cause a weak knee, and in time throw the knee out of alignment, causing physical derangement and discomfort. It has been found that a faulty acting knee in many instances causes further pain in the lower back, resulting in lumbago and like conditions.

"These serious after effects may be avoided by carefully strapping the ankle of the athlete. When strapping an ankle, normal ankle motion must be maintained with a limitation of side motion at the ankle. This is important as it is this aspect in which the sprain almost always occurs.

"By applying a strapping, it will eliminate side motion and permit free normal bending of the ankle joint. In this way, the athlete is not only insuring himself against injury, but will experience more spring and flexibility in the arch. Strapping furthermore eliminates tiring. Not only osteopathic in concept but so fundamental and rational that this principle will be understood by medical physicians and surgeons as well as coaches.

"Coaches and basketball players will find after removing the bandage, that the support afforded the feet during the game and the removal of the bandage following the game, will result in a normal stronger foot for the next game."

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The Use of the Roentgen Ray in the Study of Vertebral Mechanics with Special Reference to Its Adaptability in Osteopathic Procedure*

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AND
PAUL T. LLOYD, D.O.
Professor of Radiology

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The work now being carried out in the radiographic study of vertebral structure and mechanics, of which this is a preliminary report, was started for the purpose of obtaining a body of accurate facts concerning certain phases of vertebral mechanics, of obtaining a body of accurate facts concerning certain phases of vertebral mechanics, of which this is a preliminary report, was started for the purpose of obtaining a body of accurate facts concerning the actual conditions obtaining in the living human organism which would not only add to the general fund of knowledge concerning certain phases of vertebral mechanics, but which would be of particular value in osteopathic analyses. The writers are convinced that radiographic study of the human organism offers the most accurate method for studying vertebral mechanics now at our command. It is at once apparent that ordinary x-ray technical procedures are inadequate for the study of mechanical changes for they employ static visualization which cannot be translated into a dynamic estimation. It was necessary, therefore, to develop a technic which could translate the static of the ordinary examination into the dynamic concepts of mechanics and, as well, make possible mathematical deductions which could be used for comparative study. The following pages will contain an exposition of this technic as it has been applied to a group of normal subjects.

A few observations concerning concepts of the vertebral lesion might aid in establishing the general objectives toward which the work being reported here has been directed. The diagnostic criteria of vertebral lesions and the means used to determine changes during the course of manipulative treatment may be classed as those dealing with changed structural relationships, those expressing mechanical alterations in terms of motion changes, and those which have to do with ascertaining the condition of the so-called paravertebral soft tissues. The procedures to be explained here were evolved to study the first two of these groups.

It might be said that the older concept of the vertebral lesion leaned toward considerations of rather gross structural alterations. Exponents of this view consider that the principle element in the lesion, and the one to which the greatest weight of diagnostic importance must be attached, is a departure from normal structure and alignment of vertebrae. They hold that this structural departure from the normal is of such a gross nature that it may be easily determined by palpation alone. There is a growing body of thought, which we might say embodies the newer concept, which believes that such gross structural alterations, while they may occur, are present in relatively few, rather than many lesions. This newer school of thought holds to the idea that the effects of the lesion must be conceived in the light of changes occasioned by mechanical alterations involving articular movement and, therefore, they stress the importance of estimations of the degree of articular motion present, in attempting to evaluate the normal or abnormal state of any articular field. One may assume that there is much to be said on both sides of this problem, and we may well ask ourselves whether the evidence which has been offered in support of either idea approaches incontrovertibility. It must be admitted that a comparison of findings based upon palpation is rather unreliable, if anything approaching scientific accuracy is to be attached to a study of the lesion, for individuals vary in their methods of examination and in their interpretation of results. It must also be recognized that some of the changes accompanying the lesion may be properly determined only by the trained sense of touch. The very intricate nature of the living articulated vertebral column, subjected, as it is, to an ever changing multitude of influencing factors, precludes the possibility of obtaining mathematical values necessary for scientific comparative study by the use of palpation alone. The technical procedures which can supply such mathematical factors must be free from the personal equation. It is our hope that the technic to be described will open the way for a more exact knowledge of the structural and mechanical conditions obtaining in the vertebral column under the varying conditions of both normal and abnormal activity.

The following Roentgen ray studies were carried out as a preliminary series to determine mechanical and structural conditions in a group of relatively normal adults. These studies, then, were made to establish a new technic and to find normal values for one age group. The technic ultimately will be used to study the entire vertebral structure, in both normal and abnormal states. This paper presents the technic which has been developed to apply to the cervical vertebral segments from the second to the sixth inclusive. It was decided to use the cervical column first since, from a radiographic viewpoint, it appeared to be best suited to a preliminary study in which new technical procedures were being developed.

The purpose of this series was to determine mathematically the structural and mechanical alterations occurring during motion in the second to sixth cervical vertebral segments of normal individuals. Radiographic visualization was used to show the changes occurring between vertebral segments when the column...
is moved between flexion and extension. From an anatomical standpoint, it was desirable to make lateral studies of the cervical column in three positions: neutral, flexion, and extension (See Figure 1). The changes in the three films indicate the alterations which occur during motion of the cervical column. Thus, instead of the static visualization ordinarily employed, these films present a dynamic picture. From a technical viewpoint, the positions used demonstrate the major portions of the vertebral structure with clarity of disc spacing together with as much of the anterior and posterior cervical soft parts as possible.

The subjects used were twenty students of the Philadelphia College of Osteopathy, including seventeen males and three females, and ranging in age from 18 to 34 with an average age of 22. As nearly as could be determined, these subjects were normal and free from gross cervical vertebral pathology.

The radiographic technic finally utilized consisted of the following physical factors: Ma, 100; time, ½ second; distance, 2 meters; voltage, varied to the thickness of the part. The two meter distance was found necessary to produce a film in which none of the five segments suffered from ray divergence. All films were exposed with the subject in the sitting position, the first film being made to the position (neutral, flexion, or extension). Four points are established upon each vertebral body corresponding to the anterior and posterior limits of the superior and inferior surfaces. The corresponding vertebral body on each of the other films, in turn, is then exactly superimposed upon the originally marked film in the neutral position and homologous points established on the second film. This procedure eliminates the possibility of slight variations which might occur in establishing these basic points if each film were marked independently. From this point forward, each of the films is ruled in a similar manner so that no reference need be made to the position (neutral, flexion, or extension). Lines are drawn through the anterior and posterior points of the upper and lower body surfaces and are called upper and lower “segmental transverse” (U. S. T. and L. S. T.) lines respectively. Lines are then drawn connecting the corresponding lower and upper body surface points of adjacent vertebrae. These are known as “lateral intersegmental” (L. I.) lines. The portion of the segmental transverse line lying between the two lateral intersegments is called the “surface diameter.” At any given interspace, then, there is a lower surface diameter of the upper segment and an upper surface diameter of the lower segment. An “intersegmental transverse” (I. T.) line is then drawn through points established midway between the lower segmental transverse line of the segment above and the upper segmental transverse of the segment below. Upon this intersegmental transverse line a midpoint is established between the lateral intersegments and is called the “intersegmental center” (I. C.). Points are then established upon the intersegmental transverse equal and given distances to the right and left of the intersegmental center. The distance from the intersegmental center is called the index of extension and in all the films reported in this paper was 5 cm. These points are called “extended intersegmental centers” (E. I. C.). A line is then constructed at right angles to the intersegmental transverse and passing through the intersegmental center. This line is called the “intersegmental vertical” (I. V.). Lines are then drawn parallel to the intersegmental vertical and passing through the extended intersegmental center points. Each of these lines meets the lower and upper segmental transverse lines of adjacent vertebrae and the portion of the line between these segmental transverse lines is called the “extended intersegmental vertical” (E. I. V.).

It is measurement of the changes in the length of the extended intersegmental vertical lines which gives the mathematical basis for expressing vertebral mechanics in most of...
the studies to be herewith presented. Previous mention has been made of the need for magnifying the degree of change occurring between vertebral segments, and it is to produce this magnification and aid accuracy in measurement that the extended intersegmental vertical lines are used for analysis.

The method of measuring differences in the lengths of extended intersegmental vertical lines must be explained if the work to be presented is to be understood. Figure 1 shows the three ruled films of subject Number 20 of this series. The changes which take place among the various lines, when the column is changed in antero-posterior position, can be seen. The anterior measurements referred to are those on the left of the films or anterior to the column, while the posterior values are taken from the right of the films or posterior to the column. Figure 3 shows the ruling of the interspace between the fifth and sixth cervical vertebrae of subject Number 20, which appears as extended intersegmental verticals (E. I. V.) which are to form the basis for measurement. Measurement of the E. I. V. at A showed it to be 9.0 m.m. in length. This figure is seen tabulated under Neutral position, 5th segment, under A. The posterior E. I. V., at P, was found to measure 1.0 m.m. It will be seen that the segmental transverse lines in this instance cross posteriorly and that this crossing produces an inversion of the posterior E. I. V. In the tabulation of these inverted values, the minus sign is used. It will be seen in the case of this measurement, in the table, which appears as −1.0 under neutral position, 5th segment, posterior (P) reading.

In studying the same segment in flexion, movement is produced. Accurate extended measurements would have to bear a definite relationship to some fixed mean between vertebrae. This mean is established through the intersegmental transverse (I. T.), which is always equidistant from the two S. T. lines. Therefore, if the E. I. V. is constructed at right angles to the I. T., in all segments and all subjects, a uniform standard for measurement results.

Another point, which will be dealt with at some length later, but which might be pointed out here to avoid misunderstanding, is that the I. C. (intersegmental center) is a point arbitrarily established in the same manner for each segment, but is not necessarily the axis point for flexion and extension. It will be shown later that the actual axis varies in relation to the I. C.

We are now in a position to return to Figure 3 and will start with the segment in the neutral position. At A and P are the extended intersegmental verticals (E. I. V.) and tabulated under Neutral position, 5th segment, under A. The posterior E. I. V., at P, was found to measure 1.0 m.m. It will be seen that the segmental transverse lines in this instance cross posteriorly and that this crossing produces an inversion of the posterior E. I. V. In the tabulation of these inverted values, the minus sign is used. It will be seen in the case of this measurement, in the table, which appears as −1.0 under neutral position, 5th segment, posterior (P) reading.

In studying the same segment in flexion,
we observe that the segmental transverse lines have approximated anteriorly and separated posteriorly. Such change, of course, alters the lengths of the anterior and posterior E. I. V. lines. It is the change in the length of the E. I. V. produced by motion, which forms the basis for representing mechanical alteration in a mathematical way. In the flexion position, the anterior E. I. V. (at A) measures 1.0 m.m. and the posterior E. I. V. (at P) measures 8.0 m.m. These measurements are tabulated under the heading Flexion, at the fifth segment as A and P measurements. It might be observed in passing, that a comparison of the posterior E. I. V. in the neutral and flexion positions indicates that it has increased from –1.0 to 8.0 or a total increase of 9.0 m.m.

In the extension position, we find that the S. T. lines have again crossed, which establishes a minus value for the posterior E. I. V. The E. I. V. measurements of the segment in this position are 12.5 m.m. anteriorly (measured at A) and –4.5 m.m. posteriorly (measured at P).

If the tabulation of the measurements which have just been obtained is examined, it will be seen that they may be used to indicate the range of motion among the three positions, expressed in millimeters of E. I. V. difference. For instance, if the movement from the neutral position to flexion is first studied, it will be found that the degree of movement at the fifth interspace, expressed in terms of extended measurement, is 8 m.m. at the anterior E. I. V. (The measurement in the neutral position was 9 and that in the flexion film 1 which means that the S. T. lines approximated to the extent of 8 m.m. along the anterior E. I. V.). Posteriorly we find the range of movement to be 9 m.m. (the measurement in the neutral film was –1 and in the flexion film 8 (+) which means that the S. T. lines at the posterior E. I. V. have moved through a range of 9 m.m.). In the movement from the neutral position to extension we see the ranges of motion to be 3.5 (12.5 minus 9) m.m. anteriorly and 3.5 (4.5 minus 1.0) m.m. posteriorly. The range from the flexion position to the extension would be 11.5 m.m. anteriorly and 12.5 m.m. posteriorly.

