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DEPARTMENT OF MEDICAL ART
AND VISUAL EDUCATION



DALLAS 4, TEXAS

MEDICAL ART AND VISUAL EDUCATION

- LEWIS WATERS, Ph.G., P.D., Medical Artist.....
 Professor of Art as applied to Medicine and Chairman of the Department
- RUTH M. SANDERS, A.B., Certificate in Medical Art.....
 Instructor in Art as applied to Medicine
- ROBERT A. SAGE, A.B..... Instructor in Photography as applied to Medicine
- PATRICIA N. O'NEILL, A.B., B.S..... Student Assistant

Medical Art is the application of art to medicine. The organization and maintenance of a Department of Medical Art and Visual Education involves a number of coordinating efforts. The main purpose is to disseminate, through visual means, information relative to the study, prevention, and treatment of disease. This is done by the application of art, photography, and the science of display to these subjects, emphasizing the clearness and accuracy of the picture, and the most favorable method of presentation. To this presentation of information, conveyed through visual perception, we apply the term "visual education."

The Department produces and coordinates the visual teaching material for the Medical School and extension programs, and illustrates the research of the preclinical and clinical faculties of the Medical School. It maintains a cooperative relationship in visual educational activities with all other Departments of the School. When their teaching programs can be better presented by the use of drawings, charts, diagrams, photographs, photomicrographs, and lantern slides, these are produced in the Department. Motion pictures on various medical subjects are produced in black and white, color, and sound.

This Department has inaugurated a complete course in Medical Illustration which, supplemented by several preclinical courses in other departments, leads to appropriate degrees in this subject.

STUDENTS IN MEDICAL ART

The qualifications of a medical artist are a thorough training in art, with an equally thorough training in the basic sciences of medicine and their application to medical illustration. A classroom and laboratories are provided for a limited number of students who may be accepted for training in art, photography, photomicrography, and other methods of visual education as applied to medicine, in addition to the preclinical courses studied in the other departments of the college.

Applicants for this course must meet the entrance requirements of regular medical college students and must also have had as much

as 16 semester hours of art in an accredited college of arts. Students accepted for this course must make all arrangements for registration with Dr. Donald Slaughter, Dean of Students. A transcript of college credits is required, two 2 x 3 inch unmounted photographs, and a \$5.00 fee (not refundable) for the examination of credentials.

After the student enters Southwestern Medical College he will take selected regular medical courses which have the most bearing on medical art, in addition to the regular prescribed courses of this Department.

In conjunction with Southern Methodist University we have inaugurated for the first time, a definite curriculum whereby students may gain their Bachelor of Arts Degree, majoring in Medical Art, by doing three years work at Southern Methodist University and two years work at Southwestern Medical College. Graduate work in the Department of Medical Art will enable the student to receive the Master of Arts Degree in Medical Illustration from the Southwestern Medical Foundation. The cooperation of other colleges of arts and sciences in awarding the Bachelor of Arts Degree on a similar basis to that of S. M. U. is invited. To those prospective students who already may have their Bachelor of Arts Degree, this curriculum is particularly inviting. The three-year premedical art course given at Southern Methodist University is outlined as follows: Art, 16 Hours; English, 12 Hours; Foreign Languages, 18 Hours; Chemistry, 16 Hours; Physics, 8 Hours; Physical Education, 4 Hours; Biology, 8 Hours; Social Science and Psychology, 12 Hours; Religion, 6 Hours. Similar hours of credits will be acceptable from other colleges of Arts and Sciences.

For acceptance in this course at Southwestern Medical College, the student's general average must be C + or better, with grades in the art courses averaging B or better. He is expected to maintain an average of C or better in his courses at this institution.

COURSES OFFERED AT SOUTHWESTERN MEDICAL COLLEGE

	Hours of Credit
First Year	
Gross Anatomy (2 trimesters).....	10
Anatomical Drawing (2 trimesters).....	7
Sketches are made directly from the dissections on the cadaver, paralleling the work in Gross Anatomy.	
Drawing Techniques suitable for publication, exhibit and teaching	5
The student is given instruction in (1) Tone, dry	

brush process; (2) water color painting; (3) line drawing in pen and ink. He makes detailed drawings of fresh and preserved specimens and has practical experience in planning and executing charts and diagrams. This work is all carried out in the Department. Lectures are given on photo-engraving processes and the correct preparation of illustrations for publication.

