CONTRIBUTORS.

FONES, ALFRED C., D.D.S.

HOPEWELL-SMITH, ARTHUR, Sc.D., L.R.C.P., M.R.C.S., L.D.S.

KIRK, EDWARD C., D.D.S., Sc.D., LL.D.

MERRITT, ARTHUR H., D.D.S.

MINER, LEROY M. S., M.D., D.M.D.

OTTOLENGUI, RODRIGUES, M.D.S., D.D.S., LL.D.

STRANG, ROBERT H. W., M.D., D.D.S.

THOMA, KURT H., D.M.D.

TURNER, CHARLES R., M.D., D.D.S.

MOUTH HYGIENE

A TEXT-BOOK FOR DENTAL HYGIENISTS

COMPILED AND EDITED BY

ALFRED C. FONES, D.D.S.

BRIDGEPORT, CONNECTICUT

THIRD EDITION, THOROUGHLY REVISED

With 219 Illustrations and 9 Plates

LEA & FEBIGER

PHILADELPHIA

1927

LIST OF CONTRIBUTORS.

ALFRED C. FONES, D.D.S.,
Bridgeport, Conn.

ARTHUR HOPEWELL-SMITH, ScD., L.R.C.P., M.R.C.S., L.D.S.,
Professor of Dental Histology, Histopathology and Comparative Anatomy in the University of Pennsylvania, Philadelphia.

EDWARD C. KIRK, D.D.S., Sc.D., LL.D.,
Editor of the *Dental Cosmos*.

ARTHUR H. MERRITT, D.D.S.,
Periodontist, New York City.

LEROY M. S. MINER, M.D., D.M.D.,
Dean of Harvard University Dental School, Boston, Mass.; Professor of Oral Surgery, Harvard University Dental School, Boston, Mass.

RODRIGUES OTTOLENGUI, M.D.S., D.D.S., LL.D.,
Editor of *Dental Items of Interest*.

ROBERT H. W. STRANG, M.D., D.D.S.,
Orthodontist; Oral Surgeon to the Bridgeport Hospital, Bridgeport, Conn.

KURT H. THOMA, D.M.D.,
Assistant Professor of Oral Pathology in the Harvard University Dental School, Boston, Mass.

CHARLES R. TURNER, M.D., D.D.S.,
Dean of the School of Dentistry in University of Pennsylvania, Philadelphia.

CONTENTS.

MOUTH HYGIENE.

CHAPTER I.

ANATOMY OF THE HEAD.[1]

By ROBERT H. W. STRANG, M.D., D.D.S.

THE SKULL.

With the exception of the lower jaw or mandible, the twenty-two bones that enter into the formation of the osseous framework of the head are united by immovable joints called sutures. In this fixed relationship they form a strong supporting and protecting structure termed the skull (Fig. 1). This may be conveniently studied under four headings: (*a*) the cranium; (*b*) the base; (*c*) the lateral aspect; (*d*) the anterior aspect or face.

The Cranium.—The cranium comprises that portion of the skull which contains the brain. It is formed by the union of eight bones which are named as follows: frontal, two parietal, occipital, two temporal, sphenoid and ethmoid. In outline it is somewhat egg-shaped and presents for study a superior surface, forming the *vertex* of the skull, and an inferior surface.

The *external surface of the vertex* is convex and is covered in the living subject by the tissues that form the scalp. This convexity of surface is ideal for resisting and warding off blows. This surface is traversed by three sutures arranged in the form of the letter "H." The anterior cross suture which is situated well toward the top of the skull is called the *coronal;* the one passing from this to the posterior cross suture is the *sagittal;* the posterior transverse suture is the *lambdoid.*

The *internal surface of the vertex* is concave and is marked with elevations and depressions for the accommodation of the irregular brain surface. Through the center, running antero-posteriorly, is a groove in which lies the superior longitudinal sinus, a blood channel performing the function of a vein and carrying part of the return blood from the brain. To the margins of this groove are attached some of the supporting membranes of the brain.

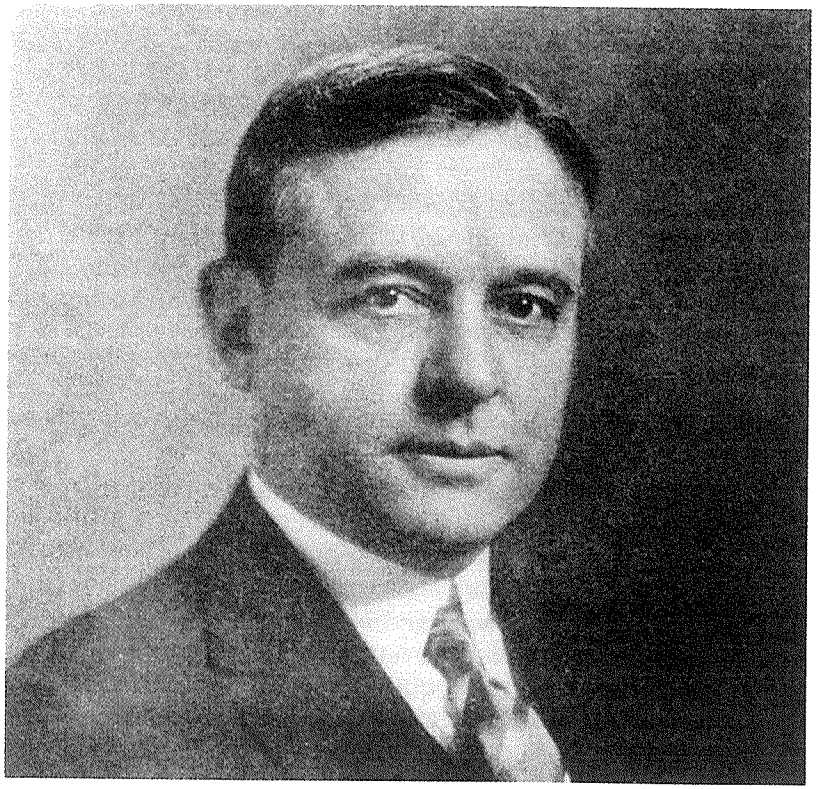
[1] Bibliography: Gray's Anatomy; Piersol's Anatomy; Cryer, Internal Anatomy of the Face; Deaver, Special Anatomy of Head and Neck; Swan, Manual of Anatomy; Chapter on Anatomy of the Teeth, by C. R. Turner, in Johnson's Operative Dentistry.

History of The American Dental Hygienists' Association 1923–1982

Wilma E. Motley, R.D.H.

sachusetts. Fones did not want to face an endless procession of suffering patients and do patchwork dentistry for them, but there had seemed to be no prevention and no cure. Impressed with Smith's ideas, he secured an invitation to visit Smith's office to talk about preventive prophylactic treatments and to observe his patients. Fones followed Smith's principles and successfully incorporated them into his practice, which he shared with his father.[37]

Beginning in 1900, Fones offered patients preventive services and noted that their dental and general health was better than that of patients in his father's practice, which had remained unchanged, facts which made Fones and his patients become enthusiastic supporters. Because of his intense interest in prevention, Fones accepted a position in the New York College of Dental and Oral Surgery, lecturing on dental prophylaxis and presenting many papers and clinics on his techniques.



Dr. Alfred Civilion Fones (1928), founder of dental hygiene.

Fones discovered that office time was a vital problem. On the trip home from his first visit to Smith's office, he remarked to his traveling companion, William Jarvie, that a woman might be trained to do prophylactic work, thus leaving the dentist free to perform restorative procedures. After five years spent perfecting the prophylactic procedures taught by Smith, Fones began training his assistant, Mrs. Irene Newman, to perform the functions of this new specialty. She remained in continuous practice with him for nearly thirty years.[38]

In 1906 Fones outlined a course of study for Mrs. Newman, which included basic dental and science subjects as well as the skills of scaling and polishing. After she had studied the anatomy of the teeth and their surrounding tissues, she was instructed in polishing techniques by working on extracted teeth mounted in modeling compound. At first it took her all day to remove indelible pencil stains using an orangewood stick and moist pumice, but after two weeks of practice she could clean a set of teeth in one hour's time. Then Mrs. Newman advanced to watching in a mirror while Fones polished her teeth, carefully explaining finger rests for pressure and stability. The next step was for Fones to sit in the chair, mirror in hand, while Mrs. Newman polished his teeth. Further practice made her competent to polish the teeth of children. Plaster of Paris and varnish applied to extracted teeth provided the material for her to learn scaling skills.[39]

Fones found that a great deal of time was saved when Mrs. Newman was able to do the preliminary removal of heavy deposits of tartar. As Mrs. Newman's technique and sense of touch improved, Fones could find no fault with the results. Fones decided that patients who continued in his practice should see Mrs. Newman at regular intervals, although he was aware that it could mean the ruin of his practice. His patients had been well prepared over the years, however, and were psychologically ready to accept this new service. From that point on, the character of his practice changed and he was able to wage a winning battle against dental disease.

Fones was convinced that 80% of all dental operations could be prevented and that, through teaching and prophylactic procedures, dental practice could be reoriented from disease to health. He acknowledged that until women became accepted

Irene Newman (1941), first to be licensed as a dental hygienist.

by the dental profession, they would have to be trained in private offices. Once they were in demand, colleges could be expected to establish training courses.

In "The Origin and History of the Dental Hygiene Movement," Fones stated:

> In the extensive material reviewed on the subject of dental prophylaxis it was the consensus of opinion that Dr. D.D. Smith was truly the father of dental prophylaxis. Although other men had made the effort to impress the dental profession with the importance of mouth cleanliness, he was the first to evolve a definite system of dental prophylaxis and offer his technique to the profession, and to show clinical evidence through his exhibits of patients, of the beneficial results of his system. To quote Dr. Smith in this regard: "The discovery and enunciation of the important fact that enforced and systematic change in the environment of the teeth will prevent decay and carry with it many other beneficial results, is new—new in essence, new in conception and new in its elaboration—and results wholly from clinical investigation and experimentation." It will be noted that for the prevention of dental caries, Dr. Smith stressed only the environment of the teeth. He did not concede that nutrition or other hygienic factors which govern the health of the body as a whole, were influential in the susceptibility or immunity to dental caries. His teachings still form the basis today of our knowledge regarding the operative technic of dental prophylaxis, and he justly deserves great credit for this. In the light of our present day knowledge the true prevention of dental disease covers a wider field than operative procedures for extreme cleanliness, although these measures must play an important role.[40]

Other dentists trained their assistants to perform prophylactic and educational services in their offices without benefit of formal course work or legal sanction. Dr. Robin Adair of Atlanta, Georgia, stated, "In the year 1898 in the office of M.L. Rhein of New York, I first saw a young woman cleaning a set of teeth. Dr. Rhein called her a dental nurse, and he had written several articles advocating the employment of a dental nurse." Adair added that he had used Irene Wood as a dental nurse since 1909, and called her "the first dental nurse in the South." Adair's patients were reminded the day before their appointments, an early example of recall service.[41]

Dr. W. George Ebersole, who founded the Mouth Hygiene Association in Cleveland, Ohio, had used a dental nurse since 1905. Olin Kirkwood of Montgomery trained Mrs. M.M. Kirkpatrick in 1911 as the first dental nurse in Alabama. In 1913 Dymple B. Johnson of Fort Smith, Arkansas, wrote to the editor of *Dental Items of Interest* that she had been performing these

paid their travel expenses. The lectures these professionals gave were recorded in shorthand, and copies were sent to each lecturer for correction and condensation. These lectures were then compiled into the first dental hygiene textbook. The text, *Mouth Hygiene*, was edited by Fones, with R.H.W. Strang and E.C. Kirk as associate editors, and was published by Lea & Febiger, Philadelphia, Pennsylvania, in 1916.