Ranges of motion, and other factors involved in the structural and mechanical changes occurring in vertebral motions, were mathematically determined by the methods just presented. Measurements of the E. I. V. lines for all segments, in all positions, were made and tabulated in the manner shown in Table I, which is the complete record of subject Number 20 from which Figures 3 and 4 were made. The figures in this table indicate, in millimeters, the lengths of E. I. V. lines.

The technical procedures which have been presented furnished data upon which several approaches to the study of vertebral mechanics could be based. Several analyses will be presented as more or less distinct entities and some correlation later attempted on the basis of the rather meager knowledge now available. It must not be assumed that a comprehensive picture of vertebral mechanics can be gained from the findings in any single analysis. The problem demands consideration of all the factors in all the studies which have been made and, as well, further investigations into regions as yet unexplored.

A STUDY OF INTERVERTEBRAL MOTION BASED UPON CHANGES OCCURRING BETWEEN ADJACENT VERTEBRAL BODIES

There are several questions concerning vertebral articular motion which should be answerable on a mathematical basis and which are of extreme importance in the differentiation of normal and abnormal mechanics. If we confine these questions to the cervical segments under consideration at this time, we might ask whether the motion in any one segment is relatively the same as in the other segments making up the group. If not, to what degree does each segment contribute to the group movement? Is there much normal variation in this segmental contribution? Is the percentage of motion contributed by a segment to the movement from the neutral position to flexion the same as from the neutral position to extension? How much normal variation exists in the total range of motion in different individuals and upon what factors might such difference in range depend?

These and other questions we will attempt to answer.

The first study which suggested itself, in connection with the analysis of these films, was that dealing with the ranges of motion in individual segments compared with the total range for the entire group of segments. The differences in E. I. V. lengths were, therefore, utilized to determine such segmental contribution. The objective was to attempt to establish an average percentage contribution for each segment based upon the twenty subjects examined. In attempting to strike an average for such a group of subjects, which would express mathematically the variations in ranges of motion between vertebral bodies, it becomes apparent at once that comparison of actual measurements would not be accurate for comparative study or for any accurate range of vertebrae among any group of subjects. The only accurate basis upon which such a normal table could be constructed is upon the basis of percentage. If the percentage of the total range of motion in the cervical group contributed by each segment is determined, and then an average struck from these figures, for the group of twenty subjects, there results a group of values which is much more accurate for comparative purposes than actual measurement of motion in millimeters.

To accomplish this reduction to percentage, the following procedure was applied: Measurements were made of the length of each E. I. V. line for each segment, anteriorly and posteriorly, in all three films—neutral position, flexion, and extension—and recorded in millimeters. The differences in the length of each E. I. V. among the three positions was determined, in the manner described in connection with Figure 3. From these differences in E. I. V. length, a table was made for each subject. Table II shows the tabulation for

### TABLE II

<table>
<thead>
<tr>
<th>SEG.</th>
<th>A</th>
<th>P</th>
<th>AP</th>
<th>%</th>
<th>A</th>
<th>P</th>
<th>AP</th>
<th>%</th>
<th>A</th>
<th>P</th>
<th>AP</th>
<th>%</th>
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<tr>
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<tr>
<td>5</td>
<td>8.0</td>
<td>9.0</td>
<td>17.0</td>
<td>28</td>
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<td>3.5</td>
<td>7.0</td>
<td>10</td>
<td>11.5</td>
<td>12.5</td>
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<td>20</td>
</tr>
<tr>
<td>6</td>
<td>7.5</td>
<td>6.5</td>
<td>14.0</td>
<td>23</td>
<td>3.0</td>
<td>4.0</td>
<td>7.0</td>
<td>10</td>
<td>4.5</td>
<td>8.5</td>
<td>13.0</td>
<td>11</td>
</tr>
<tr>
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<td>100</td>
<td>35.5</td>
<td>32.5</td>
<td>68.0</td>
<td>100</td>
<td>59.5</td>
<td>60.0</td>
<td>119.5</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Differences in E. I. V. measurements between the positions designated taken from the values shown in Table I (Subject No. 20). These figures express in millimeters the differences anteriorly, posteriorly and combined for each segment as well as the total range for the group. The percentage contribution of each segment to the combined range of motion, as determined by the total of A and P differences, is also shown.
subject Number 20. The figures in this table show the differences, in millimeters, in the length of each E. I. V. lines, when the cervical column was carried through the designated movements (neutral position to flexion, neutral position to extension, and flexion to extension). At the second segment, we see that when the column was carried from the neutral position to flexion that the range of motion, expressed in millimeters of E. I. V. differences, was .5 anteriorly, and 1 posteriorly, the sum, 1.5 m.m., being the value for the segment. In the movement from the neutral position to extension at the same (second) segment, the range was 8 m.m. anteriorly, 7 m.m. posteriorly with a total of 15 m.m. for the segment. The range for the movement from flexion to extension was 8.5 m.m. anteriorly, 8 m.m. posteriorly, and 16.5 m.m. as a combined range for the segment. The E. I. V. differences for all segments are recorded in the same manner and the totals of these differences set down for the anterior, posterior, and combined E. I. V. readings.

In determining the percentage motion contribution of each segment to the group motion of all segments, the combined anterior and posterior E. I. V. differences are used to express the changes taking place at each interspace. If the neutral to flexion part of Table II is examined, it will be seen that the combined A and P E. I. V. differences are, from the second to the sixth interspace respectively, 1.5, 11.5, 16.5, 17.0, and 14.0 m.m., with a total of 60.5 m.m. Neutral to extension movement gives values of 15.0, 20.5, 18.5, 7.0, and 7.0 m.m. for the respective segments, with a total of 68.0 m.m. In the movement from flexion to extension the E. I. V. differences are seen to be 16.5, 32.0, 34.0, 24.0, and 13.0 m.m., with a total of 119.5 m.m. The movement from the flexion position to the extension position may be used to determine the percentage contribution of each segment to the total motion, in the complete range possible for the subject. In the above instance, then, 119.5 m.m. would equal 100 per cent of motion or the complete range for the group. On this basis, the 16.5 m.m. range at the second interspace represents 14 per cent of the total, the 32.0 m.m. at the third represents 27 per cent of the total, the 34.0 m.m. at the fourth 28 per cent, the 24.0 m.m. at the fifth 20 per cent, and the 13.0 m.m. at the sixth 11 per cent of the total. In this manner the actual range in millimeters has been reduced to percentage of the group movement.

When the same procedure is applied to the other movements, the percentage contribution of the five segments from the second to sixth, in the neutral to flexion movement is found to be 3 per cent, 19 per cent, 27 per cent, 28 per cent and 23 per cent, respectively. In the movement from the neutral position to extension, the segmental contribution is 22 per cent, 30 per cent, 28 per cent, 10 per cent, and 10 per cent.

From these figures, representing percentage of segmental contribution to combined motion, tables were made showing the values for the three movements in all the subjects. In this manner, a segmental average contribution for the group of subjects could be established. Tables III, IV, and V show this material.

Table III. A shows the segmental percentage readings for all twenty subjects used and expresses values produced when the cervical column was carried from flexion to extension. The values show that in subject 1, the percentages of total motion contributed by each segment was 15 per cent, 20 per cent, 20 per cent, 24 per cent and 21 per cent, for the second, third, fourth, fifth and sixth segments respectively; in subject 2—12 per cent, 23 per cent, 22 per cent and 16 per cent, respectively, etc. The average for the group of twenty subjects, in segmental order, will be seen to be 15 per cent, 21 per cent, 24 per cent, 24 per cent, and 16 per cent. This would indicate that the third, fourth and fifth cervical segments contribute to the total range of motion in a greater degree than the second and sixth.

If these figures of 15, 21, 24, 24 and 16 per cent are to be of value as a standard or average normal against which comparisons of suspected abnormals can be safely made, the normal range above and below these figures must be known. It is perfectly possible to have wide variations within a group from which an average is computed. With the above average percentage for each segment as a basis, then, each segment of each subject was checked for increase or decrease above or below this average.

Table III. B shows these variations in all subjects in terms of increase or decrease percentage above or below the average, while Table III. C is a simplified analysis of these variations in terms of actual numbers of subjects which showed percentages above, below, (increase, decrease) or coincidence with the average. It will be seen that the greatest ranges for all segments and for the entire group of subjects are —7 and +7. This would indicate that for this group, at least, values greater than 7 per cent above or below the established averages of 15, 21, 24, 16 could be suspected of being outside the limits of normality. No attempt should be made, however, to determine normality or abnormality on the basis of these values alone, for it will become apparent, as other studies are presented, that evaluation of the state of mechanics of any of these articulations should be made only after careful comparisons of all available data.

Table IV. A shows the percentage segmental motion contributions in the movement from neutral position to flexion. Here, we find that, while the average segmental

---

**TABLE III**

**A. FLEXION TO EXTENSION**

| SEG. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| GROUP Av. % | 15 | 21 | 24 | 24 | 16 |

Twenty normals showing the percentage of the total motion for the five segments contributed by each segment and the average segmental percentage contribution for the group.

**TABLE III**

**B. FLEXION TO EXTENSION**

| SEG. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| GROUP Av. % | 15 | 21 | 24 | 24 | 16 |

Increase or decrease percentages over or under the group average shown in Table IIIA.
Analysis of the cervical vertebral column showing the average percentage of total motion contributed by each cervical segment, the number and average percentage increase or decrease from the average of the group, the greatest individual increase or decrease in percentage, and the number showing no change from the average. Based upon twenty normal cervical radiographic studies.

**TABLE III**

**C. Flexion to Extension**

<table>
<thead>
<tr>
<th>SEG. NO.</th>
<th>DECREASE</th>
<th>AVERAGE SEGMENTAL PERCENTAGE OF TOTAL MOTION</th>
<th>INCREASE</th>
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<td>6</td>
<td>3</td>
<td>1 5 10 3</td>
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**TABLE IV**

**A. Neutral to Flexion**

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<tr>
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</table>

Twenty normals showing the percentage of the total motion for the five segments contributed by each segment and the average segmental percentage contribution for the group.

**TABLE IV**

**B. Neutral to Extension**

<table>
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<tr>
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Increase or decrease percentages over or under the group average shown in Table IVA.

**TABLE IV**

**C. Neutral Position to Flexion**

<table>
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<th>NO. SHOWING NO CHANGE</th>
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<td>6</td>
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</tbody>
</table>
from the neutral to flexion or neutral to extension, that compensations occur when these movements are studied togete.rt. For this reason, the most stable findings in this analysis would be those in the complete movement from flexion to extension. We may assume, then, that the averages of 15 per cent, 21 per cent, 24 per cent, 16 per cent for the second to sixth interspaces respectively, shown in Table III, constitute a reliable basis of normality and that for comparative purposes, any segment found to be within the range of 7 above or below this average can be considered normal in motion, as determined by this method.

All of the findings presented in this section bear a very definite relationship to osteopathic procedures, especially to the diagnosis of vertebral mechanical abnormality, in this region, based upon the considerations of motion. It has been generally accepted that the definitely established vertebral lesion is accompanied by some departure from normal articular motion. Motion has been tested for by methods of palpation. It becomes apparent, when the above presented findings are analyzed, that testing for motion, in this particular area at least, should be a more exact and complicated procedure than that usually practiced. These studies show that, for this group of normals, the segmental motion measured show a rather constant relationship to each other and as well to the group, and that for comparative purposes, any segment found to be within the range of 7 above or below the average of 15 per cent, 21 per cent, 24 per cent, 16 per cent for this group of normals, the segments contribute least to the group motion, while the segmental contribution to extension. We may well ask whether palpatory methods might normally vary greatly from that considered important, however, to study these actual variations in terms of millimeters, in an attempt to ascertain if any of the measureable factors being used could account for individual variations. The totals of combined anterior and posterior E. I. V. differences in the movement from flexion to extension were used for this analysis as the previous study showed this movement to be the most accurate expression of motion range. It would be well, at this point, to refer to Table II and see the manner in which these totals were produced. In this table, the percentages of the total motion for the five segments contributing by each segment and the average segmental percentage contribution for the group.

Analysis of the cervical vertebral column showing the average percentage of total motion contributed by each cervical segment indicated, the number and average percentage increase or decrease from the average of the group, the greatest individual increase or decrease in percentage, and the number showing no change from the average. Based upon twenty normal cervical radiographic studies.