Physiology (2 trimesters)..... 13

Second Year

	Hours of Credit
Histology (1 trimester).....	5
Pathology (2 trimesters).....	11
Drawings are made from studies of normal and diseased tissues under the microscope in the above courses.	
Drawings of Surgical Procedure and anomalies found at operation. Endoscopic drawings, made from observations through the gastroscope, cystoscope, etc. Sketches are made at the clinics and hospital operating rooms; drawings are carefully completed in the Art Department	6
Autopsy Drawing. Emphasis is placed on the fresh appearance and large-field view of anatomical structures and gross tissues, only small areas of which are observable in surgery. Instruction is given in the preservation of specimens for study and display	2
Photographic Chemistry.....	2
Photographic Optics	2
Photography and Photomicrography. This course gives the student a thorough technical foundation in photographic procedure while stressing the uses of photography as applied to medicine. It includes work in color photography	4
Planning and preparation of exhibits and displays, using both drawing and photography. When possible, practical experience is given in the actual preparation of exhibits for medical presentation. A short time is devoted to the making of plaster and wax models.....	3

TUITION AND FEES

The tuition is \$600.00 per academic year (\$200.00 per trimester). This figure does not include hospitalization or loss by breakage. All rules and regulations applicable to regular medical students apply as well to students of medical art.

FILM LIBRARY

The Department is constantly endeavoring to build up a motion picture library of the best teaching films that have been produced. The library now has 28 reels of 500 feet each, 8 reels of 800 feet each, and 6 reels of 1,600 feet each. These films cover a variety of medical subjects. Most of them are in color; several are in sound and color. Many more films will be added as they are approved for teaching and as they become available for purchase.

The production of new medical teaching films is now a major endeavor of this Department. To aid in this production the Department has recently received a donation of \$10,000 with which the finest 16 mm. sound on film equipment has been purchased. This equipment, added to the equipment already owned by the Department, will be used in producing films both in sound and color.

PROJECTION EQUIPMENT

This Department is the custodian of the visual education equipment used in the Department auditorium. It attends to its proper maintenance, provides whatever personnel is necessary for projection of motion pictures and lantern slides, and aids in arranging other teaching programs.

RESEARCH IN AUDIO-VISUAL EDUCATION

Because of the increasing importance of the application of audio-visual means to medical education, this Department is constantly conducting research in the newer methods of this type of education. The improvement of equipment and the application of the newer sciences to this field of education in medicine is most desirable. We offer cooperation in research to medical art students who show especial interest in particular phases of this work.

A CURRICULUM OF TEACHING VISUAL EDUCATION IN MEDICINE

By LEWIS WATERS

*Professor of Art as Applied to Medicine, Southwestern Medical
College, Dallas, Texas*

In presenting this special curriculum for medical art, I do so with the knowledge that it varies widely from previous approaches to the study of this subject. It has been designed to give instruction in what are thought to be the most necessary subjects for a well-grounded education in the fields of production and application of medical visual-audio material. Although the curriculum is not perfect, it gives the student an outline of the objectives to be reached. It, at least, offers him the definite knowledge that if certain courses are pursued and passed, he will have an academic degree and an education which compare favorably with other educational standards.

I have included in this curriculum a number of subjects which, to some, may seem unnecessary; but all academic requirements of both the University and the Medical College had to be met. Changes may be made when schools and colleges better understand the need for this type of training. However, the student who completes the work as outlined will be in demand by a large number of institutions in the preparation and application of their teaching material, as such material is increasingly being used in the medical educational system.

I doubt if there is another single phase of medical educational endeavor that is being explored by medical educators with as much thoroughness as this one subject. The need for education in ways of production, in ways of planning and coordination, and in total application, presents a challenging problem. We must meet this challenge by supplying enough trained personnel to produce the best material possible to adequately fill these needs.