The official announcement of the course read in part:

> In the last few years, there has been a great demand for women as hygienists and prophylactic operators in dental offices, for it is a well known fact that at least 80 percent of dental diseases can be prevented by following a system of treatment and cleanliness. There is also now developing a demand for these women in public institutions, such as schools, hospitals, and sanitoriums. At the present time, there is no standard educational course for dental hygienists. The demand for these women throughout the country is sufficiently large to warrant a course of lectures to be given by men who are authorities in their various specialties, these lectures to be printed in book form. With the possibility that this movement will be a powerful aid in the prevention of disease, these educators have agreed to give their services gratis. After the lecture course, there will be six weeks of practical training in dental prophylaxis. A nominal fee of twenty dollars will be charged to partly cover this expense.[56]

Fones had anticipated no difficulty in securing students who would want to become dental hygienists, but money for the demonstration program was not immediately available and no one applied because of the uncertainty. Fones then appealed to the dental community, writing to those he knew to be interested. Eventually he recruited 24 dental assistants, 3 college graduates who were teaching school, 3 trained nurses, and the wives of 3 practicing dentists, among them his own wife.

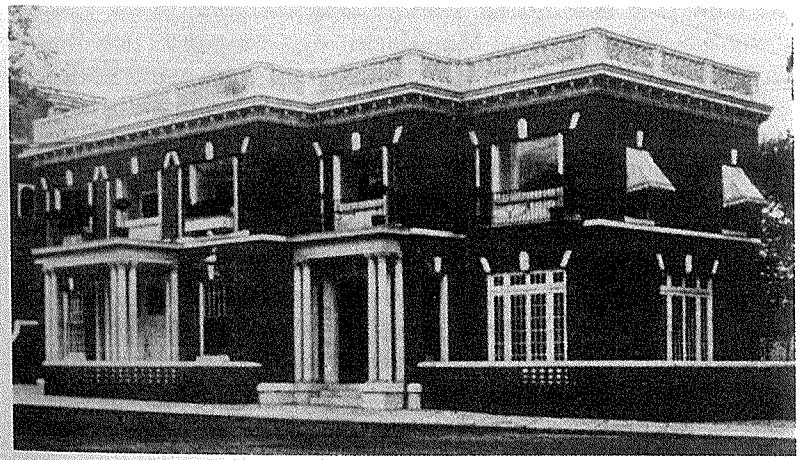
Classes were held on Monday, Wednesday, and Friday evenings, permitting women otherwise occupied during the day

to attend the course. Each session began with a review by a quizmaster at 7:30 p.m. This was followed by a lecture from 8 to 9:30. Eleven written examinations were given as soon as possible after the completion of subjects.

The term "dental nurse" had been used by many men in speaking for this new auxiliary, but Fones did not like its connotation of disease. He wanted a name that conveyed a proper description of the work these women would do. A hygienist is one who is versed in the science of health and the prevention of disease and, eventually, "dental hygienist" was coined and is still accepted.

Fones' upstairs office at 10 Washington Street in the former carriage house of the home, was shared with his father and Mrs. Newman, his second cousin. Dr. Strang said "carriage house" was a better name than "garage," for it was an elegant building. Mrs. Newman stated that it was a beautiful office, a real showplace, and many visitors came from the United States and as far away as Japan to see it. After the school was opened Fones' office attracted even more visitors than before.

The first floor housed a reception room, a secretarial office and a toilet; the second floor was divided into offices for Dr. Fones, Irene Newman, and Dr. Alden Newman, her son, and a study for Fones. Dr. Rodrigues Ottolengui of New York City called it the "finest dental office in the world," describing the



Former carriage house where Dr. Fones held his first dental hygiene courses, 1913–1914.

building of tapestry brick of 12 different shades with white marble trim. The reception room was paneled in hazelwood and bordered with Caen stone, and had a red tile floor.

The large, first floor reception room with its beautiful white marble fireplace and secretarial offices were converted into a classroom. It was equipped with a stereopticon with baloptican combination permitting the projection of illustrations from books, pictures or objects on the screen. Student chairs had arms for ease in taking notes. Part of the cost of the school was financed by Fones' wealthier patients who were eager to offer support.

On the school's opening night each student was given a course outline and a list of required reference books. After personally welcoming the students, Fones spoke of the high standards he expected of the class and remarks were made by faculty members Drs. E.S. Gaylord, M.L. Rhein, and Rodrigues Ottolengui. Questions and answers covered class hours, attendance and dress.

When the lecture courses and examinations were completed, the class of 32 women was divided into two groups of 16 each for the practical training. One group worked from 4 to 6 p.m., and the other from 7:30 to 9:30 p.m., on Monday, Wednesday, and Friday. On class days the room was open from 10 a.m. to 4 p.m. for practice, and on other days it was available from 10 a.m. to 10 p.m.

The baloptican and screen were left when the room was later converted into a clinic with 16 new Diamond chairs loaned by the S.S. White Dental Manufacturing Company. The chairs were equipped with work tables, cuspidors, and manikin heads and were arranged around the room, four to a side, with droplights over each chair for illumination. There was a sink with hot and cold running water, and a large zinc table in the center of the room provided a storage area for supplies such as paper towels, liquid soap, and cans of powdered pumice. Alcohol was used to wipe mirrors and handles of instruments which could not be placed in boiling water. Deep metal cups, milk shakers, perforated near the bottom, were immersed around the edge of a tub with an electric heater underneath to sterilize instruments.

Each student had her own instruments, furnished at cost, approximately $25, and she was provided with a Japanned box fitted with a lock and key in which to store them. Classes began with a review of the four motions, necessary in handling

Dr. Fones' first class of dental hygiene students working on manikins.

instruments and polishers, digital, wrist, rigid-arm, and rotary. Lights were turned out and pictures of polishing techniques were shown on a screen. Students practiced on manikins with rubber cheeks, tongue and two full sets of teeth in movable jaws. An arrangement of rubber dams and bags caught water used in syringing the teeth. Pictures of the proper finger positions were given to each student, along with a typewritten list of the 17 divisions of the mouth.

The same rigorous examinations given Mrs. Newman were applied to the new students. They were given 1 $^1/_2$ hours to remove carpenter's pencil marks from the manikins' teeth using a porte polisher, orangewood sticks, and pumice. Three points were deducted from 100 for each mark left. After the five lessons on polishing, the lessons on instrumentation began, with the students removing a mixture of plaster and varnish. After the practical examination, pupils were tested on their knowledge of the divisions, the teeth involved, surfaces, and proper instrument use including grasp of the instrument, best adapted fulcrum point, and the correct motion.

After this examination was passed the students were judged competent to work on children as patients. Applications sent to schools, orphanages, and boys' clubs brought enough patients to fill all the class and practice hours plus Sat-

urday mornings. Using their own toothbrushes, the children were given lessons in brushing, and had their teeth scaled and polished. In preparation for work in public schools or as dentist's assistants, each student dental hygienist charted the Angle classification of occlusion, the number of temporary teeth, the color of the gums, and the location of cavities in permanent teeth and fistulas. Instructors criticized the work, corrected the charts, and instructed students on special points. For the final examination each student worked on one patient; 75% of the grade was allowed for perfection in operating and 25% for a correct diagnosis noted on the chart.[57]

The last part of the practical course involved work on adult patients. Although there was not as great a demand, there were more than enough patients to fill the operating time. The same procedures and examinations were followed.

Mabel McCarthy commented on the class work:

> In this training the pupils were taught to attempt nothing beyond prophylactic treatment, i.e., cleaning, but these cleanings are to be most thorough, not a hasty running over the teeth with a rubber cup in the engine, but a thorough removal of all tartar and stains by careful instrumentation, followed by a thorough polishing of the tooth surfaces, labially, buccally, lingually, above and below the free gum margin, with an orangewood stick dipped in fine powdered pumice and hydrogen dioxide, taking care to reach the approximal surfaces, then using dental floss dipped in pumice for reaching approximal surfaces difficult of access, and finishing up the grooves and fissures of the occlusal surface with a bristle brush in the engine.[58]

Of the 33 who began the class in November of 1913, 27 graduated in June of 1914. Fones graduated three classes of dental hygienists, with a total of 97 students. There was one class each in 1914, 1916 and 1917 before organized institutions took up the training of dental hygienists.

The Bridgeport demonstration project that Fones envisioned began in September 1914 under the direction of four dentists and one physician, a member of the Health Board. Ten of the graduating students were employed, two of them as supervisors. Winifred A. Hart, already a registered nurse and Rose E. House each earned salaries of $1.50 per day, or $9 a week. The supervisors gave classroom talks and tooth-brush drills, distributing literature to the children and supplies to the dental hygienists. They also made arrangements for the dental hygienists to work in the schools. The dental hygienists, working in pairs, began with the first and second grade children. Their equipment and supplies for a 40 week period cost $172.20, and a detailed description of the project was recorded. There were four parts to the program. First, the prophylactic treatment, the actual cleaning and polishing of the children's teeth and chart examinations of their mouths. Second, toothbrush drills and classroom talks were held. Third, stereopticon lectures for children in the higher grades were given. Fourth, educational demonstrations for parents were presented in the homes.

Graduates of first class of dental hygienists, June 6, 1914.