Twenty normals showing the percentage of the total motion for the five segments contributed by each segment and the average segmental percentage contribution for the group.
expected from the fact that the same index of extension is used anteriorly and posteriorly with the greatest range having a value of equal the posterior differences, as might be explained later). It will be seen that the greatest ranges of motion and the lower those with least degrees.

The figures in the second column show the total of all interbody spacings, in terms of E. I. V. measurements, for the corresponding subject in the first column. These figures were arrived at by totalling the sums of the anterior and posterior E. I. V. lengths for each segment. The neutral position film was used for these measurements. These figures do not represent the total of disc thicknesses for the five interspaces, for the sum of anterior and posterior E. I. V. lines does not equal disc thickness. The figures used, however, may be taken as constant indexes of spacing, for they are all arrived at in the same manner. The average for each quartile is shown. It will be seen by comparing these averages that the five subjects showing the greatest ranges of motion, have, as an average, the least interbody spacing. It will also be seen that there is an inverse ratio established between range of motion and interbody spacing in the first three quartiles, but that this progression is broken in the last quartile. In this last group of five subjects, which show the least ranges of motion, the interbody spacing is not the greatest of the four quartiles, but is seen to correspond to the second quartile. The actual range among the averages for all the quartiles is five millimeters. It is a question whether or not this rather slight difference, distributed among five interspaces, is sufficient to account for the degree of differences which exist among the various ranges of motion.

The second factor analyzed, in relation to differences in motion range, was that of antero-posterior body diameter. It was thought possible that the antero-posterior depth of the bodies might introduce a structural factor which could influence the mechanics of motion range. It would seem reasonable to assume that a broad surface antero-posteriorly would have some limiting effect upon flexion and extension, and that a more shallow body would allow freer motion. The figures in the third column indicate this body diameter for each segment. These figures represent the average length of the lower surface diameters (L. S. D.) for all five segments in each subject. Thus, in the first subject (in this table the one showing the greatest motion range) the average of the five L. S. D. lines was 15 m.m.; that for the next 15.1 m.m., etc. The L. S. D. was selected for these comparisons because it is reasonable to consider the lower segments of the cervical and especially the upper thoracic spine, as the more fixed points upon which motion above takes place. Therefore, it would be the L. S. D. of the segment above which would appear to be the best place to measure the structural factor, as the upper of two segments could be considered to move upon the lower. The average for each subject is placed opposite its respective figures in columns one and two, and the average for each quartile is also shown. Here, again, we would seem to have an inverse ratio established between motion range and lower surface body diameter as well as an interruption of this progression in the quartile of subjects showing the least motion. The actual differences in millimeters among the quartile averages we find to be even less than in the interbody spacings, but even with such slight changes, the same character of progression is evidenced. The segments in the upper quartile, which show the greatest motion ranges, have, on the average, the shortest L. S. D. lines; the next two quartiles have longer L. S. D. lines, but the last quartile instead of having the longest L. S. D. lines, we find has them of a numerical value which places it between the first and second groups.

The third structural factor to be analyzed was that of the length of the column. These measurements were made to determine whether there is any measurable relationship between motion range and column length. For this purpose the neutral film was again used and the distances between successive I. C. points measured. The figures in column four of Table VI indicate the total of distances between I. C. points, beginning with that between the second and third and ending with that between the sixth and seventh cervical vertebrae. These totals were used to express the column length of this group of segments. The average for each quartile is shown, as in the previous two columns. The quartile averages show that the subjects having the greatest motion have the shortest group of segments and that there is a progressive inverse ratio established which is again broken when the lowest quartile is reached. Here, we see that the subjects having the

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**TABLE VI**

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<td>TOTAL RANGE OF MOTION</td>
<td>TOTAL DISC SPACING IN NEUTRAL POSITION</td>
<td>AVERAGE OF A. P. BODY DIAMETER</td>
<td>TOTAL COLUMN LENGTH OF GROUP NEUTRAL POSITION</td>
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</table>

A comparison of some factors which could influence the range of motion in the group. Column 1 shows the range of motion in each subject expressed as total of A. and P. E. I. V. differences measured in millimeters. Column 2 shows the interbody spacings expressed as totals for the group in each subject and measured in millimeters. Column 3 shows the average A. P. body diameter measured in millimeters along the L. S. T. line between the anterior and posterior lateral intersegmental vertical lines. Column 4 shows the total length of the group of segments in each subject measured in millimeters between intersegmental centers of adjacent segments. The 20 subjects are arranged into quartiles of 5 subjects each with those showing the greatest ranges of motion in the upper and those showing the least in the lower.
least motion do not have the longest column group, but that the figure representing their average length falls between the first and second quartiles.

If the three factors just presented are reviewed, it is found that the group of subjects having the greatest ranges of flexion and extension movement had, on an average, the thinnest discs, the shortest antero-posterior body diameters (L. S. D.), and the shortest columns. It will further be noted that the group of five subjects having the thickest discs, the greatest average body diameters, and the longest column is not, conversely, the last quartile which enjoys the least motion, as might be expected, but the third from the top. The disc, body diameter, and column length values of the group showing the least motion fall between the first and second quartile values.

It must not be assumed that these are all the structural factors which can influence vertebral mechanics. The values presented in this analysis are simply those which could exert an influence and which lend themselves to mathematical statement by this system of measurement. These findings suggest, however, that the evaluation of the range of flexion and extension cannot be predicated upon the basis of morphology alone, but must encompass factors associated with dynamics such as muscle tone, and the tension of all periarticular and pararticular tissues. The progression in the upper three quartiles, of all three factors studied, would suggest some relationship between morphology and motion range, but whether the differences found in the structural measurements are sufficient to account for the differences in functional capacity is a problem which demands further study.

A STUDY OF THE LOCATION AND STABILITY OF THE AXIS FOR FLEXION AND EXTENSION MOVEMENT

In the previous analysis, it was stated that to obtain an accurate figure representing the degree of flexion and extension, the total of anterior and posterior E. I. V. differences between the two movements had to be used for the reason that the anterior differences did not always equal the posterior. If Table II is referred to, it will be seen that this difference in anterior and posterior E. I. V. differences between flexion and extension expressed as totals for the five segments of this subject (Number 20), is between 59.5 m.m. anteriorly and 60.0 m.m. posteriorly. In order to present clearly what this difference means, let this total for five segments be interpreted in terms of a single segment. When this hypothetical segment is moved from flexion to extension on the anterior E. I. V. line increases its length 59.5 m.m. while the posterior E. I. V. line decreases 60.0 m.m. This indicates that the axis upon which this extension movement took place was not equidistant from the two points of measurement—the anterior and posterior E. I. V. lines—but was closer to the anterior. The totals for all subjects in this series show that as a group average, differences in anterior and posterior E. I. V. measurements vary. These findings indicated that, measured by the group totals, the axis for flexion and extension did not in this subject coincide with the I. C., which is equidistant from both E. I. V. lines in each segment (5 cm. index of extension). An attempt was made, therefore, to determine what relationship exists between the axis for flexion and extension and the intersegmental center.

The totals of all anterior and all posterior E. I. V. differences for the five segments of each subject in the movement from flexion to extension were set down as shown in Table VII. In subject Number 1 we see that the total of anterior E. I. V. differences is 65 m.m., while the posterior is 61.5 m.m.; in subject Number 2 the anterior 93, and the posterior 90.5. We see, in the last column, that these posterior figures show a decrease of 5 per cent and 3 per cent respectively, from the anterior values of the first two subjects. Analysis of this percentage column shows that all but two of the subjects (Number 18 and Number 20) have a value for posterior E. I. V. differences which is less than that for the anterior. This indicates that so far as group findings are concerned, the axis for flexion to extension movement lies somewhere posterior to the I. C. in 90 per cent of the subjects and anterior to it in 10 per cent. If the I. C. were the axis for flexion and extension in all segments, the anterior and posterior totals would be equal, for the index of extension remained the same.

Three things were suggested by this finding, first, that the axis for flexion and extension movement probably does not coincide with the I. C., second, that in the complete movement from flexion to extension the axis is posterior to the I. C. in the majority of instances, and third, an analysis of the axis behavior at individual interspaces might yield valuable information concerning vertebral mechanics.

It was believed that the study of individual segments might throw some light on the other two problems, so an analysis of the 100 interspaces of the series was undertaken to determine the location of the axis under various conditions of mechanics and also to determine whether or not the axis location is a stable quantity. This study was begun by comparing the anterior and posterior E. I. V. differences in the three movements. When the degree of change expressed in millimeters of E. I. V. difference was greater at the anterior E. I. V. than at the posterior, the axis for the particular movement was considered to be posterior to the intersegmental center; when the posterior differences were greater than the anterior the axis was considered to be anterior to the I. C. and if the differences anteriorly and posteriorly were equal, it indicated that the axis coincided with the I. C. The results are shown in Table VIII, sections A, B and C. All three sections of this table show the location of the axis of each segment in relation to the I. C.; the letter A indicates that the axis was anterior to the I. C., the letter P that it was posterior, and the letter C that the axis coincided with the I. C. In section A of Table VIII are the findings for the movement from the neutral position to flexion, in B, from the neutral position to extension, and in C, from flexion to extension.

The first thing which will be noticed from the totals for all types of movement is the fact that every segment shows some variations from a definite relationship between axis and I. C. In the totals for the neutral to flexion movement, it will be seen that of the 100 interspaces (5 interspaces each in 20 subjects) 50 (per cent) had an axis posterior to the I. C., 28 (per cent) an axis anterior to the I. C., and that in 22 (per cent) the axis for neutral to flexion movement coincided with the I. C. The totals for the neutral to extension movement show that 60 (per cent) had axes posterior to the I. C., 19 (per cent) anterior to it, while in 21 (per cent) the axis and I. C. coincided. Flexion to extension movement gives totals of 68 (per cent) pos-

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<table>
<thead>
<tr>
<th>TABLE VII</th>
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<tr>
<td><strong>TOTS OF E. I. V. DIFFERENCES IN COLUMN CARRIED FROM FLEXION TO EXTENSION</strong></td>
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<tr>
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<td>19</td>
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<tr>
<td>20</td>
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</tbody>
</table>

A comparison of the anterior with the posterior totals of E. I. V. differences when the column is carried from the flexion to extension positions. (A. anterior differences, P. Posterior differences.) The percentage decrease or increase of the posterior readings compared with the anterior are shown.
should take into consideration the column
any comparisons against such a standard
and abnormal subjects. For the present,
and total interbody spacing for each subject
in the neutral position, percentage contribu­
tions in disc spacing for each segment for
the 20 subjects is seen to be 20, 19, 19, 21, and
21 for the second to sixth interspace respect­
ively. From this it will be seen that, ex­
pressed as an average, there is little difference
in the percentage contribution of each seg­
ment. The actual ranges for each segment are
also shown and these indicate a minimum
value of 16 per cent and a maximum of 26
per cent. Reduced to variations from the
average of each segment, the range at the
second is 3 per cent below and 3 per cent
above, at the third 3 per cent below and 2
per cent above, at the fourth 3 per cent below
and 4 per cent above, at the fifth 5 per cent
below and 5 per cent above, and at the sixth
5 per cent below and 3 per cent above. It
might be assumed, then, that variations from
the segmental averages greater than those
shown would constitute an abnormal disc
spacing for the segment or segments showing
such variation.