My own interest in this subject has for a long time been in the production and application of visual material, but the lack of enough properly trained people to fill the ever-growing demands in the broad field of medical visual education has led me to become increasingly concerned with the teaching of the subject of visual production, and with raising the standards of medical art education. After some twenty years of study of this problem, I have reached the conclusion that an entirely different curriculum should be offered students desiring to enter this work. It is no more possible for one individual to teach all the subjects that these students require than it is for the Dean of a school or the President of a university to teach all of the subjects in his school or university.

It is inconceivable to think of a vast field of endeavor, without helping to plan for the proper education of individuals who may carry on the work in a manner creditable to themselves, their institutions, and the medical and allied professions. If we are to take advantage of the talented people who wish to follow this profession, we must ask them to do at least 5 years of college work. It is unthinkable that we should require this without offering

compensating degrees that will establish these people in a profession with the same standards as those now maintained in other specialized branches of medical education. I believe that this is the only way to raise the status of the people now entering this field, with a corresponding elevation in remuneration.

Up to the present time there has never been offered a comprehensive course containing the special training in art and preclinical medical science desirable for these individuals. Neither has there been offered a course, other than the one here outlined, which advocated the combined study of science, art, and photography, for the most effective production of visual material. To my knowledge there has never been a medical school that has heretofore offered to share its courses with an integrated medical art curriculum with the combined study of the basic medical sciences and their art application. In view of all of these deficiencies, we are now offering at the Southwestern Medical College and Southern Methodist University, a course of study encompassing the whole field of visual education in medicine and leading to the degrees of Bachelor of Arts and Master of Arts in Medical Illustration. The former degree will be given by S. M. U. after the required work has been completed in both institutions, and the latter by the Southwestern Medical Foundation.

In planning this course, it was necessary to break away from the former idea that students of medical art could not or should not be accepted in a regular medical college curriculum. There had apparently been an unwritten law that no persons should be accepted in medical schools except students who wanted a Doctor of Medicine Degree or wished to obtain degrees in some of the preclinical specialties. I am very thankful to the Deans and faculty of our school that this barrier has at last been removed.

After overcoming this apparent prejudice in the medical school system, we had almost as much of a hurdle to overcome in schools offering premedical courses. In these special courses in preparation for the study of medicine, Art had never been a requirement. Southern Methodist University could not abrogate any of their premedical subjects, because if they did so the students could not be accepted on an equal basis with other students in our school, but they did agree to add two years of Art to the premedical courses. This, after a year of negotiation, has prompted our present curriculum. We are cooperating with other colleges of Arts and Sciences in the Southwest that wish to offer a Bachelors Degree in Medical Art under a similar plan. We of course have no desire to limit this undertaking to any geographical section of the country. It is hoped that this may become a national or international curriculum for the training of the greatest number for the greatest usefulness in the profession here discussed.

I have offered, for several years, a two-year non-degree course in medical art and photography, with anatomy the only medical subject offered. Even though this has proven somewhat satisfactory, I have always had the feeling that those taking such a course go out under two handicaps. First, they do not have a Medical Art Degree to establish their standing in relation to other professions. Secondly, they sometimes find it difficult to do all the work re-

quired of them without having a standard medical approach to the problems confronting a modern medical illustrator.

In our institution and in its relation to the medical and allied professions of the Southwest, we doubt if pure art as applied to medicine, such as we have known in the past, could fulfill all of the present practical requirements of medical illustration. This is not to detract in any way from the magnificent quality of work that has been accomplished by a comparatively few gifted and well trained people. In reference to these people and their accomplishments, I must mention that their training for the most part has been hewn from many different courses, in many different schools. Their completed education has usually been derived from sheer personal determination to make of themselves the best medical illustrators that their capabilities would permit. For their achievements, medicine will long applaud. But if these individuals could have had planned for them a thorough and well coordinated academic curriculum, their time, their money, and much educational effort could have been saved. The determination and talents of these people we seek to preserve, perpetuate, and reward by the development of newer educational procedures and by the offering of major and subsidiary courses, leading to degrees appropriate to their attainments. We wish to attract people who may be equally as talented, but who may become lost in the confusion of art versus science, or art versus photography, when there should be no confusion, or lost effort, but a clearly defined plan for accomplishment in incorporating the best of art, medicine, science, and photography that may be used most advantageously for the desired results. We have developed a newer and broader concept of the application of the artistic capacities to the production of material for the teaching of medicine, public health, and allied subjects. We believe not only in teaching the use of true drawings, but in using all forms of photography, still or motion; any useful display; any visual exhibit, however produced, which can better present the total picture correctly and effectively.