In reporting the system under which the Bridgeport clinic was operated, Fones said,

> This work in the schools is essentially woman's work, and is the great field for the dental hygienist, to whom it opens up paths of usefulness, activity and inspiration hitherto undreamed of, allying her with the workers of the world who are helping humanity in masses.[59]

When the first year of the project was completed, additional funds were made available. This made it possible to employ more dental hygienists and to instruct pupils in the first three grades. The two dental hygienist supervisors then assisted in recruiting and training ten young women about to graduate from the Bridgeport High School. These students were trained just for the schools, because regular graduates of Dr. Fones' school were quickly employed elsewhere. The women took an intensive summer course in theory and practice and were given additional training to make them eligible for licensure. At least one of these senior students, Mabel McCarthy, a 1916 graduate, took dental hygiene courses while finishing her high school work. At Fones' request she later assumed his position in the Bridgeport school program.[60]

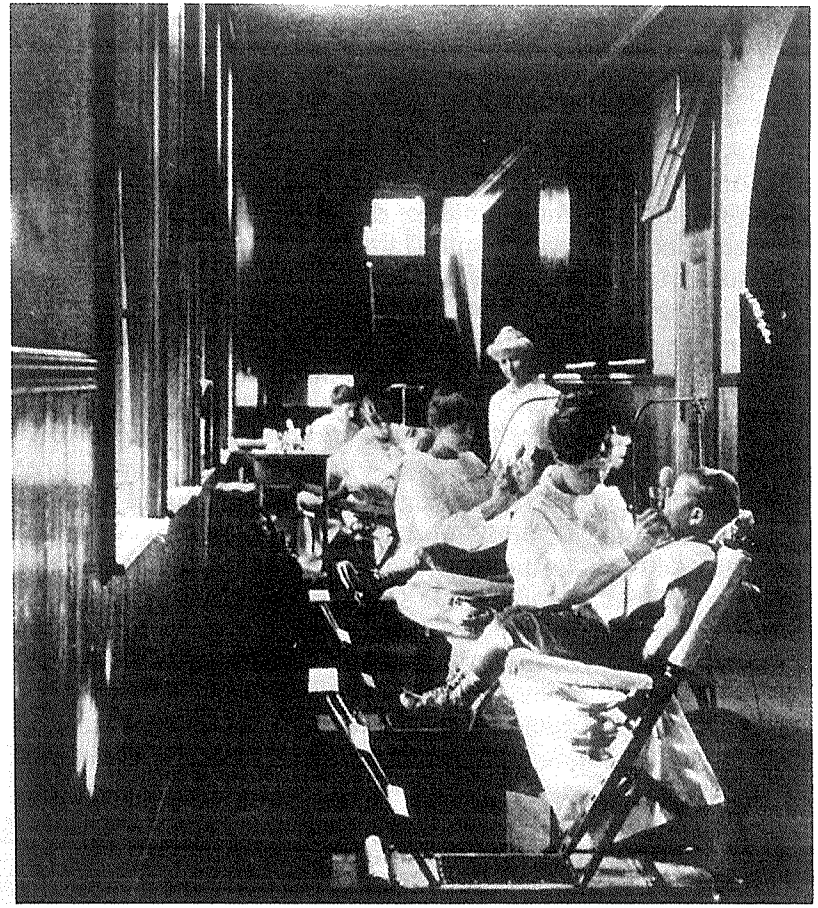
Six dental hygienists were added to the school program in 1915 and the addition of another six in 1917 enabled the program to cover the first five grades. When a parochial school asked that the system be extended to them, six more dental hygienists were employed in 1918.

At the end of the first year, Fones realized he had to develop a broader concept of prevention. Early destruction of first permanent molars was distressing and as a remedy, three women dentists were employed to fill small cavities in these teeth. Dr. B. Elizabeth Beatty was hired in 1915 and others followed in 1916 and 1917.

The reduction of decay in the children's teeth at the end of the five-year period ranged from 67.5% in some schools down to a minus record in two schools where a number of children were "absolutely negligent in the care of their mouths." The average decay reduction was 33.9%. Other statistics showed improvement in the general health of the children. This proved Dr. Fones' theory of prevention and assured "the success of the dental hygienist in the first educational and preventive dental service for school children."[61]

Progress of the Dental Hygienist

The field of dental hygiene was extended beyond the public schools and private practice in 1915 when one of Fones' students, Ella Marr, was made resident dental hygienist in the New Haven Hospital. In 1917 Emma Crabbe was employed to provide prophylactic treatment to employees of Yale and Towne



Supervisors and dental hygienists at work in school corridors.

company of Stamford, Connecticut, in their industrial clinic. A. Louise Sherman was the first dental hygienist in the Pennsylvania schools; Justine Schlosser introduced dental hygiene to Seattle, Washington; Maude Sullivan and Emma Holcomb were the first dental hygienists in private practice in New York City. Miss Louise Borchard was employed in Boston; and Veronica Graham London was the first to work in New York schools.[62]

Mabel McCarthy recalled that Dr. Fones had a good sense of humor and took great delight in telling this story:

> . . . one of our hygienists who went to a state on the Pacific coast in the interest of dental hygiene. In

Mr. Thomas Forsyth delivers diplomas to the 1918 dental hygiene class wearing the latest in professional caps.

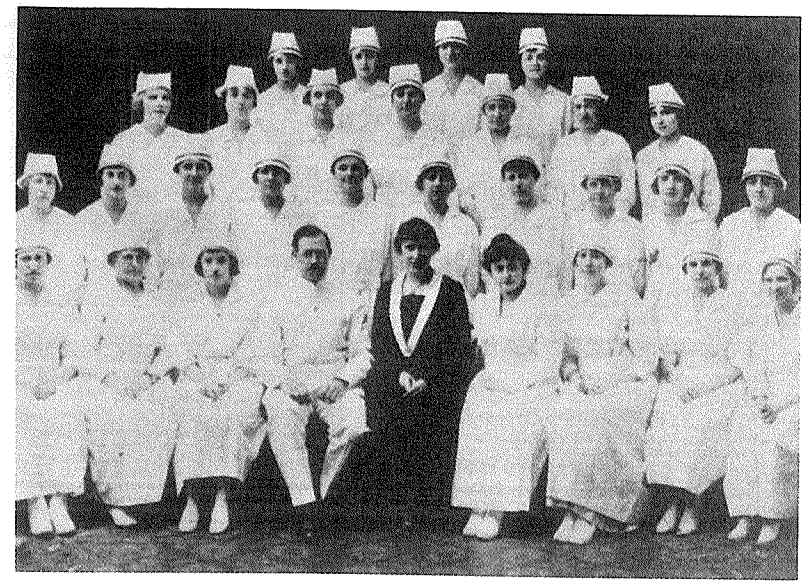
ficiency and exploitation." After these three states licensed dental hygienists, the American Dental Association formally approved licensure.

As soon as dental hygienists were legalized in these states, schools were established. The first, the Harvard-Tufts Course for Dental Hygienists, was organized by Dr. Eugene Smith, Dean of the Harvard Dental School. It graduated one class of dental hygienists and then closed. The other three, still in existence, are Forsyth Dental Infirmary for Children, Boston, directed by Harold DeWitt Cross; Rochester Dental Dispensary, Rochester, directed by Harvey Burkhart; and Hunter College, which became a part of the Vanderbilt Clinic of Columbia University, New York City, directed by Louise C. Ball. Hunter College required "evidence of one year in high school" for admission and was the first university course for dental hygienists. Through

the efforts of Drs. Ball and Rhein, a $2,500 grant from the Rockefeller Foundation was secured to found this institution.

The American Dental Association approved a model bill for dental hygiene practice in 1922. In 1928 President Roscoe H. Volland suggested a meeting of "a group of people" to work toward a uniform course for dental hygienists. Although the board approved the idea, twenty years passed before action was taken. The slow growth of the profession, a national depression, and a world war kept this project from becoming a priority item. By the mid 1940s dental hygienists were working with dentistry to attain this goal. As a result of this joint effort of the American Dental Hygienists' Association and the American Dental Association's Council on Dental Education, "Requirements for the Accreditation of a School of Dental Hygienists" was approved by the American Dental Association in 1947.

All states had licensed the dental hygienist by 1951. Surveys made at that time showed that two-thirds of all practicing



Second graduating class in dental hygiene, Columbia University, 1918. Dr. Louise Ball, head of program in center, her associate, Dr. Neis, on her right, and Grace Greine, an instructor, on her left.

Scand J Soc Med 14: 123–126, 1986

The Critics of Modern Medicine and Its Implications for Dentistry

Eino Honkala

From the Department of Preventive Dentistry and Cariology, Institute of Dentistry, University of Kuopio, Finland

In recent decades much criticism has been levelled against modern medicine, but very rarely against modern, technical dentistry. Because thoughtful review is also crucially important for developing dental services, I will try to discuss the possible dental implications derived from the concepts of medical critics. Dubos, Cochrane, Illich and McKeown are well-known critics of modern medicine and are suspicious about its value. Their main concepts, which are discussed in this letter, are effectiveness of treatment, iatrogenesis, the mechanistic model and the role of medicine. Cochrane (3) especially critisizes the low effectiveness of medical care. Illich (10) describes the process of medicalization and criticizes the iatrogenic effect of health care. Dubos (7) and McKeown (12) analyze health and the role of medicine in their historical contexts and they also make many constructive proposals for further development of health and health care. These authors discuss many overlapping topics, of which only the main ones are discussed individually in this letter. Dentistry is part of medicine and dental care is part of medical care. Therefore such criticism also directly concerns dentistry and dental care.

EFFECTIVENESS OF TREATMENT

Cochrane defines effectiveness as optimum use of personnel and materials to "the effect of a particular medical action in altering the natural history of a particular disease for better". If this statement were used in dentistry, effectiveness would be deficient, because most dental treatment usually concentrates on rehabilitation of the dentition. Dental treatment affects neither the caries process nor the history of periodontal disease, because curative treatment merely changes the dental status so that the dentition looks healthy. Fillings and scaling change the appearance of the dentition. Filled and scaled dentitions look healthy, especially to the practicing dentist. He has, however, done nothing about the causes of, or exposures to, these diseases. If the goals were to tip the balance towards dental health, the whole content of dental care would change and concentrate on the behavioural factors underlying dental diseases. Control of the underlying causes of disease is certainly essential (12). McKeown criticized clinical medicine as emphasising the mechanistic approach to disease, which certainly decreases the effectiveness of the clinical treatment, specifically "the absence of any real interest among clinical teachers in the origin of diseases apart from its pathological and clinical manifestations". Since dentistry is mainly concerned with only two diseases, the interest of the profession might be expected to concentrate more intensively on the origin of these diseases. The interest of clinical dentists is, however, almost totally focused on the clinical aspects of the disease. Caries has been diagnosed as the classes of cavities and periodontal diseases as the treatment needs. Clinical dentistry removes the diseases from the patient, separates them from their origin, and operates only on the pathological and clinical manifestations of these diseases. The interest of the clinician is thus turned away from the patient and only towards the disease. Illich describes this as the reason why hospitals were changed into museums of disease. In dental institutes this has also been seen quite often. The interest of teachers has focused on special and rare oral diseases, because the two main dental diseases seem to lack unusual characteristics.

When these dental diseases are separated from the patient himself, they also become detached from their environment, their rational context. Dubos's whole concept is based on the adaptation of human beings to environmental change. When curative dental treatment is based only on the manifestations of dental diseases, the dentist easily forgets the reason for the high prevalence of these

about the basis of human health. It is assumed that the body can be regarded as a machine whose protection from disease and its effects depends primarily on internal intervention. The approach has led to indifference to the external influences and personal behaviour which are the predominant determinants of health" (12). This mechanistic concept of disease has led physicians and laymen to think of disease as a disorder of the body machinery and the physician as its repairer. This model is reflected in the answer of the smoking boy: "When I reach the age to develop lung cancer, they will have discovered a drug to cure it" (6). Illich describes the consequences of this concept for the role of the physician and as a medicalization of peoples' whole lives. This concept also makes patients into passive victims, because morality is as implicit in sickness as it is in crime or in sin.