An analysis of compression and decom­
pression of the disc was next undertaken.
The fact that flexion and extension of this
area of the cervical column does produce
changes in interbody spacing indicating
disc variations was established when it was
found that, in many instances, the axis for flex­
ion and extension movement did not coincide
with the intersegmental center, and also that it
shifted in position as motion was carried out.
It was decided to first ascertain the group
changes which occurred with mass movement
of the five interspaces. To this end, the
totals of all combined A and P E. I. V. values
in each of the positions were tabulated and

| SEG. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|
| 2    | 19 | 20 | 21 | 23 | 17 | 19 | 22 | 20 | 19 | 17 | 18 | 20 | 21 | 20 | 23 | 21 | 25 | 19 | 22 | 20 |
| 3    | 21 | 20 | 20 | 17 | 17 | 18 | 20 | 18 | 20 | 19 | 17 | 21 | 21 | 17 | 21 | 17 | 18 | 21 | 18 | 19 |
| 4    | 18 | 23 | 17 | 18 | 21 | 18 | 16 | 17 | 19 | 21 | 23 | 17 | 21 | 20 | 19 | 17 | 20 | 20 | 19 | 20 |
| 5    | 21 | 21 | 23 | 20 | 21 | 24 | 20 | 21 | 23 | 21 | 21 | 17 | 23 | 20 | 19 | 21 | 20 | 21 | 22 | 21 |
| 6    | 21 | 16 | 19 | 22 | 24 | 21 | 22 | 22 | 21 | 23 | 21 | 21 | 17 | 23 | 20 | 19 | 21 | 20 | 21 | 22 |

GROUP | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Percentage of the five segment total of interbody spacing contributed by each interspace. Computed on the basis of the measurements in the neutral position.

sent interbody spacing expressed in milli­
meters of extended measurement. Similar
tables for all subjects were used to determine
the average interbody spacing for the group
of 20 subjects. These averages are shown in
Table XII. Each figure represents the
average, for 20 subjects, of the sum of A and P
E. I. V. measurements for each segment.
The neutral position was used for these
measurements. It will be seen that for the
second to sixth interspaces the average inter­
body spaces are 8, 4, 7, 9, 7, 9, 8, 5, and 8.6 m.m.
respectively. The value of this series of
averages would be to provide a standard
scale against which suspected departures
from the normal could be compared, but if
these figures are to be of any use in this
direction, the normal ranges making up these
averages must be known. In the second
column of Table XII, these ranges are shown
in terms of averages above and below, while
in the third column the greatest actual ranges
above and below the averages are shown.
Whether or not the last column, showing
greatest ranges, is the group of values which
will ultimately be used to define normality
in interbody spacing will depend upon a com­
parison with larger numbers of both normal
and abnormal subjects. For the present,
these figures must be accepted as expressing
normal limits. It might be mentioned that
any comparisons against such a standard
should take into consideration the column
length, for it was shown, in Table VI (column
2 compared to column 4), that total inter­
body values vary directly with the length of
the column (body plus disc).
It will be recalled that in the studies on
intervertebral motion, the changes in inter­
body measurements were reduced to per­
centage values for accuracy. The next de­
termination in the study of disc spacing was
to find the percentage contributions of each
interspace to the total of interspace measure­
ments. On the basis of individual segmental
and total interbody spacing for each subject
in the neutral position, percentage contribu­
tions of each segment were worked out
and the results tabulated as shown in
Table XIII. The average percentage con­
tributions in disc spacing of each segment for

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<td>INCREASE OR DECREASE IN INTERBODY SPACING (DISC DECOMPRESSION OR COMPRESSION) RESPECTIVELY EXPRESSED AS PERCENTAGES OF THE NEUTRAL SPACING IN THE MOVEMENTS FROM THE NEUTRAL POSITION, AND OF THE FLEXION FIGURE IN FLEXION TO EXTENSION</td>
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<td>INCREASE OR DECREASE IN INTERBODY SPACING (DISC COMPRESSION OR DECOMPRESSION) RESPECTIVELY EXPRESSED AS PERCENTAGES OF THE NEUTRAL SPACING IN THE MOVEMENTS FROM THE NEUTRAL POSITION, AND OF THE FLEXION FIGURE IN FLEXION TO EXTENSION</td>
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<td>+4</td>
<td>+11</td>
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<tr>
<td>INCREASE OR DECREASE IN INTERBODY SPACING (DISC DECOMPRESSION OR COMPRESSION) RESPECTIVELY EXPRESSED AS PERCENTAGES OF THE NEUTRAL SPACING IN THE MOVEMENTS FROM THE NEUTRAL POSITION, AND OF THE FLEXION FIGURE IN FLEXION TO EXTENSION</td>
<td>+10</td>
<td>+12</td>
<td>+11</td>
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Increase or decrease in interbody spacing (disc) in movements of flexion to extension. The figures in the three position columns show the total of interbody spacing for the five segments expressed in millimeters of extended measurement (sum of anterior and posterior extended intersegmental verticals). The plus and minus values in the various movements indicate the increase or decrease in interbody spacing (disc decompression or compression) respectively expressed as percentages of the neutral spacing in the movements from the neutral position, and of the flexion figure in flexion to extension.
### Table XV

**Neutral to Flexion**

(Percentage of Neutral Position Spacing)

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<td>+5</td>
</tr>
<tr>
<td>5</td>
<td>-6</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>+5</td>
<td>0</td>
</tr>
</tbody>
</table>

### Table XV

**Neutral to Extension**

(Percentage of Neutral Position Spacing)

<table>
<thead>
<tr>
<th>SEG.</th>
<th>SUBJECTS</th>
<th>RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-6</td>
<td>-12</td>
</tr>
<tr>
<td>3</td>
<td>+17</td>
<td>+6</td>
</tr>
<tr>
<td>4</td>
<td>+12</td>
<td>+5</td>
</tr>
<tr>
<td>5</td>
<td>+17</td>
<td>+17</td>
</tr>
<tr>
<td>6</td>
<td>+5</td>
<td>+8</td>
</tr>
</tbody>
</table>

### Table XV

**Flexion to Extension**

(Percentage of Flexion Position Spacing)

<table>
<thead>
<tr>
<th>SEG.</th>
<th>SUBJECTS</th>
<th>RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-11</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>+17</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>+12</td>
<td>+10</td>
</tr>
<tr>
<td>5</td>
<td>+17</td>
<td>+17</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>+8</td>
</tr>
</tbody>
</table>

Analysis of twenty subjects in three movements showing the increase (+) and decrease (−) in interbody spacing expressed in terms of percentage of the neutral spacing in the movements from neutral to flexion and to extension and of flexion spacing in the flexion to extension movement.

The results are shown in Table XIV. This table shows, for instance, that in subject Number 1 the total of all E. I. V. values is 44.6 m.m. in the neutral positions, 44.5 m.m. in the flexion position, and 48.0 m.m. in extension. These figures represent the total of interbody spacing for the five segments in terms of extended millimeter measurement. Reading across to the right it will be seen that in this subject, when the column was carried from the neutral position to flexion, there was a total increase in interbody spacing amounting to plus 1 per cent of the value for the neutral position. It may also be observed that when the column was carried from the neutral position to extension there was a total increase for all segments of plus 9 per cent of the neutral value, and that from flexion to extension the increase in interbody spacing for all segments amounted to plus 8 per cent.

The averages for all 20 subjects, shown at the bottom of each column, indicate that from the neutral to flexion position there was a general compression of discs indicated as amounting to −3 per cent of the total disc thicknesses of the neutral position, that from the neutral position to extension there was an increase of plus 7 per cent of the neutral value, and from flexion to extension there was an increase of plus 10 per cent over the flexion total. These, it must be remembered, are averages of the entire group of subjects and of all segments in each subject. If the table of percentage variations is examined, it will be seen that in the neutral to flexion movement there were 5 subjects which did not conform to the general compression rule, but instead actually show increased spacing. In the neutral to extension movement we see that 2 subjects decrease (compressed) rather than increased (decompressed). In flexion to extension there was increase in total spacing for all segments.

An important point to be determined was whether or not the individual segments which contributed to these totals behaved in a manner similar to that of the group. In other words, did each segment contribute a compression value in flexion and a decompression value in extension? Analysis was made of the compression and decompression obtaining in each segment when the column was carried from the neutral position to flexion, from the neutral position to extension, and from flexion to extension. The results are shown in Table XV. The signs of − and + indicate compression and decompression respectively, i.e., a − sign before a number indicates that compression, as measured by a lessened interbody space, has occurred. Thus, if we take the first figure in subject 1 we see a + 6. This means that when the column was carried from the neutral position to flexion the bodies separated (decompressed) 6 per cent of the distance which separated them in the neutral position. The first figure in subject 2 is −12 which means that when the column was carried from the neutral...
<table>
<thead>
<tr>
<th>TABLE XVI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
</tr>
<tr>
<td><strong>SEG</strong></td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
</tr>
<tr>
<td>NEUTRAL</td>
</tr>
</tbody>
</table>

**B**:

<table>
<thead>
<tr>
<th><strong>SEG</strong></th>
<th><strong>NEUTRAL TO FLEXION</strong> (Average % of neutral spacing)</th>
<th><strong>NEUTRAL TO EXTENSION</strong> (Average % of neutral spacing)</th>
<th><strong>FLEXION TO EXTENSION</strong> (Average % of flexion spacing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>10</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>11</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

The result of this is that, in this second subject, when the flexion position is compared to the extension position there is neither compression or decompression indicated, while actually there was compression to the extent of 12 per cent of the neutral spacing in both the flexion and extension positions.

Table XVI A and B, shows a comparative analysis of the figures in Table XV. Analysis A indicates the number of subjects showing compression, decompression, or no change in all segments when the three positions are compared. It will be seen that the segments vary little in their behavior, so that no one type of change (compression or decompression) is characteristic of any one segment.

The totals, however, show the group changes indicated in Table XIV. In the neutral to flexion movement, it will be seen that of the 100 interspaces represented, compression occurred in 47 per cent, decompression in 29 per cent, and no change in disc thickness occurred in 24 per cent. In the neutral to extension positions, of the 100 interspaces, compression occurred in 16 per cent, decompression in 62 per cent, and no change in 22 per cent. In flexion to extension, 11 per cent showed compression, 72 per cent decompression, and 17 per cent no change.

Analysis B of Table XVI shows the average percentage increase or decrease in disc spacing. Thus, in the 10 second segments of Table XVI A in which compression (−) occurred in the movement from the neutral position to flexion, the average decrease was 12 per cent of the interbody space in the neutral position. In the 7 second segments in which decompression (+) occurred in the movement from the neutral position to flexion the average increase in interbody space was 7 per cent of the neutral position. In the 13 second segments which increased (decompressed) in width in the movement from flexion to extension, the average increase was 12 per cent of the spacing in the flexion position. This table shows that for the group of five segments in the neutral to flexion movement, the average compression is greater than the average decompression with the exception of the third interspace. In the movement from neutral to extension, the average decompression is greater than the average compression in all segments except the second. In the movement from flexion to extension the average decompression is greater than the compression in all segments.

These variations in action and differences in behavior, while seeming to adhere to no set mechanical pattern, are all predicated upon the position of the axis for flexion and extension. If the neutral to flexion portion of Table XV is compared with the position of the axis in neutral to flexion movement as shown in Table VIII, it will be seen that with two exceptions in 100 segs. (4th segment of subject 2 and fifth segment of subject 3) the position of the axis explains the compression and decompression in table XV. Likewise, if we compare the neutral to extension portion of Table XV with axis location of Table VIII, we see that with four exceptions in 100 interspaces (segment 2 subject 6, segment 3 subject 13, segment 6 subject 12, and segment 6 subject 20) the location of the axis determines compression or decompression. Flexion to extension shows the same explanation holding with the exception of four segments in two subjects (segments 3, 4, and 5 in subject 18, and segment 6 in subject 20).

It has been mentioned that the second interspace of subject one in Table XV departed from the group changes, decompression taking place in flexion and compression in extension. Table VIII shows the reason to be that in the neutral to flexion positions, the axis is anterior to the I. C. and this would cause a separation between bodies in flexion. In the neutral to extension positions, we find that the axis remains anterior to the I. C. and thus disc compression results when extension is produced.
face diameter of the lower (fixed) segment. From this mid-point, a line is constructed at right angles to the upper segmental transverse of the fixed segment and intersecting the lower segmental transverse line of the upper (movable) of the two segments. This intersection is called the "shift point." Measurements are then made of the distance from this latter intersection anteriorly and posteriorly to the intersections of the respective lateral intersegmental verticals with the lower segmental transverse lines (limits of the L.S.D.). If the two measurements (anterior and posterior to the shift point) for the segment in the neutral position are made, then measurements between the same points on the flexion film and the extension film will show the degree of shifting which occurs forward or backward between the moveable body and the fixed body.