In planning this course in medical visual education I have in mind not only what we wish to accomplish, but have also incorporated what seems to be most desirable by a great number of other institutions and individuals. We feel that students who contemplate entering this work should complete at least three years of regular college work, including as much as two years of art, English, a foreign language, biology, physics, and chemistry. After entering our own institution, the work will include the various drawing techniques as applied to medical subjects, with a completion of the following preclinical subjects in the regular medical curriculum: Anatomy, Histology, Physiology, Pathology, with their art application. The next course of study will include advanced drawing, optics, photographic chemistry, photography, photomicrography, motion picture techniques and sound recording, the preparation of scientific exhibits and display designing, the proper preparation of material for publication, and a study of moulage and plastic prosthesis. Providing the student has received his Bachelors Degree, this last course of study will lead to the awarding of the Masters Degree in Medical Art.

In offering this curriculum in education, we must present the basic foundation upon which all work of visual medical presentations rest, that is, art as applied to medicine. Drawing has been used for visual interpretation of facts since the beginning of man. The better the drawing, the more vivid the understanding of these facts. Drawing and other forms of producing pictures came into use in medicine because of the inadequacy of any language to properly convey the appearance of disease to the mind. When it is impossible to present the objects themselves, the most desirable substitutes are pictures and sound recording. Therefore, the quality of these pictures and recordings should be as near "fac simile" as possible. The desirable attainment would be to make the pictures even more understandable than the original object. This is often possible, but even though this attainment is not reached in every instance, the product of our striving for this perfection is usually more permanent than the original. This striving for the production of good pictures of disease and its allied impedimenta with its causes, effects, and cures, and the recordings of research in medical problems, is the reason for the existence of a separate department given over to the teaching of medical illustration and the production of visual-audio material.

In regard to the types of pictures used in medical education, I do not make a severe distinction between the use of drawings and good photography—insofar as the method of production is concerned. When pictures are produced by either method the only question should be "Does the picture tell the facts in the most convincing form?"

Drawings are in many instances the most preferable method of producing pictures. They are usually divided into several groups: "Schematic"; "the true drawing which represents the subject exactly"; "the semi-schematic"; and the "ideal", which is a conception of the ultimate whole, constructed from the mean proportion of many types.

The schematic drawing is one which represents in outline the main characteristics of the object. It may be drawn with little regard for the exact knowledge of the form presented, as in demonstrating physiologic principles or the locations of the organs in the body. The true drawing intends to portray in an exacting nature all the details of the original and is particularly useful in pathology in demonstrating the course of disease in its various manifestations, and in its final termination.

The semi-schematic drawing has perhaps the most widespread use in surgery, where it can portray with a great amount of accuracy the course of a surgical procedure with anatomical exactness, yet give a true delineation of the surgical technique employed. This method is particularly suitable for publications, lantern slides, and other demonstrations.

The representation of the ideal is perhaps the best form suitable for teaching and its very development corresponds with the growth of medical science. This type of art presupposes a vast amount of previous study of medical subjects. It cannot come out of an idea in which the artistic development may overbalance that of the science of the study and treatment of disease.

This apparent feeling for the display of beauty, with a corresponding neglect of the real, has no place in presenting medical thought. We must rely on the feeling developed in lengthy and sound artistic training with an equal amount of study and understanding of cold medical and scientific facts. Neither should these facts overpower the thought of a pleasing presentation. It is by the balancing of these two tendencies that we can more satisfactorily serve the advancing science of medicine. By the use of modern methods of drawing and photography brought toward perfection through exactness of detail and ceaseless observation, we shall display in our work a comprehension of medical knowledge that will serve visual education better. Charts, graphs, and lettering are on occasion as necessary to modes of medical illustration, as any type of drawing. They are most useful in accurately recording the physical findings of instruments that are used in determining the degrees of severity in the course of a disease.