The mechanistic model is also adopted by dentists. This can be observed especially in the main content of dental treatment in restorative dentistry. Dentists have introduced this model to their patients. Regular dental check-ups are obviously consequences of this model. Whatever happens, the dentist repairs the dentition of the patient. The patient should know that, even though he has no complaint, he cannot get along without dental treatment, everybody needs regular dental treatment. The dentist knows best what is good for the patients, and check-ups usually prove how right the dentist has been and how poorly the patient can evaluate the status of his own dentition. The check-ups again puts the dentist in the position of judge, blaming the victim. The patient has never stopped eating sugar and never improved his oral hygiene enough, so the dentist can keep himself on a higher level than the patient. If the dentist were on the same level as the patient, he should also blame himself for unsuccessful prevention. Because of this mechanistic model, dentists also probably think that the patient wants to be treated. Dentists often suppose that only the treatment proves their quality, their superiority as dentists. This attitude is reflected, for example, in the fact that they give more treatment to the patient who has changed dentists (5). Dubos also mentioned that doctors often are dissatisfied with the treatment given by other doctors. In dentistry this attitude also leads to overdiagnosing and overtreatment. The risk of overtreatment most often concerns caries treatment but can also occur in periodontal treatment.

ROLE OF MEDICINE

All the above-mentioned authors really think that medicine does not play a very important role in the epidemiology of disease. Illich is the most sceptical and accuses the industrialization of medicine. He does not see any difference in the medicalization of life between the capitalist and socialist countries. It might be true that the commercial role of medicine labels disease as a product and the physician as a businessman. This role might also be emphasized in socialist countries. Although these countries have had little time to develop their own health discipline, community involvement and actions on the social environmental and behavioural levels certainly are, however, more common in their health systems. Illich seems to wish to turn back history, but of course this is never possible. Dubos and McKeown analyze the history of medicine more carefully. McKeown says that "if the term medicine is taken to include the whole enterprise—nutritional, hygienic and behavioural as well as therapeutic—then there is little doubt that the balance (from the value of medicine) is strongly in medicine's favour. If it is restricted to clinical services, the answer varies from place to place and from physician to physician." Illich sees health as an individual task, but Dubos, McKeown and Cochrane emphasize the environmental influences. Because a change in the environment has occurred and people have changed their ways of life so that the emphasis is on controlling disease rather than on living more wisely, very little happens on the social level for prevention or modification of community behaviour. If the doctors' responsibility were extended to the community (3) and their ethics were to include statistical morality (6), we would discover a better role for medicine.

On this basis, the role of dentistry can equally well be questioned. If the responsibility of dentists were extended to community level, this would be a major task for the whole profession but would also improve effectiveness. According to Cochrane's slogan "all effective treatment must be free", all preventive work should be organized by the community. With community responsibility and community involvement, health implications would have a primary place in agricultural, economic and other policies (12). Dental diseases are preventable. McKeown used Koch's postulates of infections for the relationship between smoking and cancer. These postulates are fulfilled in the relationship

ACCEPTED DENTAL REMEDIES

CONTAINING

A LIST OF OFFICIAL DRUGS SELECTED TO PROMOTE A RATIONAL DENTAL MATERIA MEDICA AND DESCRIPTIONS OF ACCEPTABLE NONOFFICIAL ARTICLES

1934

COUNCIL ON DENTAL THERAPEUTICS

AMERICAN DENTAL ASSOCIATION
212 East Superior Street
Chicago, Illinois

MEMBERS OF THE COUNCIL

J. Howard Brown, Ph.D., Sc.D. - - - - Baltimore, Md.
Associate Professor of Bacteriology, Johns Hopkins University

Paul J. Hanzlik, M. D. - - - - - San Francisco, Calif.
Vice-Chairman of the Council, Professor of Pharmacology,
Stanford University School of Medicine

Thomas J. Hill, D.D.S. - - - - - - - - Cleveland, Ohio
Professor of Clinical Oral Pathology and Therapeutics,
Western Reserve University School of Dentistry

Percy R. Howe, D.D.S., Sc.D. - - - - - Boston, Mass.
Director, Forsyth Dental Infirmary for Children

Charles N. Johnson, D.D.S., LL.D. - - - - Chicago, Ill.
Editor, Journal of the American Dental Association, Ex-officio

Milan A. Logan, Ph.D. - - - - - - - - Boston, Mass.
Instructor in Biologic Chemistry, Harvard Medical School

Arno B. Luckhardt, M.D., Ph.D., LL.D., Sc.D. - Chicago, Ill.
Professor of Physiology, University of Chicago

John A. Marshall, D.D.S., Ph.D. - San Francisco, Calif.
Professor of Dental Pathology and Biochemistry,
University of California, College of Dentistry

Victor C. Myers, Ph.D., Sc.D. - - - - Cleveland, Ohio
Professor of Biochemistry, Western Reserve University,
Schools of Medicine and Dentistry

Harry B. Pinney, D.D.S. - - - - - - - - Chicago, Ill.
Secretary, American Dental Association, Ex-officio

U. Garfield Rickert, A.M., D.D.S. - - Ann Arbor, Mich.
Professor of Materia Medica and Therapeutics and Hygiene,
University of Michigan School of Dentistry

Harold S. Smith, D.D.S. - - - - - - - - Chicago, Ill.
Chairman of the Council

Samuel M. Gordon, Ph.D. - - - - - - - - Chicago, Ill.
Secretary of the Council, Chief, A. D. A. Bureau of Chemistry

OFFICIAL RULES OF THE COUNCIL ON DENTAL THERAPEUTICS

Introduction

Object of Rules.—The following rules have been adopted by the Council primarily with the object of protecting the dental profession and the public against fraud or imposition, undesirable secrecy and objectionable advertising in connection with the marketing of proprietary dental articles.

Contents of A. D. R.—The list Accepted Dental Remedies contains a description of proprietary articles which have been accepted as conforming to the rules of the Council; of such simple non-proprietary and non-official substances as seem to be of sufficient importance to warrant their inclusion; and of simple pharmaceutical preparations, the inclusion of which is believed to give useful information to dentists.

It is anticipated that later on the Council will be in a position to consider ceramic and metallurgic articles and physical therapy apparatus. Suitable announcement will be made when these items are taken up for consideration.

Attitude on Mixtures.—For admission to A. D. R. proprietary pharmaceutical mixtures must comply with the rules, and, to determine such compliance, they will be investigated by the Council. The Council, however, endorses the principle that dental preparations, excepting dentifrices, should be prescribed and used on the basis of therapeutic effects of the individual ingredients. For this reason, it includes in this list only those mixtures that present some real advantage.

Dentifrices (with special reference to those advertised to the public) may be accepted for inclusion in the list of Accepted Dental Remedies provided: claims are strictly limited to their efficacy as an aid in the hygiene of the oral cavity and particularly to their mechanical cleansing properties; no therapeutic, chemical or bacteriologic claims are made or inferred in their exploitation; therapeutically suggestive names are not used as a brand name; the brand name is not indicative of a component which does not posses proven therapeutic properties or other inferred properties implied in the name, and there is no conflict with the rules of the Council. The provisions in reference to proprietary names will not be retroactive.

Rules Governing the Admission of Proprietary Articles to the List "Accepted Dental Remedies"

The term "proprietary article" in this place shall mean any chemical, drug or similar preparation used in the treatment of diseases or for oral hygiene purposes if such article is protected against free competition, as to name, product, composition or process of manufacture, by secrecy, patent, copyright, or by any other means.

Rule 1.—Composition.—No article will be accepted for inclusion in the list, Accepted Dental Remedies or retained therein, unless its composition is published. For simple substances, the scientific name and the chemical formula, rational or structural, if known, should be supplied. For mixtures, the amount of each active medicinal ingredient in a given quantity of the article must be stated. The general composition of the vehicle, its alcoholic percentage and the identity of the preservatives must be furnished.

Rule 2.—IDENTIFICATION.—No article will be accepted or retained unless suitable tests for determining its composition are furnished to the Council. In the case of chemical compounds, these shall consist of tests for identity and purity. In the case of mixtures, description of methods for determining the amount and active strength of the potent or otherwise important ingredients shall be furnished if practicable.

Rule 3.—DIRECT ADVERTISING.—No article that is advertised to the public will be accepted or retained, but this rule shall not apply to (a) disinfectants, germicides and antiseptics, provided the advertising is limited to conservative recommendations for their use for oral hygiene purposes; and provided they are not advertised as curative agents, either directly or inferentially (see comments to Rule 3); (b) dentifrices (tooth-pastes and powders) which act as mechanical agents in the cleansing of the teeth; provided of course that no such agent is known to contain harmful materials and none of the lay advertising is contrary to the Council's attitude on dentifrices; (c) other prophylactic agents about which the public should be informed which would not lead to harmful self-medication provided (1) they are not advertised as curative agents and provided (2) that advertising does not go beyond that passed by the Council for dentists (Rule 6); and (d) medicinal foods, except when advertised as curative agents.

Rule 4.—INDIRECT ADVERTISING.—No article will be accepted or retained if the label, package or circular accompanying the package contains the names of diseases or conditions in the treatment of which the article is said to be indicated. The therapeutic indications and properties may be stated, provided such statements do not suggest self-medication. Dosage may be indicated. (This rule shall not apply to remedies with which self-medication is altogether improbable).

Rule 5.—FALSE CLAIMS AS TO ORIGIN.—No article will be accepted or retained concerning which the manufacturer or his agents make false or misleading statements as to source, raw material from which made, or method of preparation.

Rule 6.—UNWARRANTED THERAPEUTIC CLAIMS.—No article will be accepted or retained concerning which the manufacturer or his agents make unwarranted, exaggerated or misleading statements as to the therapeutic value.

Rule 7.—POISONOUS SUBSTANCES.—The principal label on an article containing "poisonous" or "potent" substances must state plainly the amount of each of such ingredients in a given quantity of the product.

Rule 8.—OBJECTIONABLE NAMES.—Proprietary names for medicinal or dental articles coming within the scope of this Council will be recognized only when the Council shall deem the use of such exclusive names to be in the interest of public welfare. Names which are misleading or which suggest diseases, pathologic conditions or therapeutic indications will not be recognized. In the case of pharmaceutical preparations or [illegible] must be so framed as to indicate clearly

the most potent ingredients. In the case of dentifrices the Council's attitude on mixture will guide the Council in the interpretation of this rule.

Rule 9.—PRODUCTS WITH PROTECTED NAMES.—If the article is patented—either process or product, or both—the number of such patent or patents must be furnished to the Council. Furthermore, if the name of an article is registered, or the label copyrighted, the registration (trademark) number and a copy of the protected label should be furnished the Council. In case of registration in foreign countries, the name under which the article is registered should be supplied.

In the case of dentifrices the provisions of the Council's attitude on mixtures will guide the Council in the retention of a dentifrice marketed under a protected name.