Table XVII shows the manner in which these measurements were tabulated for subject Number 20. If the second segment of this subject is selected as an example, the tabulation may be explained as follows: In the neutral position, the distance from the "shift point" to the left (anterior) along the lower segmental transverse of the second cervical segment to the intersection of the lateral intersegmental vertical is seen to be 7.5 m.m. From the shift point to right (posteriorly) to the lateral intersegmental vertical is 9.0 m.m. The total, 16.5 m.m., represents the length of the lower surface diameter of the second cervical. The reason for establishing the shift point in this line is to create two measurements which will change in relation to the shift point, which is fixed in relation to the segment below, and thereby make it possible to determine the degree to which anterior or posterior shifting of one body occurs in relation to the body below. These changes in measurement become apparent when we look at the same second segment in the flexion position. Here, it is seen that the distance from the shift point anteriorly to the lateral intersegmental vertical intersection is 9 m.m. instead of 7.5 as in the neutral position, and that from the shift point posteriorly (right) to the lateral intersegmental vertical is now 7.5 m.m. instead of 9 as in the neutral position. In the extension position we find the anterior distance to be 6 m.m. and the posterior 10.5 m.m. To be of comparative value the changes in these measurements caused by flexion and extension must be reduced to percentages, for there are variations among vertebral bodies of different diameters. Reduced to terms of percentage, we see (Table XVII) that in the movement from the neutral position to flexion, the lower surface diameter of the second shifted anteriorly past the shift point to the degree of 9 per cent of the total length of its lower surface diameter. In the table, a shift anteriorly is represented by the sign +, while a posterior shift is indicated by a - sign.

Regardless of the fact that there are differences in the size of vertebral bodies among individuals, and therefore differences in the surface diameters, it was thought wise to establish first, the average change for each segment of the twenty expressed in terms of millimeters. A tabulation was therefore made of the changes occurring along the lower surface diameters past the shift point in the two movements from the neutral position to flexion and the neutral position to extension. An analysis of these findings is shown in Table XVIII. This table shows that in the movement from neutral position to flexion the average anterior (+) shift in millimeters for the second to sixth segments was 1.27, 1.60, 1.23, 1.38, and 0.78 respectively, while in the movement from neutral to extension, the average shifts for these segments were 0.93, 1.07, 1.60, 1.15, 0.28 m.m. Several facts become apparent as these figures are reviewed. The greatest amount of shift occurs between the third and fourth cervical segments.

**TABLE XVII**

<table>
<thead>
<tr>
<th>SEG.</th>
<th>NEUTRAL</th>
<th>TOTAL</th>
<th>FLEXION</th>
<th>EXTENSION</th>
<th>PERCENTAGE OF SHIFT OF LOWER SEGMENTAL TRANVERSE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>P</td>
<td>A</td>
<td>P</td>
<td>N TO F</td>
</tr>
<tr>
<td>2</td>
<td>7.5</td>
<td>9.0</td>
<td>16.5</td>
<td>9.0</td>
<td>7.5</td>
</tr>
<tr>
<td>3</td>
<td>7.5</td>
<td>9.5</td>
<td>17.0</td>
<td>8.5</td>
<td>8.5</td>
</tr>
<tr>
<td>4</td>
<td>8.0</td>
<td>9.0</td>
<td>17.0</td>
<td>9.5</td>
<td>7.5</td>
</tr>
<tr>
<td>5</td>
<td>8.0</td>
<td>9.5</td>
<td>17.5</td>
<td>9.5</td>
<td>8.0</td>
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<tr>
<td>6</td>
<td>8.0</td>
<td>8.0</td>
<td>16.0</td>
<td>9.0</td>
<td>7.0</td>
</tr>
</tbody>
</table>

Tabulation of measurements showing the body shift in flexion and extension of subject No. 20. The figures, in millimeters, represent the length of the lower surface diameter anterior (A) to the shift point and the length posterior to it (P). The percentages indicate the amount of shift in terms of percentage of the total surface diameter of the movable segment (upper).

**TABLE XVIII**

<table>
<thead>
<tr>
<th>SEG.</th>
<th>NEUTRAL TO FLEXION</th>
<th>NEUTRAL TO EXTENSION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AV. + RANGE</td>
<td>AV. - RANGE</td>
</tr>
<tr>
<td>2</td>
<td>1.27 0.5-3.5</td>
<td>0.93 0.0-2.0</td>
</tr>
<tr>
<td>3</td>
<td>1.60 0.0-3.5</td>
<td>1.07 0.0-3.0</td>
</tr>
<tr>
<td>4</td>
<td>1.23 0.0-3.5</td>
<td>1.60 0.0-2.5</td>
</tr>
<tr>
<td>5</td>
<td>1.38 0.5-2.0</td>
<td>1.15 0.0-2.5</td>
</tr>
<tr>
<td>6</td>
<td>0.78 0.2-0.0</td>
<td>0.28 +0.5-1.0</td>
</tr>
</tbody>
</table>

Totals 6.26 5.03

Analysis of twenty subjects showing the average anterior (+) shift of the lower surface diameter in the movement from the neutral to flexion positions and the posterior shift (—) in the movement from the neutral position to extension. The range of values at each segment for the 20 subjects is also shown.
in flexion, and between the fourth and fifth cervical segments in extension, while the least amount of shift occurs between the sixth and seventh cervical segments. It will be seen that with the exception of the fourth segment, the degree of shift is greater in the flexion movement than it is in the extension. This is indicated by the totals of shift for the group, which are 6.26 m.m. in flexion and 5.03 m.m. in extension. The greatest range is seen to be 3.5 m.m. in the flexion movement and 3.0 m.m. in the extension. It is interesting to note that in the neutral to extension range for the sixth segment a + 0.5 value is shown. This means that in backward movement or extension an actual anterior shift of the sixth on the seventh took place in some subject or subjects. This happened in three of the twenty subjects (Number 1, Number 12, Number 20).

Measurements, in millimeters, of changes in the lower surface diameter do not provide an accurate basis for comparison because of the great differences in vertebral size. It was necessary, therefore, to reduce these ranges of forward and backward motion to terms of percentage, if the findings were to assume comparative value. The figures forming the basis for table XVIII were used and reduced to percentages of shift in terms of the lower surface diameter of the moveable segment. An analysis of these percentages are shown in Table XIX which indicates averages for the twenty subjects. This table shows that in the movement from the neutral position to flexion, the average shift for the 20 subjects of the lower surface diameter of the second in relation to the shift point of the third was 8 per cent. This means that the lower surface of the body of the second moved anteriorly on the third 8 per cent of the lower diameter of the second. It will be seen that from the second to the sixth segments, in the movement from the neutral position to flexion, the average percentages of anterior (+) shift are 8, 10, 8, 8, and 4 respectively, and that from the neutral position to extension 6, 7, 10, 6 and 1. What becomes noticeable at once in this table is the rather wide

**TABLE XIX**

<table>
<thead>
<tr>
<th>SEG.</th>
<th>NEUTRAL TO FLEXION</th>
<th>NEUTRAL TO EXTENSION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AV. + % RANGE</td>
<td>AV. - % RANGE</td>
</tr>
<tr>
<td>2</td>
<td>0 - 21</td>
<td>0 - 13</td>
</tr>
<tr>
<td>3</td>
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<td>0 - 19</td>
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<tr>
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<tr>
<td>6</td>
<td>0 - 10</td>
<td>1 - 3 - 6</td>
</tr>
</tbody>
</table>

Analysis of twenty subjects showing the average anterior (+) and posterior (-) shift from the neutral position to flexion and to extension in terms of percentage of the lower surface diameter of the movable (upper) segment. The range in percentage at each segment is also shown.

**SUMMARY AND DISCUSSION**

The practical value of the study just presented is that its results furnish a standard of normality which can serve as a basis for comparison. There were several relatively distinct studies presented including the study of intervertebral motion based upon changes occurring between adjacent vertebral bodies, a study of the location and stability of the axis for flexion and extension movement, a study of compression and decompression of the disc, and a study of vertebral body shifting in flexion and extension movement. Each of these were, in turn, broken down into various constituent subdivisions and an analysis of each shown. It now becomes necessary to select from this data, those mathematical values which can serve as a standard for comparison. There are three such groups of values and they are shown in Table XX.

According to the values shown in this table, any second cervical vertebral segment could be considered normal if it contributed between 9 and 20 per cent to the total range of motion for five segments (from the second to sixth segments inclusive), if the interspace between the second and third cervical contributed between 17 and 23 per cent to the total interbody spacing for the five segments, and if the second shifted forward on the third in flexion to an extent between 0 and 21 per cent of the lower surface diameter of the second and backward on the third in extension to an extent between 0 and 13 per cent of the lower surface diameter of the second. Any third segment could be considered normal if its motion contribution were between 16 and 28 per cent of total motion, if its spacing (with the fourth) contribution were between 17 and 21 per cent of total group spacing, and if its anterior shift in flexion were between 0 and 22 per cent of its lower surface diameter and in extension between 0 and 10 per cent of its lower surface diameter, when compared to the fourth. Each segment has its own particular normal values so that in determining normality by the use of this standard, each segment would have to be compared to the same segment of the standard table.

The fact should again be mentioned that this presentation is a preliminary report on a study which is being carried forward to include the entire vertebral and pelvic structure and to be given clinical application. Such clinical application is already being carried out and will form the basis for future presentations on the subject. One observation could be made here relative to clinical application and that is that the age factor must be considered. The present observations were made on subjects between the ages of 18 and 34 with an average age of 22. It is recognized that older age groups might produce normal mechanical values at slight variance with those of this group and for this reason all future clinical studies will be supplemented with normal studies in their related age groups.

It is hoped that this work will pave the way for advances in osteopathic diagnosis, not alone by offering a new radiographic procedure, but also by establishing some of the mechanical principles upon which refinements in palpatory diagnosis can be predicated.

**ACKNOWLEDGEMENTS**

The writers wish to acknowledge the assistance rendered by Dr. Martha M. Bailey, of the Department of Research, who carried out most of the ruling and tabulation for these studies, and by Dr. Kenneth Wheeler, of the Department of Radiology, who carried out the major portion of the radiographic work.

48th and Spruce Streets.
WITH THE NURSES

NURSING EDUCATION

THE question that comes to each of us on many occasions is: what constitutes a competent nurse?

The first quality that we look for in a competent nurse is intelligence, naturally. The ability to cope with the scholastic requirements, the adaptability of oneself to the change from a sheltered home life to that of broad hospital routine. By nursing intelligence we mean also, the ability to think of the sick in terms of our greatest ambition in life, and the aim to accomplish this ambition.

On admission our nurses are given intelligence tests along with their psychology study to determine their aptitude for the work which they are entering upon. The hospital furnishes first rate teachers in all of the theoretical subjects. After Psychology comes the study of the various subjects required for Nursing Education. Principles and Practice of Nursing, Anatomy and Physiology, Hospital Housekeeping, Bacteriology and Urinalysis, Personal Hygiene (both as applied to the nurse and to her patient). Chemistry, Materia Medica, History of Nursing, Ethics, Dietetics and Massage. All of these subjects are covered in the first four months of intensive training. After the intensive period of study more time is spent with the patient and, while theory is ever before the nurse for her three years of training, the greatest hours of study are presented in this early period.

You can readily see that we aim to give our nurses a well rounded course in theory. At the same time we employ competent and qualified teachers of the practical part of their work so that they might intelligently grasp the art of nursing from every aspect.

One of the first thoughts pronounced is that of treating the ill person always as an individual and not as a "case." The patient is the most important individual to each nurse. She is taught that the patient is always the one to receive her first and last consideration, and by such consideration we mean, kindly treatment. Utmost consideration for the patient's needs and comfort. We do not consider need alone sufficient. We make the effort to teach that any average person can take care of the actual needs, but only a competent nurse can give something beyond the need. Can give to the patient the feeling that the nurse who is taking care of him or her is the highest trained person that he or she could obtain to care for them. This "competent" nurse not only takes care of the physical need but looks after the mental happiness of the patient.

We endeavor to train our nurses so that every patient who leaves our institution leaves with the feeling that he has had the best possible care and attention and that this institution is the finest of its kind to which he or his loved ones might be brought when ill.

We trust that we are really conveying to our nurses what we mean when the competent nurse is spoken of. Won't each and every nurse in the hospital, from the Training School Office down to the youngest preliminary student help us to turn out "competent" nurses, - intelligent nurses?

HELEN B. HARDCASTLE, R.N.
Director of Nurses.