Photography, when properly applied to medicine, should be held in the same wholesome respect as drawing, although it is a semi-mechanical method of producing pictures. There are as many, or more, classifications of this subject as there are types of drawing. In the main, however, it is my belief that in its total application the best results are obtained when it is regarded as an art in precisely the same way as any other delineation process. It can only be regarded as an art when it is dealt with and conducted by one previously trained as an artist. The process is really a medium of expression; the camera, lens, and sensitive material merely the tools employed. The artist who seeks to represent the facts of medicine most intelligently can better do so if the limitations of all forms of expressions are recognized.

The measure of success that attends the results of the use of photography as applied to medicine is entirely the measure of the artist's ability and knowledge of the subject, coupled with a recognition of the limitations imposed by photographic apparatus. The employment of no one technique will produce the desired results. Many cameras, lenses, filter factors, emulsion speeds and lights should be studied with the same assiduous endeavor as are pencils, paints, papers, and brushes.

In teaching art and photography in combination, it does not necessarily follow that I expect every student to have outstanding proficiency in all methods of expression. I must admonish those who scoff at photography that we have it with us. It is being very intelligently used in architecture, in engineering and in other forms of art application, and is being incorporated into more and more professions. It is considered a basic course in our curriculum.

I will admit that there are those whose anticipations of photography do not rise above the "snap shot" level, or the so-called "before and after" picture. These individuals I do not hesitate to class as being completely lacking in the understanding necessary for the progress of medical visual education. Another ethical thought I wish to present is that I do not advocate, and personally will not tolerate, the mixture of drawing and photography. It must be either a good drawing or a good photograph. I have students who I am

sure will never use photography except as a method of reproducing their drawings or in making lantern slides, while others are very good artists who will prefer photomicrography and motion pictures. These combinations of basic work are related to the student of medical art in exactly the same manner as the basic work required of medical students. It does not follow that because a medical student takes pathology he is going to be a pathologist.

Another type of work that should be accomplished by departments of art as applied to medicine is moulage and plastic prosthesis. This endeavor is constantly assuming greater importance as the disfigurements of the war become more apparent. For those people whom plastic surgery cannot completely restore to normal appearance, this is the only hope of overcoming the misfortune of presenting an unsightly appearance to their loved ones, friends, and the public. The more realistic and artfully applied the prosthesis, the less noticeable the deficiencies become. This work not only helps the appearance of the individual, but also helps immeasurably in restoring the ego and otherwise prevents the setting up of chronic neurotic symptoms in the affected individuals. Moulage work also has a wide application in teaching, especially in pathology, in presenting the actual form and color of specimens; while in plastic surgery it gives an actual mold of the case before and after the desirable surgery has been accomplished.

Motion pictures, when intelligently produced and used, are perhaps the most desirable form of visual-audio education yet conceived. By their use we may combine into one facility all the art of drawing and good photography now known or practiced by individuals interested in producing medical visual teaching material. Although thought of since their invention as a means of amusement, films are now highly regarded by educators as a means of condensing a vast amount of information into a most pleasing and readily absorbed form. For the dissemination of medical information to the public, films are invaluable. They bring about a better understanding of the medical viewpoint and present a better program of health education. The field of public health education is a large and ever-expanding one and one of its most important media is the motion picture. It is the thought of a great number of people interested in this work that films in medical and health education should be combined. However, it is not my intention here to stress any phase of motion pictures, except as it applies to medical use.

For those of us who are concerned with the practical application of films to medicine, there arise several important questions. First: What constitutes a good teaching film? Second: How do we actually produce the film after the subject values have been determined? Third: The total evaluation of films when used as a teaching medium. My own contention, associated with that of a number of others interested in this field, is that the best type of film for medical teaching has not been produced. It should be made with only one thought in mind—does it teach the subject with which it is concerned? If the film is on surgery, it should follow the patient from the time of entrance to the hospital; give the history, blood picture, pathology, X-ray examination and cardiac recordings in the instance of sound pictures. The

total diagnostic picture should be presented to determine why the patient needs surgery. Then it should give the surgical technique, and why that particular technique is employed. Then a very frank discussion of just how much benefit the patient has derived from this procedure.