For dentifrices put on the market after the formation of the Council, one of the conditions of acceptance is that the product be named "So-and-So's Tooth Paste" or "So-and-So's Tooth Powder or Dentifrice." This is intended to minimize the many misleading and tricky trade names for this class of products. Under no conditions can the Council accept a dentifrice which bears the prefix "Doctor" or the suffix "D.D.S." or dentist, as part of the principal designation.

Rule 10.—UNSCIENTIFIC AND USELESS ARTICLES.—No article will be accepted or retained which, because of its unscientific composition, is useless or inimical to the best interests of the public or of the dental profession.

EXPLANATORY COMMENTS ON THE RULES

PURPOSE AND METHODS OF THE COUNCIL.—The Council on Dental Therapeutics was established in 1930 by the American Dental Association, primarily for the purpose of gathering and disseminating such information as will protect the dental profession in the prescribing and use of proprietary medicinal and dental articles; and for the purpose of rationalizing dental therapeutics. In pursuance of these objects, the Council examines the articles on the market as to their compliance with definite rules designed to prevent fraud or imposition, undesirable secrecy and the abuses which arise from advertising directly or indirectly to the laity, and to advise the profession regarding the use of irrational drug preparations. Such articles as appear to conform to the rules are accepted. Their essential features are described in the list of the Council: ACCEPTED DENTAL REMEDIES, if they come within the scope of this list. This list will be published in *THE JOURNAL* of the American Dental Association and subsequently printed in the book.

Submitted Evidence.—These descriptions are based in part on investigations made by, or under, the direction of the Council, but in part also on evidence or information supplied by the manufacturer or his agents. Such interested statements are examined critically, and are admitted only if they appear to be in conformity with the evidence. It is, however, manifestly

impossible for the Council to investigate the composition of every complex pharmaceutical mixture, or to check thoroughly every therapeutic claim; it can give only an unbiased judgment on the available evidence. Criticisms and corrections of the descriptions which may aid in the revision of the matter will be appreciated,

Previous Noncompliance and Fraud.—The Council judges an article entirely by the facts in evidence at the time of its admission. Previous noncompliance with the rules (short of intentional fraud) will not prevent the favorable consideration of an article which is in accord with current rules.

Reconsideration.—Infringements of the rules after acceptance of an article for Accepted Dental Remedies, or the discovery that the Council's information was incorrect, will cause the acceptance to be reconsidered. An article is accepted for Accepted Dental Remedies and will continue to be included in the list with the understanding that serious violations of the rules after acceptance, will be followed by the omission of the article, and publication of the reasons for such omission.

Acceptance Not an Indorsement.—The Council desires dentists to understand that the admission of an article does not imply a recommendation. Acceptance simply means that no conflict with the rules has been found by the Council at the time the product was considered.

Duration of Acceptance.—Unless otherwise determined at the time of acceptance, articles admitted to Accepted Dental Remedies will be retained for a period of three years, provided during that period they comply with the rules and regulations which were in force at the time of their acceptance. New evidence which indicates that compliance with the rules no longer exists; for instance, with regard to unwarranted therapeutic claims, will be considered the basis for reconsidering the acceptance before the end of a period of three years. At the end of this period, all articles will be carefully reexamined for compliance with existing rules. Particular weight will be given to the question as to whether recent evidence has substantiated claims as to the therapeutic value of any preparation. This evidence may consist partly of recent statements in the literature and partly of the general esteem in which the preparation is held by clinical consultants chosen by the Council. The reacceptance of articles after such reexamination shall be for three years unless a shorter period is specified.

Duration of Acceptance for Dentifrices.—The period of listing for dentifrices will be one year. At the end of that period the evidence for reacceptance will be examined by the Council. If no conflicts with the rules or provisions of the Council appear, the product will be retained for a further period of one year. In order that the Council may be informed of the advertising regarding a dentifrice, during the period of listing in A.D.R., manufacturers or their agents will be requested to submit copies of all advertising in professional journals and magazines or newspapers published primarily for the laity.

Any amendments to the rules, by specific requirements or by interpretation, which may be made after the acceptance of an article, shall not apply to such article until the period of acceptance has elapsed. At the end of this period the article, if it is not eligible under the amended rules, will be omitted.

The Scope of Accepted Dental Remedies.—To aid dentists and manufacturers in deciding which articles come within the scope of this list, or, in other words to enable dentists to recognize whether an article which is not described in Accepted Dental Remedies has not been included because it has been held not to come within the scope of A. D. R. or because it has been rejected, the Council furnishes the following more detailed definitions:

Official or Accepted Articles.—Articles official in the U. S. Pharmacopoeia (U.S.P.) or National Formulary (N.F.) or accepted for inclusion in new and Nonofficial Remedies (N.N.R.) of the Council on Pharmacy and Chemistry of the American Medical Association, are within the scope of the Council, if such simple or compound preparations are useful in the practice of dentistry.

U.S.P. and N.F. and N.N.R. Articles.—These as a rule do not require detailed consideration by the Council, since standards for them are provided in these books, and enforced under the provisions of the federal Food and Drugs act, and by the provisions for inclusion in New and Nonofficial Remedies, except that they may be mentioned for information. If a U.S.P. or N.F. or N.N.R. product is offered for sale under a name which does not make its official or nonofficial status evident, or if the proprietors or their agents advance claims that the product possesses therapeutic properties other than those commonly accredited to it, it becomes subject to consideration by the Council.

Simple preparations or mixtures of official articles may be considered to have the status of official articles if they are marketed under descriptive, nonproprietary names and if unestablished claims are not made for them. At the request of the distributors of such products the Council will determine whether they meet these provisions.

Modifications of U.S.P., N.F., and N.N.R. Products.—A Pharmacopoeial, National Formulary, or New and Nonofficial Remedies product which is marketed under the official or nonofficial title or synonym, but with well-founded claims that its purity, permanence, palatability or other physical properties excel the official or nonofficial standard, may, if no extraordinary therapeutic properties are asserted, be considered as an official or unofficial accepted article and held not to be within the scope of Accepted Dental Remedies. However those official or New and Nonofficial Remedies products which possess advantage in dental therapeutics may be included as coming within the scope of the list.

When such products are marketed under the claim that they possess therapeutic properties other than those commonly accredited to the U.S.P., N.F., or N.N.R. products of which they

are modifications, they become subject to the consideration of the Council.

The burden of proof in establishing claims for therapeutic properties of products considered by the Council shall lie with the proprietor or, in the case of a foreign made product, with the agent who markets the product in the United States.

Substances Described in Accepted Dental Remedies.—The list will contain descriptions of: simple proprietary substances and their preparations; proprietary mixtures if they have originality or other important qualities which, in the judgment of the Council, entitle them to such place; important, nonproprietary nonofficial articles; simple pharmaceutical preparations, official drugs and dentifrices, the inclusion of which is believed to give useful information to the dentist.

Proprietary Mixtures.—A mixture will be considered as a proprietary. It therefore requires consideration by the Council for admission to the list if it contains any proprietary article; if it is marketed under a name which is in any way protected; or if its manufacturer claims for it any unusual therapeutic qualities.

Articles Not Considered.—Ceramic and metallurgic articles and physical therapy apparatus, at the present time, shall not be considered for acceptance by the Council. Mechanical appliances, at the present time, shall not be considered by the Council.

Suffix A.D.R.—When proprietary articles included in Accepted Dental Remedies are prescribed by or sold directly to the profession, the Council recommends that they be indicated by the abbreviation "A.D.R.," thus insuring to the prescriber or user the quality of these articles laid down in the list.

Rule 1.—Composition.—*Secrecy Objectionable.*—It is not only the right but also the duty of the dentist to know the essential composition of what he prescribes or uses. The Council cannot compromise on this proposition.

Statement of Composition.—In the case of a definite chemical substance, a descriptive name, satisfactory to the Council, must appear on the label and in the advertising. For mixtures, the label and advertising must contain a statement of the amount of each potent or important ingredient in a given quantity of the mixture.

Vehicles and Preservatives.—In the case of mixtures, not only the potent or important ingredient, but also the general character of the vehicle, the presence of alcohol, and the identity of preservatives, or of any other substance, whether added or present as an impurity, must be stated if these can under any circumstances affect the therapeutic action of the article. This as a rule does not mean the publication of trade secrets, such as flavors or the details of the working formula.

Trade Secrets.—Furthermore, trade secrets will not be required since it accepts information only with the distinct understanding that this may be freely published, at its discretion.

Inspection of Factories.—The Council does not accept invitations to inspect factories; its concern is with the finished products.

On the other hand, the Council requires that the information be complete and accurate as to medicinal ingredients.

Nonofficial Constituents.—Nonofficial constituents of proprietary mixtures must be presented by the manufacturer in the regular way and must be acted on by the Council before the preparations containing them can be accepted.

Fraud.—When it appears that a manufacturer has made a deliberately false statement concerning a product, he is asked to furnish an explanation. If this is not satisfactory, the product will not be accepted, even if the false statement is subsequently corrected or omitted.

Testimonials.—The foregoing paragraph applies not only to statements made to the Council, but also to statements furnished to dentists and to physicians by the manufacturers or his agents, even when these statements are in the guise of testimonials.

Correspondence.—All correspondence with the Council shall be in writing and must be presented to the Council through the Secretary.

Rule 2.—Identification.—In order to avoid errors in the case of chemical compounds, and to guard against adulterations, lack of potency or strength and the mistaking of one chemical for another, it is necessary to have at hand suitable tests.

Tests, etc.—If these facts have appeared in the literature, or in standard text-books, reference to them will be sufficient. In the case of new chemicals, especially synthetics, the manufacturer or his representatives will be required to supply such tests for publication as will assure an intelligent opinion of these products.

Physiologic Standardization.—In cases in which chemical methods of identification are unknown or unreliable, physiologic standardization should be employed. The Council considers the phrase "physiologically standardized" or "assayed" as misleading unless the standard and method are published in sufficient detail to permit of their control by independent investigators.

It is evident that when no standard is published, it is impossible to know whether the quality is high or low, and the conscientious manufacturer who sets for himself a high standard is placed on a level with the dishonest or careless one who adopts a low standard. Again, if the process of standardization is not published, it is impossible to learn, without actual trial, the relative value of one preparation as compared with that of another manufacturer, or to confirm or disprove the statements of the manufacturer as to the quality of his product.

Standardization of Disinfectants and Germicides.—No disinfectant or germicide of the phenol type will be accepted for Accepted Dental Remedies unless the phenol coefficient together with the test organism and the technical method employed for the determination is stated on the label of the preparation.

Rule 3.—Direct Advertising.—*Lay Advertising.*—The impossibility of controlling the irresponsible claims which are usually made in advertisements to the public, the well-known dangers of suggesting by descriptions of symptoms to the minds of the people that they are suffering from the diseases described, the dangers of the unconscious and innocent formation of a drug habit, and the evils of harmful self-medication, including the dangers of the spread of many infectious and contagious diseases when hidden from the dentist and the physician and similar well-known considerations, are the reasons for discouraging, in the interest, and for the safety, of the public, this reprehensible form of exploitation. Advertising in dental journals, etc., distributed solely to dentists does not come within the scope of this rule.