On Saturday evening, November 23rd, the Nurses Alumnae of the Osteopathic Hospital of Philadelphia, School of Nursing, entertained the nurses of the graduating class of 1935, by giving a banquet dinner followed by an invitation dance in the College Auditorium. Miss Susan Smoker was Chairman of the Committee on Entertainment, assisted by Miss Elizabeth O'Brien and Mrs. Ruth (Traeger) Murphy. May we thank these nurses in this issue of the DIGEST for a most delightful evening and voice our appreciation for the wonderful spirit which prompted such a lovely reception of the Class of 1935 into the Alumnae Association.

Miss Sara Somers will soon complete her six months post graduate course at the Wills Eye Hospital in Philadelphia. We hear that Miss Somers will embark on a matrimonial career at the completion of her work at the Wills Eye Hospital. Good luck and happiness, Sally!

Will some one please tell us HOW the probies in the hospital get acquainted so soon with the students in the college. Cupid is surely a busy person.

Miss Lulu Habecker, and Marion Frison, graduates of the Class of 1935, are both doing general duty nursing at night. We are glad to be able to employ these nurses.

State Board Examinations were held at Ervine Hall, 34th and Spruce Streets, Philadelphia, Friday and Saturday, November 22nd and 23rd for nurses graduating in the State of Pennsylvania in the year 1935. These examinations were also given in Scranton, Pittsburg and Harrisburg. We hope our graduates made a good showing.

Miss Gertrude Birchall, poor little probie, who just entered the School of Nursing in September, 1935, was operated on Saturday morning, November 23rd, by Dr. D. S. B. Pennock for appendicitis.

The School of Nursing entered a "Swim Meet" Friday evening, November 15th, at the 52nd Street Y. M. C. A. Some of the prizes were won by the girls in the school.

The Nurses Student Body gave an entertainment Friday, November 1st, 1935, in the College Auditorium. This was called "Amateur Night" and some of the nurses performed more like professionals than amateurs and we were proud of them. They had a good crowd and about seventy dollars in cold cash was added to the Nurses' Fund because of the pluck and abilities of these nurses. We are proud of the talent displayed. Miss Helen Hopf, President of the Student Body, conducted this affair very successfully.
OSTEOPATHY ACTS AS HOST TO A. A. U. ATHLETES AND COACHES

FOUR hundred Philadelphia track and field athletes, gathered Sunday, December 1st, in the auditorium of the Philadelphia College of Osteopathy, stamped their feet and cheered as this telegram was read to them:

"Baillet Latour's announcement that International Olympic Committee will accept America's entries on certification of American Olympic Committee removes all doubt concerning American participation. Outstanding Olympic candidates, including Jewish athletes, have signified their eagerness to go. Eleven members of winter sports teams have sailed and balance of 58 leave January 3, steamship Manhattan. There is absolutely no doubt concerning American representation."

This message was signed by Frederick W. Rubien, secretary of the American Olympic committee.

It was read by James McGinley, chairman of the Middle Atlantic A. A. U. Association track committee, and followed on the heels of a personal message sent by U. S. Olympic Coach Lawson Robertson, still confined to his Cynwyd home by a broken leg sustained five weeks ago.

Expressing regret that he was unable to be present, Robertson wrote that he believes interest in track and field athletics in the Philadelphia district will be revived by the series of indoor meets to start January 7th in the 103rd Engineers' Armory at Broad and Callowhill Streets.

"It is unfortunate," Robertson penned, "that at this time certain groups in the East are trying to prevent our participation in the 11th Olympiad in Germany next summer. It is these groups' contention that Nazi Germany has discriminated against certain classes. Just what this has to do with the Olympic Games is not satisfactorily explained."

"This week at the annual meeting of the Amateur Athletic Union in New York City the various sections of the country will be represented and will express their opinions on the question. We are hoping the answer will prove favorable to American athletes."

"And raising funds for the Olympics has never been easy," said Harry Penn Burke, chairman of the Olympic rowing committee who paid a flying visit to the meeting without pausing to make a public address. "Not only that, but look at it this way: The Olympics are the incentive of athletes of all ages throughout the country. They all dream of the time when they may have the honor of representing their country. If you cannot assure them that there are going to be Olympic games four or eight years from now, then you rob them of a great incentive."

Harold Osborn, twice an Olympian, a former world's champion decathlon and high jump artist, was another who spoke in behalf of Olympic participation yesterday at the College of Osteopathy, his present alma mater. Dr. Francois D'Eliescu, chairman of the meeting likewise colored his remarks, while other speakers besides McGinley, included Dr. Donald B. Thorburn, president of the Philadelphia College of Osteopathy Alumni Association; Ben Ogden, Temple University track coach, and Charley Roeser, of the track and field committee.

THANKSGIVING ASSEMBLY

THE annual Thanksgiving assembly of the Philadelphia College of Osteopathy was held in College Hall on Tuesday morning, November 26th, prior to the Thanksgiving holidays.

The principal speaker of the assembly was Rev. Charles B. DuBell, chaplain of the college and hospital.

Following Rev. DuBell's address, Dean Edgar O. Holden, spoke to the student body and told them how thankful they should be that they had a school such as the College of Osteopathy to look upon as the institution where they received their training. He related how the college had grown from a mere two-room school to the modern college and hospital that now exists.

Other speakers included Dr. J. K. Miller, head of the oral hygiene department at the college, who told of the work to be done by the juniors this year. He closed by relating some interesting facts concerning the modern game of football. Who should know better than "Poss" for he is the backfield coach at the University of Pennsylvania. Dr. Francis D'Eliescu, director of athletics, who in turn introduced the following, George Hylander, President of the Student Council, Corry Walling, president of the Neurone Society, who invited the student body on behalf of the dean to attend the Christmas Party, Martin Schnoll, president of the Athletic Council and Bob Knox, assistant director of athletics, who outlined freshman basketball and varsity swimming schedules.

The orchestra under the direction of Dr. Long played two selections which received spontaneous applause from the students and members of the faculty present. The assembly closed with the singing of the Alma Mater.

R. B. R.

FLAShES

Dr. Paul T. Lloyd, Roentgenologist at the Osteopathic Hospital of Philadelphia, addressed the November meeting of the New York Osteopathic Society, held at the Hotel Commodore, on November 16th. His topic was "X-Ray Studies of Low Back Conditions."

Dr. Albert W. Bailey, who spoke on "The Need for Osteopathy in Industrial Accident Cases" was also on the program.

On November 9th, a combined County meeting, sponsored by Essex and Morris Counties, was held at the Hotel Douglas. A symposium on "Respiratory Diseases of the Winter Season" was held by Dr. James M. Eaton, and Dr. Earl H. Gedney. A discussion from the floor followed.
Christmas Greetings!

WITH the passing of the Thanksgiving holidays, we are confronted with a short period of intensive study and then come the Christmas holidays which always prove to be the outstanding vacation in the college. Dr. Holden wishes to announce to the student body that there will be an extra day of vacation this year. The classes will be resumed on January 3rd instead of the 2nd of January as originally scheduled.

In addition to this announcement, another one of great importance, is the annual Christmas assembly which will be held in the college auditorium on Wednesday morning, December 18th, the same date that has been set as the date for the Dean's annual Christmas Party to be held at the Hotel Pennsylvania. I wish to ask on behalf of the Student Council that each student make it a point to be present at this affair. It will be an annual party and we should make every opportunity to make the first one a success.

Before closing, I would like to say a few things about the parking situation. More space has been obtained with the completion of the new lot at the rear of the hospital and we feel that the parking problem that has been so confused is at last cleared up. The new lot will be reserved for interns, fellows and other officials of the college and hospital.

The old lot facing 48th Street, will still be used by staff members and the Board of Directors of the hospital, while the students will use the lot already assigned to them. I would like to ask that all students who have not already paid for a space, remain off the lot. It will help a great deal towards making the space a suitable one for student parking.

GEORGE B. HYLANDER,
President of Student Council.

Raymond F. Spanjer is Honored by Neo Society

RAYMOND F. SPANJER, popular senior and Colgate graduate, and member of the varsity swimming squad, was elected President of the Neo Honorary Society at its special meeting held last week. Spanjer has been most active during his three years at college and very popular with the student body and his class.

Dr. George B. Hylander, President of the Student Council, and captain of the varsity swimming and basketball team is vice-president. Robert Cooper, Temple University graduate, and a member of the basketball squad, is secretary, and Charles Hillyer, Captain of the Golf Team, treasurer.

A formal meeting will be held prior to the Christmas holidays at which time plans will be completed for Neo active participation in the Charity Ball. Neo is out to sell fifty books for the Welfare Committee as its quota.

Why Not Donate Your Books to the College Library?

IT IS gratifying to note the hearty response given by the profession and friends of Osteopathy in the last appeal for books. The growth of the institution and increased interest in a larger and more spacious library requires books to fill empty shelves.

The appointment of Committees and now the added Alumni interest, has made it possible for the librarian to receive donations and increase the reading and reference list which is so necessary in a professional and educational institution.

There is still a demand for more books of all types which can be used in references of all descriptions. Many physicians and friends have extra sets of books and will not use them. Many have books but no place for them and they are remaining in the dark places where they will never be given an opportunity to be handled.

The Library of the Philadelphia College of Osteopathy wants to progress educationally. Hundreds of books will be given the best of attention and guaranteed distribution. Do you have any books that we can use? We will pay postage or call for them personally, if you will let us know time, date and place.

Physicians With Football Teams

Dr. Roger M. Gregory has been Football team physician for thirteen years in the Public High Schools. At present he is team physician to the new Pierre S. DuPont High School.

Dr. Joseph L. Sikorski has been football team physician for three years to the Salesianum Catholic High School and the Wilmington High School.
SPO RTS

HANDBALL TOURNAMENT

A N Inter-Class handball tournament, the first of its kind to be held by the Philadelphia College of Osteopathy, will start at the West Branch Y. M. C. A., 52nd and Sansom Streets, on Monday, December 9th.

A record entry list of 46, assures the contestants plenty of competition. The junior class heads the list with 16 points, while the sophomores are next in line with 13. In comparison with the entry list at the recent inter-class and inter-fraternity swimming championships, this should top all competition of this nature at the college this fall or any other fall.

Prizes will be awarded to the first, second and third places and in addition there will be prizes given to the winning class team.

Harold M. Osborn, president of the junior class, is conducting the tournament and will be assisted by Bob Knox.

R. B. K.

SOPHOMORE CLASS WINS MEET

INTEREST in inter-class and inter-fraternity competition reached its peak when the sophomore class won the fifth annual swimming championships with a score of 27 points. The meet was held at the West Branch Y. M. C. A., 52nd and Sansom Streets, on Thursday evening, November 13.

Brilliant exhibitions of diving and swimming were given by Florence Peck, a member of the Penn A. C. team and holder of numerous Middle Atlantic A. A. U. titles, and Rugiero Flocco, a sophomore at the Philadelphia College of Osteopathy and holder of the Middle Atlantic A. A. U. high and low board fancy diving championships. Simon Lubin, of the sophomore class, attempted to lower the pool record for the 40-yard freestyle, but failed by 2-10 second, completing the distance in 19.9.

The inter-fraternity relay of 160 yards gave those present an idea of what was to follow, when the Its won the trophy for the fourth straight year. The Thets pushed the winners all the way and took second honors with Phi Sigma Gamma in third. Time 1:43.2.

In the diving Ted Loux, of the Junior class, retained the championship for the second year. E. Scally and Erwin, both of the Junior class, finished second and third respectively.

The next event, the 40-yard freestyle, listed twelve entries and was run off in heats. The best time recorded was the winner. The final results showed that Perry, of the Pre-0 class, was the winner in the good time of 21.6. This was four seconds ahead of his nearest rival, J. Pulker, of the Sophomore class. Pulker beat out R. Doyle, a classmate, by 1-10 second.

The 100-yard breaststroke found Bob Erwin of the sophomore class, out in front by a length and a half. Loux, of the Junior class, was unable to keep pace with Erwin after the 40-yard mark had been passed and was forced to take second place with Bunting, a teammate in third. Time: 1:12.7.

Perry, of the Pre-0 class, came back after winning the 40-yard freestyle to take honors in the 200-yard freestyle for his second victory of the evening. In this event, Perry had Tavener, a Freshman, as an opponent, but won in handy fashion in 2:32.2.