The same outline should hold true in the production of other films, whether in medicine, surgical specialties, or preclinical work.

In its total evaluation, after the film has been produced, it is quite necessary for the progress of medical teaching to convince the teachers that the motion picture can be a supplement of high value and efficiency to teaching, and that it requires its own special technique of application. The best, and perhaps the only way, to achieve this would be to produce many good teaching films. The making of the best medical films is not a simple affair. They must be conceived and planned with an understanding of the objectives to be reached, the contents to be incorporated, and the general treatment of the film information previously determined. Particular care should be used to integrate these points with other methods of teaching. The specific purpose of such films is to supplement instruction in a given subject, course, or a part of a course. To produce films that teach, a number of fundamentals should be observed. First: There should be the closest cooperation in the planning of the film between the teacher and the department or persons producing it. The information to be presented should come from authorities on the subject. The matter of film designing, visual organization of the material, smooth and clear continuity, should be left to the producer. Here it should be borne in mind that professional zeal should not be allowed to interfere with the ultimate usefulness of the film. There should also be a determination on the part of the person producing the film not to allow any artistic leaning to bring out anything except the medical facts presented in the most pleasing form.

The motion picture with its exactness and brevity may be admirably adapted to the teaching of neuro-psychiatry. By means of films and sound recording, patients manifesting symptoms of various disorders can be assembled for classroom study. The progress of a disease in one patient over a period of years can be better studied by way of the terse medium of the film. Unusual disorders infrequently encountered in medical practice are made readily available for audience study, giving them an opportunity to analyze characteristic movements by means of slow motion and to see results of special studies covering many years. The different forms of mobility which are impossible to describe accurately by words or still pictures, are vividly portrayed through the motion picture. A careful study by this method of presentation will lead to an improved understanding of the mechanism of deterioration in the damaged nervous system and the study of the formation of different lesions.

The recording of sound is now proving its worth. Too often it is not possible in clinical medicine to have the right cardiac case, psychiatric patient, or other ill individual to present to medical students. By means of sound recordings, permanent histories of typical cases can be preserved and presented, thus insuring that adequate instruction is always given. Heart sounds can be

recorded and thus the student may listen to classical or rare types of cardiac murmur, thereby obtaining a better idea of any heart condition.

The microscope is a visual aid which has been recognized as indispensable for decades. In combination with photography, it makes possible photomicrographs which are invaluable in medical teaching, publications, and visual demonstrations.

Of increasing importance in teaching medical students is the use of reproductions of cardiograms and encephalograms. A copy of a cardiogram can easily accompany the history and heart sound record in the case of the patient with heart disease; while the encephalogram, accompanied by a sound recording of the examination of the patient, not only helps to establish the diagnosis in certain psychiatric conditions, but, like the Wassermann in syphilis, is the proof of the disease and is a visual means of recording and illustrating its characteristics.

There is scarcely an aspect of any subject in medical teaching or any procedure in the practice of medicine that cannot be aided by visual-audio methods. They lighten the load of the instructor and help the student establish in his own mind many aspects of his medical courses which are not easily made clear by some of our present teaching methods.

Visual-audio aid will assume great importance in teaching post-graduate students after the war. The doctors returning from the battlefield will want detailed courses and special instruction in many subjects. They too, will have much information to impart to civilian physicians wherein visual aids will be used to great advantage.

In the study of visual-audio methods, we should strive to maintain an equal balance with the research done in medicine. It is for this reason that we in the Southwestern Medical College are constantly studying newer methods of presentation. Some of our recent studies have been on cardiac sound recordings, and co-axial beam photography for endoscopic instruments, with a continued investigation of color photography as applied to medical subjects. It is only by these investigations that we can hope to record more perfectly the advances in research, medicine, and allied sciences.

We have a completely coordinated department where we are developing the newer ways of medical teaching by sight and sound and where we are training students properly for the pursuit of this profession, which is such an advantageous adjunct to the broad field of medicine.

REFERENCES

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