Exceptions.—In the case of subjects on which the public should be instructed, as the use of certain disinfectants, germicides, antiseptics, certain dentifrices and certain laxatives, advertisements to the public, if not in objectionable forms, are considered admissible. In no case shall such advertisements include recommendations for use as curative agents, nor shall the names of any diseases or conditions appear on or in the trade package or in advertisements thereof. If the preparation is sufficiently toxic to require caution in its use to prevent poisoning, this fact shall be stated on the label. On account of the deplorable results which would follow any abuse of this privilege, the conscientious cooperation of manufacturers and their agents in adhering strictly to the limitations laid down is asked. For the same reason the acceptance of an article which is so advertised as to infringe on these limitations in any essential way (as by naming diseases or by making false and exaggerated claims) shall be summarily rescinded. The reasons for such action may be published without notice to manufacturer or his agent. A disinfectant, germicide or antiseptic, whether alone or in a mouth wash, will be accepted for description in Accepted Dental Remedies. An article of this class which has already been accepted will continue to be included in Accepted Dental Remedies only on the explicit understanding by the manufacturer and agent that such infringements of the rule will be followed by deletion of the article and by publication of the facts as described.

Matter Distributed Solely to Dentists and Physicians.—The Council deals primarily in the interest of the public and of the dental profession, with articles proposed for admission to Accepted Dental Remedies. In determining the status of any article, the Council must take into consideration any statements made regarding it or any method of advertising employed by the manufacturer or his authorized agents or representatives, whether in this country or abroad.

Advertisements in Foreign Countries.—The Council will not regard as within its scope, however, questions concerning the marketing of articles (except the matter of direct advertising to the laity and unwarranted claims or misrepresentations) outside the United States.

Rule 4.—Indirect Advertising.—*Naming Diseases on Label.*—It should be remembered that the sole intent of this rule is to protect the dentist, so that in prescribing or using a proprietary medicine he shall not unconsciously advertise proprietary preparations. The rule imposes no restriction on the legitimate methods of bringing a remedy to the attention of the profession such as advertising in dental and medical journals, circulars and other printed matter distributed solely to dentists and physicians. The rule applies only to the package as it may reach the patient. The naming of diseases on the label or package is not necessary, as is shown by the very large number of proprietary products which have been successfully introduced without resorting to this expedient. This method of popularizing a proprietary remedy with the laity is most objectionable, and should not be tolerated in any form.

Therapeutic Indications.—In general, therapeutic indications should be omitted from the label and package. The Council will not insist on this point, however, when such indications are so given as not to promote self-medication, particularly in dental diseases which require expert diagnosis and supervision.

Permanently Affixed Names.—It will be considered an infringement of the rule if an article is marketed in bottles which have the name of the article blown into the glass, or if otherwise the name or initials or other distinctive mark of the article is permanently stamped on the container, on the article itself, or on the stoppers or seals. Articles which are marketed in any of these ways are not accepted for Accepted Dental Remedies. Readily removable labels are not objectionable, nor is the permanent affixing of the firm's initials or name to the trade package if such initials or name is not suggestive of the article.

Use of Articles for Advertising.—The Council does not countenance the use of an accepted article for advertising other articles which have not been accepted by the Council. This applies to circular matter dealing with such accepted articles whether included with the trade packages or otherwise, but does not apply to pricelists, catalogues, and other general advertising. Nor will the Council accept an article or continue the acceptance of an article, if the same article or an essentially similar one is marketed by the same firm under another name which has not been recognized. When in the opinion of the Council, a firm secures the acceptance of one or more articles and employs the acceptance in a way that promotes the exploitation of articles that are opposed to the principles of the rules of the Council, the preparations of the firm will be dismissed summarily and no preparations of that firm will be accepted by the Council.

Rule 5.—False Claims as to Origin.—No false or misleading statement in regard to an article can be permitted concern-

ing the source of material from which is is made, or the persons by whom it is made.

Rule 6.—UNWARRANTED THERAPEUTIC CLAIMS.—This rule insists that the claims of manufacturers or agents concerning the therapeutic properties of their products must be compatible with demonstrable facts.

Permissible Optimism.—Manufacturers will be held responsible for all statements made or quoted in their advertising "literature" regarding their products. Recognizing the existence of honest differences of opinion on many therapeutic questions, the Council desires to be liberal in the application of this rule. It is natural that a manufacturer should be partial toward his own product, and a moderate degree of emphasis in advertising may not be objectionable. The Council, however, will not admit claims which are neither in harmony with already accepted facts nor supported by acceptable evidence. In doubtful cases the Council will consider these questions with the advice and cooperation of clinical consultants to be chosen by the Council.

Exaggerated Claims.—Therapeutic claims that do not exceed the statements in current Accepted Dental Remedies as a rule will not be challenged. But if the Council finds reason to doubt the validity of any description in Accepted Dental Remedies, it may require the manufacturer to submit further evidence if he desires to continue such claims. Since the claims of the manufacturers are judged largely by their advertising, noncompliance of the manufacturers with the Council's request for copies of the current advertising may be sufficient ground for the rejection of an article, unless in individual cases the Council deems such submission unnecessary.

Clinical Evidence.—To be acceptable, the clinical evidence must offer objective data with such citation of sources as will enable the Council to confirm the facts and establish the scientific value of the conclusions drawn. The amount and character of the evidence which is required depends on the inherent probability of the claims. No evidence is needed for a self evident claim; very strong evidence is needed when the claim is contrary to the accepted data of science. The acceptability of evidence is determined mainly by its quality. The mere multiplication of inaccurate observations does not render them accurate. The evidence must be furnished in sufficient detail to permit judgment as to the care with which it was gathered and the legitimacy of the deductions. Comparative trials facilitate and are often necessary for such judgment. Observations that are not described with sufficient detail to permit verification are subject to suspicion. The credibility of the data and the justification of the deductions is influenced by the reputation and experience of the investigators, as to disinterestedness, technical ability, and critical sense. Anonymous communications and observations gathered without adequate facilities are usually worthless as evidence.

Rule 7.—POISONOUS SUBSTANCES.—To enable the pharmacist or dispenser to safeguard the interests of the patient and the dentist, all articles containing such potent agents as the poisonous alkaloids, other organic substances and the salts of some of the metals should have stated on the label the exact amount of these ingredients which is contained in the average adult dose.

Rule 8.—OBJECTIONABLE NAMES.—Many of the abuses connected with proprietary medicine arise from "coined" proprietary trade names. Such names will not be recognized by the Council unless in particular instances the Council shall deem their use to be in the interest of public welfare. In every such exception the burden of proof, both for establishing and for continuing the exception, lies with those who market the product.

Proprietary ("Trade") Names; When Permitted.—In consideration of the benefits which may come from the discovery of a therapeutic agent, the Council concedes to the person or firm which, by right of discovery, controls such a product, the right to name it. The Council will offer no opposition to an arbitrary name for such a new product, provided it is not misleading, therapeutically suggestive, or otherwise subversive of scientific pharmacy, chemistry and therapeutics. If the discovery that a previously known substance has therapeutic value is deemed of sufficient importance, the Council may recognize a name for such a substance if the name is applied by the person who makes the discovery; or, with the consent of the discoverer or in the absence of any protest on his part, the Council may recognize a name applied by the firm which first makes such a product available to dentists. Under these conditions the Council may also recognize proprietary names when new uses or actions of exceptional novelty and importance are discovered for substances, previously used in medicine or dentistry, but which had become practically obsolete. In the interest of rational drug therapy, the Council recommends that trade names be coined so as to indicate the potent element or important constituent.

Scientific Names.—When the proprietary or trade name for an article is considered insufficiently descriptive of its chemical composition or pharmaceutical character, the Council may require as a condition for the acceptance of such articles that a descriptive scientific name satisfactory to the Council appear on the labels, circulars and advertisements for such an article. For all definite chemical substances it is required that the scientific name be given prominence on the labels, in circulars and advertisements.

Proprietary Names for Unoriginal Articles.—Proprietary names will not be recognized for articles which are included in the U. S. Pharmacopoeia, National Formulary, or another proprietary name for a product accepted for inclusion in the current issue of New and Nonofficial Remedies, or for unessential modifications of such articles. Neither will proprietary names be recognized for substances or mixtures which are described in dental, medical or pharmaceutical publications except in connection with fundamentally important discoveries relating to articles whose use had become practically obsolete.

In the marketing of unoriginal articles, the legitimate interests of the producer are fully served by identifying such products by appending the name or initials of the manufacturer or agent, or by the use of a general brand mark. No objection will be made by the Council to the use of such brand marks, provided that in no case shall such mark be used as a designation for an individual article.

For any product which, by reason of the absence or lapse of patent rights or for other reasons, is open to manufacturer by more than one firm, the Council reserves the right to select a common name and to provide standards of identity, purity and strength, and then will accept such article only if it is marketed under the title adopted as the A. D. R. name or the name under which such article was introduced (to which may be appended the firm's identifying mark).

Pharmaceutical Preparations and Mixtures.—These, with rare exceptions, are not original in composition and they should not be endowed with uninforming names. It is important that they be so named as to remind the prescriber and user constantly of their potent or important ingredients. When in the rare exception a pharmaceutical preparation or mixture is accepted with a coined name on the ground of originality because it presents a distinct improvement over available preparations, only the first preparation of this kind which is placed on the market shall be recognized under a coined name (which, however, must clearly indicate the potent or important constituent of the preparation). The Council may also recognize coined names for pharmaceutical preparations or mixtures (including dentifrices) that were in actual use before the establishment of the Council and that have been used continuously since that time. Names for mixtures that were named under the reasonably justified bona fide belief that they were chemical compounds, provided that such coined names indicate the potent ingredients or ingredients of the preparation, are not misleading, and do not suggest diseases, pathological conditions, or therapeutic indications may also be recognized.

Therapeutically Suggestive Names.—Names which carry the suggestion of a therapeutic indication, pathologic condition, disease, or organism causing a disease shall be considered therapeutically suggestive. Articles bearing such names will not be accepted for inclusion in Accepted Dental Remedies, because they are likely to lead dentists into prescribing names instead of remedies, and because they tend to encourage unwarranted self-medication by the laity. Even if the name is at first apparently meaningless to the public, its meaning will soon be understood because patients soon learn the technical names applied to their diseases and symptoms.

Rule 9.—Patents, Trademarks, Copyrights, etc.—This information is important as a means of determining the legal status of medicinal articles and as an aid to their ready recognition in current publications.

Rule 10.—Unscientific and Useless Articles.—The use of articles which are unessential modifications of official or established non-proprietary articles is unscientific and serves no useful purpose. The Council will not accept products which are scientifically unsound and which, therefore, must be considered useless or inimical to the best interest of the dental profession and the public. This class includes compounds or mixtures containing an excessive number of active ingredients; those compounds or mixtures the components of which are of no probable assistance to one another, and those articles which are of no therapeutic value.