R. Koch, of the Sophomore class, won the 80-yard freestyle in 57.8, beating out W. Burnard, a classmate, and Snider of the Freshman class. The long easy strokes employed by the winner were too much for Burnard and Snider to overcome.

The final event of the evening was the inter-class relay of 160 yards, in which the Sophomore class won by a wide margin over the Freshman class in 1:42.2. By winning this event, the Sophomores boosted their final total to 27 points beating out the Pre-0 class by 17 points. The other scores were: Pre-0, 10; Juniors, 9, and Freshman, 6.

It is interesting to note that the ten points scored by the Pre-0’s were compiled through the individual efforts of Perry, as a result of his double victory in the 40- and 200-yard freestyle events.

From the showing made during the meet, there are several good prospects for the varsity swimming team. Among them are: Perry, Pre-0, Koch, Sophomore, Burnard and Pulker, both Sophomores.

THE SUMMARIES:

Inter-Fraternity Relay (160 yards)—First-Iota Tau Sigma; (Soden, Barringer, Speer, Riland)
Second-Theta Psi; Third-Phi Sigma Gamma.

Diving—First, Loux, Junior; Second, E. Scally, Junior; Third, Erwin, Junior.

40-Yard Freestyle—First, Perry, Pre-0; Second, J. Pulker, Sophomore; Third, R. Doyle, Sophomore. Time—21.6.

100-Yard Breaststroke—First, Erwin Sophomore; Second, Loux, Junior; Third, Bunting, Junior. Time—1:12.7.

200-Yard Freestyle—First, Perry, Pre-0; Second, Tavener, Freshman. Time—2:32.2.

80-Yard Freestyle—First, Koch, Sophomore; Second, W. Burnard, Sophomore; Third, Snider, Freshman. Time—57.8.

Inter-Class Relay (160 yards)—First, Sophomore (Koch, Pulker, Burnard, Doyle); Second, Freshman.

VARSITY ANNOUNCES BASKETBALL SCHEDULE

W ITH the addition of Western Maryland and Albright Colleges and the return of Gallaudet and Juniata Colleges, the Philadelphia College of Osteopathy basketball team faces the hardest schedule in several seasons, just passed on by the Graduate Council of Athletics.

For the past two weeks, the wearers of the maroon and gray have been working out at the West Branch Y. M. C. A., 52nd and Sansom Streets, under Allie McWilliams, nationally known coach. The squad has been drilling on fundamentals and passing, with the hopes of finding a starting line-up for the opening game with Haverford College on the latter’s floor on December 14.

Western Maryland and Albright were late arrivals on the schedule.
but their appearance gives the osteopaths one of the most colorful schedules to date. The Green Devils will be met at Westminster, Md., on December 17, while the Albright five will entertain Osteopathy at Reading on February 8.

The Gallaudet team will oppose the local osteopaths in two games. The first at Washington, D. C., on February 21 and the second on the West Branch Y floor on February 29. Prior to the game with Albright, Coach McWilliams will take his squad to Huntingdon, Pa., where they will meet the Juniata quintet on February 8th. The up-staters will return the visit with a game in this city on February 27th.

The eleven game schedule this year will see Coach McWilliam's team on the road for seven of the eleven games. They will travel to Swarthmore, Washington, D. C., Reading, Pa., Huntingdon, Pa., Westminster, Md., Elizabethtown, Pa., and Haverford. A game with Mount St. Mary's College of Emmitsburg, Md., is still pending.

The entire squad from last year returned for the opening practice. With this turnout, Allie McWilliams will have little to worry about as to the starting line-up. Reserve strength to combat the hard schedule will be the chief obstacle the osteopaths will face this year. However, with the new candidates that have reported for the team, the coaches are more optimistic.

George "Bud" Hylander, newly elected captain of the team, will lead the squad of fifteen players. He was an all-around athlete at Philadelphia High School before entering Osteopathy, being an outstanding basketball player and swimmer. At some time or other, Bud has taken a hand at tennis, baseball and golf.

Hylander, will probably start at one of the guard positions, due to his fine playing last year. A knee injury kept him out of action the early part of the 1934 season. However, he is in better shape this year and hopes that the knee will give him no trouble.

The other holdovers who reported are: Art Bunting, whose long range shooting and clever floor tactics was an outstanding factor in the victories recorded by the osteopaths last year; Bill Furey, who will be playing his third year on the varsity team and who will be alternated at both guard and forward; Martin Schnoll, captain of the 1934 team and high scoring forward; Bob Cooper, formerly of Temple University; Dick Jameson, Henry Maciejewski, of Wilmington, Del., and Elias Korn, first string substitute. Norman LaBove, who hails from Haddonfield, N. J., will make a serious threat for center with his six-foot two inches, Bill Pulker, Henry Marzullo and Reed Speer, complete the list of varsity candidates.

THE SCHEDULE

December 14—Haverford College at Haverford
December 17—Western Maryland at Westminster, Md.
January 11—Elizabethtown College at Elizabethtown
January 14—Moravian College at Home
February 7—Albright College at Reading, Pa.
February 8—Juniata College at Huntingdon, Pa.
February 15—Swarthmore College at home
February 21—Gallaudet College at Washington, D. C.
February 27—Juniata College at Home
February 29—Gallaudet College at Home
March 6—Elizabethtown College at Home

FROSH ORGANIZE BASKETBALL SQUAD

Gilham Coaching

WITH its opening game one week away, the Freshman basketball team of the Philadelphia College of Osteopathy under the coaching of George Gilham, is completing its third week of practice at the West Branch Y. M. C. A., 52nd and Sansom Streets.

The first two weeks were devoted to the fundamentals of the game and the second week passing and shooting from close range were stressed with the hopes of getting the candidates accustomed to handling the ball. Coach Gilham has not yet decided on a line-up for the opening game with Peddie School at Hightstown, N. J., on Saturday afternoon, December 14.

A squad of fifteen players, have been absorbing knowledge of the game from Coach Gilham and show possibilities of crack team. This is the first time in almost six years that Osteopathy will be represented by a yearling squad.

Several former high school stars comprise a portion of the squad. Among them are: William Mason, from Friends Central School; Carlyle Hupka, Matamoras High School, Matamoras, Pa., Donald Coon, Silver Creek High School, Silver Creek, N. Y., Richard Bond, who graduated from the Upper Darby High School; Ralph Tomei, former Stroudsburg High star; George Moore, from Lynn, Mass., Donald Ulrich, from Kent Roosevelt High, Kent, Ohio; James McCauley and Charles Lichtenwalner, both from Lansdale High School.

A five-game schedule with a game pending with the Bristol High School has been arranged. The schedule:

December 14—Peddie School at Hightstown, N. J.
December 17—Bryn Athyn Academy at Home
January 10—Atlantic City High School at Atlantic City
January 14—Lincoln Prep at Home
March 6—Bryn Athyn Academy at Bryn Athyn, Pa.

Inter-Fraternity Basketball Develops Into Battle!

THE Iota Tau Sigma basketball team started in quest of its third straight Inter-Fraternity basketball championship of the Philadelphia College of Osteopathy, when they staged a brilliant second half rally to defeat Phi Sigma Gamma by the score of 25-11. The game was played at the West Branch Y. M. C. A., 52nd and Sansom Streets, on Tuesday evening, November 19.

The Phi Sigs started off at a fast clip and scored nine points at halftime. The teamwork displayed by the Sigs appeared to have the Its on their heels through most of the first half. The ultimate winners scored 4 points in the first twenty minutes of play.

The Its held the helpless Sigs to 2 points and scored 21 markers for themselves in the second half. Reed Speer, of the Its, carried off the individual scoring honors of the game with 8 points, while a teammate J. Hotham tallied 6 markers. For the losers, Pulker and Koch were outstanding.
On Thursday evening, November 21, the Logs basketball team opposed the Theta Psi team in the second game of the Inter-Fraternity championships and buried the Thets under a 38-15 score. At the conclusion of the first half, the Logs had scored 18 points and the Thets, 13.

The second half resulted in a complete rout of the Thets, when the Logs put on a whirlwind attack and netted 20 markers.

Despite the one-sided score, Mulhollan, of the Thets was high scorer of the game with 10 points. Norman LaBove was the outstanding player for the Logs, making 9 points.

Osteopathy Sponsors Cross Country Championship

CHARLES CARNEGIE, of the Nativity A. C., won the 6½-mile Junior Middle Atlantic A. A. U. Cross Country Championship, over a difficult Cobbs Creek Golf course on Saturday afternoon, November 2nd. The event sanctioned by the Middle States A. A. U., was held under the auspices of the Philadelphia College of Osteopathy Athletic Association, with Dr. Francois D’Eliscu directing.

Carnegie covered the distance in the good time of 35 minutes 28 seconds to lead Joe Sullivan, of Shanahan A. C., to the tape by 200 yards. Wolf Rubenstein, of the newly formed Philadelphia A. C., finished in third place 30 yards behind Sullivan.

Seventy-four harriers representing twelve different organizations, a record entry for this event according to James Foley, chairman and referee of the local A. A. U. long distance board, answered the starters gun. It is interesting to note that out of the seventy-four who started, seventy-one finished and seventy-one is the golfers par for that course.

The Philadelphia A. C. carried off top team honors by netting a low of 51. Germantown Boys Club was second, three points behind, while Shanahan was third with 65. Others in the order of the finish were Nativity, 110; West Chester Teachers College, 113; University of Pennsylvania, 112, and Camden “Y”, 123.

The following men comprised the winning Philadelphia A. C. team: Joe Alexander, former Penn State harrier, was the first man to finish in fourth place, Phil Cochrane, who finished in 13th, Dr. George Liberman, 18th; Bill Robinshold, 25th, and Alex Proven, in 30th.

DEAR FELLOW GRADUATES AND STUDENTS:

As this is the last OSTEOPATHIC DIGEST you will receive before the Holidays, it represents my one and only opportunity to extend to you the Season’s Greetings.

With P. C. O. graduates in many states in the Union and with others in foreign lands—I feel much like a father whose family is scattered to the far points of the compass, and who suddenly realizes that the gang won’t be home for Christmas.

And even though thousands of miles may intervene—we can still be united in the spirit of Good Will that abounds everywhere at this season of the year. It is in this spirit I wish the Merriest of Christmases and the Happiest and most prosperous of New Years.

With a friendly handshake across the miles, I am

Sincerely yours,

EDGAR O. HOLDEN, D. O.

Dean.
**News of the Classes . . . .**

**SENIORS**

EVERYBODY is back from the Thanksgiving holiday and keenly looking forward to the Dean's Christmas Dance and the next vacation. All of which reminds us that the final examinations are not far off. In fact, we will already have had a couple of finals, before this paper goes to print.

We are glad to welcome Jerry Mills, one of the outstanding students of the senior class, back to school. For a time it was thought that he would have to drop out this semester, due to a serious accident to his mother. We would like to extend to her our sincere sympathy and hope for a complete and speedy recovery.

Before this piece of news becomes completely antiquated, we would like to state that the present senior class was awarded the Inter-Class Baseball Championship, winning it as Juniors last spring. Those that received medals were Schnoll, Korn, Hylander, Kramm, Perkins, Ross, Hurd, Kennedy, Stauffer, and Albeck.

For the second consecutive year, a member of our class captains the varsity basketball team. This year it is Bud Hylander, who has been on the varsity team for four years. Other members of the class on the team are former captain, Schnoll, Cooper, Korn and Hurd.

Remember Washington's Birthday and the Charity Ball. Get busy on the Charity Ball chance books and win the inter-class contest. We can use the money towards the school gift.

**JUNIORS**

THE Junior Class showed a fair representation in the recent Swimming and Diving Contest at the Y. M. C. A. H. Maciejewski entered the Diving and the 50-yard Freestyle, as also did Ted Loux who took first place in Diving. Art Bunting and Ted Loux entered the Breaststroke and Ted was once more fortunate in winning second place. The Inter-Fraternity Relay also drew a few entries. R. Speer and W. Soden swam for Iota Tau Sigma and carried first place. P. Bretts and W. Shub were our representatives of the Lambda Omicron Gamma Fraternity. H. Zaehringer, also swam on the Phi Sigma Gamma Inter-Fraternity Relay team.

Recently the class has completed three of the assigned trips of observation for the Hygiene Department, as assigned by Dr. Francois D'Eiscul, a Professor. The first trip was to the Sharp and Dohme Laboratories at Glenolden to see some of the serums. The next was to the Municipal Hospital where we all received a lecture on contagious diseases. Lastly the class went to Norristown State Hospital. Some left there at noon but others decided that it would be more beneficial to themselves if they remained longer. The trips have proven very interesting as well as helpful in applying their principles and lessons in the various classes.

May the class as a unit offer its deepest sympathy to you and your family, Brother Aveni, following your sad bereavement.

Among the missing—perhaps we may expect to see Bill walk out of class with that far away look in his eyes and an old favorite expression on his lips “I’d walk a mile for a Campbell.” Or perhaps he has a pair of kilts and all dressed up with nowhere to go because “The Campbells are coming.”

Poor Bob had a little trouble a while back. He had a birthday which was duly celebrated and the following day it was circulated that he had been married. Oh, what a shock! But to top it off, the following day it came out that he was going to take A. M. D. to the Freshman Formal. Perhaps there is more truth than poetry but we are still in the fog.

The Junior Class welcomes all trained or untrained voices, or other-wise, to its interclass song recitals. Some of the outstanding leaders that most of you already know are, P. S. Bretts—with that fine soprano voice, C. Williams—that booming bass, Henry Maciejewski, singing tenor, Art Bunting—nearer Alto than anything, and Ross Chap who will sing any part from Soprano to Bass if you ask him?????? Join the Fun!

Merry Xmas From The Juniors!

**SOPHOMORES**

WITH more than usual gusto accompanying sophomoric brag-gadoccio the class left for their Thanksgiving respite—if it may be such called when Principle notes replace Esquire or Neophytic treatment mentally replaces the well practiced phrases of Cyrano de Berg-erac that were to have been in order when alone (?). In the main, the thought carried away for the holiday brings up memories of: Earl Scally and Miss Peggy Birmingham waltzing to a first prize at the Neurone Society's Hallowe'en Dance; the class amassing a multitude of points in the Inter-class Swimming Meet. Bob Erwin took first place in the breast-stroke (and third place in diving), Dick Koch and D. Burnard first and second in the 80-yard free-style event, Earl Scally (again, those Scallys!) was satisfied with second place in diving, “Microscopic” Pulker and “macroscopic” Doyle (two extremists) took second and third place in the 40-yard freestyle race—and the wind-up was an exciting 160-yard freestyle relay that the Sophomore team captured. Then Inter-class football with the Sophs accorded the championship, the bulwark of the line being Joe Laytin and Herm Gentile (of Purdue) measuring 7 yards across—from clavicle to clavicle. (Is it a wonder the other teams refused to compete with such sizable stars?)

Another most pleasant memory and for which we wish to thank the Freshmen, was their brilliant annual dance—with twinkling feet, well pressed clothes and shining faces (femmes exempted) it was an event that we I capped the fall season. The “bringe r
down-to-earth” was eight o’clock labs the next morning—quite distasteful but nevertheless effective.

The most infectious laugh in the class is that of Miss Eleanor Boal—a light laugh but well meant, a laugh that runs the range of colors on the cars Miss Boal drives—from a green Chevie to a gentian violet Buick. The most booming laughs belong to Bill Cable and his shadow—Don Christian, whom of late has given up his afternoon nap for better reasons.

—But—the party who slipped up on the latter item, take heed—the eyes and ears of the class is also on your trail!!

Of major importance is a plan presented to the school by Don Avery—concerning an endowment fund for the school. It has been suggested that a part of the student’s Activities Fee be set aside at each registration year and be saved for a period of 15 years, like sums to come from men in the field. At the end of that time the fund assembled would be utilized to the best advantage of the Board of Trustees of the College and Hospital. As a class we would like to hear from the faculty, staff, students and men in the field what your thoughts of such a plan are and would greatly appreciate suggestions—for we know that out of many suggestions we can amass the best for further presentation to the officials.

The class of 1938 wishes to extend the usual Christmas greetings—knowing that everyone shall attempt to make the approaching Christmas merrier than the preceding ones, and furthermore hopes that the New Year shall successfully bear the fruitful thoughts of every one.

**FRESHMEN**

IF EVER a holiday was appropriately named, it was the one on November 28th. More than one freshman will give thanks that those exams are over—for awhile.

Well P. C. O., this year’s Freshman Class has done its bit to continue the traditional Freshman Formal. We hope you liked it.

Speaking for the men in the class as a group, we extend to the fraternities our thanks for the fine hospitality shown us during rushing season.

We always thought the skull was dense, especially when we tried to hide some information there, but now—we know it is not only dense, but also intricate. Whether anyone or no one knows the nose as the nasal cavity, and nearby parts should be known, no one knows. Only time will tell. Time and an examination.

Although not meaning to “slight” any of our “profs” one class in particular stands out as a highly interesting one. Dr. George sure takes the proverbial “cake” as an interesting lecturer. His poignant examples bring home to us his “point” with amazing clearness.

To Dr. Rothmeyer, Section B extends a loud thanks for his pains-taking lectures on the skull.

What happened to the “Osteoclasic”?

It seems as if one of the freshmen is turning horticulturalist, at least he is always talking about his “little sweet pea.”

Our members for some unknown reason seem to be unusually anxious to make the acquaintance of the hospital and its attendants. At least so it seems, since several of our classmates have enjoyed confinement there since the start of this term. Our newest fugitive and convalescent is Dot Winters. We hope she joins us again soon, we’ll be waiting—I mean he’ll be waiting.

Who were the participants in the Junior Room play, “He Who Gets Slapped?”

**ORGANIZATIONS**

**PHI SIGMA GAMMA**

TWO outstanding events climaxed Zeta Chapters Rushing Season: The Annual Stag Rush Banquet held at Hotel Pennsylvania November fifth, and The Annual Fall Outing held at the Bar-X Dude Ranch on November ninth. The end of Formal Rush Week found twelve men wearing the Crown and Shield of Phi Sigma Gamma, Churchill, Delia, Gerhardt, Koch, Lentz, McClintock, Smith, Snider, Simmons, Weeks, Williams.

Hereafter, the second meeting night of each month will be planned as Alumni night, and a program will be presented that will prove of definite interest to those out in practice. This arrangement was made in response to requests from several of our Alumni.

The first meeting under the new program was held on Tuesday, November 26th, at the Fareway with Dr. Paul T. Lloyd as our speaker. He chose as his subject “Back Strain, from the Roentgenological viewpoint”
and a wealth of interesting material was presented. Dr. Lloyd illustrated his lecture with typical Roentgen slides, selected from our own Hospital cases. Speakers for future meetings during the remainder of the semester have already been secured, and include such outstanding men as Dr. Frederick Long, Dr. Orrin Copp, and Dr. Henry George.

Already challenges from the Alumni have been rumored in regards to basketball, bowling and other sports. Last year some interesting engagements took place in which the Active Chapter decidedly "had the edge." However, reports have been arriving that the alumni are massing in War Formation, and are girding on their armor in preparation for battle.

In closing, we of Zeta Chapter, Phi Sigma Gamma, extend to all our best wishes for a Merry Christmas, and a Happy and Successful New Year.

**THETA PSI**

At THE termination of another formal rushing season we announce the pledging of the following men and offer them our heartiest and sincerest congratulations: Warren Mulhollan, Charles Norton, Harold Waddell, Jack Lanese, George Northup, Robert Mayer, and J. Hamilton Duffy.

The recent intra-mural and inter-fraternity swimming meet uncovered several heretofore unknown swimmers who would be a credit to any team. Norton, being a varsity man, was unable to compete in the relay so we had to content with second place in the inter-fraternity relay, very close on the heels of the Its.

In the Inter-fraternity basketball competition, we were forced to admit defeat to a better Logs team after a game which saw plenty of action from the whistle to the bell.

In the spirit of the holiday season which is drawing near, we extend to the faculty, students and nurses the best of wishes for a Merry Christmas and a Happy New Year.

**LAMBDA OMICRON GAMMA**

The Logs announce, with a great deal of pleasure, the pledging of sixteen men, including thirteen freshmen, one sophomore and two juniors. The pledges are Stein, Cooperman, Brunner, Blumenthal, Witberg, Blumberg, Krasney, Witnick, Gerber, Rubenberg, Richman, Chaiten, Feldman, Serkeika, Winoker and Freeman. These men were tendered a banquet at Bookbinder's, Second and Walnut Streets.

The fraternity was very fortunate in securing as guest speakers at its bi-weekly dinner meetings, Dr. O. J. Snyder, founder of our institution, and Dr. John Robinson, Chief Pathologist at the Philadelphia General Hospital.

Word has just been received that Dr. L. Selisker, '34, has been appointed assistant team physician for most all of the activities at the Arena, 46th and Market Streets. It is such items that gradually drift back and make the fraternity feel proud of its men in the field.

As this issue of the Digest goes to press, the Logs once again approach the Inter-fraternity Basketball Championship and maybe this is the year that our eligible playing members will hoist us to the top rung.

The senior members during November urged the lower classmen to com-
When our imprint appears on a magazine or book, you may feel sure the editors have had at their disposal every feature of service which nearly 30 years of specialization have shown to be most desirable.

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THE AXONE SUPPLEMENT

INTER-FRATERNITY GAMES SHOW SPIRIT—

IN THE third game of the inter-fraternity basketball championships, the Logs team was forced to the limit in order to eliminate a surprisingly strong team from Atlas. The final score was 23-19.

In the initial half, the Logs jumped into the lead at the very start and held that advantage until the whistle ended the first twenty minutes of play. The Logs came out for the second half with the intention of making the game a rout but were completely outplayed by the Atlas team.

After trailing a 12-6 the half, the Atlas five forged into the lead and held it until the final minutes of the game when the Logs netted two field goals in succession to win out by a close margin. Smith, of Atlas was the high scorer of the game, splitting the cords for three field goals and two foul tosses, for a total of 8 points. Norman LaBove, pivot man for the winners was next with 7 points.

As a result of their victory, the Logs will meet the Its in the game that will decide the championship on Thursday evening December 5 at the West Branch Y. IOTA TAU SIGMA
THE members of Iota Tau Sigma extend congratulations to those Freshmen who have chosen to pledge themselves to the College Fraternities and welcome the following: L. Brown, I. Butler, J. Drew, F. Gedney, D. Harkins, Jr., S. McDaniel, G. Moore, J. Russo, N. Sorenson, R. Tomei, M. McCauley, and D. Ulrich.

Men, familiar to us all, who expect soon to enter into active membership, are: A. Bunting, Junior; H. Kerr, Sophomore; W. Bricker, Freshman.

The inter-fraternal athletic competitions have been of interest to the vigorous and the lofty. Behringer, Ryland, Speer, and Soden, with great gulping and splashing of water, were responsible for the “ITS” victory in the relay swim. The basketball results are pending. The fleet, the leapers of rope, and the tossers of heavy rocks are doing knee bends and sucking in morning air in preparation for the coming indoor track meet. We anticipate a mighty combat.

Two of our alumni, Bob Barrett of Arlington, Massachusetts, and Steve Walker of Dayton, Ohio, walked into town recently. We were glad to see them and to hear of the doings in those strange parts, for they have been recently initiated into a world, which to us is full of wolves and worms and lepers. They seemed to enjoy the things which to us have become commonplace, and we hope that some day we, too, may return with such pleasure to the old familiar places.
An Invitation

ALLIE McWILLIAMS (your coach), extends a cordial invitation to the readers of the "Osteopathic Digest," to inspect the outstanding values Jackson & Moyer are offering this season in Men's Suits, Topcoats, Overcoats, Furnishings, Hats and Shoes.

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"Post Grad" Curriculum Being Planned

Dates June 20 to July 2 Confirmed by Committee

Drs. George Rothmeyer, specializing in orthopedic surgery, and associates, will inaugurate the new "Post Grad" curriculum being planned by the college for the period June 20 to July 2.

The college, which is one of the few in the country to offer a special "Post Grad" curriculum, expects a large enrollment of students from all parts of the United States.

The program will consist of lectures, clinical work, and laboratory instruction, and will cover the latest developments in the field of osteopathy.

The college is located in the heart of the city, adjacent to the Philadelphia College of Osteopathy, and is easily accessible to students from all parts of the country.