Unessential Modifications of Official Substances.—The subterfuge of obtaining proprietary rights over an official or established non-proprietary product, by introducing unessential modifications, also tends to confusion and abuses, and such articles will not be admitted by the Council. Essential and important modifications, however, will receive recognition. (The Council interprets the term "established non-proprietary product" as applying to a preparation of any formula which has been published through any recognized or reasonably accessible channel of publication, prior to its appropriation or modification by a manufacturer.)

in deep cavities, and as an ingredient of many mixtures for sealing pulp canals. A number of recipes for this purpose have been suggested.

When admixed with zinc oxide in approximately equal parts, it is the basis of many so-called surgical packs. (See under zinc oxide.)

SILVER PREPARATIONS

Silver compounds are used in dentistry to secure caustic, astringent, germicidal and antiseptic effects. These results are produced by the free silver ions. When caustic effects are desired, silver nitrate is preferred, because the organic compounds of silver are largely or completely lacking in caustic properties. As an astringent, silver nitrate is the compound of choice; but it must be used in weak solutions. The antiseptic action of silver nitrate is complicated by irritation, astringency and corrosion. These results may be desirable for the destruction of tissues or the stimulation of indolent wounds. When they are not necessary for such purposes, they are distinctly undesirable because they are painful. They may be avoided by the use of colloidal silver preparations, such as mild silver protein and strong silver protein, U.S.P.

Silver nitrate is used in the preparation of ammoniacal silver nitrate and for other therapeutic measures in the treatment of gangrenous dental pulp.

Simple Silver Salts

Silver Citrate.—Argenti citras, $Ag_3C_6H_5O_7$—The normal silver salt of citric acid.

PROPERTIES: Silver citrate forms an odorless, heavy powder, which is moderately sensitive to the light, from which it should be carefully protected. It is almost insoluble in water. Pure silver citrate, when heated to redness, leaves a residue of metallic silver weighing 63.16 per cent of the weight of the original salt.

ACTIONS AND USES: Silver citrate is a nonirritating antiseptic. It is said to be useful in the treatment of wounds and ulcers and other diseases of the mucous membranes.

DOSAGE: It may be applied in substance to wounds. Solutions of from 1:4,000 to 1:10,000 are recommended for injection into the body cavities.

Silver Citrate—Merck: A brand of silver citrate. On heating it yields not less than 62 per cent of metallic silver.

Merck & Co., Rahway, N. J., distributor. No U. S. patent or trademark.

Silver Lactate.—Argenti lactas—$AgC_3H_5O_3+H_2O$. The normal silver salt of lactic acid.

PROPERTIES: Silver lactate occurs in the form of crystalline needles, granular masses or crystalline powder. It dissolves in about 15 parts of water. Pure silver lactate when heated leaves a residue of metallic silver weighing 50.2 per cent. It is usually colored brownish and gives with water a brownish or reddish solution. The salt must be protected from the light.

ACTIONS AND USES: Silver lactate is used as an active antiseptic. The 1:300 to 1:500 solution (aqueous) is said to be equal in disinfecting power to a 1:1,000 solution of mercuric chloride. It is irritating if applied in substance to wounds.

DOSAGE: From 1:100 to 1:2,000 solutions, or in substance.

Silver Lactate—Merck: A brand of silver lactate. On heating, it yields from 50 to 51.5 per cent of metallic silver.

Merck & Company, Inc., Rahway, N. J., manufacturer. No U. S. patent or trademark.

Silver Nitrate, U.S.P.—Argenti nitras (Arg. nit.) $AgNO_3$.

PROPERTIES: Silver nitrate occurs in colorless, tabular, rhombic crystals, becoming gray or grayish black on exposure to light, in the presence of organic matter. It is odorless and has a bitter, caustic and strongly metallic taste. It is very soluble in water (1:0.4) and soluble in alcohol (1:30).

INCOMPATIBILITIES: Silver nitrate is incompatible with soluble chlorides, bromides and iodides, with which it forms the corresponding insoluble salts of silver. It is also incompatible with soluble carbonates and hydroxides, which precipitate the oxide of silver; and with practically all organic drugs and reducing agents.

ACTIONS AND USES: Silver nitrate is an antiseptic and germicide. A solution of 1:1,000 destroys many micro-organisms, and 1:10,000 prevents their growth. Weak solutions are astringent to mucous membranes and strong solutions are caustic when applied to mucous membranes, denuded surfaces and, in some cases, the normal skin. Its internal use continued for some time may be followed by the deposition of silver in the skin, producing the grayish discoloration known as argyria, which cannot be eliminated. Prolonged use should, therefore, be avoided.

Silver nitrate is applied as a mild caustic to wounds, ulcers and exuberant granulations. It is applied as an astringent and antiseptic in catarrhal infections of the mucous membranes. It is used in dentistry principally in the form of Howe's solution, ammoniacal silver nitrate (which see). It has been used for treatment of hypersensitive dentine.

DOSAGE: As a caustic, silver nitrate is used in the form of fused silver nitrate, which should be moistened before use. To avoid blackening the fingers, it should be held with the forceps or in a suitable holder. It may be fused on a probe for application to parts that are difficult of access.

For application to mucous membranes, the following strengths of solution in water are most suitable:

Solutions containing from 2 to 10 per cent of silver nitrate may be applied to the pharynx. A 10 per cent solution is useful to cauterize small ulcerating surfaces on the buccal mucous membranes, such as occur in trench mouth. A 35 per

cent solution is used by some in conjunction with Churchill's iodine solution in the treatment of trench mouth.

Solutions of silver nitrate should be made with distilled water, and the mucous membranes to which they are to be applied should receive a preliminary cleansing to remove mucus, pus, food, etc., which would interfere with the action of silver nitrate.

FUSED SILVER NITRATE, U.S.P.—ARGENTI NITRAS FUSUS (ARG. NIT. FUS.) (Lunar caustic, molded silver nitrate). A white, hard solid, generally in the form of pencils or cones. It contains a small amount of silver chloride which toughens the mass.

Silver Nitrate Applicators: (Silver nitrate, 75 per cent). Wooden sticks, 2 inches (5 cm.) and 6 inches (15 cm.) long, tipped with a mixture of silver nitrate, 75 per cent, and potassium nitrate, 25 per cent; each stick to be used only once.

Prepared by Arzol Chemical Company, Nyack, N. Y. No U. S. patent or trademark.

Ammoniacal Silver Nitrate.—A solution containing approximately 30 per cent silver as silver diammino nitrate. Solution of silver diammino nitrate—approximately 57 per cent. $Ag(NH_3)_2NO_3$.

ACTIONS AND USES: The silver salts form resistant precipitates with proteins which act to limit their penetration in vital teeth and immediately after pulp extirpation. The end-product of the application of silver nitrate to carious areas is probably a mixture of silver proteinates and reduced silver, owing to the action of light and other reducing agents. In order to hasten the reduction of the silver salt, the use of the complex silver ammonium compounds as the nitrate or the oxide ($Ag(NH_3)_2^+$) was introduced. The solution as prepared above contains approximately 30 per cent of readily reducible silver. It is claimed that it is less toxic than silver nitrate *per se*. Its most important use in dental practice is based on its ready diffusibility into the dentin. The finely divided silver which is laid down by this process in carious dentin retards the progress of dental decay. When judiciously used, it is said to arrest completely the course of caries.

Properly used, ammoniacal silver nitrate is useful in root operations. The action depends not only on its bactericidal properties, but also on the fact that it combines with the toxic products of protein cleavage in such conditions as gangrene of the pulp.

The insolubility of the finely divided silver in the circulatory elements and the high tolerance of the tissues toward it has made it a useful agent in conditions mentioned above. The oligodynamic properties of silver inhibit the growth of bacteria. On account of its staining propensities, its use is generally confined to the posterior teeth.

When a thorough diffusion is desired, as in the treatment of toxic roots, the silver solution, without the use of a reducent, may be sealed in for a number of hours.

It is used for hypersensitiveness of the dentin, but because of its staining effect, its use is limited to posterior teeth.

Ampoules Ammoniacal Silver Nitrate—P. N. Condit: Solution of ammoniacal silver nitrate. Each ampule contains about 2 c.c. of ammoniacal silver nitrate prepared according to the directions of Percy R. Howe (*D. Cosmos,* 59:481, 1917). These ampules are accompanied by ampules containing 2 c.c. of a solution of formaldehyde, approximately 10 per cent.

ACTIONS AND USES: (See preceding article on ammoniacal silver nitrate solution.)

DOSAGE: For use in prophylaxis against dental caries, a drop or two of the solution is applied to the carious area and reduced with eugenol or formaldehyde solution (10%). For use in gangrenous pulp, a drop or two is applied locally and followed by the application of eugenol or formaldehyde solution 10 per cent. A special applicator is furnished by the manufacturer.

It is also used for treating hypersensitive dentine by application, but its use is limited to posterior teeth because of the stain.

Prepared by P. N. Condit, Boston, Mass. No U. S. patent. Trademark No. 167462.

Ammoniacal silver nitrate (Howe) is a clear, colorless solution prepared by the careful addition of strong ammonia water U.S.P. to a saturated solution of silver nitrate U.S.P. until all but the last trace of black precipitate is dissolved. The saturated silver nitrate solution should be prepared at ordinary temperatures (15 to 30 C.). It should contain not less than 28.0 per cent nor more than 32.0 per cent silver (Ag) and not less than 8.9 per cent nor more than 9.8 per cent ammonia (NH_3). The ratio %Ag:%NH_3 should not be less than 3.10 nor greater than 3.60. It should be marketed in all glass containers. The weight of 1 c.c. at 20 C. is between 1.45 and 1.55.

The solution is strongly alkaline to litmus. It yields an immediate black precipitate with 10 per cent formaldehyde solution (distinction from solution of silver and ammonium nitrate). A diluted solution (1:10) responds to the tests for silver and nitrate, U.S.P. X. Five cubic centimeters of a diluted solution (1:10), are treated with 2 c.c. diluted hydrochloric acid, filtered and made alkaline with 5 c.c. sodium hydroxide solution and boiled. The vapors turn red litmus blue (ammonia).

The solution is colorless, exhibiting not even the faintest blue (copper). To 1 c.c. of ammoniacal silver nitrate, add 3 c.c. of diluted hydrochloric acid, and filter. The clear solution when tested in a flame test with a platinum wire yields no more than the usual traces of alkali (sodium or potassium) (distinction from Tollen's reagent).

Accurately pipet 1 c.c. to a weighing bottle and determine the weight of the sample. Transfer the contents to an Erlenmeyer flask with 50 c.c. of distilled water and add 10 c.c. of diluted nitric acid and 5 c.c. of ferric alum solution. Titrate with tenth normal potassium thiocyanate solution. The amount of silver found is not less than 28.0 per cent nor more than 32.0 per cent.

Accurately pipet 1 c.c. to a Kjeldahl distilling flask and dilute with distilled water to a volume of 200 c.c. Add 10 c.c. of sodium sulphide solution (10 gm. $Na_2S.9H_2O$ per hundred centimeters) and 20 centimeters sodium hydroxide solution (40 gm. NaOH per hundred centimeters). Connect the flask to a condenser and distil approximately 100 c.c., collecting the distillate in 50 c.c. of half normal hydrochloric acid. Titrate the excess acid with half normal sodium hydroxide using methyl red as an indicator. The percentage of ammonia (NH_3) obtained divided into the percentage of silver obtained is not less than

3.10 nor greater than 3.60. The amount of ammonia found is not less than 8.9 per cent nor more than 9.8 per cent.

Accurately pipet 1 c.c. to an aspirating apparatus. (Van Slyke & Cullen, J.: Apparatus for Determining Urea Content, J. Biol. Chem., 19:217, 1914. Hawk: Practical Physiological Chemistry, Ed. 7, p. 515.) Add 20 c.c. of distilled water. Aspirate for one hour at a lively rate, collecting the aspirated gases in 25 c.c. of fiftieth normal hydrochloric acid. The air used for aspiration is drawn through a soda lime tube, then through fiftieth normal hydrochloric acid and through water to remove traces of carbon dioxide and ammonia in the air. Titrate the excess acid with fiftieth normal sodium hydroxide solution using methyl red as the indicator. Not more than 5 c.c. of fiftieth normal hydrochloric acid is required for neutralizing the "aspirable" ammonia.

Colloidal Silver Preparations

The action of silver nitrate is dependent on the ionization of the compound to form silver ions. Because of its irritant action, it has been somewhat replaced in medicine by compounds of silver with different proteins.

In these, the silver does not exist to any great extent as free ions. Therefore, it does not precipitate chlorides or proteins, and is noncorrosive, and, relatively or quite, nonastringent and nonirritant. Nevertheless, a considerable degree of antiseptic action is retained. This is not proportional to the total silver content, and varies for the different compounds. It has been suggested that the antiseptic action is due to the liberation of a very low concentration of silver ions, which vary for the different compounds.

The mechanism of these effects is analogous to the relatively slow action of silver nitrate. This takes place in two stages: (1) the immediate irritant and germicidal actions, and (2) the later, milder antiseptic actions produced by the re-solution of the silver-protein compounds that were formed in the first stage. If the second stage alone is desired (i.e., mild antisepsis without irritation), the direct application of the colloid compounds may have advantages over their indirect production from silver nitrate, aside from the avoidance of irritation. The absence of any coagulation membrane facilitates their access to the cells. They form more concentrated solutions than are likely to be formed from the re-solution of the silver precipitates *in situ*. The colloidal aggregates may be smaller and therefore more reactive, and because of the absence of irritation, they are likely to be more frequently applied and would for that reason secure a more nearly continuous action.

Metallic silver and insoluble compounds of silver, such as the oxide, the halogen salts (iodide, chloride, etc.) and silver protein precipitates, may be brought into "colloidal solution," if they are sufficiently finely divided and they became miscible with water, so that they apparently go into solution (although such "colloidal solutions" are strictly permanent "suspensions" of the insoluble substances in a state of ultra-microscopic particles).

The commercial preparations are for the most part produced by dissolving reduced silver or silver oxide, or some protein-silver precipitate, in an excess of denatured protein and drying *in vacuo*. This results in the formation of substances that dissolve very freely although somewhat slowly, in water, yielding

brown "colloidal solutions" which contain so little of free silver ions that they do not readily precipitate chlorides or proteins. They consist probably of indefinite mixtures of metallic silver, silver oxide, and various silver-protein compounds, all in colloidal form. The proportions of these and the properties of the mixture vary according to the conditions under which they are produced. Although there are probably all kinds of gradations, most of the products on the market fall into a small number of fairly definite therapeutic groups: (1) strong silver-protein type; (2) mild silver-protein type; (3) collargol type, and (4) electric type.

Strong Silver-Protein Type: Strong silver-protein compounds contain the lowest percentage of silver (from 7.5 to 8.5 per cent), but have the strongest germicidal action, and are distinctly irritant, because they produce more ionizable silver in solution. They are, therefore, therapeutically intermediate between silver nitrate and mild silver-protein. Protargol and proganol belong to this group.

Protargol is said to be prepared by precipitating a "peptone" (albumose solution with silver nitrate, or with moist silver oxide; dissolving the silver peptonate in an excess of protalbumos, and drying *in vacuo* (Fraenkel).

Mild Silver-Protein Type: Mild silver-protein compounds contain from 19 to 25 per cent of silver, but are relatively nonirritant. The following products listed belong to this group: argyn, silvol and solargentum-Squibb.

Argyn is defined as a colloidal compound of silver oxide and serum albumin.

Solargentum-Squibb is prepared from alkalin-gelatin, used as a solvent for silver oxide. The solution is then concentrated and dried *in vacuo*.

Silvol is a compound of colloidal silver with an alkaline protein.

THERAPEUTIC USES: The colloidal silver compounds are used mainly on mucous membranes, for antisepsis. The strong silver-protein group is most effective in this respect, but is slightly irritant and stimulant. The mild silver-protein group acts also largely as a mucilaginous demulcent and protective; and as a detergent, by dislodging pus.

DOSAGE AND ADMINISTRATION: The concentration for mucous membranes range from 0.1 to 10 per cent for strong silver-protein; and from 5 to 50 per cent for mild silver-protein. They are applied every two to four hours, if possible. Solutions should be recently prepared, and should be protect against light. Ointments and suppositories are used with the same concentrations as the aqueous solutions. Stains on linen are removed by 1:1,000 solution of mercuric chloride.

Strong Silver-Protein, U.S.P.—Argento-proteinum forte (Arg.-prot. fort.) Protargin strong. A colloidal compound of silver oxide and protein containing 7 to 8.5 per cent of silver. The brands described differ somewhat in composition, but are essentially equivalent therapeutically.

PROPERTIES: Strong silver-protein usually occurs as a brown powder, freely but slowly soluble in water (about 1:2) forming colloidal solutions. It is also soluble in glycerine, but insoluble in alcohol and oils. Solutions are dark in color (but less deeply colored than solutions of mild silver-protein). Solutions are best prepared by sprinkling the substance on distilled water and allowing solution to take place spontaneously.

INCOMPATIBILITIES: It is incompatible with acids and concentrated salt solutions.

ACTIONS, USES AND DOSAGE: (See preceding article on silver compounds.)

Protargol: A brand of strong silver-protein U.S.P. Protargol is a compound of albumin and silver.

Manufactured by Winthrop Chemical Co., Inc., New York. U. S. patent expired. U. S. trademark 30,882.

Mild Silver-Protein, U.S.P.—Argento-proteinum mite (Arg.-prot. mit.) (Protargin mild).—A colloidal compound of silver oxide and a protein derivative containing from 19 to 30 per cent of silver. The brands of mild silver-protein differ somewhat in composition, but are essentially equivalent therapeutically. The following brands are included: argyn, silvol and solargentum-Squibb.

PROPERTIES: Mild silver-protein occurs in dark brown or almost black lustrous scales or granules freely soluble in water, forming deeply colored colloidal solutions. It is also soluble in glycerine, but insoluble in alcohol and oils.

INCOMPATIBILITIES: It is incompatible with acids and strong solutions of salt.

ACTIONS AND USES: (See preceding article on silver compounds.)

DOSAGE: Mild silver-protein is usually employed in concentrations of 50 per cent, which are used several times daily. Solutions of mild silver-protein should be prepared fresh and dispensed in amber-colored bottles.

Argyn: A brand of mild silver-protein, U.S.P. Argyn is a colloidal compound of silver oxide and serum albumin.

Manufactured by the Abbott Laboratories, North Chicago, Ill. No U. S. patent. U. S. trademark 137,522.

Argyn Tablets, 6 grains.

Silvol: A brand of mild silver-protein U.S.P. Silvol is a compound of colloidal silver with an alkaline proteid.

Manufactured by Parke-Davis & Co., Detroit, Mich. No U. S. patent or trademark.

Solargentum-Squibb: A brand of mild silver-protein U.S.P. Solargentum-Squibb is a compound of silver and gelatine, containing from 19 to 23 per cent of silver in colloidal form.

Manufactured by E. R. Squibb & Sons, New York City. No U. S. patent or trademark.

Tablets Solargentum-Squibb, 4.6 grains.

Neosilvol.—Colloidal silver iodide compound.—A compound of silver iodide with a soluble gelatine base containing from 18 to 22 per cent of silver iodide in colloidal form.

PROPERTIES: Neosilvol occurs as pale yellow granules. In concentrations up to 50 per cent, neosilvol forms with water an almost colorless, milky or opalescent solution (colloidal suspensions). Neosilvol is insoluble in fixed oils, but slowly soluble in glycerine. Solutions of neosilvol are not precipitated in the cold by strong acids or sodium chloride, and they tend to precipitate on standing.

ACTIONS AND USES: Neosilvol, even in concentrated solutions, causes neither irritation of mucous membranes nor coagulation of albumin. It does not stain the skin.

It is maintained that neosilvol, in laboratory tests for germicidal value, has been found as effective as phenol in its action on bacteria.

Neosilvol is intended for the prophylaxis and treatment of infections of accessible mucous membranes and is said to be indicated in infections of the eye, ear, nose and throat.

DOSAGE: In the treatment of acute inflammations of the mucous membranes, solutions of neosilvol as strong as 50 per cent can be used. For irrigating the sinuses, from 2 to 5 per cent solutions are used.

Solutions of neosilvol are prepared by adding the substance to the required amount of water and agitating the mixture until solution occurs.

Manufactured by Parke, Davis and Co., Detroit, Mich. U. S. patent and trademark applied for.

Capsules Neo-Silvol, 6 grains.

Neosilvol is prepared by heating freshly precipitated silver oxide with gelatine which has been previously dissolved in a dilute alkaline solution, until the silver oxide has been reduced to metallic silver in a colloidal state of subdivision. The solution is treated with iodine, which combines with the silver. The liquid is then evaporated to dryness *in vacuo*. The finished product contains from 1 to 3 per cent of combined iodine in excess of that required for combination with the silver.

SOAP

Soap is the product formed by the action of alkalis on animal or vegetable fats (saponification).

Soap is used principally as a detergent. The detergent action is obtained only by the use of the soluble soap; that is, of salts of the higher fatty acids (oleic, palmitic, and stearic) with sodium or potassium. When solutions of soluble soap are brought in contact with the soluble salts of the alkaline earths, insoluble soaps are precipitated. This is commonly observed when soap is used with hard water and thus represents one of the common incompatibilities of soap and seriously interferes with its detergent action.

ACTION AND USES: Soap is used as detergent either alone or combined in the form of tooth pastes or powders. The detergent action of soaps are at present not clearly understood. It is held that their action is due to hydrolysis of the